NATIONAL HEALTH
LABORATORY SERVICE

ANNUAL REPORT

2019/2020

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2020

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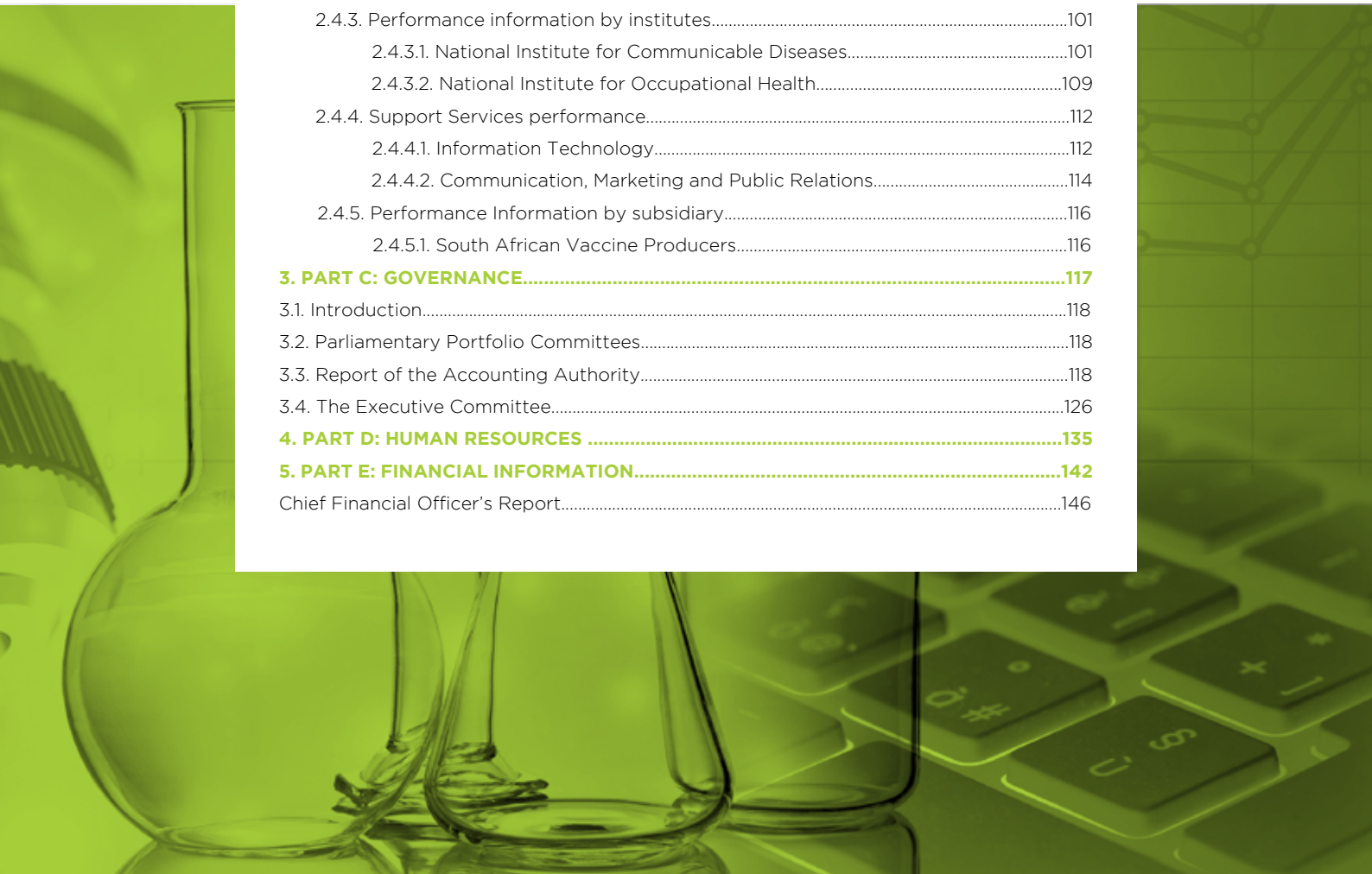


Financial highlights (2019/2020)

The NHLS generated a surplus of **R1.082 billion.**

A turnover of **R9.3 billion** was generated.

The NHLS reported a cash balance of **R4.1 billion** at the end of the financial year which greatly assisted with its response to COVID-19 pandemic in the months to follow.

Adherence to the settlement agreement signed by the Gauteng Department of Health (DoH) on **22 February 2018,** led to the reduction of a long outstanding debt and enhanced our cash flow.

Our creditor days improved from an already low base of 30 days (31 March 2019) to **28 days** (31 March 2020). This clearly illustrates our continuous commitment to the timely payment of our suppliers.

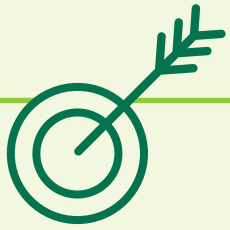
Our debtor days improved from 127 days (31 March 2019) to **105 days** (31 March 2020), which points to an improvement in both our debt collection and the provincial payments. It is important to note that this calculation neither includes the amount disputed by the KZN DoH, nor the settlement agreement from the Gauteng DoH.

The unqualified audit report is evidence of the NHLS' improved internal controls and financial record keeping.

Performance highlights (non-financial)

The NHLS acted swiftly to prepare and respond to the **COVID-19 pandemic.** We commenced testing from 8-9 March 2020, after the NICD reported the first positive case in South Africa. At first, only two laboratories were resourced to test for COVID-19, but by the end of March 2020, this has increased to eight laboratories.

Nineteen new laboratories received SANAS accreditation for the ISO 15189 standard which brought the total number of accredited laboratories to 80. resourced to test.



A total of 25 regional and 25 district laboratories received SANAS accreditation, which **exceeded the respective targets of 12 and 19 by far.**

The NHLS published **632 articles** in peer-reviewed journals against a target of 600.

We successfully hosted the Pathology Research and Development Congress (PathRed), which was attended by **513 delegates.**

The Division of Biosafety and Biosecurity (DBB) successfully commissioned and fully operationalised a newly constructed biosafety level 3 (BSL3) laboratory. This laboratory, together with the biosafety level 4 (BSL 4) laboratory, represents the most advanced high and maximum biocontainment infrastructure in the country and in Africa.

The sequencing core facility in the NICD generated the first **SARS-CoV-2 genome** in South Africa and is assisting other African countries through the Africa CDC partnership.

The NHLS acquired **intellectual property** (IP) of the Occupational Health and Safety Information System (OHASIS) that supports surveillance and to ensures compliance with the Occupational and Environmental Health and Safety (OEHS) legislation.

1. PART A
General Information

1.1. National Health Laboratory Service General Information

Registered name:	National Health Laboratory Service (NHLS)
Legal status:	Schedule 3A Public Entity
Practice number:	PR5200296
Registered office address:	1 Modderfontein Road, Rietfontein, Sandringham, Johannesburg, 2000
Postal address:	Private Bag X8 Johannesburg 2131
Telephone number:	011 386 6000
Email address:	enquiries@nhls.ac.za
Website address:	http://www.nhls.ac.za
Company Secretary:	Advocate Mpho Mphelo
External auditors:	Nexia SAB&T
Bankers:	First National Bank Limited, Rand Merchant Bank Limited, Investec Limited and Nedbank Limited

1.2 Abbreviations and acronyms

5-FC	5-Fluorocytosine
AAb	Autoantibody
AAR	Academic Affairs and Research
AARMS	Academic Affairs and Research Management System
AARQA	Academic Affairs, Research and Quality Assurance
ACTG	AIDS Clinical Trials Group
ACTH	Adrenocorticotropic hormone
AFP	Acute flaccid paralysis
AFS	Annual financial statements
AGSA	Auditor-General of South Africa
AIDS	Acquired Immune Deficiency Syndrome
AMA	Anti-mitochondrial antibody
AMR	Antimicrobial resistance
ANC	Antenatal care
Anti-LKM-1	Liver kidney microsomal type 1 antibody
APCA	Anti-parietal cell antibody
APH	African Primary Healthcare
aPL	Antiphospholipid antibody
APP	Annual performance plan
aPTT	Activated partial thromboplastin time
AR	Annual report
ARAOH	Africa Regional Association of Occupational Health
ARC	Audit and Risk Committee
ARMS-PCR	Amplification refractory mutation system polymerase chain reaction
ART	Antiretroviral therapy
ARV	Antiretroviral
ASLM	African Society for Laboratory Medicine
ASMA	Anti-smooth muscle antibody
AST	Aspartate transaminase
ALT	Alanine aminotransferase
AU	African Union
AVE	Advertising value equivalence
AUDA	African Union Development Agency
BA	Bilateral agreement
BHSc	Bachelor of Health Sciences
BLUC	Blood and Laboratory User Committee
BPA	Blanket purchase agreement
BRICS	Brazil, Russia, India, China and South Africa
BSL3	BioSafety level 3
BSL4	BioSafety level 4
CA 19-9	Cancer antigen 19-9
CA 125	Cancer antigen 125
CANSA	Cancer Association of South Africa
CAPRISA	Centre for the AIDS Programme of Research in South Africa
CC	Collaborating centre
CCHF	Crimean-Congo haemorrhagic fever
CCMT	Comprehensive care management and treatment
CCPCP	Cervical Cancer Prevention and Control Policy
CD4	Cluster of differentiation
CDC	Centers for Disease Control and Prevention
CDW	Central data warehouse
CEA	Carcinogenic embryonic antigen
CED	Centre for Enteric Diseases
CEO	Chief Executive Officer
CEZPD	Centre for Emerging Zoonotic and Parasitic Diseases

CgA	Chromogranin A
CHARM	Centre for Healthcare-Associated Infections, Antimicrobial Resistance and Mycoses
CHBAH	Chris Hani Baragwanath Academic Hospital
CHC	Community healthcare centre
CHE	Council on Higher Education
CHIVSTI	Centre for the human immunodeficiency virus (HIV) and sexually transmitted infections
CIPC	Companies and Intellectual Property Commission
CJMH	Charles Johnson Memorial Hospital
CLAT	Cryptococcal latex antigen test
CLI	Clinic-laboratory interface
CM	Cryptococcal meningitis
CMJAH	Charlotte Maxeke Johannesburg Academic Hospital
CML	Chronic myeloid leukaemia
CMSA	Colleges of Medicine of South Africa
CMV	Cytomegalovirus
CNS	Central nervous system
CoAg	Co-operative agreement grant
COBIT	Control objectives for information and related technologies
CoSH	Church of Scotland Hospital
COVID-19	Coronavirus disease of 2019
CPD	Continuing professional development
CPP	Comprehensive prevention package
CPUT	Cape Peninsula University of Technology
CQI	Continuous quality improvement
CrAg	Cryptococcal antigen
CRDM	Centre for Respiratory Diseases and Meningitis
CRE	Carbapenem-resistant Enterobacteriaceae
CROI	Conference on Retroviruses and Opportunistic Infections
CRP	C-reactive protein
CS	Congenital syphilis
CSC	Correctional Services Centres
CSF	Cerebrospinal fluid
CSIR	Council for Scientific and Industrial Research
CTB	Centre for Tuberculosis
CU	Comprehensive university
CVD	Cardiovascular disease
CVI	Centre for Vaccines and Immunology
DAFF	Department of Agriculture, Forestry and Fisheries
DBB	Division of Biosafety and Biosecurity
DBS	Dried blood spot
DCS	Department of Correctional Services
DCST	District Clinical Support Team
DGGE	Denaturing gradient gel electrophoresis
DGM	Dr George Mukhari Hospital
DLT	Drug level testing
DMRE	Department of Mineral Resources and Energy
DoH	Department of Health
DEL	Department of Employment and Labour
DMP	Diagnostic Media Products
DNA	Deoxyribonucleic acid
DPHSR	Division of Public Health Surveillance and Response
DRC	Democratic Republic of Congo
DR-TB	Drug-resistant TB
dst	Drug susceptibility testing
DSI	Department of Science and Innovation
DTR	Dolutegravir-based
EAP	Employee Assistance Programme

ECC	Expert Committee Chair
ECHO	Extension for Community Healthcare Outcomes
ECM	Enterprise content management
EDTA	Ethylenediaminetetraacetic acid
EE	Employment equity
EFI	European Federation of Immunology
EGK	Electronic gatekeeping
EID	Early infant diagnosis
ELISA	Enzyme-linked immunosorbent assay
EOC	Emergency Operations Centre
EPBCR	Ekurhuleni population-based cancer registry
EPTB	Extra-pulmonary tuberculosis
EQA	External quality assessment
ESBL	Extended-spectrum beta-lactamase
ESF	Education service fee
EU	European Union
EUA	Emergency use authorisation
EV	Enterovirus
EXCO	Executive Management Committee
FA	Fanconi anaemia
FinCom	Financial Committee
FBC	Full blood count
FETP	Field Epidemiology Training Programme
FIOH	Finnish Institute of Occupational Health
FIND	Foundation for Innovative New Diagnostics
FISH	Fluorescence in situ hybridisation
FNA	Fine needle aspiration
FOBT	Faecal occult blood test
FPD	Foundation for Professional Development
fPSA	Free prostate specific antigen
FSASP	Federation of South African Societies of Pathology
GAM	Global AIDS Monitoring
GC-MS	Gas chromatography-mass spectrometry
GDD	Global Diseases Detection
GDH	Glutamate dehydrogenase
GDoH	Gauteng Department of Health
GDSP	Global Data Services Platform
GEMP	Graduate entry medical programme
GERMS-SA	Group for Enteric, Respiratory and Meningeal Disease Surveillance in South Africa
GFO	Grants Finance Office
GIS	Geographic Information System
GLASS	Global Antimicrobial Resistance Surveillance System
GOARN	Global Outbreak Alert and Response Network
GP	General Practitioner
GPCC	General Practitioner Care Cell
GRAP	Standards of Generally Recognised Accounting Practice
GSEC	Governance and Social Ethics Committee
GSH	Groote Schuur Hospital
GXP	GeneXpert
HA	Haemophilia A
HAART	Highly active antiretroviral therapy
HAST	HIV and AIDS/STI/TB
HbA1c	Hemoglobin, alpha 1c
HBV	Hepatitis B virus
HCP	Healthcare Practitioner
HCT	HIV counselling and testing
HCV	Hepatitis C virus

HCW	Healthcare worker
HEU	HIV-exposed uninfected
HHV	Human herpesvirus
Hib	Haemophilus influenzae type b
HIS	Hospital information system
HIVDR	HIV drug resistance
HIV	Human immunodeficiency virus
HIV-PCR	Human immunodeficiency virus - polymerase chain reaction
HIV VL	HIV viral load
HLA	Human leucocyte antigen
hMPV	Human metapneumovirus
HOD	Head of department
HPCSA	Health Professional Council of South Africa
HPRS	Health Patient Registration System
HPV	Human papillomavirus
HRP	Hospital Revitalisation Programme
HSL	Health and Safety Laboratory
HSS	Health systems strengthening
HTA	Health technology assessment
HVTN	HIV Vaccine Trials Network
IALCH	Inkosi Albert Luthuli Central Hospital
IAPC	Institutional Academic Pathology Committee
IATA	International Air Transport Association
ICOH	International Commission on Occupational Health
ICT	Information and communications technology
ICU	Intensive care unit
IgG	Immunoglobulin G
IgM	Immunoglobulin M
IHR	International Health Regulations
IL-6	Interleukin-6
ILDAC	Integrated laboratory data analysis for care
iLEAD	Innovation for Laboratory Engineered Accelerated Diagnostics
ILI	Influenza-like illness
ILO	International Labour Organization
IMD	Inherited metabolic disease
IMDRF	International Medical Devices Regulatory Forum
INH	Isoniazid
INR	International normalized ratio
IP	Intellectual Property
IPC	Infection prevention and control
IPR	Intellectual property rights
IQC	Independent quality control
IRMA	Immunoradiometric assay
ISO	International Organization for Standardization
IT	Information technology
ITGC	Information Technology Governance Committee
ITIL	Information technology infrastructure library
JEE	Joint external evaluation
JSW	Johannesburg Sedibeng West Rand
KEH	King Edward VIII Hospital
King IV	King Code of Governance Principles
KPA	Key performance area
KIDCRU	Children's Infectious Diseases Clinical Research Unit
K-RITH	KwaZulu-Natal Research Institute for Tuberculosis and HIV
LA	Learning academy
LabCop	Laboratory Systems Strengthening Community of Practice
LAN	Local area network

LBC	Liquid-based cytology
LFA	Lateral flow assay
LFT	Liver function test
LIS	Laboratory Information System
LMMS	School of Laboratory Medicine and Medical Sciences
LPA	Line probe assay
LSHTM	London School of Hygiene and Tropical Medicine
MALDI-TOF	Matrix-assisted laser desorption/ionization - Time of Flight
MBOD	Medical Bureau for Occupational Diseases
MCDS	Minimum clinical data set
MCH	Maternal child health
MCWH	Maternal child and women's health
MDO	Missed diagnostic opportunity
MDR	Multidrug-resistant
MDR-TB	Multidrug-resistant tuberculosis
MGIT AST	Mycobacterium growth indicator tube-antibiotic susceptibility testing
MHSC	Mine Health and Safety Council
MIC	Minimum inhibitory concentration
MLPA	Multiplex ligation-dependent probe amplification
MLS	Medical laboratory science
MMed	Master of Medicine
MMPA	Mine Medical Professionals Association
MOG	Myelin oligodendrocyte glycoprotein
MOU	Maternity Outpatient Unit
MoU	Memorandum of understanding
MRC	Medical Research Council
MRSA	Methicillin-resistant Staphylococcus aureus
MSSA	Methicillin-susceptible Staphylococcus aureus
MTB/RIF	Mycobacterium tuberculosis/Rifampicin
NAAT	Nucleic acid amplification test
NAGI	National Advisory Group on Immunisation
NAPC	National Academic and Pathology Committee
NAPHISA	National Public Health Institute of South Africa
NCD	Non-communicable diseases
NCOH	National Centre for Occupational Health
NCR	National Cancer Registry
NEHAWU	National Education, Health and Allied Workers' Union
NEPAD	New Partnership for Africa's Development
NGO	Non-governmental organisation
NGS	Next generation sequencing
NHA	National Health Act, no. 61 of 2003
NHF	National Health Forum
NHI	National Health Insurance
NHLS	National Health Laboratory Service
NHRC	National Health Research Committee
WHWB	Workplace Health Without Borders
NIAID	National Institute of Allergy and Infectious Diseases
NICD	National Institute for Communicable Diseases
NIH	National Institutes of Health
NIOH	National Institute for Occupational Health
NIOSH	National Institute for Occupational Safety and Health
NIPMO	National Intellectual Property Management Office
NIV	National Institute of Virology
NMAH	Nelson Mandela Academic Hospital
NMC	Notifiable medical condition
NMCSS	Notifiable Medical Conditions Surveillance System
NMO	Neuromyelitis optica

NMU	Nelson Mandela University
NNRTI	Non-nucleoside reverse-transcriptase inhibitor
NPO	Non-profit organisation
NPP	National Priority Programme
NPPU	National Priority Programme Unit
NPR	National priority research
NQF	National Qualifications Framework
NRF	National Research Foundation
NTBRL	National Tuberculosis Reference Laboratory
NTT	National Task Team
NWU	North-West University
OECD	Organisation for Economic Co-operation and Development
OEHS	Occupational and Environmental Health and Safety
OH	Occupational Health
OHASIS	Occupational Health and Safety Information System
OHS	Occupational Health and Safety
OMA	Oracle Master Agreement
O.P.D.	Out-patient Department
ORU	Outbreak Response Unit
OTT	Office of Technology Transfer
PAHWP	Pan African Harmonisation Working Party
PathRed	Pathology Research and Development Congress
PBMC	Peripheral blood mononuclear cell
PCR	Polymerase chain reaction
PCT	Patent Cooperation Treaty
pct	Procalcitonin
PEPFAR	United States President's Emergency Plan for AIDS Relief
PET	Provincial Epidemiology Team
PFGE	Pulsed-field gel electrophoresis
PFMA	Public Finance Management Act
PHC	Primary healthcare centre
PhD	Doctor of Philosophy Degree
PI	Protease inhibitor
PIVOTAL	Professional, vocational, technical and academic learning
PLG	Panleucogated
PMA	Prioritised management area
PMC	Peri-mining community
PMTCT	Prevention of mother-to-child transmission
POC	Proof of concept
POCT	Point-of-care testing
POPI	Protection of personal information
PP	Plasma preparation
PPC	Parliamentary Portfolio Committee
PPO Serve	Professional Provider Organisation Services
PPP	Public-private partnership
PRF	Poliomyelitis Research Foundation
proBNP	Pro hormone brain natriuretic peptide
PSA	Prostate Specific Antigen
PSC	Plasma Separation Card
PTS	Proficiency Testing Scheme
QA	Quality assurance
QAD	Quality Assurance Division
QC	Quality control
QCA	Quality compliance audit
QCI	Quality control initiative
QCMD	Quality control for molecular diagnostics
QF-PCR	Quantitative fluorescent polymerase chain reaction

QIT	Quality improvement tool
QMS	Quality management system
R&D	Research and Development
RA	Rheumatoid arthritis
RACL	Relational algebraic capacitated location
RCE	Regional centre of excellence
RDC	Research Development Committee
RDT	Rapid diagnostic test
RDTMP	Research development training and mentorship programme
RF	Rheumatoid factor
RfA	Results for action
RFLP	Restriction fragment length polymorphism
RHRC	Remuneration and Human Resources Committee
RIA	Radioimmunoassay
RIC	Research and Innovation Committee
RIF	Rifampicin
RFQ	Request for quotation
RMR	Rifampicin monoresistant
RPR	Rapid plasma reagin
RR	Rifampicin-resistant
RSV	Respiratory syncytial virus
RT-PCR	Real-time polymerase chain reaction
RTQII	Rapid test quality improvement initiative
RVF	Rift Valley Fever
RXH	Red Cross War Memorial Children's Hospital
SAAVI	South African AIDS Vaccine Initiative
SABMR	South African Bone Marrow Registry
SACoMD	South African Committee of Medical Deans
SADC	Southern African Development Community
SAFETP	South Africa Field Epidemiology Training Programme
SAHCS	Southern African HIV Clinicians Society
SAIOH	Southern African Institute for Occupational Hygiene
SAIMR	South African Institute for Medical Research
SAMRC	South African Medical Research Council
SANAS	South African National Accreditation System
SANBS	South African National Blood Services
SANDF	South African National Defence Force
SANReN	South African National Research Network
SAHPRA	South African Health Products Regulatory Authority
SAPPHGenE	South Africa-Pittsburgh Public Health Genomic Epidemiology Research Training Programme
SAPS	South African Police Service
SARI	Severe acute respiratory infection
SARS-CoV-2	Severe acute respiratory syndrome coronavirus 2
SASOHN	South African Society of Occupational Health Nursing Practitioners
SASOM	South African Society of Occupational Medicine
SAVP	South African Vaccine Producers
SAVQA	South African Viral Quality Assessment
SBE	Snakebite envenoming
SCC	Staphylococcal cassette chromosome
SCM	Supply chain management
SDG	Sustainable development goal
SFLC	Serum free light chains
SHE	Safety, health and environment
SKC	Scientific knowledge centre
SLA	Service level agreement
SLE	Systemic lupus erythematosus
SLIPTA	Stepwise Laboratory Quality Improvement Process Towards Accreditation

SLMTA	Strengthening Laboratory Management Towards Accreditation
SME	Subacute measles encephalitis
SMLTSA	Society of Medical Laboratory Technology of South Africa
SMS	Short message service
SNP	Single nucleotide polymorphism
SOE	State-owned enterprise
SOP	Standard operating procedure
SPF	Specific-pathogen-free
SPI-RT	Stepwise Process for Improving the Quality of HIV Rapid Testing
STEA	Scientific travel and events attendance
STI	Sexually transmitted infections
T3	Triiodothyronine
T4	Thyroxine
TAD	Tshwane Academic Division
TAT	Turnaround time
TB	Tuberculosis
TBH	Tygerberg Hospital
TDH	Tshwane District Hospital
TENET	Tertiary Education and Research Network of South Africa
TEPHINET	Training Programmes in Epidemiology and Public Health Interventions Network
TMS	Tissue microarray analysis
ToR	Terms of reference
TQM	Total quality management
T-RFLP	Terminal restriction fragment length polymorphism
Trop I	Troponin I
TSH	Thyroid stimulating hormone
TTAC	Technologist and Technician Advisory Committee
TTO	Technology Transfer Office
TWAS	The World Academy of Sciences
TWG	Technical working group
UCT	University of Cape Town
UI	User interface
U&E	Urea and electrolytes
UFS	University of the Free State
UJ	University of Johannesburg
UKZN	University of KwaZulu-Natal
UN	United Nations
UoT	University of Technology
UP	University of Pretoria
US	Stellenbosch University
USAID	United States Agency for International Development
UTT	Universal Test and Treat
VDPV2	Vaccine-derived polio virus type 2
VL	Viral load
WCL	Western Cape Laboratories
WGS	Whole-genome sequencing
WHO	World Health Organization
WHO-AFRO	World Health Organization-Regional Office for Africa
WIL	Work integrated learning
Wits	University of the Witwatersrand
WSP	Workplace skills plan
WSU	Walter Sisulu University
XDR	Extensively drug-resistant

1.3. Foreword by the Chairperson

Prof Eric Buch
Chairperson

Introduction

The National Health Laboratory Service (NHLS) is the largest diagnostic pathology service in South Africa, with the responsibility of supporting the national and provincial health departments in the delivery of healthcare.

The NHLS provides laboratory and related public health services to over (eighty percent) 80% of the population through a national network of laboratories.

Our specialised institutes include: The National Institute for Communicable Diseases (NICD), the National Institute for Occupational Health (NIOH), and the South African Vaccine Producers (SAVP), as our subsidiary.

The NHLS has laboratories in all nine provinces in the country, employing approximately 7000 people. Its activities comprise: Diagnostic laboratory services, research, teaching and training, and production of sera for anti-snake and other venom, reagents and media.

The NHLS is mandated to:

- Provide cost-effective and efficient health laboratory services to all public sector healthcare providers; Support and conduct health research; and
- Provide training for health science education in conjunction with medical faculties at Universities and Universities of Technology (UoTs).

The NHLS also plays a major role in:

- Public health in South Africa through epidemiology, surveillance and outbreak response activities;
- The national antiretroviral rollout programme through CD4+ viral load studies and HIV treatment monitoring;
- Tuberculosis (TB) diagnosis and treatment monitoring;
- The screening for cervical cancer; and
- The support of occupational health services.

Strategic overview

Strategically, the organisation is tasked with meeting its annual performance plan (APP) goals and targets, aligned with government's overall service delivery goals and deliverables.

As the government moves to implement the National Health Insurance (NHI), the NHLS is required to improve all levels of service delivery to provide efficient and cost-effective laboratory testing.

The NHLS executes its mandate and supports this national agenda in a focused and structured manner through the following five programmes:

Laboratory Services

The NHLS performs the majority of South Africa's HIV, TB and cervical cancer tests for the public health system, through its network of 268 laboratories countrywide. Operational efficiency and timely services are not only critical to the management of these diseases, but will also be prevalent when the NHI is fully operational.

Academic Affairs, Research and Quality Assurance

The Academic Affairs, Research and Quality Assurance Department continuously fosters excellent relationships with health science faculties at medical universities, comprehensive universities and UoTs across the country. During the reporting year, ongoing quality assurance efforts were supplemented by SANAS assessments to improve the quality of service and turnaround times (TATs) of tests performed at our laboratories.

Surveillance of Communicable Diseases

All the NICD laboratories are SANAS-accredited and seven of these laboratories are also accredited as World Health Organization (WHO) reference laboratories. This has proven to be critical since the outbreak of the global coronavirus disease 2019 (COVID-19) pandemic in the last quarter of the financial year.

The NICD informed the NHLS of the outbreak in Wuhan in December 2019, which afforded the organisation the opportunity to prepare resources to manage testing, occupational health and safety and research to support the Department of Health (DoH) and other African countries as soon as the disease spread to South Africa in March 2020.

The NICD handed diagnostic testing for COVID-19 over to the NHLS laboratories, as the NHLS has a broader footprint across the country. The NICD however plays an active role in combating this pandemic, as part of the Ministerial Advisory Committee that reports on the disease statistics and conducts research to guide the understanding of the disease in a South African context.

Occupational Health and Safety

The NIOH is recognised internationally for excellence in research, services and training to support occupational health services across all economic sectors, not only in South Africa, but also in Southern Africa through its extensive outreach activities and collaborations, with the ultimate aim to improve and promote workers' health and safety. The exemplary work of the institute includes occupational medicine, hygiene, advisory, statutory pathology and laboratory services, research and teaching and training in occupational and environmental health and safety.

Administration

All aspects of the organisation's service delivery is underpinned by effective administration provided through a range of support services, such as organisational development, human resources (HR) and labour relations, information technology (IT), property management, security, legal services, communication and integrated planning. Four key programmes are in place to keep these vital elements of the organisation on track, namely: Financial Management, Governance and Compliance, Information and Technology and Human Resources Management.

Strategic relationships

The NHLS has strong relationships with the national and provincial Departments of Health as well as with global bodies like the WHO and the Centres for Disease Control and Prevention (CDC). During the year under review, collaborations with African institutions such as the African Union (AU) CDC and the African Primary Healthcare (APH) Foundation have been vital to mitigate the impact of COVID-19 on our continent.

The NHLS Board

A significant development during the financial year under review, was the formal appointment of Dr Kamy Chetty as Chief Executive Officer (CEO) on 1 January 2020, after serving in acting capacity for two years. Dr Chetty has already proven her ability and the Board wishes her every success as she continues to lead the organisation during this crucial time.

Notably, there were two other senior appointments. Mr Michael Sass was appointed as Chief Financial Officer (CFO) on 1 December 2019 and we look forward to supporting him as he continues to drive the financial stability of the organisation under Dr Chetty's leadership. Mr Sibongiseni Hlongwane was also appointed as Chief Information Officer (CIO). We anticipate that his many years of experience will greatly contribute towards building our organisational technological capacity to add further value to the South African public.

The year ahead

By the end of the financial year under review, the world was adjusting to the impact of COVID-19 on healthcare services, the global economy and the lives of millions of people around the globe.

We foresee that during the year ahead, the NHLS will play an integral role in supporting the DoH and our government in providing efficient diagnosis testing, occupational health and safety guidance and epidemiological and pathology advisory services.

As the leading healthcare service provider to the majority of the South African population, which has significant prevalence of HIV, TB and diabetes, the NHLS will no doubt also remain at the frontline of the COVID-19 pandemic.

This pandemic is likely to continue having an impact on our country and our resources as an organisation well into the new financial year. The organisation will strategically deploy these resources to continue supporting the DoH and our government by providing the best services possible to combat this dreaded disease.

Conclusion and acknowledgements

In May 2019, Dr Zweli Mkhize was appointed as the national Minister of Health, and it has been a pleasure to engage with such a seasoned professional. Previously, he has been a member of the National Health Forum (NHF) and the longest serving member of the executive council (MEC) for Health, before he was appointed as the Premier of KwaZulu-Natal. On behalf of the Board, I would like to express our gratitude to Minister Mkhize for his support of the NHLS and the strong working relationship that he is developing in the fight against the COVID-19 pandemic.

We would also like to extend our appreciation to the MECs for Health and the heads of provincial health departments who recognise the national value of the NHLS and continue to cultivate a relationship of reciprocal respect and support.

Dr Chetty and the executive team have been instrumental in implementing the Board's vision of a financially stable organisation and played a pivotal role to prepare the NHLS to deal with the COVID-19 pandemic. We salute Dr Chetty and her team for their unrelenting commitment.

Finally, I wish to thank each of the Board Members for the strategic guidance and expertise they have shared with the organisation, as they serve with minimal personal compensation.

Chairperson of the Board
Prof Eric Buch

1.4. Chief Executive Officer's Overview

Dr Kamy Chetty
Chief Executive Officer

Introduction

It is my pleasure to present the NHLS annual report for 2019/2020 financial year. This year we are once again able to show a continued level of financial stability. The NHLS achieved most of its performance targets set in the annual performance plan for 2019/20 financial year and will focus on those areas which need improvement. In the last quarter of this financial year, most of our activities centred around preparing for the Covid-19 pandemic. Our first patient was diagnosed on March 5, 2020. This was followed by the lockdown announced by the President of the Republic, Mr Cyril Ramaphosa, on 26 March 2020 in line with the National State of Disaster Act. The NHLS ensured that it was prepared for the pandemic through the procurement of additional equipment and test kits. Whilst there were challenges of production and supply of test kits, the NHLS persevered and managed the demand. I would like to thank all staff, especially those who had to deal directly with Covid-19, for their dedication and hard work. My thanks also to the officials who went beyond the call of duty to respond to this pandemic.

Financial Overview

The NHLS financial stability has improved further compared to the previous year. Our cash balance has remained consistently high as a result of increased cash collections. The NHLS has successfully demonstrated its ability to pay its current liabilities out of current assets and easily exceeds the standard for this ratio of 2:1. Our creditor days have reduced to 28 days, a significant reduction on the target of 60 days.

The collection of revenue from provincial Departments of Health has been an ongoing issue for many years. The NHLS continues to grow its business which is demonstrated by the 3% increase in volumes and its revenue also increased by 9%. The NHLS collected R8.7 billion from provincial departments compared to R7.4 billion in the prior year. In the last quarter, Covid-19 has impacted revenue and volume as compared to the previous quarter. This will be monitored in the 2020/21 financial year.

As of 31 March 2020, the provincial Departments of Health debt payable amounted to R4.7 billion (2018/19 R5.3 billion). The majority of the debt is owed by KwaZulu-Natal and Gauteng provinces and constitutes R3.8 billion or 80% of trade receivables. The settlement agreement that was reached with the Gauteng Department of Health has seen a reduction in the debt owed by Gauteng. The negotiations with the KwaZulu-Natal Department of Health regarding the settlement of overdue amounts owed to the NHLS are ongoing. The NHLS will continue to engage the provinces with regards to timely payments of debt in arrears.

The NHLS generated a surplus for the year amounting to R1.082 billion compared to a revised R995.8 million surplus in the previous financial year. The NHLS revenue grew from R8.5 billion to R9.3 billion. Revenue from provincial budgets amounted to 89% of the total revenue generated. The increase in test revenue was largely due to the increases in Viral Load, Profile Discrete Analyser U & E, GeneXpert PCT TB, Creatinine Automated, Full Blood Count Incl Platelet, HIV PCR, CD4 PLG, EXF Cytology (Gynae) by LBC, C-Reactive Protein. Our current liabilities have increased from R1.4 billion to R1.5 billion (6% increase) due to an increase in the provision of leave pay and the creditors days have reduced from 30 days to 28 days.

I am pleased with the progress that we have made concerning our finances. This is a reflection of the commitment of NHLS employees to the financial sustainability of the organisation, the effectiveness of measures that we put in place and the disciplined application of the cost management strategies that we implemented to strengthen our finances, to remain financially sustainable in our operations.

People Management

The NHLS achieved a staff turnover of 3%. This is attributed to the organisation's staff-related perks such as employee market-related remuneration and benefits, education, training and development opportunities, performance pay progression and proficiency progression for health professionals.

The NHLS has constantly shown its capability to consistently produce the next generation of pathologists, technologists, scientists and technicians in support of laboratory medicine across the South African health sector, and both the public and private sectors.

The NHLS continues to fulfil its mandate of teaching and training, with regards to a shift in the central locus of control, for exercising and implementing strategic and operational initiatives. This is testament to the greater requirement placed on AARQA and the Learning Academy, and strengthening their role in fulfilling the training mandate of the NHLS. During the 2019/2020 financial year, our Academic Affairs department placed 526 trainees from various academic institutions on the NHLS platform. This includes 56 intern medical scientists, 253 registrars, and 217 student medical technologists.

Improvement in systems

The NHLS has completed the rollout of the Laboratory Information System (LIS) in all laboratories across the country, which resulted in seamless and integrated management of laboratory data. LIS facilitates the seamless standardising of reporting, monitoring and evaluation of test turnaround times and test volumes.

The NHLS IT infrastructure, which has been a challenge for some time, has been prioritised. The aim is to build a strong IT foundation based on robust and agile infrastructure with core laboratory and enterprise capabilities and innovative solutions that help build a state of the art laboratory services in the country.

Our IT department has been working on improving the effectiveness and efficiency in serving the organisation's business needs. IT conducted a network vulnerability assessment and hardening of the NHLS internet-facing applications to improve security. Internet bandwidth upgrades were also done to enable the deployment of business collaboration tools such as video conferencing systems. The plan is to roll out these collaboration tools to the rest of the NHLS offices. For consistent and accurate identification of patients, the laboratory Information system (LIS) continues with the digitisation of the NHLS laboratory operations through the use of the health patient record number. The NHLS integrated the Health Patient Record System of the National Department of Health into LIS to allow for better identification of patients and improve the accuracy of information recorded. Interfaces between third-party systems and TrakCare are continuously developed to support replicable and context-appropriate online health information and clinical data.

A service agreement between the NHLS and SANReN was signed in February 2020. The NHLS Head Office together with Braamfontein offices including laboratories from eight hospitals will be the first sites to be taken over to the SANReN connectivity. Network equipment to make this possible is also being procured. Phase two where connectivity from the hospital side will be extended to NHLS laboratories will be done shortly after the ten sites from Phase one would have been taken on board.

Service Delivery

In the year under review, the NHLS performed more tests compared to the previous financial year. The NHLS is mandated by the NDoH to provide services aimed at improving tuberculosis (TB) and human immunodeficiency virus (HIV), acquired immunodeficiency syndrome (AIDS) management for vulnerable communities in South Africa. During 2019/2020, 5.7 million viral load (VL) tests were performed, compared to 5.2 million during 2018/2019, which constitutes an increase of 9.45% (487 885 tests). However, in the last quarter, there has been a decrease in these tests. Of the tests performed, 85.6% showed virally suppressed results (<1 000 copies/mL).

The number of HIV PCR tests increased by 2.52% from 604 886 in the 2018/2019 financial year, to 620 168 in the 2019/2020 financial year. Improvements in qualitative HIV polymerase chain reaction (PCR) testing was achieved through the introduction of the Cobas® HIV-1/HIV-2 Qualitative assay. The transition of the early infant diagnosis (EID) assay from the Roche CAP/CTM (expected to be phased in by the supplier in 2021) was implemented by leveraging the existing Cobas 6800/8800 HIV VL systems.

The NHLS continued to provide quality service within an acceptable turnaround time. The rollout of new cervical screening technology (liquid-based cytology) was well received by the health care workers. This resulted in an increased number of specimens to the laboratory which had a negative impact on the turnaround time for cervical cancer screening. This challenge will be addressed.

In the last quarter of the year under review, the NHLS' National Institute of Communicable Diseases (NICD) activities focused on initial COVID-19 contact tracing and monitoring, data management and analysis, development of reporting systems and epidemiological support, both centrally and at the provincial level. During the year under review, the NHLS' National Institute for Occupational Health (NIOH) focused on industrial sectors that are known to be poorly covered by OHS services. These included the informal, construction, and agricultural sectors. These sectors have workplace health risks that are inadequately quantified and new emerging risks that require attention, such as artificial stone production causing silicosis. The NIOH has programmes in all three sectors but the extension of basic OHS services to prevent injury and disease and promote improved health among these vulnerable, underserved workers, requires a considerable multi-stakeholder, national effort. The NIOH played a role in some notable developments in OHS in South Africa during the reporting period. Several staff members represented the NIOH at the Department of Employment and Labour technical committees, drafting and revising occupational health legislation.

As of 31 March 2020, our Quality Assurance department facilitated the accreditation of 19 new facilities by SANAS for the ISO 15189:2012 standard compared to 21 in the previous financial year. As a result, a total of 80 laboratories in all provinces and across 39 district municipalities were accredited at the end of the 2019/2020 financial year, compared to 61 accredited laboratories across 31 district municipalities at the end of the 2018/2019 financial year. Of the 80 laboratories (25%), 20 were on the strengthening laboratory management towards accreditation quality improvement programme.

The South African Vaccine Producers (SAVP), a subsidiary of the NHLS, sold 12066 units of antivenom in the last financial year. This is a slight decrease compared to 12 302 units sold in the 2018/19 financial year. The implementation of lockdown in March 2020 affected the ability of SAVP to dispatch many export orders. Polyvalent antivenom being the biggest seller followed by Scorpion, Spider, Boomslang and Echis antivenoms.

The year ahead

We enter the next financial year with the COVID-19 pandemic behind our agenda. The investment in equipment and testing will ensure that NHLS' ability to deal with Covid-19 pandemic. Our existing HIV and TB testing instruments will also be utilized to do COVID-19 testing as is evident in the 11 laboratories that were providing COVID-19 testing by the end of March 2020.

The pandemic will have an impact on the NHLS. I am confident that the Board and the staff of the NHLS will persevere and ensure that the organisation plays a pivotal role in the fight against the pandemic. The nature of the pandemic and its impact on South Africa will likely dominate all activity for most, if not all, of the year ahead. The executive team has already placed a large amount of their attention and focus on preparing the organisation to cope with the testing volumes and resources required to deliver this within reasonable turnaround times.

Acknowledgements

With all these achievements, I would like to thank the Board, the executive leadership and staff of the NHLS for their dedication. None of the achievements of this past year would have been possible without them. I would like to thank all our employees for their hard work, passion and commitment towards fulfilling the mandate of the NHLS. I would also like to thank organised labour for their contribution to creating a stable work environment.

Chief Executive Officer
Dr Kamy Chetty

1.5. Board Members

Prof Eric Buch
Chairperson

Ms S'phiwe Mayinga

Ms Nelly Mkhize

Mr Ian Van der Merwe

Dr Monde Tom

Dr Tim Tucker

Prof Thanyani Mariba

Prof Mary Ross

Dr Kamy Chetty
CEO

Mr Jonathan Mallet

Dr Gerhard Goosen

Mr Michael Shingange

Mr Ben Durham

Dr Balekile Mzangwa

Mrs Nicolene Van Westhuizen

Dr Zwelibanzi Mavuso

Prof Larry Obi

1.6. Statement of responsibility and confirmation of the accuracy of the National Health Laboratory Service annual report

To the best of our knowledge and belief, we confirm the following:

- All information and amounts disclosed in the annual report (AR) of the National Health Laboratory Service (NHLS), are consistent with the annual financial statements (AFS) audited by Nexia SAB&T;
- The AR is complete, accurate and free from any omissions;
- The AR was prepared in accordance with the Annual Report Guidelines as issued by National Treasury;
- The AFS (Part E), were prepared in accordance with the Standards of Generally Recognised Accounting Practice (GRAP), as applicable to the NHLS;
- The Accounting Authority is responsible for the preparation of the AFS and for the judgments made in this information;
- The Accounting Authority is responsible for establishment and implementation of a system of internal control, designed to provide reasonable assurance of the integrity and reliability of the performance information, the human resources information and the AFS; and
- The external auditors are engaged to express an independent opinion on the AFS.

In our opinion, the NHLS AR fairly reflects the operations, performance information, human resources information and financial affairs of the NHLS for the financial year that ended 31 March 2020.

Yours faithfully

Chief Executive Officer
Dr Kamy Chetty

Chairperson of the Board
Prof Eric Buch

1.7. Overview

About the National Health Laboratory Service

The National Health Laboratory Service (NHLS) is a national public entity, established in terms of the National Health Laboratory Service Act, no. 37 of 2000, to provide quality, affordable and sustainable health laboratory services, education and research. It has approximately 268 laboratories across the nine provinces of South Africa, excluding depots, and serves approximately 80% of the South African population.

The NHLS is the main provider of pathology services to the national, provincial and local departments of health, through its countrywide network of quality assured diagnostic laboratories. It also provides surveillance support for communicable diseases, occupational health and cancer.

The NHLS is managed according to the provisions of the National Health Laboratory Service Act, no. 37 of 2000; the NHLS Rules, gazetted in July 2007; and the Public Finance Management Act (PFMA), no. 1 of 1999. It is a state-owned enterprise (SOE), governed by a Board and a Chief Executive Officer (CEO).

It has a clear organisational structure comprising a head office in Sandringham, Johannesburg, six regions (Mpumalanga and Limpopo; KwaZulu-Natal; Eastern Cape; Western and Northern Cape; Free State and North West; and Gauteng) and two institutes, namely: The National Institute for Communicable Diseases (NICD), incorporating the National Cancer Registry (NCR) and the National Institute for Occupational Health (NIOH). The six regions are purposefully designed to ensure that the NHLS jointly plans, monitors and agrees on budgets with provincial health partners, with the aim for laboratory services to form a significant part of the public health delivery system.

The NHLS delivers services throughout the public sector, from academic, provincial tertiary, regional and district hospitals, to primary healthcare facilities. The level of complexity and sophistication of services increase from the peripheral laboratories to the central urban laboratories, (with specialised surveillance infrastructure in place at specific sites).

South African Vaccine Producers (SAVP), is a wholly owned subsidiary of the NHLS and the only South African manufacturers of antivenom for the treatment of snake, scorpion and spider envenomation.

The National Health Laboratory Service way

Vision

To render efficient patient-centred services and become a global centre of excellence for innovative laboratory medicine.

Mission

To provide quality, affordable and sustainable health laboratory services through an integrated network of laboratories, the provision of training for health science education and the execution of innovative and relevant research with focus on patient care.

Values

The NHLS has identified the following values as the principles that govern the behaviour of all employees within the organisation:

#	Value	Description
3.1	Care	*The primary goal of the NHLS is to ensure the overall care and well-being of patients by supporting a strong and effective public healthcare system. In addition, we also care about the environment and society:* This involves consideration of our impact on the environment and local communities, acting with concern and sensitivity. We are committed to behave ethically and contribute to the economic development of the workforce, community and society at large. It's about giving back to society and the environment as well as capacity building for a sustainable future.
3.2	Unity of purpose	*All Working together towards a common goal:* All employees should be united by a common vision and support each other in contributing to a beneficial and safe working environment. Teamwork and cohesion are key and collaboration should include pooling resources and communicating about each other's roles. We foster trust and honesty in interactions with colleagues and behave professionally. We value all contributions, treat everyone consistently and fairly and capitalise on diverse viewpoints. We will address and resolve conflicts effectively. We will listen to others to fully understand and give clear, concise information when communicating expectations and accountabilities and providing feedback during coaching. We will make the NHLS' goals a priority, use NHLS' resources wisely and effectively and take responsibility for our work.
3.3	Service excellence	*Valuing good work ethics and striving towards service excellence for customers:* This represents being committed to working with customers and building good relationships with them by understanding their needs, responding quickly and providing appropriate solutions. We will treat them with respect at all times; we are helpful, courteous, accessible, responsible and knowledgeable in our interactions. We understand that we have internal and external customers that we provide services and information to. This information should be presented in a clear and concise form, where the message is adapted to the audience.
3.4	Transfo-rmation	*Looking forward to the future and growing together:* We will encompass investing in the professional growth of staff by sharing knowledge and experience, peer networking, education through training and seeking opportunities to develop. We will enable the equitable representation of Race, Gender and People with Disabilities across all occupational levels within the organisation. This covers creative problem solving, informed risk-taking, learning from our mistakes and experiences and behaving professionally. We should adapt to change timeously and positively, address setbacks and ambiguity and adapt our thinking/approach as the situation changes to ensure the long-term sustainability of transformation. Our ideas will be shared and implemented effectively. Leaders should develop innovative approaches and drive continuous improvement as well as effective and smooth change initiatives.
3.5	Innovation	*Pioneering relevant research to address health challenges:* We are committed to fostering an environment that supports research, with particular emphasis on innovative approaches to diagnostics, surveillance and health systems strengthening to support national programmes. We will work on identifying needs for priority health challenges in South Africa within the laboratory and at the clinical-laboratory interface. We will encourage operational research with an emphasis on measuring the impact of diagnostic interventions on patient care, ensuring these are cost-effective, affordable, accessible and evidence-based. We will support the investment in the analysis of "big data' for surveillance of public health needs but also for addressing individual and community-based healthcare needs. We will encourage social entrepreneurship and support innovative ideas and individuals to enable the translation of new products and processes into clinical practice. We will encourage pioneering personalities to operate outside the classic research paradigm and generate intellectual property for which they are rewarded and adequately acknowledged. Partnerships with various universities, donors, NGOs and relevant government departments are critical to creating the needed space, funds and sustainability. Mentoring and communication with senior managers to change the way they view laboratory services will be a necessity. Novel approaches to training will be considered in the face of scarce skills, a large laboratory footprint and the ever-changing economic pressure on traditional learning structures.

#	Value	Description
3.6	Integrity	*Working with integrity, ethics and responsibility:* We will set and achieve goals, consistently delivering business results while complying with standards and meeting deadlines. We will display a commitment to organisational success and ethical behaviour; proactively identifying ways to contribute and taking the initiative to address problems/opportunities. We will build efficiencies in the best use of public resources. We will ensure the integrity of financial information and annual financial statements.

1.8. Legislative and other mandates

The legislative mandate of the NHLS is derived from the Constitution, the National Health Act, no. 61 of 2003 (NHA), the NHLS Act 37 of 2000, and several laws, regulations and policies issued by Parliament.

1.8.1. Constitutional mandate

In terms of the constitutional provisions, the NHLS is, amongst others, guided by the following sections and schedules:

1. The Constitution of the Republic of South Africa, 1996, places obligations on the state to progressively realise socio-economic rights, including access to healthcare;
2. Section 27 of the Constitution states the following with regards to healthcare, food, water, and social security:

    a) Everyone has the right to have access to:
        (i) Healthcare services, including reproductive healthcare;
        (ii) Sufficient food and water; and
        (iii) Social security, including appropriate social assistance in instances where they are unable to support themselves and their dependents.
3. The state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of each of these rights; and
4. No one may be refused emergency medical treatment.

1.8.2. The National Health Act, no. 61 of 2003

This act provides a framework for a structured and uniform health system within South Africa, taking into cognisance all the obligations imposed by the Constitution and other laws on the national, provincial and local governments regarding health services.

The objectives of the NHA are to:

- Unite the various elements of the national health system in a common goal to actively promote and improve the national health system in South Africa;
- Provide for a system of cooperative governance and management of health services, within national guidelines, norms and standards to guide each province, municipality and health district to address questions of health policy and delivery of quality healthcare services;
- Establish a health system based on decentralised management, principles of equity, efficiency, sound governance, internationally recognised standards of research and a spirit of enquiry and advocacy which encourages participation;
- Promote a spirit of cooperation and shared responsibility among public and private health professionals and providers and other relevant sectors within the context of national, provincial and district health plans; and
- Create a foundation for the healthcare system, that must be interpreted and implemented alongside other laws and policies that relate to health.

1.8.3. The National Health Laboratory Service Act, no. 37 of 2000

This act mandates the NHLS to provide cost-effective and efficient health laboratory services to all public sector healthcare providers; any other government institution inside and outside of South Africa that may require such services; and any private healthcare provider that requests such services. The act also mandates the NHLS to support health research and provide training for health science education.

1.8.4. Additional governance prescripts

The NHLS is required to comply, inter alia, with the following additional prescripts that form part of our governance context:

- Constitution of the Republic of South Africa, Act 108 of 1996 (as amended) (The Constitution);
- Public Finance Management Act, No 1 of 1999 (as amended) (PFMA);
- National Health Laboratory Service Act, No 37 of 2000;
- National Health Act, no 61 of 2003 (NHA);
- Preferential Procurement Framework Act, No 5 of 2000;
- Companies Act, No 71 of 2008;
- General rules established in terms of Section 27 of the NHA;
- Protocol on Corporate Governance in the Public Sector;
- King IV Code of Corporate Governance;
- Treasury Regulations issued in terms of the PFMA; and
- All laws that are applicable to the health sector.

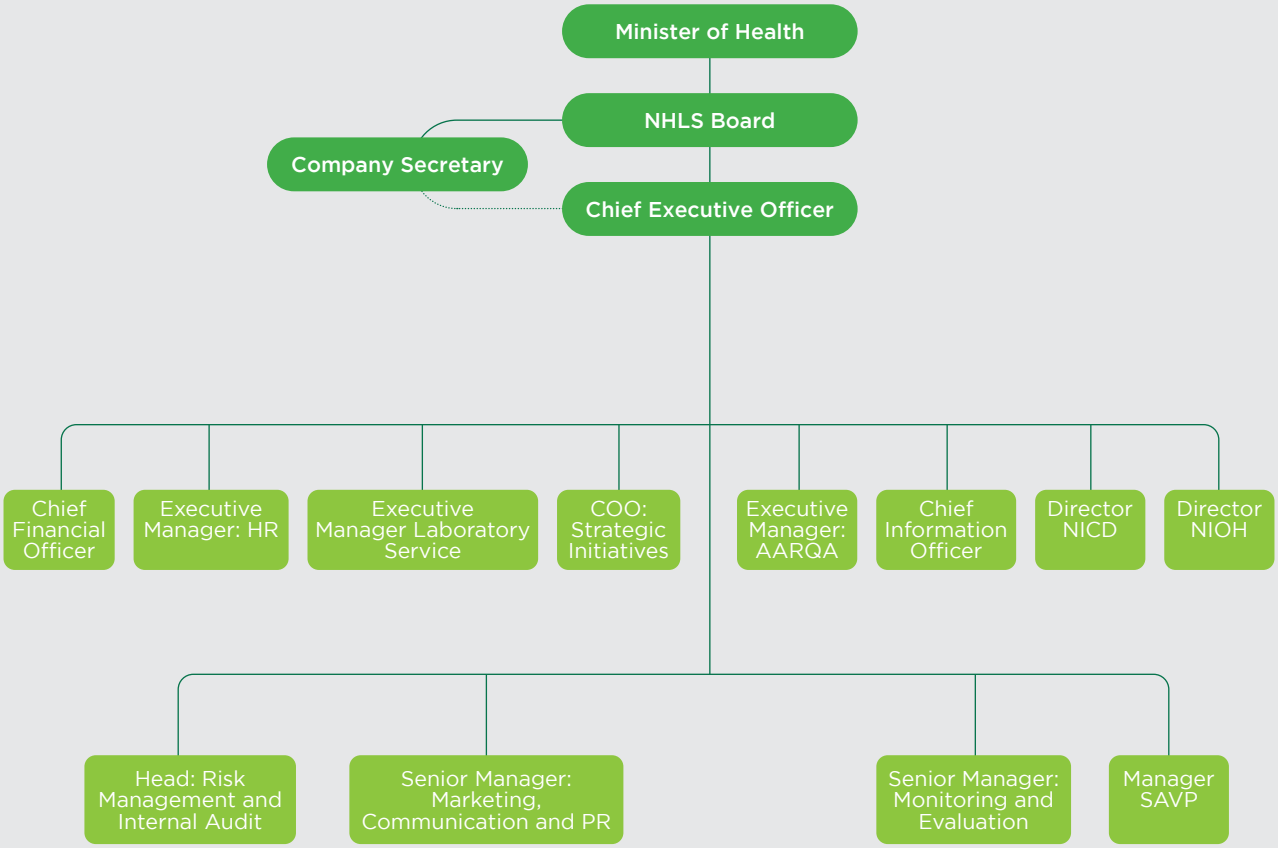
1.8.5. Policy initiatives

As articulated in our Strategic Plan 2015/2016 - 2019/2020, the NHLS is committed to support the following:

- The National Health Insurance (NHI), which covers a defined repertoire of pathology services that are aligned with the package of services required per level of care. The pathology services are delivered at public healthcare level, as well as at higher levels of care as defined by the NHLS Act and in line with the NHA. The latter requires the establishing, monitoring and enforcing of quality control (QC) standards applicable to pathology services, to ensure patient safety.
- The National Public Health Institute of South Africa (NAPHISA), that has the following functions:
  - Communicable diseases;
  - The National Cancer Registry (NCR);
  - Occupational health (OH);
  - Non-communicable diseases (NCDs); and
  - Injury and violence prevention.

The various departments that will form part of the NAPHISA have been determined and it is anticipated that the NICD, including the NCR and NIOH will be incorporated into NAPHISA.

1.9. Organisational structure



2. PART B
Performance Information

2.1. Auditor's report predetermined objectives

The independent auditor performed the necessary audit procedure on the performance information of the NHLS to provide reasonable assurance in the form of an audit conclusion. The audit conclusion on the performance of the NHLS against its predetermined objectives is included in the report to management, unqualified with no material findings reported in the report on the audit of the annual performance report section of the auditors' report on pages 150-154.

2.2. Situational analysis

2.2.1. Performance environment

2.2.1.1. The South African landscape

Medical testing laboratories are distributed across the public and private health sector in South Africa. The NHLS was established in 2000 by an Act of Parliament to provide pathology services to the public health sector, servicing more than 80% of the population across all nine provinces. The population of South Africa is growing rapidly, with a consequent increasing number of individuals who require healthcare. The demographics, geographic distribution and prevalence of disease are key factors that determine the type and capacity of laboratory services required.

Gauteng is the most highly populated province, followed by KwaZulu-Natal, and both provinces are characterised by migration and significant population influxes. South Africa has a young population with at least 29.6% who are less than 15 years of age and only 8% who are over 60 years of age. Life expectancy varies across gender and age groups, with that of males significantly lower than that of females, at 61,2 years versus 66,7 years, respectively. Nearly one million births occur per annum with most of these among mothers in the 20 to 24-year age group (31%) and an alarming number in the 10 to 19-year (13.9%) category (Statistics South Africa {Stats SA}, Recorded Live Births, 2016).

The priority diseases in South Africa remain the human immunodeficiency virus (HIV) and tuberculosis (TB), which have reached epidemic proportions. The management of these diseases require substantial volumes of testing on a scale which is unparalleled globally. This however remains an important mandate of the NHLS to help meet the targets of the 90-90-90 HIV and the End TB strategies.

The prevalence of HIV is estimated at 12,6% of the general population and rises to 18% in the 15 to 49-year age group. Over seven million South Africans are HIV-infected with approximately 4,3 million individuals on antiretroviral therapy (ART). The recent World Health Organization (WHO) report confirms the unique nature of these epidemics in South Africa where high rates of co-infection occur, further challenging diagnostic assay algorithms and needs (WHO, Global Tuberculosis Report, 2017). At least 69% of TB cases are co-infected with HIV.

Tuberculosis has showed signs of decline in South Africa, but a prevalence of 380/100 000 (210-590) and incidence of 450/100 000 (400-510) confirm that there is still much to be done. As treatment progress has been made, an inevitable consequence has been the development of both HIV drug resistance, as well as multidrug-resistant (MDR) and extensively drug-resistant (XDR) TB, which requires new technologic approaches to diagnosis and monitoring.

The rapid acceleration plans for HIV and TB treatment access will have a knock-on effect on the NHLS that will require a significant programme review with the automation, modernisation, consolidation and integration of laboratory platforms and services to ensure affordability. Just to achieve the accelerated HIV treatment initiation plan's target of six million on treatment by 2019/2020 for example, will no doubt have a significant impact on the investment requirements of the NHLS.

The most recent mortality reports reflect that TB remains the leading cause of natural deaths, followed closely by diabetes and cardiovascular disease (CVD). NCDs now contribute to 60% of the top ten causes of death (Stats SA, Mortality and Causes of Death 2015, released February 2017). Strategic planning for supportive laboratory services will be critical to help address this issue.

A wave of NCDs is likely to necessitate additional requirements to laboratory services as cancer is predicted to increase by at least 30% by 2030, with annual figures reaching an estimated 10 million cases (Lancet, 2017). In a recent survey that was conducted in rural South Africa, high rates of stroke, CVD, hypertension and dyslipidemia were noted in addition to HIV, with at least 56% of individuals having two or more of these diseases (Hofman, 2014: SAMJ). It is predicted that by 2030, NCDs will account for over six-fold more morbidity than communicable diseases.

Due to the high burden of communicable diseases, NCDs have not been a main priority of the Department of Health (DoH). This is however changing as demonstrated by the national public health policies that have recently been released to facilitate national access to diagnosis and care for cervical and breast cancers by 2030 (NDoH Breast Cancer, Prevention and Control Policy; Cervical Cancer Policy, August 2017). In addition, occupational, environmental and safety risk factors, including workplace exposures and injuries, are significant contributors to the global burden of diseases and to morbidity and mortality (Lancet 2016 Vol 388, Issue 10053, p1659-1724).

These examples clearly indicate the increasing requirement for precision laboratory medicine to facilitate greater prevention in public health, as well as a greater investment to enable it. Much needs to be done on the laboratory front where there are currently only 230 pathologists serving the public sector and only 75 anatomical pathologists [1 per 750 000 of the population (NHLS, 2017)].

All this must occur against the backdrop of a declining economy, budget deficits and rising healthcare costs. It will therefore be critical for the NHLS to embed innovation in its organisational culture.

2.2.2. Organisational environment

2.2.2.1. Network of laboratory services

The National Health Laboratory Service (NHLS) is a national public entity established in terms of the National Health Laboratory Service Act 37 of 2000 to provide quality, affordable and sustainable health laboratory and related public health services to all public healthcare providers, other government institutions and any private healthcare provider in need of service. It is also mandated to support health research and provide training for health science education.

It was furthermore designed to be a self-funded body that raises funds by conducting diagnostic tests for provincial health departments. In addition, the NHLS is the main provider of clinical support services to the national, provincial and local departments of health through its countrywide network of quality-assured diagnostic laboratories. It conducts diagnostic tests, produces highly acclaimed research, and provides teaching and training for medical technicians, medical technologists and pathologist. The NHLS also provides surveillance support for communicable diseases and occupational health and cancer, which requires that its strategy is aligned with the priorities of the DoH, as well as the objectives of the national and regional burden of disease surveillance.

The NHLS is the largest diagnostic pathology service in South Africa, with a network of 268 pathology laboratories. The NHLS is responsible for most HIV and TB tests in the public health system and plays a critical role in screening for cervical cancer. Accurate and timely tests are an imperative for the effective treatment of HIV and TB.

A unique feature of the NHLS, is that all of its laboratories in the public sector are connected through a single laboratory information system (LIS) which facilitates the seamless standardising of reporting, monitoring and evaluation, which has become an important national resource for treatment programme design, monitoring and evaluation.

The NHLS was established through the merging of several organisations, namely: The South African Institute for Medical Research (SAIMR), the National Institute of Virology (NIV) and the National Centre for Occupational Health (NCOH), as well as all provincial health laboratory services. The NIV and the NOCH are now known as the National Institute for Communicable Diseases (NICD) and National Institute for Occupational Health (NIOH) respectively.

The NHLS laboratories are predominantly based in the healthcare facilities, across all nine provinces. The highest level of care is provided at the national central hospitals and the lowest level at primary healthcare facilities. To rise to the ever-increasing demand for more complex services and a higher number of pathology services, the NHLS aims to:

- Place a renewed focus on innovation and new approaches to improve laboratory systems across the entire laboratory value chain;
- Follow a multi-disciplinary approach to the design and planning of services; and
- Strengthen initiatives for staff retention and the development of an appropriate workforce.

2.2.2.2. Linkages within the NHLS laboratories

There are ten national central laboratories (academic), that offer routine and highly specialised laboratory services and act as referral centres for lower level laboratories. The national central laboratories also offer training for health professionals, in collaboration with the medical universities and the universities of technology (UoTs).

The next level of care is provided at the provincial tertiary and regional laboratories, of which there are a total of 17 and 42 respectively. They also offer routine laboratory services and act as referral centres for lower level laboratories. The lowest level of care is provided at the district laboratories, of which there are 199 in total. They offer limited routine laboratory services, and some also act as depots.

2.3. Strategic outcome-oriented goals

The goal statements and descriptions of each of the Strategic Outcome Orientated Goals (SOOG) are shown in the table below:

Goal	Goal statement
Goal 1: Modernised and accessible laboratory service	The vision for the NHLS is to provide 100% of hospitals at regional or above level with pathologist cover by 2020 and to provide a comprehensive, quality, cost effective and timely pathology service which subscribes to international standards. This requires that all tests be performed according to international best practices and that technology is leveraged optimally, to improve TATs.
Goal 2: Academic excellence in training and research	To produce highly competent pathology health professionals who spearhead service delivery and locally relevant research. It is the ultimate strategic intent of the NHLS to ensure that research ultimately strengthens laboratory systems and influences policy development for improvement of health outcomes
Goal 3 Sound governance and improved stakeholder relations	The NHLS must show accountability and transparency through communicating more frequently with its stakeholders on its strategic initiatives and key decisions, both internally and externally. The NHLS must ensure sound corporate governance through strict adherence and compliance with all relevant legislation, financial regulations, directives, policies and procedures.
Goal 4 Efficient and ethical organisation for improved service delivery and implementation of NHI	The NHLS must be effectively managed through efficient use of resources, integrated systems and improved monitoring and evaluation. With the introduction of the NHI, it is especially essential for resources to be optimised. For this reason, a comprehensive review of the NHLS in its entirety is being conducted, including but not limited to its governance, service, financial, funding and workforce models. The aim is to grow the footprint of the NHLS and transform it into an even more dynamic, effective and efficient entity which meets the requirements of its patients and builds capacity.
Goal 5 Efficient financial practices	The NHLS must ensure effective financial management, policy and practice and strengthen the management of its financial resources and procurement processes. The entity must also generate sufficient revenue to ensure financial viability and sustainability.
Goal 6 Skilled, competent and motivated workforce	Competent and motivated staff plays a vital role in ensuring organisational success. It is the intended goal of the NHLS to have the right number of staff with the right skills mix at the right level available and employed in appropriate positions within the organisation.

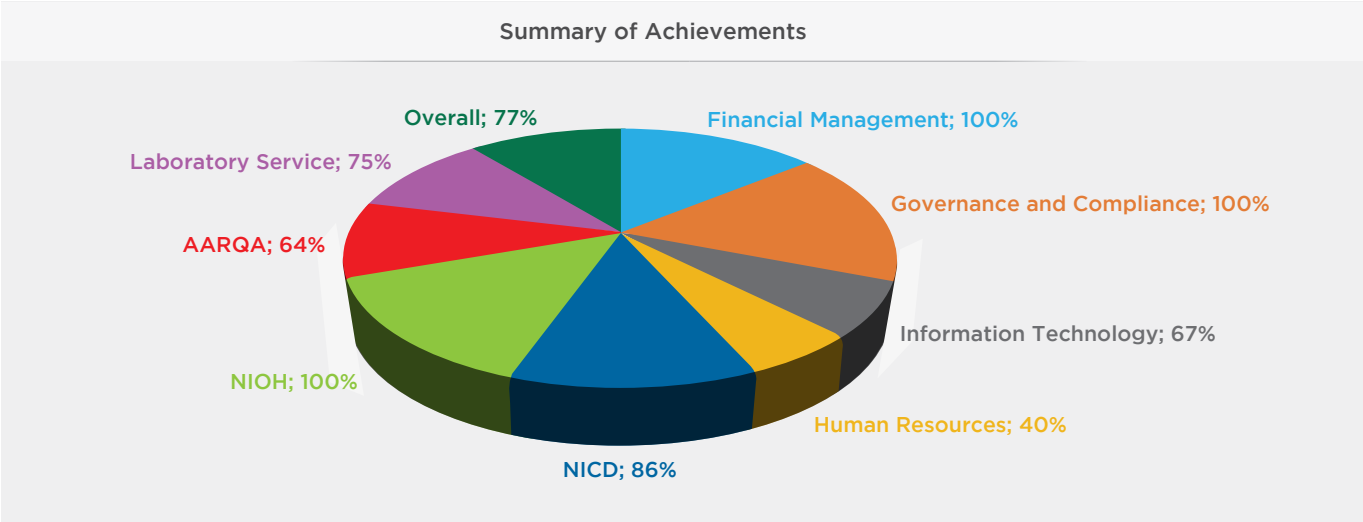
2.4. Performance information by programme

2.4.1 Introduction

Performance information enables the organisation to track its progress in meeting its strategic goals and objectives. Performance information is key to effective management, including planning, budgeting, implementation, monitoring and reporting of information. It also facilitates accountability and enables stakeholders and interested parties to track progress and identify the scope of improvement plans and better understand the issues involved (Framework Performance of Information: National Treasury).

The NHLS achieved 77% of its targets, which is a decrease from the performance of 83% in the previous financial year. This decrease can be attributed to the impact of COVID-19 pandemic in the last quarter.

The figure below demonstrates the overall performance of the individual programmes.



2.4.1.1. Programme 1: Administration

Programme purpose

The Administration Programme plays a crucial role in the delivery of the NHLS services by providing a range of support services that covers the following: organisational development; human resources (HR) and labour relations; information technology (IT); property management; security; legal aspect; communication and integrated planning.

The NHLS is highly dependent on the effective management of its financial resources and procurement processes as administered within the financial department. Generating sufficient revenue remains a critical focus area for the NHLS to ensure financial viability and sustainability.

The Administration Programme comprise the following four sub-programmes:

- **Sub-programme 1: Financial Management** - The purpose of this sub-programme is to improve the cash flow position of the NHLS.
- **Sub-programme 2: Governance and Compliance** - The purpose of this sub-programme is to provide support services and ensure compliance with all the relevant legislation.
- **Sub-programme 3: Information Technology** - The purpose of this sub-programme is to build a robust and agile IT infrastructure and innovative digital solutions to facilitate and enable the NHLS to deliver state-of-the-art laboratory services by 2020.
- **Sub-programme 4: Human Resources Management** – The purpose of this sub-programme is to provide effective services through efficient processes and adequate HR.

Sub-Programme – Financial Management

Key performance indicators

Performance indicator		Actual 2016/17	Actual 2017/18	Actual 2018/19	Annual Target	Actual 2019/20	Actual deviation	Status	Reason for Deviation
1.1.1	Review of all finance policies	New	New	New	15	15	0	☺	Achieved
1.2.1	Ratio of current assets to current liabilities	1.3:1	1.9:1	3.2:1	2:1	3.5:1	1.5:1	☺	Achieved - Our cash balance has remained consistently high as a result of increased cash collections. The NHLS has successfully demonstrated its ability to pay its current liabilities out of current assets and easily exceeds the standard for this ratio of 2:1.
1.2.2	Cash flow coverage ratio (Operating cash flows/ total debt)	0.8:1 (1.9:1)	1.1:1 (2.3:1)	4.6:1	1.5:1	6.7:1	5.2:1	☺	Achieved - Our cash balance has remained consistently high as a result of increased cash collections. The NHLS has successfully demonstrated its ability to pay its current liabilities out of current assets.
1.2.3	Percentage of material to revenue	44%	43%	41%	43%	38%	5%	☺	Achieved -This is due to the high volume test performed, which have a less direct material cost component.
1.2.4	Number of Creditor days	60 (74)	59 (51)	26	60	28	32	☺	Achieved-The accounts payable made a concerted effort to pay all suppliers before the financial year end 31 March 2020.
1.2.5	Number of Debtors days	164 (336)	114 (260)	127	250	105	100	☺	Achieved - While there was an increase in Provincial collections in the last quarter, collections for last quarter of 2020 was R2.0bn (2019: 1.5bn) which was mainly attributed to the collections in March 20 of R1.0bn, provinces like NC and EC still have debt outstanding for the prior financial years which they have not cleared. This contributes negatively to the debtors' days.
1.3.1	Percentage turnaround time for awarding tenders within 90 days	New	New	84%	80%	94%	14%	☺	Achieved - We had to process increased emergency procurement due to COVID-19 and this resulted in improved turnaround time for awarding tenders.

NB: Historical figures (in brackets) were restated to align it with generally accepted ratio standard calculations.

Commentary on the contribution of the strategic objectives to the strategic outcome - oriented goals:

Commentary on the contribution of the strategic objectives to the strategic outcome-oriented goals:

The strategic objectives contributed to the achievement of the "Efficient Financial Practices" strategic outcome-oriented goal. The entity's cash position as at the end of March 2020, demonstrates stronger financial liquidity, which in turn enables greater financial stability.

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Sub-Programme – Governance and Compliance

Sub-Programme – Governance and Compliance	
Strategic Objective 1.4	Audit opinion of the Auditor General.
Objective Statement:	Clean audit outcome by ensuring continuous management practices through compliance with standards operating procedures and systems within the NHLS.

Key performance indicators

		Actual 2016/17	Actual 2017/18	Actual 2018/19	Target 2019/20	Actual 2019/20	Actual deviation	Status	Reason for deviation
1.4.1.	Unqualified audit opinion of the Auditor General	Unqualified	Qualified	Unqualified	Unqualified	Unqualified	0	☺	

Commentary on the contribution of the strategic objectives to the strategic outcome oriented goals.

The strategic goals have contributed towards the achievement of the "Sound Governance and Improved Stakeholder Relations" strategic oriented goals. The NHLS has developed the monitoring and Evaluation Framework and procedures to establish an effective monitoring and evaluation system.

Sub-programme – Information Technology and Communication	
Strategic objective 1.5	Modernised and efficient IT systems
Objective statement	Invest in modernised, innovative and efficient IT systems that are patient-centred.

Key Performance Indicators

Performance indicator		Actual 2016/17	Actual 2017/18	Actual 2018/19	Target 2019/20	Actual 2019/20	Actual deviation	Status	Reason for Deviation
1.5.1	Number of dashboard, analytics and customer channels projects implemented	New	4	4	4	4	0	☺	Achieved
1.5.2	Percentage System Uptime for Critical Systems at facility level	99%	99%	100%	99%	97%	-2%	☹	Not Achieved - Reason for deviation - January was the month after Upgrade of the database 11g to 12c. Down time was planned to apply patches to address performance and GL Create accounting. The planned downtime for February for two days caused the SLA to decline. The Oracle Production was taken for application of RUP.12 which is a mandatory patch for South Africa prior to Tax Year end 2020 and upcoming statutory updates effective 01-Mar-2020 to comply with legislative updates.
1.5.3	Number of Modernisation Projects completed	New	5	10	10	10	0	☺	Achieved

Commentary on how the contribution of the strategic objectives to the strategic outcome-oriented goals.

The strategic objective has contributed towards the achievement of the "Effective, Efficient and Ethical Organisation for improved service delivery and implementation of NHI". The IT Strategy and roadmap articulates how IT will enable NHLS to achieve its business objectives, transform into a state of the art laboratory service and become sustainable digital healthcare business.

Sub-Programme – Human Resource Management

Sub-Programme – Human Resource Management	
Strategic Objective 1.6	Appropriately trained human resources in adequate numbers to staff the service
Objective Statement:	Provide effective services through efficient processes and adequate human resources. To improve the motivation and performance levels of all employees.
Strategic Objective 1.7	Human Resource Workforce planning tool to determine staffing norms and training needs

Sub-Programme – Human Resource Management	
Objective Statement	Ensure that the laboratory service and supporting services have adequate number of staff necessary to provide service.

Key performance indicators

Performance indicator		Actual 2016/17	Actual 2017/18	Actual 2018/19	Target 2019/20	Actual 2019/20	Actual deviation from the target	Status	Reason for Deviation
1.6.1	Staff Turnover ratio	5%	-	3%	5%	3%	2%	☺	Achieved - Minimal exits are attributed to NHLS offering employees a favourable employee value proposition, i.e market related remunerations and benefits, education and training development opportunities, performance pay progression, proficiency progression for health professionals.
1.6.2	Average staff recruitment turnaround within 90 days	62%	-	89%	80%	80%	0	☺	Achieved
1.6.3	Percentage of Employment Equity achieved across grade C,D & E relative to EAP	83%	88%	70%	85%	84%	-1%	☹	Not Achieved -There has been a challenge in getting equity candidates for level D. The NHLS will continue with an effort to attract the suitable candidates so that we can meet our EE targets.
1.6.4	Percentage of employees with approved and evaluated performance agreements	63%	80%	94%	95%	90%	-5%	☹	Due to the COVID-19 pandemic, most of the staff were isolated or quarantined. Most staff members were therefore not available during the period of appraisals.
1.7.1	Percentage of employees trained as per the approved training plan (WSP)	New	New	81%	90%	72%	-18%	☹	Not Achieved – Operational priorities within the business units prevented the release of staff to attend training interventions and cancellation of planned training interventions due to COVID-19 pandemic. Some employees deferred the training to the next financial year due to operational reasons.

Commentary on the contribution of the strategic objectives to the strategic outcome-oriented goals.

The strategic objectives have contributed towards the achievement of the "Skilled, competent and motivated workforce" strategic oriented goal. A 3% staff turnover confirms that the NHLS is the employer of choice.

Changes to targets.

There were no changes to the targets of Programme 1 in the 2019/20 financial year.

Linking performance to budget:

Programme 1	Budget	Actual expenditure	Over/under expenditure	Budget	Actual expenditure	Over/ expenditure
	2019/20	2019/20	2019/20	2018/19	2018/19	2018/19
	R'000	R'000	R'000	R'000	R'000	R'000
Administration	1,380 405	1,167 514	- 212,891	860,409	449,861	360,549

Reasons for deviations from the budget

Whilst the cash flow position improved when compared to the previous financial year, the executive remains cautious and continuously manage labour costs by filing critical posts only. This resulted in an underspend on labour costs.

2.4.1.2 Programme 2: Surveillance of Communicable Diseases

Programme purpose

The National Institute for Communicable Diseases is a national public health institute for South Africa providing reference microbiology, virology, epidemiology, surveillance and public health research to support the government's response to communicable disease threats.

Strategic objectives

Programme – Surveillance of Communicable Diseases	
Strategic Objective 2.1	A robust and efficient communicable disease surveillance system and outbreak response
Objective Statement:	Maintain comprehensive communicable diseases surveillance programmes for leading infectious disease, and maintain an effective response time.
Strategic Objective 2.2	Training and Research in Surveillance and Communicable Diseases
Strategic Statement	To conduct relevant public health related research and train qualified professionals in communicable diseases.

Key performance indicators

Performance indicator		Actual 2016/17	Actual 2017/18	Actual 208/19	Target 2019/20	Actual 2019/20	Actual deviation	Status	Reason for Deviation
2.1.1	Number of GERMS-SA reports produced.	New	New	1	1	1	0	☺	Achieved
2.1.2	Percentage of outbreaks responded to within 24 hours after notification	100%	100%	100%	100%	100%	0	☺	Achieved
2.1.3	Percentage of NICD laboratories that are SANAS accredited	100%	100%	100%	100%	100%	0	☺	Achieved
2.1.4	Annual report of population based cancer surveillance	New	New	1	1	1	0	☺	Achieved

Performance indicator		Actual 2016/17	Actual 2017/18	Actual 208/19	Target 2019/20	Actual 2019/20	Actual deviation	Status	Reason for Deviation
2.1.5	Number of NICD laboratories with WHO reference status	New	New	Maintenance	7 laboratories with WHO reference status	7 laboratories with WHO reference status	0	☺	Achieved
2.2.1	Number of articles published in the peer reviewed journals	130	180	180	130	181	51	☺	Achieved - The review process at different medical journals is variable and can result in either more or less articles reviewed and published at any given time.
2.2.2	Number of field epidemiologists qualified	14	8	9	7	6	-1	☹	The 7th student must still complete the projects and will graduate in May 2020 from the University of Pretoria.

Commentary on the contribution of the strategic objectives to the strategic outcome-oriented goals.

The strategic objectives contributed towards the achievement of the "Modernised and Accessible Laboratory Service" and the "Academic Excellence in Training and Research". The NICD continues to maintain its laboratories accredited by SANAS:ISO 15189 and its WHO references status. The maintenance of these standards position the NICD as an entity that serve as a trusted source of information, both during outbreaks and as a part of routine surveillance of priority infectious diseases.

Changes to targets

There were no changes to the targets of Programme 2 in the 2019/20 financial year.

Linking performance to budget:

Programme 2	Budget	Actual expenditure	Over/under expenditure	Budget	Actual expenditure	Over/ expenditure
	2019/20	2019/20	2019/20	2018/19	2018/19	2018/19
	R'000	R'000	R'000	R'000	R'000	R'000
Surveillance and Communicable Diseases	418,890	410,371	-8,519	381,225	404,418	-23,193

Reasons for deviations from the budget

Overspend on labour due to direct labour under budgeted.

2.4.1.3. Programme 3: Occupational and Environmental Health and Safety

Environment in this context refers to the environment that is contaminated through workplace activities or that can be protected from contamination through workplace interventions. Safety in this context refers to the synergies between occupational health and occupational safety such as in risk assessments, ergonomic assessments, teaching and training and surveillance of occupational diseases and injuries.

Programme purpose

The National Institute for Occupational Health (NIOH) is a National Public Health Institute, which provides occupational and environmental health and safety support across all sectors of the economy to improve and promote workers' health and safety. National and provincial government departments and public entities are important clients, including the Medical Bureau for Occupational Diseases (MBOD) of the NDoH.

The Institute achieves this by i) providing occupational medicine, hygiene, advisory, statutory pathology and laboratory services, ii) conducting research and iii) providing teaching and training in occupational and environmental health and safety.

Strategic objectives

Programme – Occupational and Environmental Health services	
Strategic Objective 3.1	Robust and efficient Occupational and Environmental Health Services
Objective Statement:	Provide and improve Occupational and Environmental Health services including laboratory testing, hazard and health assessments surveillance reports, and NHLS OHS audits.
Strategic Objective 3.2.	Research and Training in Occupational and Environmental Health and Safety
Objective Statement	Promote and conduct research on occupational and environmental health, including gender issues, in South Africa; and advance capacity building to strengthen human resources in occupational and environmental health and safety.

Key performance indicators

Performance indicator		Actual 2016/17	Actual 2017/18	Actual 2018/19	Target 2019/20	Actual 2019/20	Actual deviation	Status	Reason for Deviation
3.1.1	Percentage of occupational health and environmental health laboratory tests conducted within predefined turn-around time	85%	86%	75%	90%	93%	3%	☺	The TAT exceeds the target due to laboratories improving their processes.
3.1.2	Number of occupational and environmental health and safety assessments completed	22	29	36	30	30	0	☺	
3.1.3	Number of surveillance reports produced	New	2	4	4	4	0	☺	
3.1.4	Percentage of NHLS laboratories audited which were below targeted compliance in 2018/19	New	98%	98%	95%	98%	3%	☺	20/86 = 8% labs were audited in the 4th quarter, resulting in a total of (84/86 = 98%)
3.2.1	Number of articles published in the peer reviewed journals	24	25	34	27	33	6	☺	The review process at different medical journals is variable and can result in either more or less articles reviewed and published at any given time.

Performance indicator		Actual 2016/17	Actual 2017/18	Actual 2018/19	Target 2019/20	Actual 2019/20	Actual deviation	Status	Reason for Deviation
3.2.2	Number of students, interns, registrars under supervision	20	28	29	26	28	2	☺	External bursary and scholarship opportunities have become available, thus enabling an increased number of students.

Commentary on the contribution of the strategic objectives to the strategic outcome-oriented goals.

The strategic objectives contributed to the achievement of the "Modernised and Accessible Laboratory Service" and "Academic Excellence in Training and Research" strategic outcome-oriented goals. The NIOH provides specialised advisory services to national and provincial governments and support to all sectors of the economy to promote health and safety. This is achieved by conducting assessments, amongst others, to ensure compliance with the Occupational Health and Safety Act.

Changes to targets.

There were no changes to the targets of Programme 3 in 2019/20.

Linking performance to budget:

Programme 3	Budget	Actual expenditure	Over/under expenditure	Budget	Actual expenditure	Over/ expenditure
	2019/20	2019/20	2019/20	2018/19	2018/19	2018/19
	R'000	R'000	R'000	R'000	R'000	R'000
Occupational Health	156,502	137,078	-19,423	125,126	125,954	-828

Reasons for deviations from the budget

Underspend due to vacancy budgeted but not filled, anticipated volumes did not materialise and operating expense were contained.

2.4.1.4 Programme 4: Academic Affairs, Research and Quality Assurance

Programme purpose

The main purpose of this programme is to strengthen the mandate of the NHLS of maintaining and providing quality assured and accredited laboratory medicine and the academic platform. Two of the focus areas within this programme are to ensure that research is conducted to contribute to service delivery improvement and quality, and to ensure national coverage by NHLS pathologists.

The aim is to oversee and collaborate with various training institutions that contribute to the development of qualified and skilled people operating within the scientific field of pathology services.

- **Sub-Programme - Quality Assurance -** The purpose of this sub-programme is to improve Total Quality Management systems within laboratories and support structures to improve the quality of results issued by NHLS laboratories.
- **Sub-Programme - Academic Affairs -**The purpose of this sub-programme is to promote capacity building of health professionals to strengthen a business case for sustained development for the NHLS through the development of Pathologists, Medical Scientists, Medical Technologists and Medical Technicians.
- **Sub-Programme – Research and Innovation -** The purpose of this sub-programme is to increase the knowledge base on diseases and influence the decision taken to diagnose, treat and care for these diseases through research outputs and articles published.

Strategic objectives

Sub-Programme – Quality Assurance	
Strategic Objective 4.1	Improved Quality Management Systems
Objective Statement:	Improve Total Quality Management systems within laboratories and support departments to increase certification of support structure and accreditation of laboratories.

Sub-Programme –Academic Affairs	
Strategic Objective 4.2	Increase pool of available pathology health professionals and pathologist national coverage
Strategic Objective 4.3	Improved Training Platform
Objective Statement	Promote capacity building of health professionals to strengthen a business case for sustained development for the NHLS through the development of pathologists, medical scientists, medical technologists and medical technicians. Ensure adequate and relevant contribution to diagnose laboratory services outside Academic centres, access by and clinical interaction with clinicians outside academic centres and contribution to the improvement of service delivery across the NHLS platform by pathologists.

Sub-Programme –Research	
Strategic Objective 4.4	Develop and implement a national research agenda for laboratory service and the NHI
Objective Statement:	Increase the knowledge base on diseases and influence the decisions taken to diagnose, treat and care for these diseases through research outputs and articles published and explore opportunities for innovation.

Key performance indicators

Performance indicator		Actual	Actual	Actual	Target	Actual	Actual deviation from the target	Status	Reason for Deviation
		2016/17	2017/18	2018/19	2019/20	2019/20			
4.1.1	Percentage compliance achieved by laboratories during annual quality compliance audits	90%	90%	79%	90%	86%	-4%	☹	Not Achieved – The percentage of laboratories achieving 80% increased by 7% when compared to 2018/19 financial year. This is because of improved quality management systems put in place.

Performance indicator		Actual	Actual	Actual	Target	Actual	Actual deviation from the target	Status	Reason for Deviation
		2016/17	2017/18	2018/19	2019/20	2019/20			
4.1.2	Number of National Central laboratories that are SANAS Accredited	90%	92%	94%	53	51	-2	☹	Not Achieved - There were no new laboratories accredited in the 4th quarter. The remaining two laboratories (Universitas Genetics and CMJAH Virology) could not apply for Pre SANAS assessment before the end of the financial year. Universitas indicated lack of skilled staff to enable the laboratory to obtain accreditation. The equipment needs were addressed but new equipment was not fully functional by the end of the financial year. CMJAH indicated that they started with the build-up of accreditation process in 2018 and indicated that they are short staffed due to the fact that new PCR testing were introduced. Universitas Genetics laboratory has completed the renovations to improve the workflow and has appointed staff in preparation for accreditation in 2020/21.
4.1.3	Number of Provincial Tertiary laboratories that are SANAS Accredited	47%	71%	70%	13	13	0	☺	Achieved
4.1.4	Number of Regional laboratories that are SANAS Accredited	11%	27%	17	12	25	13	☺	Achieved - Improved implementation strategies contributed to more laboratories being accredited. Edenvale, Mafikeng, St. Ritas got accredited in the 3rd quarter. Pholosong and Sebokeng were assessed in the 4th quarter and were recommended for accreditation. The certificates are delayed due to the lockdown.

Performance indicator		Actual	Actual	Actual	Target	Actual	Actual deviation from the target	Status	Reason for Deviation
		2016/17	2017/18	2018/19	2019/20	2019/20			
4.1.5	Number of District laboratories that are SANAS Accredited	New	3%	11	10	25	15	☺	Achieved - Improved implementation strategies contributed to more laboratories being accredited. Escourt, Helderburg, Hermanus, St. Apollinaris and Willowvale were accredited in the 4th quarter. Tintswalo was assessed in March 2020 and the certificate is delayed due to lockdown.
4.1.6	Percentage of laboratories achieving proficiency testing scheme performance standards of 80%	New	92%	96%	90%	88%	-2%	☹	Not Achieved- This is due to most laboratories not returning the results to the department to be assessed, as a result no scores were allocated to those laboratories, bringing down the final score.
4.2.1	Number of pathology registrars admitted and trained in the NHLS	243*	63	27	30	60	30	☺	Achieved - The recruitment of registrars was expanded to address the demand for pathologists.
4.2.2	Number of medical intern scientists admitted and trained in the NHLS	New	New	36	50	27	-23	☹	Not Achieved - The stipend for the intern medical scientists had to be reviewed in 2019/20. This resulted in the delay in the recruitment.
4.3.1	Number of intern medical technologists and student medical technicians admitted and trained in the NHLS	New	New	248	200	218	18	☺	Achieved - There was an increased intake of the intern medical technologists and the BHSc interns by the universities of technology. The intake in the NHLS is always aligned to the intake by universities of technology.
4.3.2	Number of bilateral or umbrella agreements signed with universities and the universities of technology	New	New	5	18	23	5	☺	9 medical universities signed the umbrella agreement, 8 universities of technology signed the umbrella agreement and 6 medical universities signed the bilateral agreements.

Performance indicator		Actual	Actual	Actual	Target	Actual	Actual deviation from the target	Status	Reason for Deviation
		2016/17	2017/18	2018/19	2019/20	2019/20			
4.4.1	Number of articles published in the peer reviewed journals	570	588	593	600	632	32	☺	Achieved - The review process at different medical journals is variable and can result in either more or less articles reviewed and published at any given time.

**The reported number of registrars admitted in 2016/2017 included all the registrars on the training platform. The reported number in subsequent years was based on the number of registrars admitted and trained in that financial year*

Commentary on the contribution of the strategic objectives to the strategic outcome-oriented goals

The strategic objectives contributed to the achievement of the "Modernised and Accessible Laboratory Service" and "Academic Excellence in Training and Research" strategic outcome-oriented goals. The NHLS improved significantly in strengthening its QMS' in the regional and district laboratories. It also exceeded its expectations in the publication of research based articles.

Changes to targets.

There were no changes to the targets of Programme 4 in the 2019/20 financial year.

Linking performance to budget:

Programme 4	Budget	Actual expenditure	Over/under expenditure	Budget	Actual expenditure	Over/ expenditure
	2019/20	2019/20	2019/20	2018/19	2018/19	2018/19
	R'000	R'000	R'000	R'000	R'000	R'000
Academic Affairs, Research and Quality Assurance	58,488	88,800	30,312	59,893	70,237	-10,345

Reasons for deviations from budget

Overspent on labour due to intake of more Medical Officer Community Service than what was budgeted for and the provision for teaching and training.

2.4.1.5. Programme 5 – Laboratory Service

Programme purpose

This programme represents the core business of the NHLS as mandated by the NHLS Act, to provide cost-effective and efficient health laboratory services to all public sector health care providers; any other government institution inside and outside of South Africa that may require such services; and any private health care provider that requests such services. It is anticipated that the NHLS should provide a comprehensive, accessible, quality and timeous pathology service resulting in improved patient care. There are two sub-programmes, namely:

- **Sub-Programme – Operational Efficiency**

The purpose of this sub-programme is to Increase the overall turnaround times of all tests within every laboratory across South Africa and improve levels of quality of tests performed in the laboratories.

Strategic objectives

Sub-Programme – Operational Efficiency	
Strategic Objective 5.1	Improved Turnaround times
Objective Statement:	Increase the overall turnaround times of all tests within every laboratory across South Africa.
Strategic Objective 5.2	Laboratory Service equipped, and functioning at a level that provides accurate, reliable results timeously
Objective Statement	All laboratories shall have appropriate functional equipment and adequate supplies to support uninterrupted delivery of service.

Key Performance Indicators

Performance indicator		Actual	Actual	Actual	Target	Actual	Actual deviation	Status	Reason for Deviation
		2016/17	2017/18	2018/19	2019/20	2019/20			
5.1.1	Percentage TB Micros-copy tests performed within specified turnaround time	96%	94%	94%	95%	95%	0	☺	Achieved
5.1.2	Percentage TB GeneX-pert tests performed within specified turnaround time	97%	91%	94%	90%	94%	4%	☺	Achieved
5.1.3	Percentage CD4 tests performed within specified turnaround time	94%	91%	91%	90%	94%	4%	☺	Achieved
5.1.4	Percentage HIV Viral Load tests performed within 96 hours	87%	82%	86%	75%	79%	4%	☺	Achieved

Performance indicator		Actual	Actual	Actual	Target	Actual	Actual deviation	Status	Reason for Deviation
		2016/17	2017/18	2018/19	2019/20	2019/20			
5.1.5	Percentage HIV PCR tests performed within 96 hours	82%	77%	86%	85%	72%	-13	☹	Not Achieved - The main reason for KZN is increase in testing numbers due to the guidelines whilst at the same time the laboratory experienced frequent instruments downtime. Also more than 10 months' delay in migration of viral load testing from Roche platform to Abbott platform as per the new contract (at IALCH which is our testing site for HIV-PCR) meant that we continued to run Roche for both Viral Load and HIV-PCR whilst we had budgeted to free Roche to focus only on HIV-PCR according to the tender. The strategy as to decentralise HIV-PCR testing to Edendale and Ngwelezane so that we have 3 sites doing the test instead of 1 site. These additional sites started running from April 2020. The analyser at Tshwane academic had to replace because the one in use was faulty and that impacted on the turnaround time.
5.1.6	Percentage Cervical Smear screening performed within five weeks	97%	90%	84%	90%	86%	-4%	☹	Not Achieved - Limpopo was affected by a sudden increase of over 100% of the requests in the months of August and September. These were the only months where the turnaround time was not met. The volumes were very high and affected the whole year performance. Gauteng, the challenges was at DGM because of insufficient testing capacity. The analyser is too small and old. Tender process is in process for the Liquid Based Cytology instruments which will increase the testing capacity and will improve the turnaround time.
5.1.7	Percentage of laboratory tests (FBC) performed within 8 hours	80%	94%	95%	95%	95%	0	☺	Achieved

Performance indicator		Actual	Actual	Actual	Target	Actual	Actual deviation	Status	Reason for Deviation
		2016/17	2017/18	2018/19	2019/20	2019/20			
5.1.8	Percentage of laboratory tests (U&E) performed within 8 hours	80%	91%	93%	94%	94%	0	☺	Achieved

Commentary on the contribution of the strategic objectives to the strategic outcome oriented goals

The strategic objectives contributed to the achievement of the "Modernised and Accessible Laboratory Service" and "Effective and Ethical Organisation for the Improved Service Delivery and Implementation of NHI" strategic outcome-oriented goals. The NHLS continues to offer laboratory services of high quality within the TATs.

Changes to targets

There were no changes to the targets of Programme 5 in the 2019/20 financial year.

Linking performance to budget:

Programme 5	Budget	Actual expenditure	Over/under expenditure	Budget	Actual expenditure	Over/ expenditure
	2019/20	2019/20	2019/20	2018/19	2018/19	2018/19
	R'000	R'000	R'000	R'000	R'000	R'000
Laboratory Services	7,648 269	6,830,737	-817,532	860,409	449,861	360,549

Reasons for deviations from the budget

The NHLS executives are managing labour costs carefully by filling critical vacancies only. The laboratories also improve and strengthened their operational efficiency which result in minimal wastage of direct materials.

2.4.2. Business unit performance

2.4.2.1. Introduction

The NHLS has five business units that serve to execute its core mandate which has the following main objectives:

- Support the DoH in delivering laboratory services to South Africans;
- Provide training in health sciences in partnership with universities and UoTs, and
- Promote and undertake relevant and innovative health-related research.

The business units are as follows:

- Laboratory Services, which is further classified into six regions, namely: Eastern Cape, Free State and North West, Gauteng, KwaZulu-Natal, Limpopo and Mpumalanga and Northern and Western Cape;
- Academic Affairs, Research and Quality Assurance (AARQA);
- The National Priority Programme (NPP)
- The National Institute for Communicable Diseases (NICD); and
- The National Institute for Occupational Health (NIOH).

In addition, the organisation has the following support services departments:

- Human Resources;
- Finance;
- Information Technology and
- Communication, Marketing and Public Relations.

The NHLS also has a subsidiary namely South African Vaccine Producers (SAVP).

2.4.2.2. Laboratory Services

The Operations Team

Tabita Makula
Eastern Cape

Jone Mofokeng
Free State and North West

Bahule Motlonye
Gauteng

Jacob Lebudi
Limpopo and Mpumalanga

Sibulele Bandezi
KwaZulu-Natal

Nasima Mohamed
Western Cape and
Northern Cape

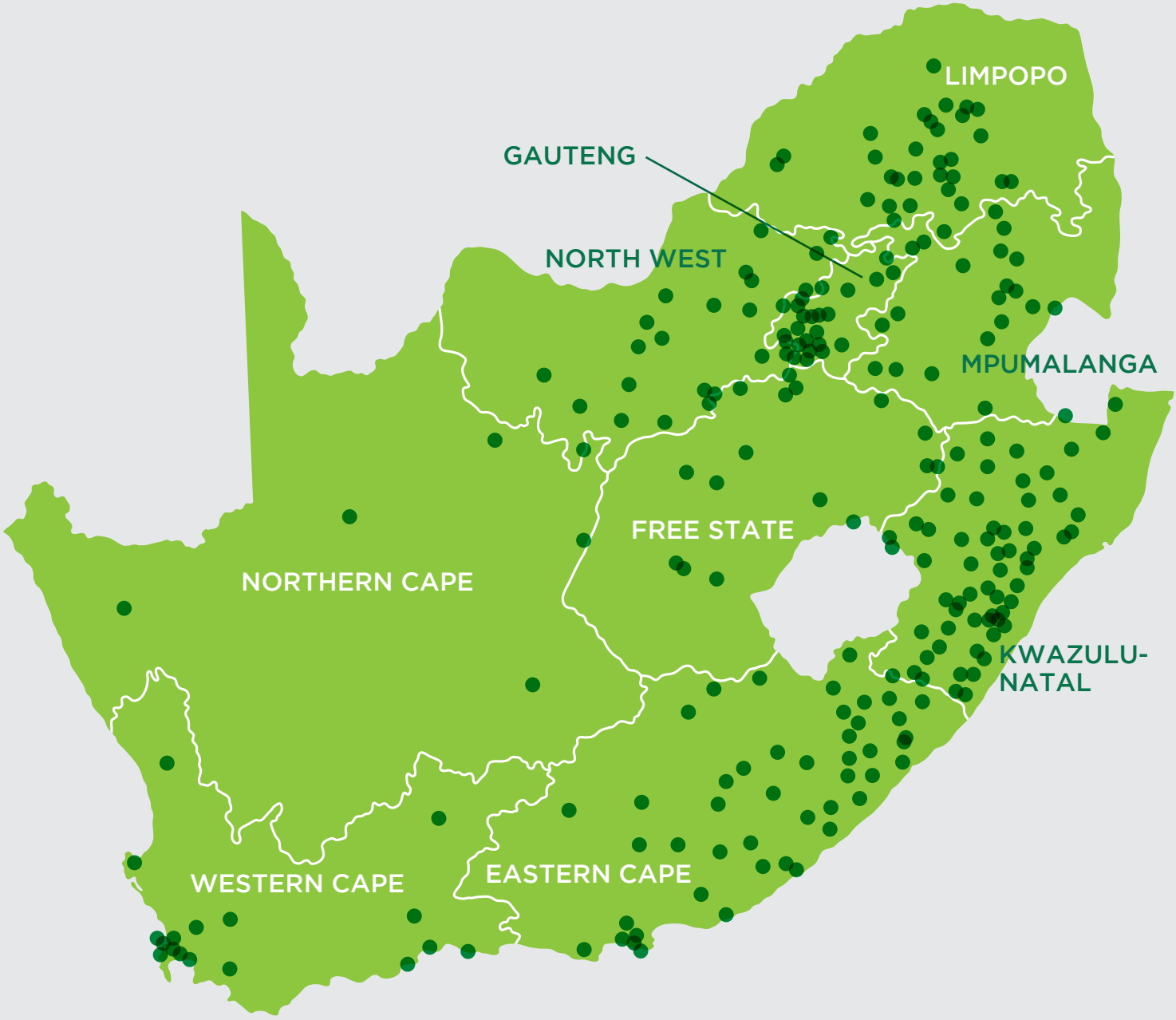
Introduction

The National Health Laboratory Service has a mandate to provide three functions: diagnostic services, research and training. This section focuses on the diagnostic services that are provided through laboratory services across South Africa. In some regions, like Gauteng, services are also provided to other regions and countries.

Within each region, business units provide services across all of South Africa's provincial districts.

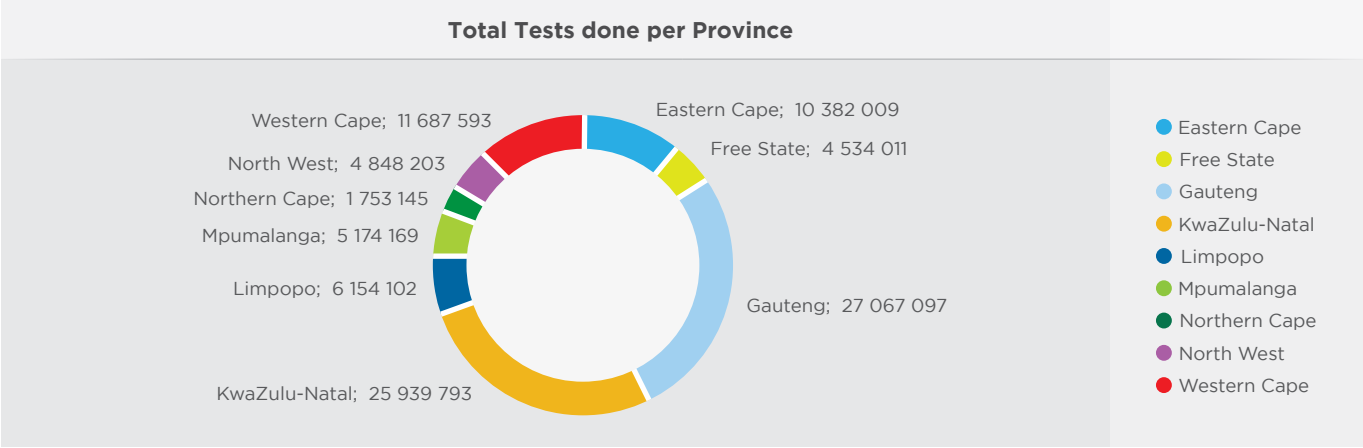
The NHLS has at least one laboratory in every district across the country from the most rural and unpopulated areas in Northern Cape to the metropolitan cities in Gauteng, KwaZulu-Natal, and Western Cape. Where hospitals and primary health clinics do not have an on-site laboratory, specimens are couriered to the nearest laboratory once or twice per day. Depots receive specimens, register and refer them to the laboratories.

The NHLS national footprint



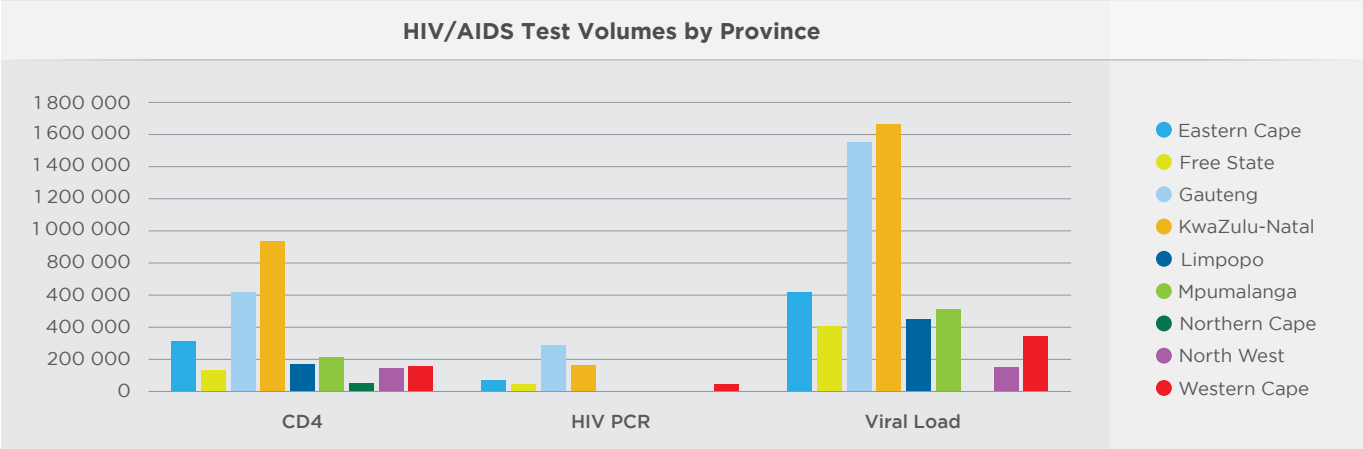
Diagnostic services and new developments

In total 97 540 122 tests were done in the year under review representing a 3.2% increase on the previous year. The graph below shows the number of tests done per province within the financial year 2019/2020.

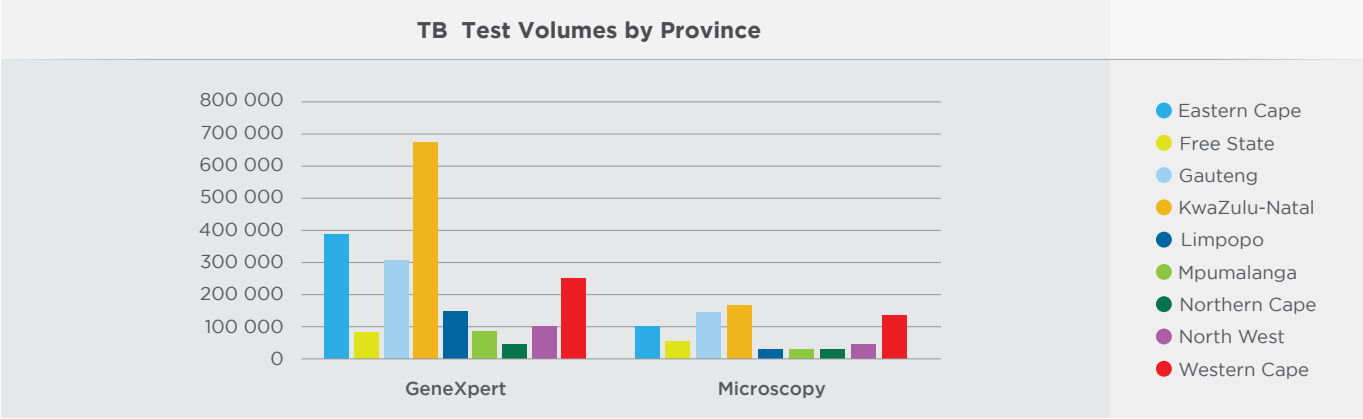


National priority tests

The NHLS laboratories supports the Department of Health's National Priority Programme through testing for Tuberculosis, Cervical Screening, HIV and AIDS. Each province supports this programme where facilities allow and a demand is present.



HIV/AIDS testing includes CD4 count, diagnosis of HIV through Polymerase Chain Reaction (PCR) tests and viral load tests. In the 2019/2020 financial year, viral load tests increased by 8.9% nationally, a notable achievement for one of the National Priority Programme tests. The increase on the number of tests is per increase demand from provinces. The provinces that are not showing in the graph are referring to other provinces. They do not perform the tests on site.



More than 2,8 million Tuberculosis tests were done in the year under review. The vast majority of these were done on the GeneXpert high throughput instruments that provide integrated testing.

Table 1: Cytology laboratories

Fiscal Year	Province	Eastern Cape	Free State	Gauteng	KwaZulu-Natal	Limpopo	Mpumalanga	North West	Northern Cape	Western Cape	Total
	Metrics	Total Number of Gynae Slides Received	Total Number of Gynae Slides Received	Total Number of Gynae Slides Received	Total Number of Gynae Slides Received	Total Number of Gynae Slides Received	Total Number of Gynae Slides Received	Total Number of Gynae Slides Received	Total Number of Gynae Slides Received	Total Number of Gynae Slides Received	Total Number of Gynae Slides Received
FY 17/18		91 826	43 208	191 046	182 585	84 316	69 544	63 913	15 886	127 443	**869 767**
FY 18/19		105 575	51 781	208 937	234 075	80 018	87 723	67 618	18 873	134 921	**989 521**
FY 19/20		122 255	56 186	235 398	216 890	75 298	96 098	75 538	17 337	135 488	**1 030 488**

There are 12 Cytology laboratories situated in seven provinces (North West province and Northern Cape refer their cytology specimens to DGM and Universitas cytology laboratories respectively). Following full implementation of Liquid Based Cytology (LBC) in the previous year, most provinces recorded a high LBC conversion rate (above 90%) from conventional smears. The table above shows the number of cervical smear tests done by province for 2017/18 comparative to 2018/19 and 2019/2020.

COVID-19

In December 2019, a novel coronavirus was identified in Wuhan, China, which rapidly spread to the rest of the world.

The NHLS worked quickly to upscale capacity in the laboratories to provide COVID-19 testing through the procurement of new equipment. In March 2020, commercial reagents were available for the Roche and GeneXpert testing instruments which are normaly used for TB and HIV for the COVID-19 testing.

The first two laboratories which started testing were Groote Schuur Hospital Laboratory and Tygerberg Hospital Laboratory on the 8th and 9th March respectively. There were three more laboratories testing by the 20th March 2020, namely Charlotte Maxeke Johannesburg Academic Hospital Laboratory, Universitas Laboratory and Inkosi Albert Luthuli Central Hospital Laboratory. Two more laboratories were added on the 28 March namely Tshwane Academic Laboratory and Dr George Mkhari Laboratory. By the end of the financial year eleven laboratories were doing COVID-19 tests, 6644 tests had been done and 1353 positive cases had been diagnosed within South Africa.

The NHLS Virology laboratory at Tygerberg Hospital commenced testing for the virus at the beginning of March 2020, using commercial Seegene 2019-nCoV assay kits. Test volumes increased exponentially within the first two weeks and then escalated daily, following confirmation of the local transmission of the virus.

The limited stock of SARS-CoV-2 commercial test kits and the pace at which the virus spread, led to a pandemic of an unprecedented scale, which required rapid innovation to counter the risk of stock outages and maintain testing capacity.

Mathilda Claassen, a principle medical technologist in the Virology Laboratory at Tygerberg Hospital, (TBH) was instrumental in setting up an in-house SARS-CoV-2 PCR protocol by mid-March 2020. The in-house assay used readily available reagents, enzymes and primers, as published by Corman et al, 2020.

WHO guidelines for countries testing for SARS-CoV-2 where the virus was not detected before, were used to validate the assay, using plasmid controls supplied by the NICD.

Due to the foresight of Mathilda Claassen and the rapid response of the TBH Virology Laboratory, this in-house assay was implemented within a week after commercial kits were depleted, enabling the laboratory to continue testing.

New Tests

Several laboratories added new tests to their offering in the year under review.
The table below highlights the expansion of the test offering across provinces.

Table 2: Test offering across provinces

Province	Laboratory	New Tests Added
Eastern Cape	NMAL	Carbapenem Resistant Enterobacteriaceae screening (CRE)
	Port Elizabeth	COVID-19
	Umtata	COVID-19
	Humansdorp	HBA1C
	Somerset East	HBA1C
	Port Alfred	CLAT
	All Saints	Blood gas
	Cala	Cholesterol; Triglyceride; CRP
	St Barnabas	PTT
	Queenstown	Amylase
	Holy Cross	CSF cell count and CSF chemistry
	Madzikane	CSF Chemistry
Free State	Universitas	COVID-19
Gauteng	CMJAH	Cytomegalovirus (CMV) immunoglobulin M (IgM) CMV immunoglobulin G (IgG) Rubella IgM Rubella IgG Hepatitis A IgG COVID-19
	TAD	Amikacin Tacrolimus Myositis-associated autoantibody (AAb) screen COVID-19
	DGM	COVID-19
KwaZulu-Natal	IALCH	COVID-19 Updated its DRB Reflex testing protocol in the TB lab Automation of Protein C
	KEH Chemical Pathology	Urine Cortisol T3 T4 TSH Ferritin
Limpopo	Polokwane	COVID-19
Mpumalanga	Rob Ferreira	Bone marrow aspirates Peropheral smear morphology Mycology bench
	Ermelo	**Drug tests:** Valporic Acid, Acetaminophen, Salicylates, Phenytoin, Carbamazepine **Nutritional tests:** Iron, Transferrin, Ferritin, Vitamin B12, Folate **Cancer markers:** pheto proteins, CEA, CA199 and CA 125
	Witbank	Automation of RPR and HIV testing
Northern Cape	Kimberley	Micro-albumin in urine
	De Aar	Drugs of abuse in urine samples Serum rheumatoid factor
	Tshwaragano	Serum calcium Magnesium Phosphates

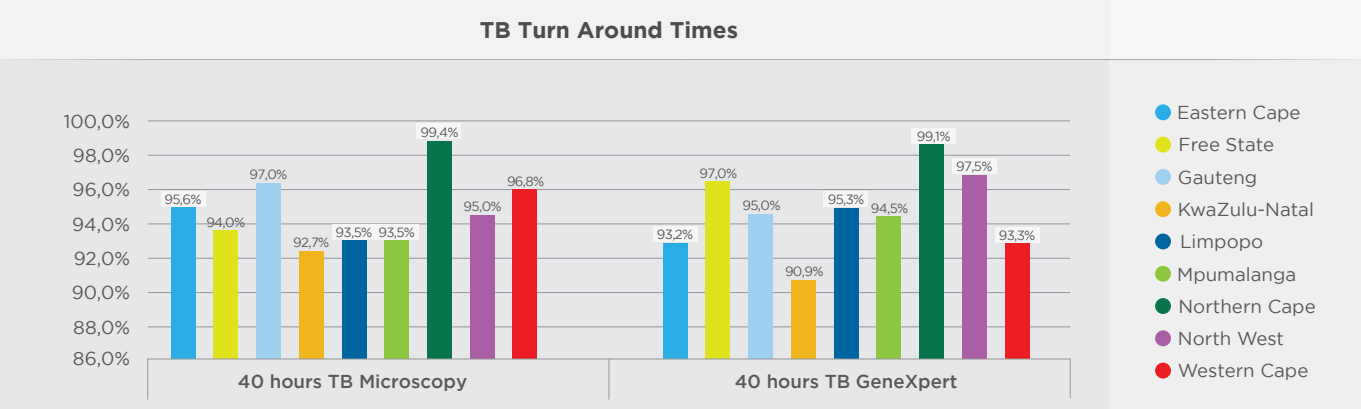
Province	Laboratory	New Tests Added
Western Cape	GSH	Faecal occult blood test (FOBT); Lateral flow assay (LFA) Troponin I (Trop I) high sensitivity test Lipase tests COVID-19
	Green Point	Chemistry and iron studies introduced Lipase tests
	Paarl	Haematinic tests Lipase tests
	Worcester	HbA1c Lipase tests
	Tygerberg	COVID-19 Lipase Tests Free PSA Automation of Osmotic fragility testing Myelin oligodendrocyte glycoprotein

Service delivery

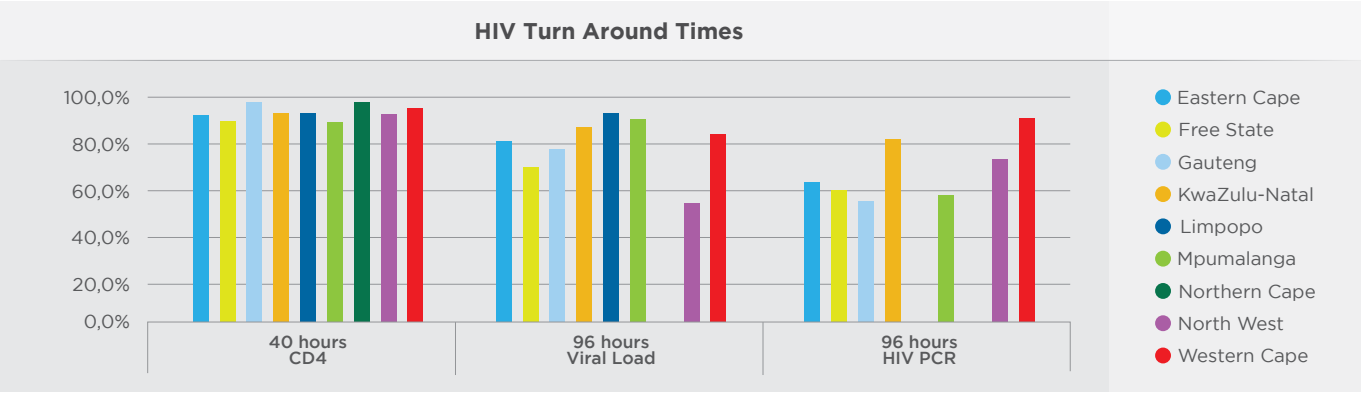
Service delivery is measured based on the number of tests that are completed within the agreed turnaround times.

Tuberculosis

Both Tuberculosis tests, Microscopy and GeneXpert, have a reasonable Turn Around Time (TAT) of 40 hours. Laboratories are expected to meet this time frame for a target 95% of microscopy and 90% of GeneXpert tests. The graph below depicts the number of tests conducted that were within the target.



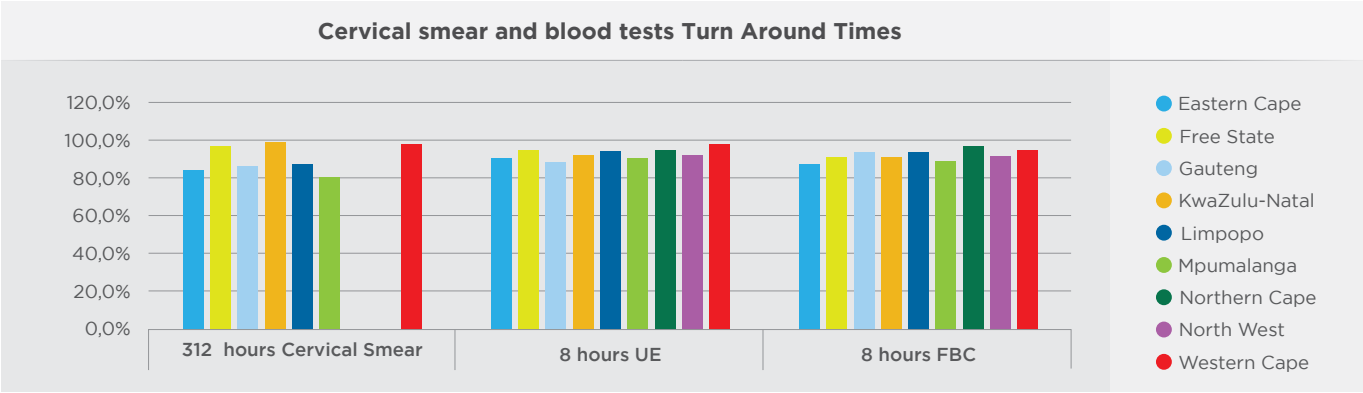
HIV and AIDS



The turnaround times for all the national priority programmes were achieved by most of the provinces. There was however a challenge in achieving targets for the HIV Viral Load and HIV PCR across provinces. This was mainly due to the placement of new HIV Viral Load instruments. This required renovations in most of the laboratories. the renovations and removal of old instruments to be replaced by new ones necessitated the closure of some of the laboratories with a subsequent referral of work to other operational sites. This contributed to the increase in turnaround time.

Furthermore, the main contributor to the delayed turnaround time of HIV PCR was the prolonged stock outs of the testing kits globally. The changes made to the Prevention of Mother To Child Transmission guidelines (PMCT) in November 2019, could have contributed to delayed turnaround time. The guidelines were updated to include an additional HIV PCR test at six months for all HIV-exposed infants testing negative at birth and at 10 weeks of age.

Cervical smear and blood tests



The new cervical cancer screening technology, Liquid base Cytology (LBC), was very well accepted by the health care workers. This resulted in a much higher uptake of work and the influx of LBC specimens inundated the cytology laboratories. Backlog of LBC specimens caused a drop in turn-around-time in certain laboratories. The Western Cape and Limpopo have not changed to LBC as yet. A new tender for additional LBC equipment to address the backlogs and turn-around-time, is currently in process. The additional equipment will alleviate the pressure and affect the turn-around-time positively.

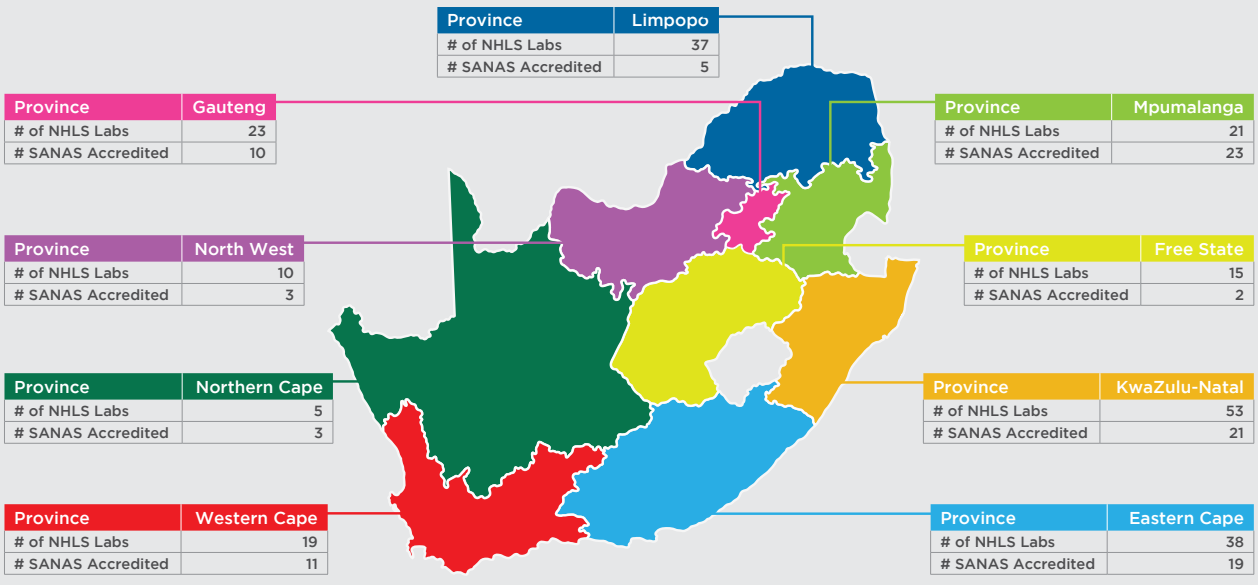
Urea and electrolytes (UE) tests are commonly used to detect abnormalities of blood chemistry, primarily kidney (renal) function and dehydration. The 93% target was reached by most provinces and those that missed the target did so by 1.1%-2%.

The full blood count (FBC) is one of the most commonly requested tests and provides important information about the kinds and numbers of cells in the blood as a primary step in diagnosis. The provincial results within the turn around time of 8 hours ranged between 90% and 97,8%, where the target was 95%.

Notable achievements

The NHLS is proud to have 69 SANAS accredited laboratories, 52 of which have maintained or improved on their accreditation from previous years and 19 received their initial accreditation in the year under review. Thirteen laboratories underwent pre-SANAS screening and have been recommended for review.

Applications for pre-SANAS accreditation assessments, which will be conducted in the new financial year.



** The number of laboratories excludes depots.*

Eastern Cape

In the Eastern Cape, three district laboratories, Victoria, Bisho and Zitulele also submitted applications for pre-SANAS accreditation assessments, which will be conducted in the new financial year.

Free State

Tshepong laboratory in the North West maintained its SANAS accreditation status for the fourth consecutive year

Universitas hospital laboratory in the Free State maintained SANAS accreditation for all its departments, except for Human Genetics.

North West

Rustenburg and Mafikeng laboratories achieved their SANAS accreditation this financial year. Tshepong Laboratory maintained its SANAS accreditation status for the fourth consecutive year.

National coverage provided from Rustenburg Provincial Tertiary Laboratory

Gauteng

All academic business units in the Gauteng region and other laboratories such as Braamfontein Complex (TB laboratory, Immunology and Cytology), Helen Joseph, Thelle Mogoerane and Tambo Memorial laboratories have maintained their SANAS accreditation (ISO 15189), during the period under review.

The academic laboratories offer national coverage to district and regional laboratories including those outside of Gauteng.

NHLS Jubilee Laboratory that provides national coverage from Dr George Mukhari Hospital

KwaZulu-Natal

KwaZulu-Natal has a total of 21 accredited laboratories as at the 31 March 2020. These accreditation statistics are not only unprecedented within the organisation; but the six additional laboratories that have been accredited also broke the standing record of the most laboratories accredited in one financial year, which was in the 2014/15 financial year.

Limpopo

Polokwane, Tshilidzini and Malamulele laboratories improved on their performance which translates to readiness towards achieving SANAS accreditation and improved service to customers.

Mokopane maintained their performance of the previous year, while Lebowakgomo regressed. This indicates a requirement for greater focus on performance in these laboratories.

Mpumalanga

The Ermelo Regional laboratory in Mpumalanga maintained full SANAS accreditation for all its tests offered, and obtained accreditation for some additional tests that have been added, such as: automated syphilis, Hepatitis A, B, and C.

Northern Cape

De Aar District laboratory achieved official SANAS accreditation status in July 2019 after a successful initial assessment in February 2019. Kimberley laboratory, which is a provincial tertiary laboratory, maintained its SANAS accreditation status after a successful surveillance audit. Upington Regional laboratory obtained SANAS accreditation status after a successful initial assessment. The business unit is working towards accreditation of Tshwaragano and Springbok laboratories to achieve accreditation of all the laboratories within the unit.

Upington Laboratory staff with Mabuse Mashishi (laboratory manager), Janet Scholtz (regional manager: quality assurance) and Moeketsi Mabote (quality assurance coordinator)

Western Cape

In the Western Cape the NHLS Groote Schuur Hospital (GSH) laboratory's Tissue Immunology laboratory remains the only laboratory on the African continent that is both SANAS and EFI accredited. The GSH Genetics laboratory remains the only SANAS-accredited genetics laboratory within the NHLS and it has added Constitutional DNA microarray to its SANAS accreditation. The Red Cross Children's Hospital(RXH) Chemistry and Haematology laboratory increased its accredited test repertoire by adding chromogranin A (CgA) to the SANAS schedule.

Laboratories that are non-accredited are subjected to quality compliance audits (QCAs), to assess their compliance with the ISO 15189 standard.

Helderberg Laboratory accreditation

Hermanus Laboratory accreditation

New laboratories and laboratory upgrades

In the year under review, several regions did extensive renovations to improve workspace and accommodate new instrumentation to expand the laboratories' services and upscale for COVID-19 testing.

Free State

Phase 2 of the renovations to improve the workflow at the receiving office in Pelonomi Laboratory in the Free State has been completed during the financial year under review. Botshabelo Laboratory was renovated to improve health and safety compliance.

The Human Genetics department in the Free State previously operated from three different locations, but during this financial year, the entire department was moved to a newly renovated space under one roof. This should have a positive impact on their preparation to regain SANAS accreditation. The Virology laboratory received its second Cobas 8800 instrument to handle VL testing, which could later also be utilised for COVID-19 testing.

Botshabelo laboratory renovations

Human Genetics laboratory renovations

North West

The North West region commissioned several renovations to improve the workflow and working conditions, and to be compliant with health and safety requirements. During the year under review, phase 2 of the renovations were completed in Mafikeng, Rustenburg and Tshepong laboratories.

KwaZulu-Natal

In KwaZulu-Natal, the floor repair project at IALCH,was completed. The TB laboratory structural changes for health and safety, will continue after the COVID-19 lockdown. The restructuring of the laboratories in the Virology Section was necessary, as there was an increase in testing due to the COVID-19 pandemic, and the Abbott Alinity system was placed for VL testing.

Infrastructural challenges still exist at the KEH laboratories, as floor repairs have been budgeted for, but the procurement processes have not yet been finalised. Renovations were undertaken at Ngwelezane laboratory in preparation for HIV-PCR testing.

The Madadeni Microbiology and Virology departments were renovated to provide for the increase in VL testing. Ladysmith laboratory was renovated to create a new reception and data capturing area.

Limpopo

Two of the Limpopo regional laboratories, namely Letaba and Tshilidzini commenced with renovations. The aim of the renovations in Letaba was to create space to accommodate microbiology testing. The objectives of the Tshilidzini renovations were to modernise the laboratory, improve working conditions and ensure compliance with health and safety standards. The renovation costs amounted to R344 380 for Tshilidzini and R292 812 for Letaba.

Minor renovations were successfully completed in Malamulele, Botlokwa and Giyani, to improve laboratory space, working conditions and compliance to safety standards.

Seshego and Musina laboratories, each procured a new park home laboratory for additional laboratory space, improved working conditions and compliance to health and safety standards. The current infrastructure was dilapidated and insufficient for laboratory operations. The two laboratories are in the process of relocating to these new facilities, which cost over R2.5 million.

In Sekhukhune-Waterberg, renovations commenced at Philadelphia and Bela Bela. Upon completion, this will result in expanded laboratory space, enhanced workflow, improved working conditions and compliance to health and safety standards.

Mpumalanga

A number of laboratory infrastructure upgrades took place in Mpumalanga during this reporting period to improve workflow and meet state-of-the-art laboratory standards. Renovations to the value of over R2 million were completed at Mapulaneng, Tintswalo, Barberton and Themba laboratories and the renovation projects at Mapulaneng and Tintswalo laboratories are in progress, with the aim to be completed in the new financial year.

New Musina Laboratory interior

New Seshego Laboratory

Northern Cape

In the Northern Cape, the Kimberley laboratory underwent a renovation process. The aim of the renovations was to increase the capacity of the phlebotomy service, increase the space within the specimen reception area while improving workflow, and to prepare for full automation of the chemistry and haematology laboratories inclusive of pre-analytical automation. This is in line with a strategy to improve service delivery and create state-of-the-art laboratories.

Kimberley Renovations

Kimberley Renovations Phlebotomy

Western Cape

The Western Cape Public Health Laboratory at Green Point Complex established a COVID-19 laboratory, in response to the COVID-19 pandemic.

The Mossel Bay laboratory was relocated to a new area on the Mossel Bay Hospital grounds, funded by NHI resources. Construction commenced in October 2019 and the staff took occupation in February 2020.

The tearoom at GSH-C18 Microbiology/Virology was upgraded to contribute to improved working conditions and staff morale.

The common areas at TBH laboratory, such as the cloakrooms, passages and some seminar rooms were upgraded during 2019. This contributed to an improved working environment for staff and enhanced the image of the NHLS during visits from students and other stakeholders.

Phase one of the renovation of the TBH Microbiology Laboratory was completed in the last quarter of the 2019/2020 financial year.

Stakeholder Relations

In general, the regions maintain strong relationships with clients such as the DoH, the CSCs of the SANDF, and municipalities, as well as partners of the DoH. To this end, regional staff attend all relevant meetings and workshops. The regions also participate in health-related campaigns and roadshows hosted by clients.

Eastern Cape

The Eastern Cape business units participated in a number of community outreach programmes in the health districts. Customer training on phlebotomy was conducted to improve the quality of samples received for testing. The Eastern Cape region maintained constant interaction with clients to strengthen stakeholder relations and the various managers attended relevant stakeholder meetings and events at different forums. A customer satisfaction survey was conducted to measure the quality of service delivery and identify gaps. An overall satisfaction score of 88% was achieved, with 87% for service delivery and 90% for communication and service culture, respectively. Later in the year, customers were also educated on the coronavirus pandemic and how to collect COVID-19 samples.

Free State and North West

Blood and laboratory user committees are functional at all hospitals in the Free State province. Excellent relations are maintained with the University of the Free State (UFS) and the staff consistently participate in informal and formal meetings with the Dean, including the Institutional Academic Pathology Committee meetings.

The Free State region also maintains a positive relationship with its major stakeholder, the Free State DoH, and various meetings and training sessions have been conducted with clients during the year under review. The business unit also maintained an excellent working relationship with the Free State DoH laboratory services manager, enabling positive results for interventions and communication on use of laboratory services, in line with the service level agreement (SLA) and the provincial DoH's requirements for electronic gatekeeping (EGK).

North West

The North West region participated in NPP activities by supporting the provincial campaigns for mass screenings and testing, and participating in all the relevant national and international awareness initiatives such as World Aids Day and Cancer Month.

NHLS staff attending the World Aids Day celebrations in Orkney to assist with TB screening via an NHLS mobile unit

Gauteng

The region maintains good relationships with all its stakeholders and continuously participates in numerous committees such as the Medical Advisory and Pathology Management Committees. Staff from the region also attend meetings such as the laboratory users and district meetings and conduct clinic visits together with representatives from the DoH and their partners. The dedicated clinic laboratory interface coordinator ensures seamless liaison between all parties involved.

Signing of the President Health Compact at Doctor George Mukhari Academic Hospital

KwaZulu-Natal

In KwaZulu-Natal, dedicated training, workshops and induction sessions have been conducted for the PHC and CHC clinics that are serviced by the KEH laboratories. New doctors, medical interns and clinic sisters at clinics and hospitals were also given access to the WebView patient portal and training was conducted on the new PHC request forms.

Management teams from the NHLS and DoH held numerous meetings at IALCH and KEH throughout the financial year, to discuss and resolve challenges pertaining to cost efficiency, monitoring of rejection rates, clinical gatekeeping, EGK, specimen taking practices, the LIS and hospital information system (HIS), the Global Green and Healthy Hospitals Initiative, etc. Additional meetings were convened with the NHLS to discuss the IALCH floor repair project, and address issues in Clinical Haematology and Haematopathology, Specialised Reflex Testing and Histopathology services. Daily COVID-19 updates were provided at joint operations meetings at IALCH and at KEH.

The region also participated in the KEH HOD meetings to ensure that customer complaints are addressed in a timely manner, and that optimal access to laboratory results are provided. KEH clinics were visited on a quarterly basis and issues were addressed on an ongoing basis. The SMS printers are fully functional in all the clinics, ensuring seamless access to test results. Frequent collection of samples was enabled through an outsourced courier service and an increased number of trips to the IALCH Virology laboratory was authorised, to enable rapid COVID-19 testing of patients in the triage area of KEH.

Test statistics were provided to the clinical HODs to assist them with electronic and clinical gatekeeping, rejections, contamination, TATs, pre-ordering, future orders and to enforce compliance with the MCDS and management of COVID-19 patients.

The bimonthly Lab User Committee meetings contributed to maintaining good client relations, whilst addressing operational efficiency matters, optimising clinical gatekeeping and rejections and minimising costs.

Meetings between the NHLS and the Impilo Consortium focused on day-to-day operational matters such as compliance with regulations of the Department of Employment and Labour (DEL) and the municipality, the agreement with the public-private partnership (PPP), and other issues such as equipment placement cycles, power outages, floor repairs, transitional changes, infrastructural changes, security, waste disposal and health and safety. To this end, the NHLS KwaZulu-Natal team also had meetings with the relevant subcontractors to coordinate the various operational and infrastructural changes.

Jointly appointed staff attended the UKZN LMMS Board meetings, and school meetings with the NHLS academic staff were held and chaired by the Dr S Ramlall, who is the coordinator of the Registrar Programme. Discussions involved motivating academics to pursue postgraduate studies, and in particular, Doctor of Philosophy degrees (PhDs), KPAs, the undergraduate curriculum, postgraduate support, the visual learning project, the robot system, etc.

Institutional Academic Pathology Committee (IAPC) meetings were held regularly, to address operational and academic matters escalated from per-mining community (PMC) levels and any other matters that form part of the umbrella agreement. The local bilateral agreement between the UKZN and NHLS KwaZulu-Natal Academic Complex has not yet been signed by the university. The school's operational manager also attended the PMC meeting to ensure that academic challenges are highlighted and resolved, and that teaching, training and research platforms are optimised for delivery.

Limpopo and Mpumalanga

In Limpopo and Mpumalanga, a critical aspect of relationship management with the provincial DoHs is the quarterly meetings to discuss the SLA. In these meetings, the discussion is centred on, but not limited to the following matters:

- Services delivered during the period under review;
- Perceived quality, efficiency, effectiveness and economy of laboratory service delivery;
- Timeliness of payments made by the department to the NHLS;
- Costs of utility services rendered by the municipality; and
- Other management and administrative matters, as and when necessary.

In December 2019, the Limpopo DoH, NHLS and Anova Health met to discuss the introduction of the Anova clinic-laboratory interface (CLI) system and how a collaboration can best be forged to achieve better health outcomes for the province.

The NHLS in Limpopo supported the DoH with community COVID-19 screening and testing at the Mantsole Traffic Control Centre. The screening took place from 24-26 March 2020 and was attended by the area manager, two business managers and a laboratory manager. The NHLS Mobile Laboratory was also made available for use by the DoH.

The Microbiology Department is involved in various committees at facility, district and provincial levels. This includes the Pharmacy and Therapeutics Committees, as well as the Antibiotic Stewardship and Infection Control Committees. The department remains actively involved in the infection prevention and control (IPC) programmes at the hospitals and partners with provincial and district managers to strengthen IPC and outbreak response initiatives.

In addition, the department participated in various workshops aimed at improving healthcare services. Activities included quarterly Surveillance and Outbreak Response Team meetings (at district and provincial levels) and chairing of the provincial Antimicrobial Stewardship Committee meetings in the province.

The Mpumalanga business unit participated in the following stakeholder engagements:

Mpumalanga Department of Health

- Quarterly meetings with the Mpumalanga DoH, to discuss issues such as the performance of the HIV prevention of mother-to-child transmission (PMTCT) programme; plus challenges experienced by laboratories with regards to high rejection rates; and ways to curb or reduce these rejections;
- Orientation of newly appointed doctors;
- Representation on the Rob Ferreira Hospital Patient Safety Incident Management Committee;
- Meetings to address challenges with the Mpumalanga HIV and AIDS/STI/TB (HAST) Programme;
- Participation in the laboratory and blood transfusion meetings to provide input on improvements that can be made to manage costs and reduce sample rejections in pathology services by the different hospitals; and
- Meetings with the SANDF CSCs to address operational issues and identify gaps in service delivery.

Non-governmental organisations

The DoH, NHLS and BroadReach established a joint partnership model to guide a collaborative effort between the DoH, NHLS and NGOs to effectively address any operational challenges at PHC level.

Right to Care is one such NGO that has formed a partnership with the Mpumalanga DoH to help improve healthcare service delivery.

Northern Cape

The client liaison officer actively engages clients at all levels, which includes training. Training is provided on MCDS, specimen rejection reasons, SMS printer operations, blood collection techniques, LBC procedures, EID collection techniques, use of the WebView portal and changes in testing methodology. The strategy of being visible and available proved to be effective in maintaining high levels of customer satisfaction.

Client interactions

Client interactions	Q1	Q2	Q3	Q4	Total
Training conducted (HCWs)	84	268	145	100	597
Facilities visited	42	43	35	32	152
Meetings attended	**2**	**8**	**7**	**7**	**24**

Western Cape

Based on the monthly NHLS rejection report, the unit focused on the improvement of phlebotomy technique and laboratory workflow. Several training sessions were conducted with various groups of HCWs at facilities.

Phlebotomy training of Health Care Workers

The NHLS was invited to attend the HAST, Child and Adolescent, Maternal and Reproductive Health Integrated Conference. A practical demonstration on phlebotomy was done and the completion of laboratory request forms was discussed. The unit's microbiologist, Dr. Natalie Beylis answered questions regarding discordant TB results on the GeneXpert, as well as the interpretation of trace result with the new ultra assay. Our Virologist Dr. Stephen Korsman addressed the issue of mother folder numbers being used for baby HIV-PCR testing.

Following on from this conference, the unit is now in discussion with the Peoples Development Centre to set up a phlebotomy course for HCWs.

The World TB Day events were cancelled due to the coronavirus pandemic.

Testing volumes for TB declined during the month of March, as testing for the coronavirus took centre stage. There are fears that the number of new TB infections may increase, considering many TB patients will be placed in the national COVID-19 lockdown, together with their families.

Virologists from both TBH and GSH attended several stakeholder events throughout the financial year under review.

Dr. Kruger Marais among farmworkers at Koplande Farm, during a World Aids Day event

Dr. Joanna Reid presenting a talk at a factory in Elsies River, which was organised by the Elsies River Clinic

2.4.2.3. National Priority Programmes

Prof Wendy Stevens
Director

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Introduction

During the 2019/2020 review period, the National Priority Programmes (NPP) Division of the NHLS continued to offer multidisciplinary services to the national diagnostic testing programmes that serve to support South Africa's HIV and TB programmes through:

- Ongoing assessment of diagnostic requirements and implementation of programmematic improvements;
- Driving research and development to guide innovations across the laboratory diagnostic value chain;
- Supporting existing testing laboratories through provision of technical assistance, training activities, certification as super users, and troubleshooting;
- Ongoing monitoring of performance, utilisation rates, spare capacity, error rates, specimen rejection rates, TATs, etc.;
- Planning and implementation of newly awarded tenders for respective programmes together with key stakeholders such as individual business units and suppliers; and
- Expansion of implementation science, drawing on the ability to access molecular characteristics of the testing platforms to:
    - Inform improvements in the clinical management of respective diseases;
    - Identify service delivery gaps;
    - Highlight disease hot spots; and
    - Improve linkage-to-care.

The routine diagnostic programmes were strengthened by national evaluation of Abbott's latest platform for testing HIV VL, amongst other diagnostic tests. The Alinity m instrument was implemented as per the requirements of the newly awarded HIV VL tender process for medium throughput testing sites, together with Roche's high-throughput platforms (Cobas 6800/8800) systems. Following national validation, EID HIV testing was implemented at two additional laboratories in 2019/2020, using Roche's Cobas instruments.

During quarter four of the financial year under review, the NPP Division devoted significant resources to assist with COVID-19 preparedness and diagnostic activities. Several work streams were established for the following purposes:

- Conducting landscape reviews of molecular- and serology-based diagnostic modalities;
- Compilation of validation protocols for both molecular and serology assays;
- Review and testing of collection material and new collection approaches;
- Establishing standardised serology panels for evaluating antibody/antigen-based rapid test kits;
- Sourcing reference material for validations and quality assurance aspects;
- Completing capacity assessments for integration of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) testing and leveraging existing diagnostic platforms such as the Roche Cobas, Abbott m2000, and Xpert;

- Assisting with grant funding for additional reagents and consumables; and
- Actively participating in advisory boards.

Research and development and grant-funded activities would not be possible without collaborations with national and international stakeholders and funders such as the CDC, Right to Care that is funded by the United States Agency for International Development (USAID), the Bill and Melinda Gates Foundation, the WHO, and diagnostic suppliers, to name a few.

National Diagnostic Testing Services: Tuberculosis Programme

National Xpert MTB/RIF Ultra Testing Programme

Overview

The NPP Division is responsible for implementing and monitoring GeneXpert MTB/RIF testing across the country. By 2018, this testing programme has transitioned to Xpert MTB/RIF Ultra (Xpert Ultra), the more sensitive version of the assay, performed at 166 testing laboratories using 325 Xpert instruments of varying capacity (127: GX4, 189: GX16, 1: GX48, and 8: GX80). Since March 2011, 17.1 million tests have been performed, which includes 4.8 million Xpert Ultra tests.

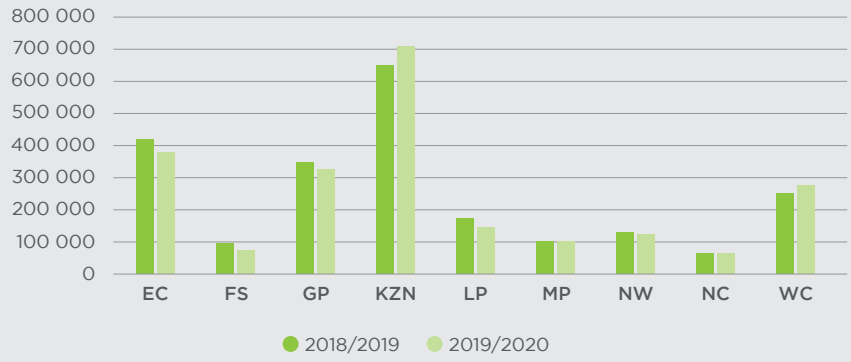
Operations

Between April 2019 and March 2020, 2.1 million Xpert Ultra tests were performed with the highest number of tests performed in four provinces as follows:

- KwaZulu-Natal (32.1%);
- Eastern Cape (17.8%);
- Gauteng (14.4%); and
- Western Cape (12.0%) (figure NPP1).

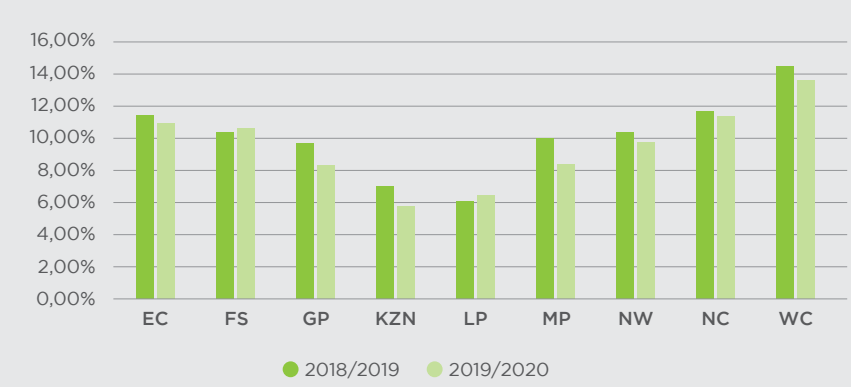
The average national TB positivity rate reported for the period was 8.8% (9.6% in 2018/2019). Western Cape reported the highest positivity rate (13.6%) and KwaZulu-Natal the lowest (5.9%) (figure NPP2). The average

Figure NPP 1: Xpert MTB/RIF Ultra provincial tested volumes for 2018/2019 and 2019/2020



Province	2018/2019	2019/2020
Eastern Cape	411455	390385
Free State	100353	88557
Gauteng	326445	326445
KwaZulu Natal	656525	703182
Limpopo	172599	145807
Mpumalanga	104014	100714
North West	126455	116475
Nothern Cape	69203	67994
Western Cape	249896	261932
	2216945	2189783

Figure NPP 2: Xpert MTB/RIF Ultra provincial positivity rates for 2018/2019 and 2019/2020



Province	2018/2019	2019/2020
Eastern Cape	11,16%	10,76%
Free State	10,41%	10,59%
Gauteng	9,57%	8,44%
KwaZulu Natal	7,00%	5,86%
Limpopo	6,15%	6,35%
Mpumalanga	9,92%	8,64%
North West	10,38%	9,88%
Northern Cape	11,70%	11,36%
Western Cape	14,53%	13,61%

RIF resistance detection rate for the period was 5.2% (5.3% in 2018/2019). Mpumalanga reported the highest RIF resistance rate of 6.8%, followed by KwaZulu-Natal at 6.4%, whilst North West reported the lowest rate of 3.9%. The number of reported unsuccessful tests remained at ~2%.

The improved sensitivity with Xpert Ultra is largely due to the detection of 'trace' amounts of MTB, representing the lowest measurable level of genetic material due to amplification of specific insertion sequences. However, when MTB is detected, the assay cannot distinguish organism viability, i.e., non-viable or remnant organisms may be detected in individuals with a history of previously diagnosed and/or treated TB and patients may not necessarily have active disease. To guide clinical management of suspected TB patients reporting 'trace' on pulmonary specimens, the NPP Division and the NICD Centre for Tuberculosis compiled interim guidance which was distributed to all laboratories. In summary, clinical management is guided by:

- Consideration of the patient's previous TB history;
- Repeating clinical assessments and the TB symptom screen; and
- Evaluating results of additional collected sputum specimens submitted for TB culture and drug susceptibility testing.

Of all the Xpert Ultra results reported, 1.9% detected 'trace'. Provincial differences were noted with Mpumalanga reporting the highest 'trace' detection rate (3.0%) and Limpopo the lowest (1.2%). KwaZulu-Natal reported the lowest MTB detection rate (5.86%) and similarly, a low 'trace' detection rate (1.3%). In contrast, Western Cape reported an MTB detection rate of 13.61% and a 'trace' detection rate of 2.6%. The differing 'trace' detection rate across provinces is currently under investigation, as it may have further implications for clinical management.

During 2019/2020, an average of 93.5% of Xpert Ultra tests were performed within a TAT of 40 hours, which exceeds the NHLS APP target of 90%.

All Xpert laboratories are monitored monthly in relation to test volumes, instrument utilisation, TATs, positivity, resistance and error rates through data extracted from the CDW and the Cepheid C360 real-time monitoring dashboard. Summary reports of laboratory performance are also compiled and distributed to area and business managers, on a monthly basis. This supports continuous monitoring of the programme.

For ongoing monitoring of testing quality, all Xpert Ultra testing laboratories are enrolled in the SmartSpot® EQA programme using dried culture spots (DCSs). Three DCS panels, containing four specimens each, were distributed to all Xpert Ultra sites, the results of which were submitted online and analysed. Consolidated reports are distributed to the NHLS Quality Assurance Division and area managers at the end of each EQA phase. During 2019/2020, 98% of laboratory sites participated in the EQA programme.

Output

Training

The NPP Division team provides technical training to the staff of Xpert Ultra laboratories, which includes hosting of advanced GeneXpert training workshops in collaboration with Cepheid. During the reporting period, two such advanced workshops were held and 32 participants were certified as super users (figure NPP3).

A new online training programme for Xpert Ultra for NHLS operators was furthermore launched in March 2020. The training is registered for CPD points and can be accessed at: www.TBGxMonitor.com. The online training programme comprises the following six modules:

1. Clinical utility;
2. Principles of PCR;
3. Reagent and sample processing;
4. Assay control;
5. Results interpretation; and
6. Trouble shooting.

Knowledge is assessed upon completion of each module. Since its launch, 30 operators have completed the online training programme. Support with troubleshooting was rendered during 31 site visits and another 179 laboratory staff members received basic technical training.

Figure NPP 3A: Mr. Frank Phiri conducting a practical demonstration during an advanced GeneXpert training workshop.

Figure NPP 3B: An attendee getting certified as a super user.

Xpert MTB/RIF Ultra Version 2

South Africa was one of the first countries to transition to Xpert Ultra in 2017. At the time, Xpert MTB/RIF Ultra Version 1 was provided. Version 2 was subsequently introduced with the following changes:

- Increased enzyme to extend cartridge stability to 12 months;
- Inclusion of a new reflector tube to improve manufacturability; and
- Realignment of the semi-quantitative result with Xpert MTB/RIF (previous test version) for uniformity across both assays.

In response to the launch, the programme structured a multi-laboratory study to demonstrate non-inferiority of the Xpert MTB/RIF Ultra Version 2 cartridge in comparison to the Xpert MTB/RIF Ultra Version 1 cartridge for both pulmonary and extra-pulmonary specimen types.

COVID-19

In response to the COVID-19 pandemic, the existing national Xpert footprint was leveraged as one of the diagnostic platforms to detect SARS-CoV-2. Following emergency use authorisation (EUA) from the Food and Drug Administration in March 2020, the NPP Division validated and implemented the Xpert Xpress SARS-CoV-2 cartridge at selected testing sites, upon completion of training, establishment of SOPs and onsite verification.

National Diagnostic Testing Services: HIV Programme

National Cluster of Differentiation-4 Count and Reflex Cryptococcal Antigen Testing Programme

Overview

Cluster of differentiation-4 (CD4) count testing continues to play a valuable role in the management and care of patients with HIV in SA [1,2,3,4,5]. The NHLS CD4 services are consolidated and strengthened by the successful widespread national implementation of cryptococcal antigen (CrAg) screening offered for HIV-infected, immune-compromised patients whose CD4 specimens reveal a count of <100 cells/Ql [6]. The CD4 Unit continues to monitor the prevalence of the burden of advanced HIV disease and cryptococcal infections, to identify areas in South Africa where the burden of disease is greatest.

CD4 servicing is decentralised at 47 testing facilities across the country and the unit supports and facilitates all training, site visits, onsite audits and preparation for SANAS accreditation.

1. Hirasen K, Fox MP, Hendrickson CJ, Sineke T, Onoya D. HIV Treatment Outcomes Among Patients Initiated on Antiretroviral Therapy Pre and Post-Universal Test and Treat Guidelines in South Africa. Therapeutic and Clinical Risk Management. 2020;16:169-80
2. Kalonji D, Mahomed OH. Health system challenges affecting HIV and tuberculosis integration at primary healthcare clinics in Durban, South Africa. Afr J Prim Health Care Fam Med. 2019;11(1):e1-e7.
3. Larsen A, Cheyip M, Tesfay A, Vranken P, Fomundam H, Wutoh A, et al. Timing and Predictors of Initiation on Antiretroviral Therapy Among Newly-Diagnosed HIV-Infected Persons in South Africa. AIDS Behav. 2019;23(2):375-85.
4. Lilian RR, Rees K, McIntyre JA, Struthers HE, Peters RPH. Same-day antiretroviral therapy initiation for HIV-infected adults in South Africa: Analysis of routine data. PLoS One. 2020;15(1):e0227572.
5. Pascoe SJ, Fox MP, Huber AN, Murphy J, Phokojoe M, Gorgens M, et al. Differentiated HIV care in South Africa: the effect of fast-track treatment initiation counselling on ART initiation and viral suppression as partial results of an impact evaluation on the impact of a package of services to improve HIV treatment adherence. J Int AIDS Soc. 2019;22(11):e25409.
6. Govender NP, Glencross DK. National coverage of reflex cryptococcal antigen screening: A milestone achievement in the care of persons with advanced HIV disease. S Afr Med J. 2018;108(7):534-5.

In addition, the unit:

- Distributes SOPs;
- Monitors performance of laboratories on EQA programmes and the Beckman Coulter Inter-Laboratory Quality Assurance Programme;
- Reviews weekly test volumes and TATs; and
- Initiates corrective action interventions as and when necessary.

Operational research output has also been published and presented at both local and international conferences, during the 2019/2020 financial year.

Operations

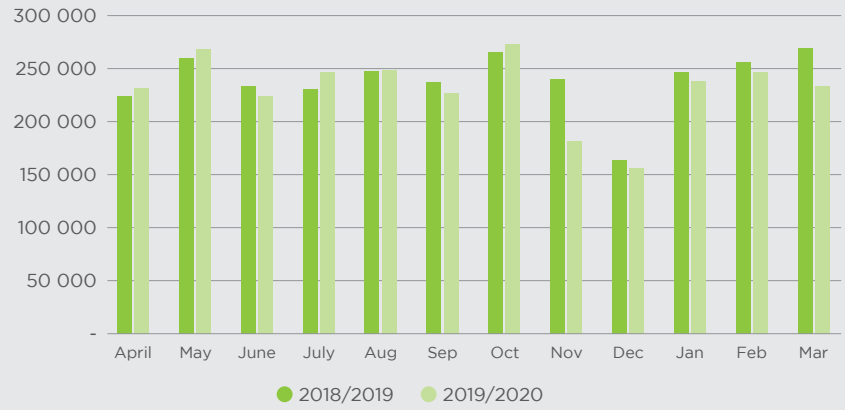
During the 2019/2020 financial period, the training team of the CD4 Unit executed the following activities:

- 13 Audits to assist laboratories with preparation for SANAS accreditation or internal audits;
- 30 Site visits to conduct troubleshooting and implement interventions to address identified issues;
- 18 Onsite training sessions on newly installed equipment or for newly appointed staff;
- Assistance with verifications at five sites where instruments were replaced;
- Tshepong Laboratory was switched from MPL to the AQUIOS system in February 2020;
- Trainers conducted a post-implementation survey at clinics served by the Tshwaragano Laboratory that was established in November 2018;
- The validation of new generation lateral flow assays for Cryptococcal antigen was finalised; and
- Trainers attended the SMLTSA conference in Bloemfontein in October 2019 where they also conducted oral presentations.

CD4 testing

There was a slight decrease of 3.5% (not statistically significant, p>0.1) in national testing volumes from 2018/2019 to 2019/2020. At provincial level, the decrease ranged from 2.5% (Gauteng) to 7.1% in the Free State, while the Northern Cape showed an increase of <1% in test volumes (figure NPP4). The CD4 test volumes performed in the various provinces ranged from 2.3% in the Northern Cape to 34% in KwaZulu-Natal.

Figure NPP4: CD4 test volumes per month for 2018/2019 and 2019/2020



Total CD4 Tests		
Month	2018/2019	2019/2020
April	223 872	229 679
May	254 641	257 630
June	237 750	224 912
July	229 466	248 632
August	247 766	249 890
September	234 687	227 539
October	261 300	266 635
November	240 537	184 528
December	164 110	154 605
January	248 501	240 510
February	252 979	243 677
March	262 146	230 057

Analyses of CD4 test volumes which reflect the burden on HIV disease, showed that:

- 61.2% of all specimens tested were within the category of CD4 >350 cells/Ql;
- 9.7% had a CD4 count of <100 cells/Ql; and
- 10.5% had a CD4 count of between 100-200 cells/Ql.

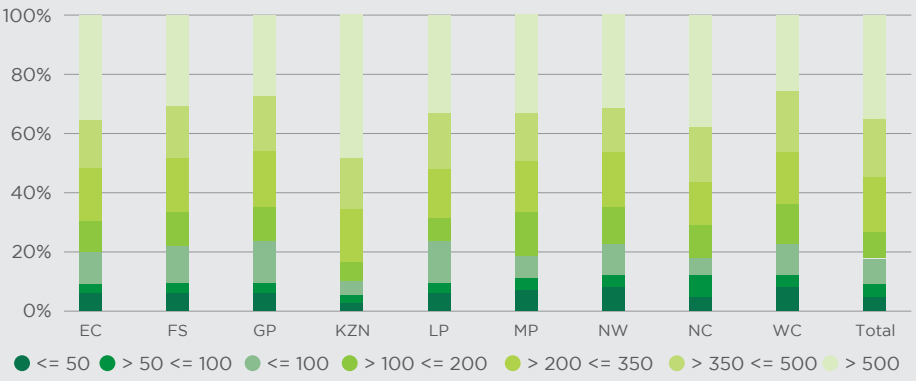
All categories showed a decrease in total numbers, confirming the overall downward trend.

A breakdown of the volumes of CD4 tests performed in each province (figure NPP5) indicated the following:

- KwaZulu-Natal had the highest percentage of specimens (of total tested) with a count of >500 cells/Ql (51.9%); and
- Western Cape had the lowest percentage in this category (indicating patients with acceptable immune response to treatment) of 31%.

Figure NPP5: CD4 tests volumes per province and per category in 2019/2020

Province	<= 50	> 50 <= 100	<=100	> 100 <= 200	> 200 <= 350	> 350 <= 500	> 500	Total	% of Total
EC	17719	15399	33118	34090	57382	56014	118132	298736	10,83
FS	8458	7217	15675	16734	27881	26250	49490	136030	4,93
GP	40507	31830	72337	74953	123477	111824	207055	589646	21,38
KZN	28480	25813	54293	67575	146163	183997	488842	940870	34,11
LP	13415	9804	23219	20159	33078	32570	70159	179185	6,50
MP	12764	10727	23491	25480	45708	44073	89520	228272	8,28
NW	10874	9273	20147	20327	32631	30555	61027	164687	5,97
NC	3185	3056	6241	6362	11114	11456	26441	61614	2,23
WC	10774	10238	21012	23099	34786	29459	50898	159254	5,77
Total	146176	123357	269533	288779	512220	526198	1161564	2758294	
% Total	**5,30**	**4,47**	**9,77**	**10,47**	**18,57**	**19,08**	**42,11**	**100**	



Specimens with counts between 350-500 and 200-350 cells/Ql represented 37% of all those tested, with no significant differences noted across provinces. Limpopo had the highest percentage (7.5%) of severely immune-suppressed specimens with CD4 counts of <50 cells/Ql followed by Gauteng at 6.8% and KwaZulu-Natal had the lowest percentage of 3%.

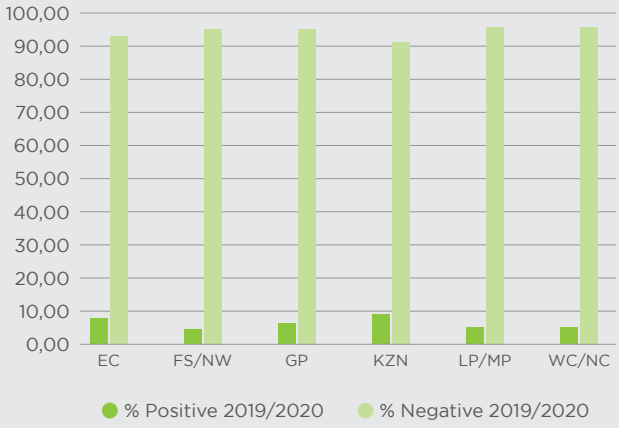
Laboratory TAT performance is monitored weekly and interventions (training and/or audits) are executed in cooperation with the laboratory management and staff, taking additional information from the daily operational call logs into consideration. TAT monitoring through the TAT dashboard continued weekly throughout 2019/2020, and the average monthly TAT noted was 17.4 hours (ranging from 3.1 to 33.3 hours). The NHLS overall annual target for specimens tested within a TAT of 40 is 90%. The unit exceeded this target by achieving an average of 93.6% (91.4-95.8% confidence interval) in 2019/2020, which is an improvement of the 91.2% (89.5-94.3% confidence interval) which was reported for 2018/2019.

Cryptococcal antigen testing

Globally, 9.7% of all CD4 specimens tested reported CD4 counts of <100 cells/Ql and qualified for CrAg testing. During the 2019/2020 financial year, 98% of these specimens reported a CrAg result within 24 hours of testing. The total number of CrAg tests performed were in line with the CD4 test trend, with a statistically non-significant decrease from 278 242 to 268 976 specimens from 2018/2019 to 2019/2020 (-3.3%), respectively.

Figure NPP6: Distribution of the percentage cryptococcal antigen positivity rate per NHLS region for 2019/2020

	% Pos 18/19	% Neg 18/19	% Positive 2019/2020	% Negative 2019/2020
EC	6,52	93,53	7,56	92,51
FS/NW	4,05	95,97	4,84	95,19
GP	4,79	95,25	5,20	94,83
KZN	7,78	92,25	8,97	91,08
LP/MP	5,63	94,46	6,01	94,12
WC/NC	5,39	94,70	6,35	93,75



Gauteng reported the highest CrAg test volume of 27%, followed by KwaZulu-Natal with 19.9% and Western /Northern Cape with 10.2%. KwaZulu-Natal recorded the highest CrAg positivity rate at 8.9%, followed by Eastern Cape at 7.6%, and the Free State/Northern Cape region recorded the lowest positivity rate at 4.8% (figure NPP6). The overall average national CrAg positivity rate for 2019/2020 was 6.5% (5.7% reported for the 2018/2019 financial year).

In anticipation of the local changes in CrAg testing guidelines as set out by the WHO to include specimens with a CD4 count between 100-200 cells/Ql, a preliminary report was prepared for discussion with the DoH in 2019. As ~10% of CD4 specimens had a CD4 count of 100-200 cells/Ql during 2019/2020, it is anticipated that the workload for CrAg testing across NHLS CD4 laboratories will double.

A preliminary data analyses and costing (desktop exercise) was completed to determine equivalent test numbers and a cost-per-result for specimens with a count <100 versus 100-200 cells/Ql. These results were submitted and accepted for presentation at the INTEREST 2020 Conference.

A large-scale prevalence/incidence study was proposed to determine the prevalence of CrAg positivity for CD4 counts between 101-200 cells/Ql.

Output

Categorising turnaround times with a view to benchmark performance

Based on data obtained from the CDW, the CD4 Unit developed a TAT model in 2017 that was nationally implemented as a series of interactive management dashboards to monitor TAT across a range of the top 25 laboratory tests (by volume) across the organisation. This was widely embraced by multiple levels of management. The impact of dashboard utilisation was assessed by a recently developed risk score to stratify performance, as represented in figure NPP7. Annual CD4 specimens tested within the institutional TAT target increased year-on-year (figure NPP7A), showing a significant decrease in 2019, while the month-on-month median TAT trend (figure NPP7B) confirms the positive impact of dashboard TAT monitoring on overall test performance.

Figure NPP7A: Annual specimens tested within the organisational CD4 turnaround time target over three years

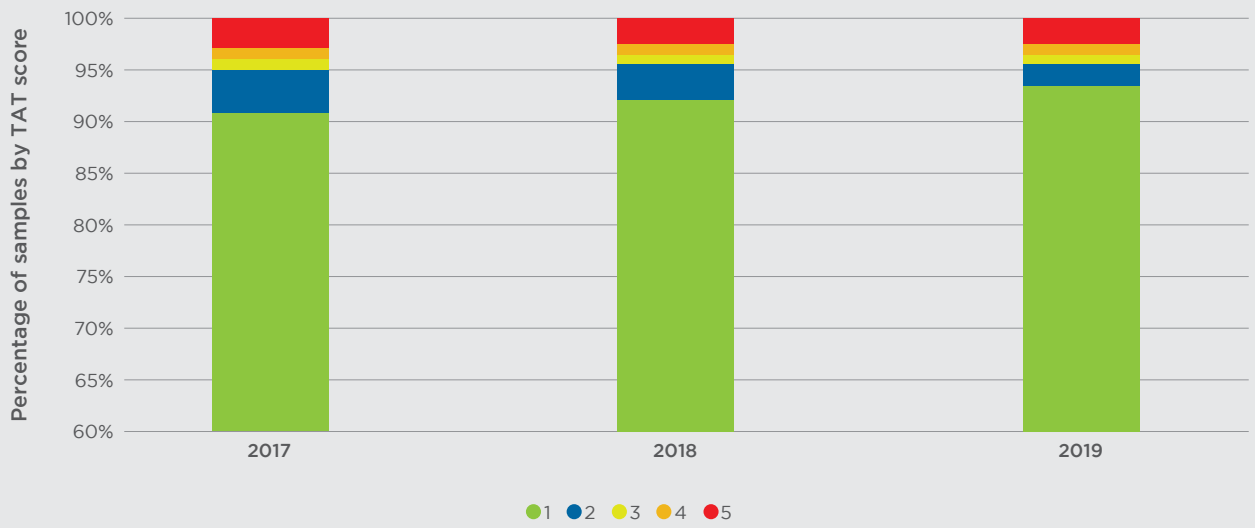
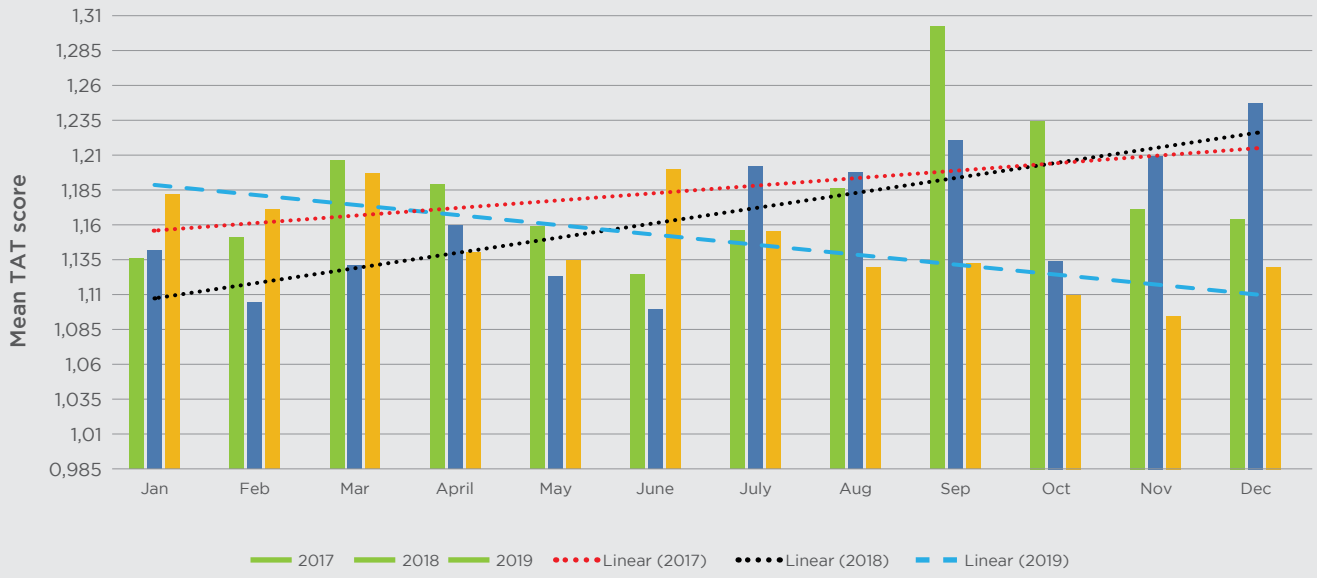


Figure NPP7B: Month-to-month median turnaround-time score for CD4 specimens tested per year (2017 to 2019)



National HIV Viral Load Testing Programme

Overview

South Africa has the largest HIV epidemic with an estimated 7.98 million people living with HIV. Correspondingly, the country has the largest HIV treatment programme in the world, accounting for 20% of people on ART globally. Eighty percent of its AIDS response programme is domestically funded.

The DoH has mandated the NHLS to provide HIV VL testing services as part of this programme. The NHLS provides HIV VL testing at 16 centralised laboratories across eight provinces in South Africa. The Northern Cape refers their specimens to the Free State for testing.

Through the President's Emergency Plan for AIDS Relief (PEPFAR) surge plan that aims to accelerate HIV epidemic control in SA, initiation of a further two million individuals will increase the number of people in the public health system on ART to 6.1 million by December 2020. This will in turn increase the VL testing volumes to an estimated 7.1 million in the 2020/2021 financial year.

Operations

During 2019/2020, 5.7 million VL tests were performed, compared to 5.2 million during 2018/2019, which constitutes an increase of 9.45% (487 885 tests). Of these tests, 85.6% were representative of viral suppression (<1 000 copies/mL). Monthly test volumes varied between 349 822 and 547 631. Regionally, KwaZulu-Natal processed the highest percentage of VL tests at 29.4% (1 679 374), followed by Gauteng with 23.6% (1 345 324). Northern Cape performed the least VL tests at 1.3% (76 278).

The HIV VL tender (RFB017/18-19) was adjudicated to:

1. Roche (on the Cobas 8800 platform) for six high-throughput laboratories based at CMJAH, DGM, Ngwelezane, Mankweng, Rob Ferreira, and Universitas; and
2. Abbott (on the Alinity m platform) for ten medium throughput laboratories based at Addington, Madadeni, IALCH, Edendale, NMAH, Port Elizabeth, Frere, Tshepong, Groote Schuur, and Tygerberg.

Eleven of the laboratories successfully transitioned to these new systems during the 2019/2020 financial year, namely: CMJAH, Mankweng, Rob Ferreira, Universitas, Ngwelezane, Tshepong, Frere, Port Elizabeth, IALCH, Madadeni, and Groote Schuur. The five remaining laboratories are: Edendale, Addington, Tygerberg, NMAH and DGM.

The process that is followed to enable the transitioning of laboratories to these new instruments includes:

1. A detailed onsite assessment to determine the laboratory's capacity to house the new equipment;
2. Assessment of sufficient power and other operational requirements;
3. Assessment of the structural integrity of the facility to handle the weight of the instrument;
4. Considerations for renovations that are necessary for effective transitioning;
5. Completion of the required renovations, where necessary;
6. De-installation and removal of existing testing equipment that has become redundant;
7. Installation of the new equipment;
8. Instrument setup and verification;
9. Provision of training on the newly installed equipment;
10. Setup of interfaces required to integrate with the LIS; and
11. Sign-off on all processes for go-live.

All these processes are conducted simultaneously to ensure minimal disruption of diagnostic services and minimal impact on TATs.

Figure NPP 8: Hoisting of Abbott's Alinity m instrument to the Port Elizabeth Virology Laboratory.

The unit monitors and evaluates the National HIV VL Programme on an ongoing basis, in collaboration with the CDW. Test volumes and TATs are monitored both weekly and monthly to identify challenges and gaps, ensure timely corrective actions and strengthen the national laboratory network service. These efforts are strengthened by continuous support and frequent onsite visits. It is furthermore mandatory for all laboratories to participate in Quality Control for Molecular Diagnostics (QCMD) and the CDC HIV VL EQA programme. The use of national SOPs ensures standardisation across the 16 testing laboratories.

Output

Pre-analytical track systems

Through the NHLS CDC Co-operative Agreement (CoAg) Grant, a total laboratory automation solution, namely the pre-analytical track system, was made possible and successfully piloted at CMJAH, Mankweng and Rob Ferreira HIV VL laboratories. The aim was to strengthen and enhance the in-laboratory pre-analytical component of the NHLS value chain through workflow engineering and automation of HIV VL testing.

The NPP Division was tasked to determine the best possible approach to the placement of the pre-analytical instruments designed to optimise the analytical utility of the Roche Cobas instruments. The selection of sites for the pre-analytical systems was based on volumes of reported VL per hour, number of instruments installed, minimum specimens to justify placement, laboratory space, staffing, infrastructure available and estimated growth. An assessment tool to measure laboratory efficiency pre-automation was developed and used to assess the above-mentioned laboratories. Post-assessment surveys demonstrated that the pre-analytical systems contributed to an overall reduction in hands-on time by technologists prior to and post-loading onto the HIV VL analysers (31-45% reduction). Subsequently, as part of an 'add-on service' to the HIV VL tender, the existing systems have been upgraded and another laboratory, namely Ngwelezane, has been equipped with a pre-analytical system.

Training

The division conducts training on an ongoing basis, both for newly appointed staff members and existing staff members who require refresher courses. A successful Roche Cobas 6800/8800 training workshop was conducted at the Roche Scientific Training Campus in Midrand, from 14-18 October 2019.

Figure NPP 9: Participants at the Roche Cobas 6800/8800 HIV Viral Load Training Workshop.

Connectivity

With input from the NPP Division, the Roche dashboard was completed and is expected to be implemented by quarter two of the next financial year. This dashboard is a monitoring tool which provides real-time statistical data for quality management purposes with the aim of improving performance. A key advantage of real-time access to this data is that it enables timely and informed decision making for the implementation of interventions. The data highlights tested volumes, failed runs, control failures, error rates, error flags, etc. Following suit, Abbott's Alinity m dashboard is also under development.

Regional laboratory systems strengthening

The Laboratory Systems Strengthening Community of Practice (LabCoP), a division of the African Society for Laboratory Medicine (ASLM) was launched in 2017 to assist with scale-up of HIV VL testing across the African continent to help meet the 90-90-90 treatment targets of the joint UN Programme on HIV and AIDS (UNAIDS).

LabCoP is a South-to-South learning collaboration of approximately 12 countries involving laboratorians, clinicians, policymakers, patients and communities. South Africa is represented by three members from the NPP Division, namely: Dr Lucia Hans (clinical virologist), Somayya Sarang (HIV VL national programme manager) and Naseem Cassim (PhD candidate and monitoring and evaluation expert).

The main aim of LabCoP is to strengthen laboratory systems through information sharing, tools and resources that support clinical, policy technical, scientific and programmematic aspects to aid in the successful implementation of HIV VL testing.

During the year under review, the following three workshops were conducted:

1. **1-4 July 2019, Kampala, Uganda**

   A regional, hands-on workshop on strengthening laboratory systems that included presentations on the following:

   b. "Key considerations for establishing an efficient HIV VL and early infant diagnosis laboratory network and achieving laboratory capacity optimisation and utilisation" by Somayya Sarang;
   c. "Sample and results tracking to reduce TAT" by Kumbirai Chigudu; and
   d. "The use of the plasma separation card for HIV VL specimen collection - will it be a game changer?" by Dr Lucia Hans.

2. **21-25 October 2019, Addis Ababa, Ethiopia**

   A LabCoP meeting with the following contributions:

   c. "Monitoring and evaluation systems - South Africa country experience" by Naseem Cassim; and

   d. "Measuring our progress: The LabCoP country self-assessment of the HIV VL testing cascade" rapporteur session by Somayya Sarang.

3. **12-13 February 2020, Addis Ababa, Ethiopia**

   An Africa CDC-Global Fund joint consultative meeting to support member States to strengthen national laboratory systems and networks.

Figure NPP 10: (A) Somayya Sarang presenting at the African Society for Laboratory Medicine meeting.

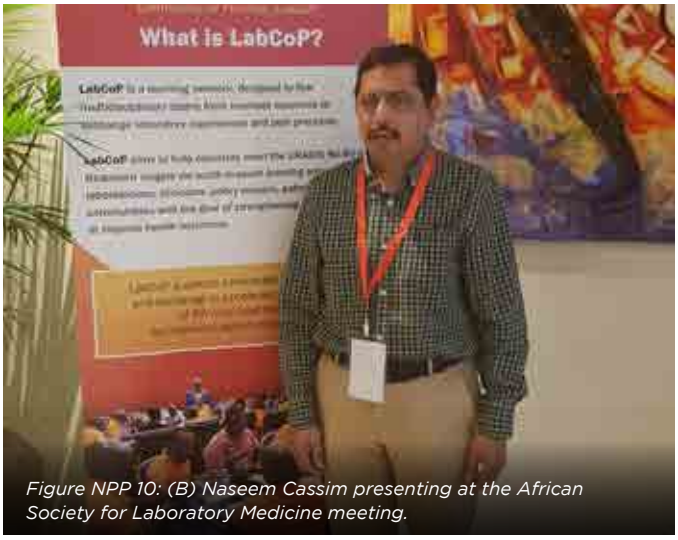


Figure NPP 10: (B) Naseem Cassim presenting at the African Society for Laboratory Medicine meeting.

National Early Infant Diagnosis HIV Polymerase Chain Reaction Testing Programme

Overview

In collaboration with the DoH, at all levels, and other partners, the EID HIV PCR Testing Programme aims to assist in the delivery of quality HIV diagnostic services through training, mentoring, monitoring, and the provision of technical assistance.

The recommended diagnostic test for EID remains the HIV PCR test. The management of HIV PCR testing capacity is guided by the demand for tests recommended in guidelines published by the DoH. The DoH Guideline for the Prevention of Mother to Child Transmission of Communicable Infections was revised and published in November 2019. The HIV testing component was updated to include an additional HIV PCR test at 10 weeks, as well as at six months of age for all HIV-exposed infants who test HIV-negative at birth.

The PCR platform is furthermore the recommended confirmatory test for any positive result in infants and children less than two years of age. HIV DNA PCR testing was performed across nine centralised laboratories using the Roche AmpliPrep COBAS TaqMan (CAP/CTM) instrument.

Operations

The number of HIV PCR tests performed in 2019/2020 reached 620 168 (compared to 604 886 in 2018/2019), which constitutes a 2.52% increase in volume. Monthly test volumes varied between 44 539 and 55 481. KwaZulu-Natal processed the highest number of tests at 26.4% (163 515), followed by Gauteng with 22.7% (140 534). Northern Cape conducted the lowest number of tests at 1.3% (9 803). The infection rate decreased from 1.98% (2018/2019) to 1.85% (2019/2020).

Improvements in qualitative HIV PCR testing was achieved through the introduction of the Cobas® HIV-1/HIV-2 Qualitative assay. Transition of the EID assay from the Roche CAP/CTM (expected to be phased in by the supplier in 2021) was implemented by leveraging the existing Cobas 6800/8800 HIV VL systems. The introduction of the assay on the higher throughput systems increased the capacity to two million tests, doubling it from the one million test capacity of the Roche CAP/CTM instruments. This in turn improved the EID diagnostic service through the use of 13 systems (nine Cobas and four Roche CAP/CTM systems) at 11 testing laboratories.

To ensure effective national transitioning to the new instruments required:

1. Completion of a national validation;
2. Approval from the Virology Expert Committee;
3. Development and sign-off of the LIS interface;
4. Approval from procurement for the loading of reagent test kits/consumables on Oracle;
5. Development and preparation of panels for verification prior to testing;
6. Instrument installations;
7. Laboratory renovations;
8. Installation of instrument software; and
9. Training of laboratory staff.

The project was initiated in May 2019 and rollout was completed by February 2020. The Roche CAP/CTM systems remain in use at three laboratories, namely: CHBAH, Groote Schuur and Tygerberg, due to physical space limitations for placement of the Cobas systems and the requirement to accommodate whole blood as a unique specimen type in the Western Cape. DBS testing at all the other provinces can be performed on the Cobas platforms.

Monitoring and evaluation of the national EID programme is achieved in collaboration with the CDW. The facility and results for action (RfA) reports facilitate fast-tracking of all PCR-positives. The missed diagnostic opportunities (MDOs) report allows careful monitoring of specimen rejection rates and assists in prioritising training interventions to minimise rejection rates further. Robust facility support visits and mentoring assist in reducing rejection rates and increasing the uptake of HIV PCR testing.

Output

Training

The unit's Sister Tsakani Mhlongo conducts training for HCWs involved in the management of newly born babies and infants, including clinicians, nursing staff, counsellors and facility managers. Training activities include:

- Reinforcement of guidelines and any updates;
- Identification of which babies/infants should be tested;
- Correct administration of NHLS request forms;
- Collection of quality specimens to maximise HIV PCR diagnosis and minimise specimen rejection;
- Interpretation of rapid and HIV PCR results; and
- Management of those exposed to HIV regarding prophylactic regimens.

In 2019/2020, 2 701 HCWs were trained and 236 healthcare facilities were visited and supported.

National HIV Genotyping Programme

Overview

The National HIV Genotyping Programme is supported by five HIV drug resistance testing laboratories, namely: CMJAH, Tygerberg, IALCH, Universitas, and DGM. These are managed by the respective laboratory managers and supported by business and area managers who are directly responsible to ensure continuous service delivery.

HIV treatment guidelines were recently updated to include recommendation of dolutegravir-based (DTG) ART for most HIV-infected patients. Accordingly, the drug resistance testing guidelines in the public sector were updated. HIV drug resistance testing is still recommended in patients failing protease-based ART to guide the choice of the most suitable third-line regimen.

In addition, resistance testing is now recommended for adults and adolescents failing a second-line DTG-based regimen and who meet the definition of confirmed virologic failure. However, this testing should be authorised by an expert on a case-by-case basis.

Operations

Across all laboratories, 4 975 specimens were processed for HIV drug resistance testing in 2019/2020, constituting a 13% increase from 2018/2019. CMJAH (33%), IALCH (25%), and Tygerberg (23%) laboratories processed the bulk of the testing volumes.

Four laboratories are SANAS-accredited for HIV drug resistance testing, and DGM laboratory aims to be accredited in the following fiscal year.

Output

Validations

A new commercial HIV drug resistance was validated and approved by the NHLS Health Technology Assessment Unit and will be implemented in the following fiscal year with the aim to standardise HIV drug resistance testing across the five laboratories.

NHLS HIV Drug Resistance Committee

Dr Kim Steegen, senior medical scientist at the NPP Division, continued to chair the national NHLS HIV Drug Resistance Committee.

General Practitioner Care Cell Project

Overview

The Foundation for Professional Development and Professional Provider Organisation Services embarked on a pilot project to implement a private general practitioner (GP) network contracting model to deliver HIV testing and management services to public sector patients.

This novel intervention allowed GPs to identify and initiate newly diagnosed HIV-positive patients onto ART by utilising state-funded pharmaceuticals, commodities, and laboratory services, whilst ensuring alignment with government standards/protocols and with governance controls to prevent fraud and over-utilisation. This project is funded by PEPFAR through USAID.

Operations

By March 2020, 55 GP practices have been enrolled in the project of which 29 are located in Tshwane and 26 in Ekurhuleni districts. The NPP Division supports the project by monitoring TATs and ensuring provision of quality results. The CDW provides a weekly TAT report to respective business managers to enable monitoring and improvement of TATs. During the 2019/2020 financial year, 12 821 tests were requested through the GP Care Cell (GPCC) network.

National and provincial HIV counselling/testing and tuberculosis campaigns and events

Overview

Previously, the NHLS (as a sub-recipient of financial support from the DoH and a primary recipient of Global Fund assistance) has supported HIV and TB Day commemorations throughout SA with deployment of Xpert mobile laboratories to provide onsite molecular diagnostic services for TB screening. Although the grant ended on 31 March 2019, the mobile laboratories were still available to continue the service in 2019/2020 to support national events.

Activities

National World AIDS Day 2019 event was commemorated at James Motlatsi Stadium in Orkney, Klerksdorp on 1 December 2019 with the support of DoH and Dr Kenneth Kaunda District. Two Xpert mobile laboratories were deployed at the event for screening. The Honourable Deputy President of South Africa, Mr. David Mabuza and the Minister of Health, Dr Zweli Mkhize also attended the event.

In July 2019, the NHLS Xpert mobile laboratories supported the Diepsloot Health Day 2019 in collaboration with the "Wits Friends of MSF". The exercise provided Wits students with insights on following pathology as a career path.

Due to the COVID-19 pandemic, World TB Day 2020 commemorations were canceled in March 2020.

Linkage-to-care and Data Management for Programmematic Monitoring

National Laboratory Results SMS Printer Programme

Overview

The NHLS bi-directional SMS printer rapidly delivers HIV- and TB-related results upon authorisation, including: CD4 counts, reflexed CrAg, HIV VL, EID PCR, TB smear microscopy, Xpert Ultra, any amended results from those listed, and notifications of rejected specimens. The printers are placed at healthcare facilities which initiate patients on ART treatment with prioritisation of PHCs and CHCs.

SMS printers can retrieve patient results when the HCWs scan the respective NHLS barcodes, which are usually placed in the patient folder at the time of specimen collection. The bi-directionality aims to improve rapid delivery of priority diagnostic results throughout South Africa.

Operations

Initial funding enabled procurement of 2 096 printers, which were distributed to PHCs and CHCs that provide HIV and TB services. To mitigate the in-field challenges experienced with the initial SMS printer batch, the following improvements were implemented in the 2019/2020 reporting period:

1. A transition was made from SMS to the Global Data Services Platform (GDSP), to enable international roaming across all countries/sites and improve network connectivity. The transition was done for 71.6% of existing printers;
2. Scanners and power supplies were modified, and external antennae internalised to reduce the likelihood of component loss and/or removal. 801 of the newer format (version 5) printers were updated accordingly;
3. Due to the fact that it does not have the character and cost limitations of SMS, the transitioning to GDSP also enabled the addition of extra test results to the existing test repertoire, such as creatinine and glomerular filtration rate estimates;
4. Additional newer version printers were procured which increased the coverage of healthcare facilities from 59.6% to 76.6%; and
5. A dashboard was established with the capacity to obtain statistical data at province, district, sub-district, and facility level. The dashboard monitors parameters such as functionality, whether printing paper is loaded, the battery charge level, strength of connectivity signal, scanner status, etc. in real time.

The main objective of the new dashboard is to improve service delivery by:

- Providing regular reports to business units and DoH-approved healthcare professionals; and
- Issuing notifications of facilities with non-functional printers, so that corrective action can be taken swiftly.

During 2019/2020, 4 983 950 results were successfully delivered to healthcare facilities through this mechanism. Monitoring indicators will also be incorporated into the dashboard in the next financial year.

Data management

In December 2016, the Wits Human Research Ethics Committee granted approval (Clearance M160978) for the NPP Division to analyse LIS data for programmematic monitoring and evaluation purposes. During 2019/2020, activities continued in compliance with these requirements, as an array of monthly, quarterly, and ad-hoc reports were generated for distribution to partners, funders, and TB/HIV coordinators, as well as the provincial and national departments of health.

The reports provide aggregated/non-patient identified data on test volumes, detection rates, laboratory workflow analyses, TATs, instrument utilisation rates, error rates, specimen rejection rates, and exception reporting such as tests with CD4 counts of <100 cells/Ql and HIV VL counts of >1000 copies/ml.

Stakeholders utilise information such as rejection rates to design training interventions that serve to correct these issues. Correlation of detection rates or positivity rates for TB are utilised to confer numbers reported in TB registers and assists in reducing the number of patients lost to follow up.

Research and development to support the National Programmes

Overview

The NPP R&D Group comprises a multidisciplinary team specialising in applied research and implementation of new laboratory diagnostics for HIV and TB, and includes quality management systems of high- to low-throughput testing platforms. The R&D Group includes specialists in biomedical engineering (data mining/biometrics), digital health and geographic information system (GIS) mapping.

Under the leadership of Professor Lesley Scott, the group's output contributes to

- The improvement of services within the NHLS;
- Transfer of knowledge to the NPP Division;
- Policy development for the DoH; and
- Global quality management for several diagnostic tests.

A key focus of the R&D Group is innovation within the laboratory value chain, spearheaded through iLEAD, which was established within the group in late 2017, through seed funding from the Bill & Melinda Gates Foundation. The portfolio of iLEAD comprises several innovations at various phases of development, and range from technologies that achieve incremental improvements, to those that are disruptive and game-changing.

The primary work streams in the iLEAD portfolio are HIV, TB, and cross-cutting innovations, which fall within the digital health space and are used across the laboratory value chain. A recent addition to the R&D Group is SARS-CoV-2 diagnostics, which are performed through iLEAD in collaboration with the NPP Division.

Output

Contributing to Africa's Innovation through Science: Verification and EQA Programmes

Xpert MTB/RIF EQA and Verification Programme: The R&D Group continues to supply national and international laboratories with the DCS technology programme (developed by the group) for verification and EQA of the Xpert MTB/RIF Ultra (Cepheid, Sunnyvale, CA, USA) platform. The programme is managed by SmartSpot Quality Pty (Ltd), a Wits Enterprise spin-off company.

MTB Combo EQA Programme: The MTB Combo EQA Programme comprises the GenoType® MTBDRplus (HAIN diagnostics, Nehren, Germany) EQA and the Strip Interpretation Analysis programmes which provide additional educational support to sites performing the MTBDRplus assay. The programme is managed by SmartSpot Quality Pty (Ltd).

MTB LAM EQA: The R&D Group is currently developing a quality material to support the testing of LAM in both clinical (POC) and laboratory settings.

HIV Viral Load Programmes: SmartSpot Quality Pty (Ltd) now supplies the HIV VL thermostable EQA material, which was developed by the R&D Group for the NPP Division in 2018, and is provided to a number of international sites.

Contributing to National Health TB Policy: Aiming for improvements in sensitivity of TB molecular diagnostics

Xpert MTB/RIF Ultra version 2: Following the launch of the Xpert MTB/RIF Ultra version 2 assay (Cepheid, Sunnyvale, CA, USA), a head-to-head evaluation of the original and updated assays was performed in four NHLS GeneXpert laboratories. Results confirmed non-inferiority and were shared with the NPP Division to confirm that transitioning to the updated assay was feasible.

Xpert XDR: A multicentre clinical trial, in collaboration with the Foundation for Innovative New Diagnostics (FIND), was performed in the Eastern Cape to evaluate the novel Xpert XDR cartridge (Cepheid, Sunnyvale, CA, USA) that detects further TB drug resistance targets. This trial is ongoing.

Molecular TB multiplatform evaluation: A head-to-head evaluation of multiple molecular assays for TB diagnosis (in collaboration with FIND and WHO) was performed to investigate the limit of detection and precision of multiple molecular TB assays (Roche MTB (Roche Molecular, Pleasanton, CA, USA), Hain Fluorotype MTB RIF/INH (Brucker-Hain Diagnostics, Nehren, Germany), Abbott RT MTB and MTB RIF/INH (Abbott Molecular, Abbott Park, IL, USA), BD MAX™ MDR-TB (Franklin Lakes, NJ, USA) and Xpert MTB/RIF (Cepheid, Sunnyvale, CA, USA) and has been ongoing since 2018. Phase 1 (laboratory strain analytical evaluation) is complete and a report was circulated to the NPP Division. Phase 2 has commenced with Roche MTB and Hain Fluorotype assays only, in comparison to standard of care (Xpert Ultra) and will continue into 2020.

MTBC-positive culture Microbank: MTB-positive isolates with varying mutation patterns continue to be processed for long-term storage at -80°C. A collaboration was initiated with the NHLS Port Elizabeth TB Culture Laboratory to expand the numbers of relevant strains available for research.

Contributing to National Health TB Policy: Information Technology's superpower and its place in global disease control

TB GIS Mapping

The following two geospatial TB mapping projects are ongoing:

1. The NIOH R21-funded GIS TB mapping project which serves to evaluate the use of Xpert MTB/RIF and Xpert Ultra cycle threshold values; and
2. The Newton Medical Research Council/SA/UK-funded project which serves to investigate mapping of molecular characteristics from the Xpert MTB/RIF assay across districts in South Africa, in collaboration with the Wits School of Public Health, the London School of Hygiene and Tropical Medicine, Boston University and BiTanium.

Data collected from 62 clinics in the Eastern Cape was analysed to determine the use of cycle threshold (specimen positivity) and MTB and MTB/RIF resistance hotspots. This included analysis of Xpert Ultra 'trace' specimens, with exact matching being applied to 12 million Xpert Ultra 'trace' results to determine laboratory outcomes for patients diagnosed with 'trace' TB results. Temporal spatial analytics were applied to drug-resistant TB to investigate the association between MTBDRplus version 2 assay absent wild type probes and corresponding Xpert probes using GIS. This was piloted in the North West, extended to the greater Gauteng province and will be scaled to national level.

Geographic maps were generated to visualise local municipalities with the highest percentages of Xpert rejection rates. Municipalities and facilities with the highest rates of Xpert MTB/RIF test rejections can now be visually identified for follow-up by both the NPP Division's clinical and laboratory teams, using dashboards. The national Xpert Ultra dashboard development was completed, and the dashboards were reviewed by the NHLS' TB Subcommittee of the Microbiology Expert Committee. Reports were submitted to the NPP Division, ahead of presentation to the DoH.

The R&D Group continues to assist the data analytics team of the NPP Division, as well as the operations group using C360 (Cepheid supplier dashboard for Xpert). Additionally, in collaboration with Dr Jacob Bor (Boston University, Boston, MA, USA), an algorithm was developed to uniquely identify patients, over time, using record linkage to create a longitudinal TB cohort. Based on this, a new NIH grant was awarded to further investigate the link between HIV/TB laboratory data to impact on both epidemics.

TB Think Tank: New Tools: The R&D Group and the NPP Division joined the DoH's TB Think Tank and are providing ongoing guidance on new TB diagnostic tools.

Contributing to improved HIV testing and monitoring services

Plasma Separation Card (PSC): The PSC (Roche Molecular, Pleasanton, CA, USA) is an alternative plasma specimen collection device that eliminates the need for phlebotomy and provides stable specimen transport, thereby increasing access to accurate HIV VL testing (required for monitoring a patient's response to antiretroviral treatment).

The PSC was evaluated with the Cobas® systems through the NPP (Carmona et al, Separation of Plasma from Whole Blood by Use of the Cobas® Plasma Separation Card: a Compelling Alternative to Dried Blood Spots for Quantification of HIV-1 Viral Load, Journal of Clinical Microbiology 57(4) e01336-18) and showed good performance.

A multisite national clinical evaluation is under development with Dr Diana Hardie (NHLS Groote Schuur, Cape Town) and three NHLS HIV VL laboratories. Cost and impact models were developed in collaboration with the Health Economics and Epidemiology Research Office, predicting cost-effective replacement and expansion of access to HIV viral load testing (Nichols et al, J Int AIDS Soc. 2019;22(9):e25337. Nichols et al, Clin Infect Dis. 70(6):1014-1020).

The R&D Group is also evaluating the PSC for HIV VL testing on alternative VL platforms (Abbott m2000, GeneXpert), which, to date, have shown acceptable results and will continue into 2020.

The following alternative use cases for the PSC (beyond HIV VL testing) are also being examined:

1. A therapeutic drug monitoring study was initiated in collaboration with Prof Jaya George (Department of Chemical Pathology, Wits, Johannesburg|); and
2. An HIV genotyping evaluation was initiated in collaboration with Dr Kim Steegan (NHLS HIV Drug Resistance Laboratory, CMJAH).

Alternative plasma separation devices are also being investigated.

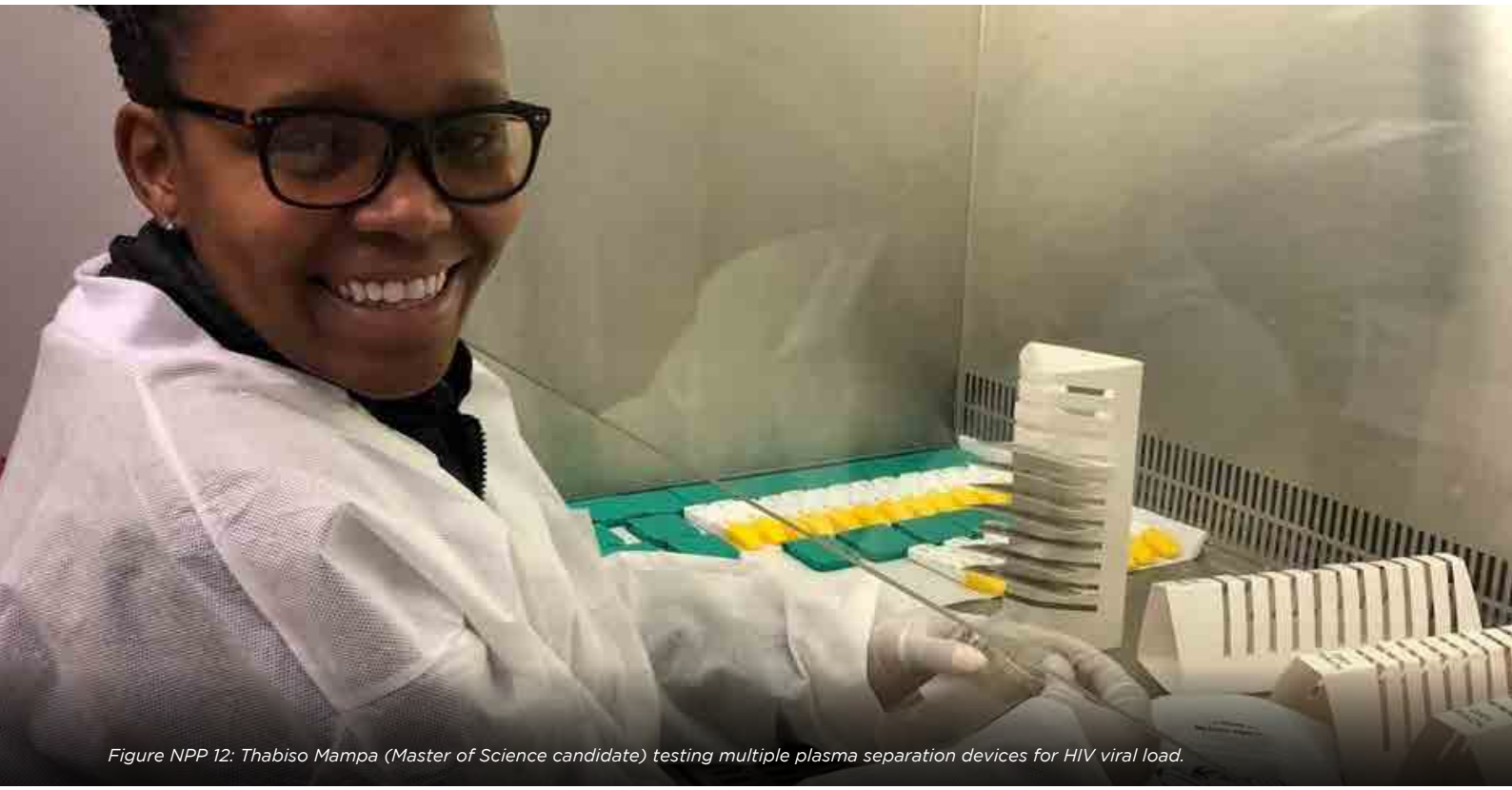


Figure NPP 12: Thabiso Mampa (Master of Science candidate) testing multiple plasma separation devices for HIV viral load.

Aldatu PANDAA qDx HIVDR RTI evaluation: The R&D Group and the NHLS HIV Drug Resistance Laboratory (CMJAH) collaborated to evaluate the PANDAA qDx HIVDR RTI assay (Aldatu Biosciences, Boston, MA, USA) for identification of common mutations causing reverse transcriptase inhibitor resistance. This innovative assay showed good performance compared to HIV genotyping and may have potential as a rapid screen test for HIV drug resistance.

Addressing the COVID-19 pandemic: SARS-CoV-2 diagnostics

SARS-COV-2 diagnostics: In March 2020, the WHO declared the SARS-CoV-2 outbreak and associated COVID-19, a global emergency. To assist the NHLS and the NPP Division to scale SARS-CoV-2 testing, the R&D Group, through iLEAD, performed a rapid landscape review of existing technologies and initiated protocols for rapid evaluations of molecular (PCR-based) and serological assays. Through collaboration with Prof. Bavesh Kana (Centre of Excellence for Biomedical TB Research, Johannesburg), discussions were initiated to produce a reliable source of SARS-CoV-2 culture and mimetics for use in rapid evaluations and for future quality assessment of laboratories.

Improving the laboratory value chain: leveraging digital technology

eLABS: eLABS (an electronic laboratory specimen tracking tool) was initially developed for scaled HIV VL testing in Zambia and is currently being expanded to a number of countries. eLABS-South Africa has been piloted through the NHLS at 24 facilities in the Gauteng province during the 2018/2019 financial year.

By March 2020, scaled implementation has been completed at 413 facilities with 2 141 registered service providers and 45 registered courier services across four provinces and >one million results scanned by mid-February 2020.

An analysis of the first 949 066 specimen barcodes showed that 44% were HIV VL specimens, with 97% tested and results authorised. The HIV viral suppression rate for this sample was 89% which is an improvement of the national rate of 88%. A total of 79% actionable results (patient specimens' requiring repeat phlebotomy and those with VL >1 000 copes/ml) were read by healthcare practitioners within a four-day TAT.

Fio Deki Reader™ evaluation: The R&D Group and the NPP Division evaluated the Deki Reader™ (Fio Corporation, Toronto, Canada) during 2017 and 2018. This device enables continuous quality monitoring and central surveillance of rapid HIV tests in South Africa. The data was cleaned and analysed in 2019 and a manuscript accepted in 2020. Technology reports were shared with the DoH and CDC Africa to investigate larger clinical trials.

Patient Messaging - iThemba: iThemba (Roche Molecular, Pleasanton, California, USA) is a mobile application that enables patients to receive their HIV VL results directly to their mobile devices. This collaboration with Roche was initiated in April 2019 and to date, two studies have been completed.

iThemba Phase 1 was a field evaluation implemented at two clinical sites which reached 500 patients and provided them with their HIV VL results with a median of six days versus 56 days for standard of care (return to clinic). In summary:

- 71% of users were able to successfully download the application and scan the barcode of their HIV VL sample;
- Users received their HIV VL results ~50 days earlier using iThemba than with standard of care;
- 76% of results received were viewed by users with a median time to viewing of 13 hours after notification of result availability; and
- >95% of users surveyed wanted to continue using iThemba and reported they are likely to recommend the application to others.

iThemba's Phase 2 will commence in mid-2020, through integration of the following factors:

- A scaled field evaluation, increasing the number of patients, clinics and laboratories involved; and
- An adjustment of the technical support model with the aim to identify the specific requirements that must be in place for further expansion of the application.

A field evaluation of iThemba combined with PSC specimen collection in a pharmacy setting, funded through DoH's HIV Think Tank, was initiated in January 2020. Data collection for this project was capped at the end of March 2020, and initial analysis shows that the combination is both robust and acceptable to patients.

Biometrics for unique identification: Two biometric systems were evaluated to determine robustness, accuracy of identification and patient acceptance. The Lynx-ID kit (IPRD Solutions, New York, New York, USA) used iris scanning or fingerprint recognition. The system is technically feasible, but limited mobility impacts the use case for this technology and the multiple physical components make maintenance and management of devices difficult.

Following the above considerations, a mobile, software-based biometric solution (Element Inc., New York, New York, USA) was evaluated. Element uses palm and facial scanning, and, being a mobile solution, eliminated or reduced many of the concerns that were present with the Lynx-ID kit. The reports and target product profile document were shared with the NPP Division, to guide future evaluations of unique biometric identifiers.

Digital Health Policy: Digital health requires a user-friendly business intelligence system and an overall secure digital health functionality to ensure data security and patient confidentiality, and enable the execution of impact studies. Prof Wendy Stevens drafted a digital health policy to address some of these requirements. The policy was presented to the NHLS in November 2019 and is currently being circulated at executive level for input. The main focus of the policy is to identify the layers which affect data security, privacy and confidentiality throughout the data life cycle.

Other Activities to support the National Priority Programmes

Cooperative Agreement between Centers for Disease Control and NHLS

Overview

The five-year CoAg between the CDC and the NHLS was established in 2015 with the aim to strengthen delivery, expand access to quality laboratory services and enhance healthcare worker and laboratory safety in South Africa. The key area of support under the CoAg involved the use of innovative technologies for the strengthening and improvement of pre-analytical and post-analytical processes for HIV VL monitoring in the 27 PEPFAR-supported districts in the country. The overarching goal of the support by the CDC was to strengthen the clinic-laboratory-patient interface and improve access to HIV VL monitoring. Several sub-projects are detailed.

HIV Viral Load Pre-analytics Systems Project

This project is discussed under "output" of the National HIV Viral Load Testing Programme above.

eLABS Digital Health Intervention

The eLABS application has been developed and piloted at 24 facilities since October 2018. The key indicators for the project were:

1. Improvement of TATs;
2. Reduction of specimen rejection rates; and
3. An increase in the rate of HIV VL results acknowledgement by the healthcare facilities.

The eLABS application process is detailed in figure NPP13. In summary:

- Healthcare practitioners (HCPs) are equipped with smartphones;
- Unique specimen barcodes are scanned by HCPs into batches using the eLABS application;
- Drivers collect the specimens from the HCCs and scan the created batches for delivery at designated hubs for testing;
- Specimens are either tested at the receiving hub or referred to an alternate laboratory;
- All referred specimens are couriered by means of tracking the packing slips generated by the LIS and delivered at the referral laboratory for testing;
- As soon as the results are authorised, either at the initial hub or referral laboratory, they are delivered electronically to the facility through the eLABS application; and
- The application track time stamps and allows indicators to be monitored at each of these stages.

Since 22 July 2019, use of the eLABS application has been expanded to 508 facilities across >11 districts in four provinces as follows:

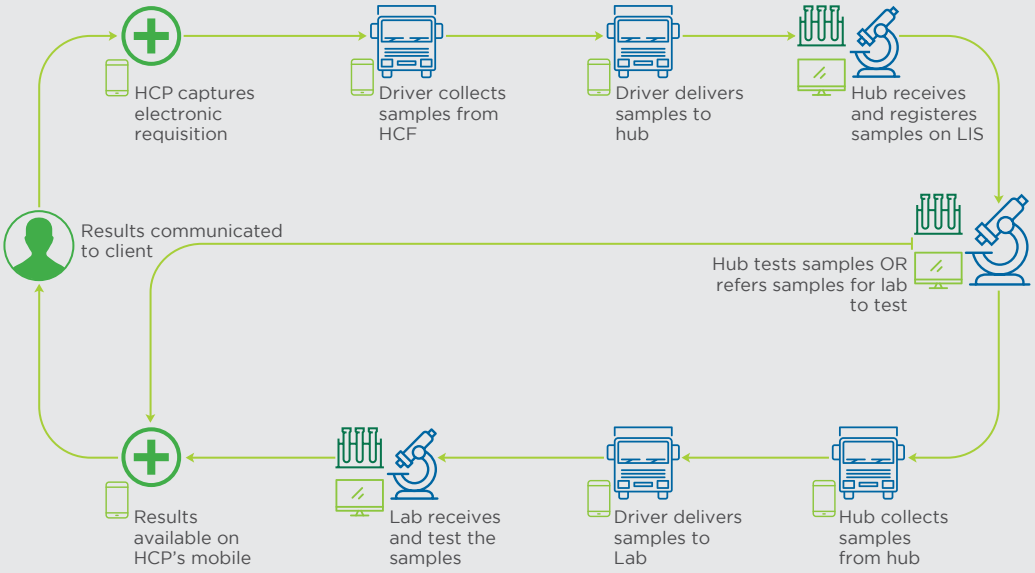
- 102 in Gauteng;
- 109 in KwaZulu-Natal;
- 121 in the Eastern Cape; and
- 95 in North West.

Furthermore, to strengthen support of emergency response to the COVID-19 pandemic, the CDC approved the expansion of eLABS to all 27 PEPFAR-supported districts. As a result, partnerships were forged with PEPFAR-supported clinical partners to accelerate the implementation of eLABS at a total of 2 535 facilities.

Specimen Route Optimisation

The aim of the project was to develop a model for optimised service coverage, improved TATs, and maximised cost-efficiency at a national level, for the top 16 requested tests (by volume).

NPP13: Illustration of eLABS process which covers the journey from specimen collection to results delivery



The optimisation process involved the following:

1. Analysing existing NHLS specimen transport routes;
2. Determining the cost and efficiency of each route and for the network as a whole;
3. Optimising vehicle routes for the NHLS specimen transport network with the aim to decrease transport costs within given system constraints for two scenarios; one in which no provincial boundaries are crossed, and the other in which provincial boundaries are crossed;
4. Comparing the cost of the optimised system to the existing system/routes to determine efficiency of both improved routes and the elimination of provincial boundaries; and
5. Identifying facilities with problematic TATs and high rates of specimen rejection and prioritising them in the routing algorithm.

The specimen route optimisation project led to the cleaning of the coordinates of the HCCs on the NHLS' CDW and linkage to the District Health Information Software. This process was completed for ~99.7% of CDW volumes. Initial optimisation of the routes within Eastern Cape and KwaZulu-Natal, using a borderless approach, demonstrated a potential for ~17% savings and ~22% for Gauteng.

HIV viral load support

Acceleration of optimised HIV testing is critical in attaining the UNAIDS 90-90-90 targets by December 2020. Recruitment of clinical and technical trainers ensured that the clinical-laboratory environment was able to provide safe and quality patient care, including reliable testing, clinical proficiency, and professionalism. Four hundred and nineteen Siyenza PEPFAR-supported facilities and 16 HIV VL testing laboratories were earmarked to receive support from technical and clinical HIV VL trainers to strengthen the clinic-laboratory interface.

In the 2019/2020 financial year, 212 of 419 facilities were supported by clinical trainers across Gauteng, North West, KwaZulu-Natal and Eastern Cape. Technical trainers conducted baseline and workflow assessments at facility and testing laboratory levels to identify gaps that impact the efficiency of the clinic-laboratory interface. These assessments informed improvement plans to increase efficiency, improve TATs and minimise rejection rates. Ongoing support will be provided throughout the next financial year.

Real-time laboratory performance monitoring dashboard

The aim of this project is to provide real-time performance monitoring within the HIV VL NHLS laboratory network, using dashboards.

Sixteen VL testing laboratories are earmarked to receive visualisation screens (48 procured) and functional dashboards to monitor processes and improve efficiency. Assessments were conducted at eight of the 16 HIV VL laboratories and installation is occurring in tandem with the transitioning to new instruments as per the adjudicated HIV VL tender. The project is set for completion in the next financial year.

Data command centre

Real-time monitoring is used to track performance and improve staff accountability across industry and is also not uncommon among private pathology groups. The data command centre will provide real-time performance monitoring within the HIV VL NHLS laboratory network through the use of visual dashboards, with the aim to strengthen laboratory quality and diagnostic services to both facilities and patients.

The real-time information will be made available for continuous monitoring of critical daily indicators. This will in turn help to enable capacity building for laboratory personnel and address gaps in scaling up of services within key HIV priority areas. Upon establishment of the command centre, additional priority tests will be included. The project is set to go live in the last part of 2020.

Research output

The NPP's academic focus resulted in signifcant research output. The team published 19 peer-reviewed manuscripts (with first authorship on six). Eighteen conference submissions were accepted for oral presentation as follows:

- One at the 13th INTEREST Conference which took place from 14-17 May 2019 in Accra, Ghana;
- Two at the 9th SA AIDS Conference which took place from 11-14 June 2019 in Durban, South Africa;
- Two at the PathRed 2019 which took place from 18-21 July 2019 in Johannesburg, South Africa;
- One at the Integrated Diagnostic Meeting which took place from 12-13 September 2019 in Washington DC, USA;
- One at the Annual Gauteng Laboratory Coordinators Conference which took place from 19-20 September 2019 in Johannesburg, South Africa;
- One at the consultative meeting on the Africa collaborative to advance diagnostics to meet the continent's health agenda which took place from 24-25 September 2019 in Addis Ababa, Ethiopia;
- Four at the International Workshop on HIV Drug Resistance and Treatment Strategies which took place from 16-18 October 2019 in Johannesburg, South Africa;
- One at the School of Public Health Research Day which took place on 23 October 2019 in Johannesburg, South Africa;
- Two at the 25th National Medical Technology Congress which took place from 25-27 October 2019 in Bloemfontein, South Africa;
- One at the 50th Union World Conference on Lung Health which took place from 30 October-2 November 2019 in Hyderabad, India;
- One at the CQUIN Project's 3rd annual meeting which took place from 10-14 November 2019 in Johannesburg, South Africa; and;
- One at the Conference on Retroviruses and Opportunistic Infections (CROI) 2020 which took place from 8-11 March 2020 hosted online from Boston, USA due travel restrictions because of the COVID-19 pandemic.

Ten posters were also accepted for presentation as follows:

- Two at the 13th INTEREST Conference which took place from 14-17 May 2019 in Accra, Ghana;
- One at 9th SA AIDS Conference which took place from 11-14 June in Durban, South Africa;
- Two at PathRed 2019 which took place from 18-21 July 2019 in Johannesburg, South Africa;
- One at the 10th IAS Conference which took place from 21-24 July 2019 in Mexico City, Mexico;
- One at the International Workshop on HIV Drug Resistance and Treatment Strategies, which took place from 16-18 October 2019 in Johannesburg, Sout Africa;
- One at the 50th Union World Conference on Lung Health which took place from 30 October-2 November 2019 in Hyderabad, India;
- One at the 20th International Conference on AIDS and STIs in Africa which took place from 2-7 December 2019 in Kigali, Rwanda; and
- One at CROI 2020 which took place from 8-11 March 2020 and was hosted online from Boston, USA, due to travel restrictions because of the COVID-19 pandemic.

2.4.2.4. Academic Affairs, Research and Quality Assurance

Prof Koleka Mlisana
Executive Manager

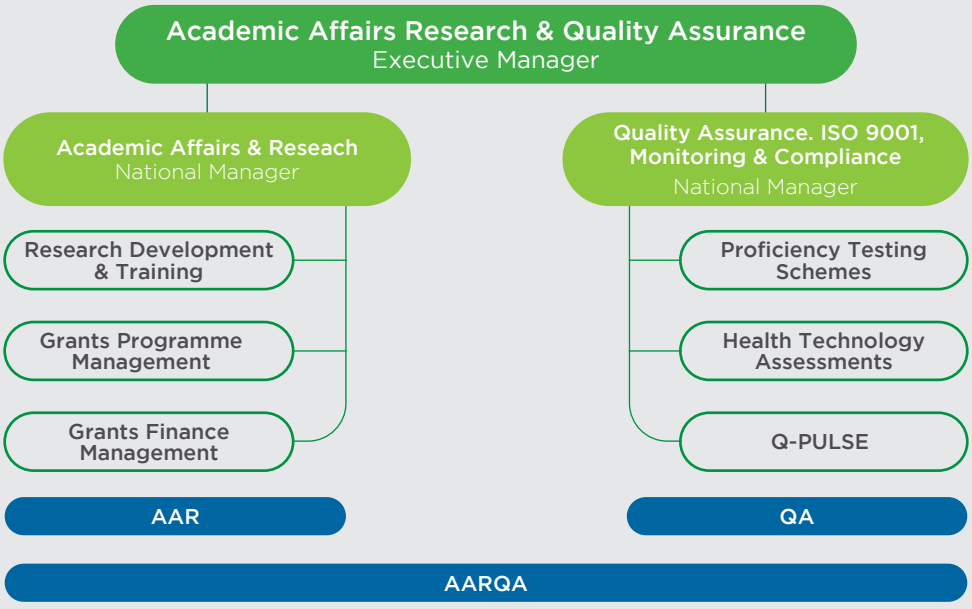
Introduction

The main objectives of the AARQA Division of the NHLS is to strengthen the academic affairs, teaching and training, as well as the research and innovation mandate of the organisation whilst maintaining and providing quality improvement processes throughout the platform. The division comprises two departments, namely: Academic Affairs and Research (AAR) and Quality Assurance (QA) that are collectively responsible for overseeing the implementation and management of the national strategic and operational mandate of the division.

AARQA is responsible for the maintenance and establishment of effective partnerships with faculties of health sciences across South African medical universities, comprehensive universities (CUs) and universities of technology (UoTs).

In collaboration with the area managers, the QA Department serves to:

- Enhance the NHLS QA systems and processes;
- Maintain and acquire accreditation of the laboratories across the country; and
- In collaboration with the area managers, the QA Department serves to:



Academic Affairs and Research Department

The Academic Affairs and Research (AAR) Department is responsible for the teaching, training and research mandate of the NHLS. In collaboration with the medical universities, CUs and UoTs, the department supports an academic platform staffed with skilled personnel that provide technical pathology training.

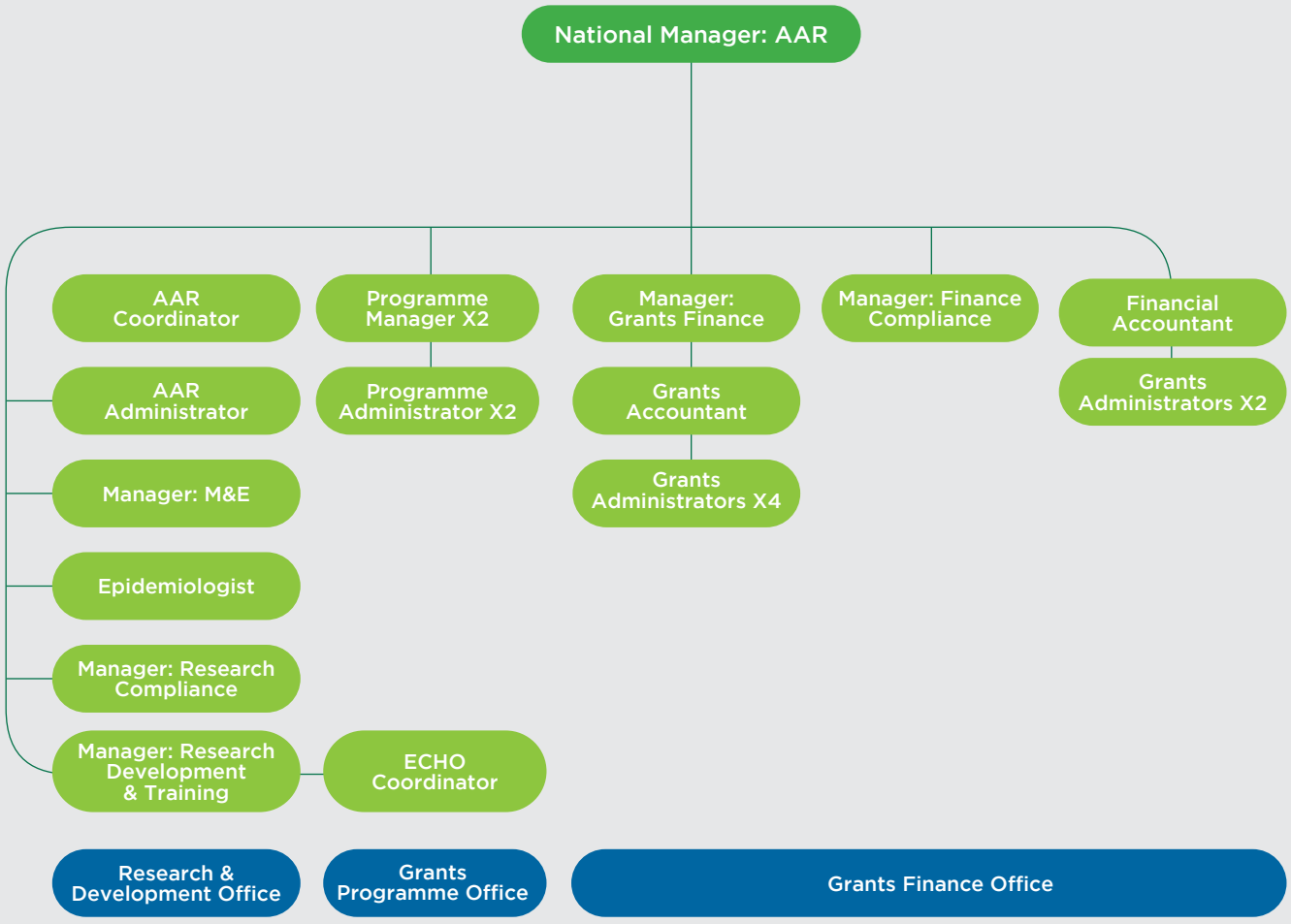
The training output and laboratory services are provided by skilled pathologists and medical scientists, technologists and technicians. The office provides support for research and innovative activities that are mainly undertaken by the academic institutions; with the aim to ensure cutting-edge yet locally responsive research that is focused on translational research to enhance the service platform and influence health policy.

Medical Universities

Universities of Technology and Comprehensive Universities

AAR is also responsible for overseeing the management and support of the implementation, monitoring and evaluation of research strategic initatives of the NHLS and the financial administration and management of grant-funded projects within the organisation. The department consists of the following three offices:

- Research Development and Training;
- Grants Programme Management; and
- Grants Finance Mamagement.



Research, development and training

Teaching and Training

The delivery of the teaching, training, and research mandate of the NHLS is a shared responsibility between the NHLS and medical universities and UoTs across South Africa. Vocational training is provided to registrars, intern medical scientists and student medical technologists working towards qualifications as pathologists and medical scientists and technologists in compliance with the HPCSA requirements.

Table 3: Number of intern medical scientists and registrars by pathology discipline

Discipline	Registrars	Intern medical scientists	Overall
Chemical pathology	40	6	46
Clinical pathology	12	0	12
Haematology	48	9	57
Histopathology	77	2	79
Human genetics	3	5	8
Immunology	0	6	6
Microbiology	53	16	69
Occupational medicine	3	4	7
Virology	17	8	25
Other	0	0	0
Total	**253**	**56**	**309**

During the 2019/2020 financial year, there were 526 intern medical scientists and registrars trained from the various academic institutions on the NHLS platform. This includes 56 intern medical scientists, 253 registrars, and 217 student medical technologists. Details on the number of intern medical scientists and registrars per pathology discipline and their distribution across partner academic institutions is shown in tables 3 and 4.

Table 4: Distribution of internal medical scientists and registrars across medical universities

Medical university	Registrars	Intern medical scientists	All
Sefako Makgatho University	25	5	30
University of Cape Town	30	10	40
University of Free State	18	5	23
University of KwaZulu-Natal	28	4	32
University of Pretoria	38	13	51
University of Stellenbosch	34	4	38
University of Witwatersrand	78	15	93
Walter Sisulu University	2		2
Total	**253**	**56**	**309**

The NHLS introduced a workforce skills development initiative that utilises the "Project Extension for Community Healthcare Outcomes (Project ECHO) video conferencing platform to support the teaching and training activities and enhance consultative initiatives".

Project ECHO is an innovative remote learning and mentoring solution which links subject matter experts within the academic centres and well-resourced laboratories (called the "hub") to multiple secondary urban and rural learning sites (called the "spokes"), especially in the medically under-serviced regions. This creates an expanded and more effective platform for sharing of knowledge to help build capacity and develop the skills of pathology professionals in laboratories nationwide.

In summary, Project ECHO enables improved remote access to:

1. Specialised teaching and training;
2. Skills development;
3. Interactive lectures and mentoring;
4. Consultations and case discussions; and
5. Interactive document and report reviews.

To date, NHLS Project ECHO has been effectively implemented in 86 hubs, spokes, and mini-hub sites at tertiary, regional, and national central laboratories in eight provinces, as indicated in the figures below.

During the 2019/2020 financial period, 174 Project ECHO sessions were conducted, the majority of which were discipline-specific sessions (128) presented by 93 subject subject-matter. The average number of participants per session was 22. The participants included registrars, technicians, technologists, medical scientists and intern medical scientists (Table 4).

Cross-collaborative sessions were also conducted with subject matter experts from external organisations such as the South African Bone Marrow Registry (SABMR) and the South African National Blood Service (SANBS) covering topics such as donor selection and transplant coordination.

Eight COVID-19 specific ECHO sessions were conducted for clinicians, registrars, technicians, technologists, and medical scientists (Table 3). This included a special consultation session for the South African Minister of Health. Session attendance averaged 100 participants per session, with one session exceeding 300 participants.

Figure 1: NHLS Project ECHO sites per laboratory type

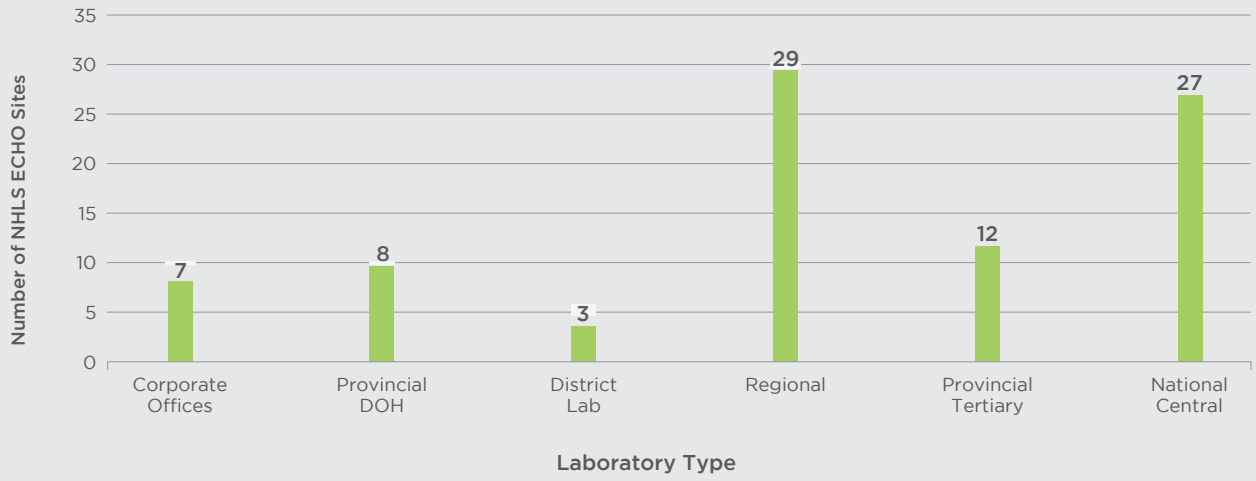


Figure 2: Project ECHO sessions per province

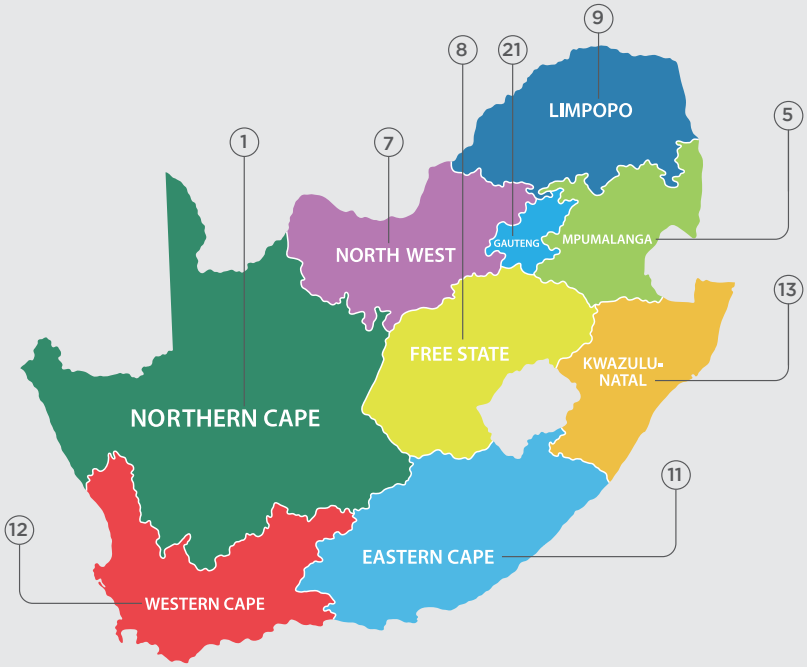
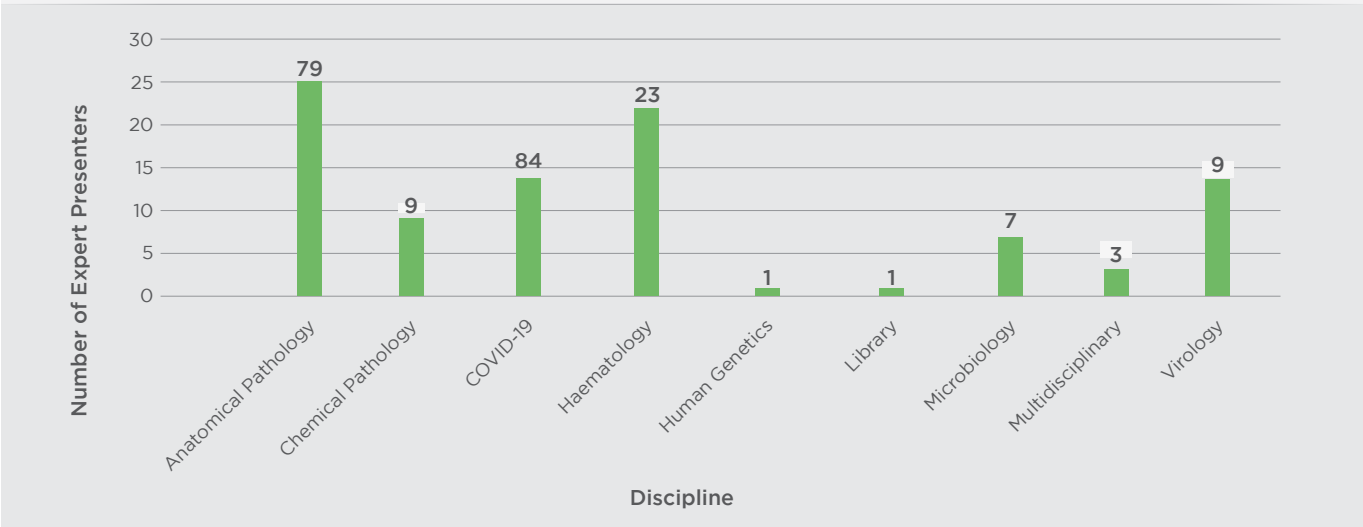


Table 5: Summary of ECHO Sessions by Session Type and Discipline

Session type	Discipline	Number of sessions	Average attendees per session
Case Studies	Anatomical Pathology	12	16
	Chemical Pathology	1	35
	Haematology	3	30
	Virology	5	30
Inductions	Stakeholder Engagement	4	5
Journal Club	Anatomical Pathology	7	16
Meeting	Chemical Pathology	2	9
	Haematology	1	9
	Quality Assurance	2	10
	Academic Affairs and Research	13	6
	Virology	3	15
	Committee	19	15
	Stakeholder Engagement	2	11
Skills Development and Training	Anatomical Pathology	19	16
	Chemical Pathology	23	35
	Haematology	30	30
	Human Genetics	1	5
	Microbiology	7	24
	Virology	4	30
	COVID-19	8	100
	Library	1	8
	Multidisciplinary	7	50
Overall		**174**	**23**

Figure 3: Number of Expert Presenters per Discipline



Research support

The NHLS commenced with building capacity for data management and analytics to support NHLS researchers and departments in study design, data collection and analysis. This includes the procurement of software for data analysis that will be made available to researchers on the NHLS platform.

The AAR Department is implementing the the following support services to researchers especially those not linked to academic:

- Training on basic epidemiological research methods, and graduate and postgraduate supervision;
- Guidance on study design and protocol development;
- Literature reviews;
- Advanced data analysis (including biostatistical and geospatial analysis);
- Reviewing and editing research reports (manuscripts, abstracts, dissertations, etc.);
- Guidance on publication processes; and
- Identification of funding opportunities.

Scientific knowledge centres

In line with the strategic research plan, Scientific Knowledge Centres (SKCs) are in the process of being established. Terms of reference (ToRs) for technical working groups (TWGs) have been drafted, and one TWG was established during the financial year.

The SKCs will promote innovative research in the key priority areas identified by the NHLS, including: TB, HIV, non-communicable diseases (NCDs), maternal and child health, vaccines, human microbiome, point-of-care testing (POCT), and health systems strengthening. The main objectives of the SKCs are to:

- Identify and address knowledge gaps in the designated key priority areas by performing gap analyses and promoting research and innovation in those identified areas;
- Identify and develop support structures for under-resourced research groups within the designated key priority areas;
- Coordinate research activities in the identified key priority areas;
- Keep stakeholders abreast of new research findings and their implications;
- Strengthen and promote collaboration across all NHLS platforms and improve inter-institutional and multi-sectoral interactions and partnerships;
- Mobilise increased funding support for the designated key priority areas; and
- Ensure rationalisation and best use of financial and human resources.

Grants finance management support

Analysis of project status

The Grants Finance Office (GFO) started its new financial year on 1 April 2019 with 235 actively managed cost centres. The GFO is currently managing a total awarded budget to the value of R747 million, of which a total of R548.8 million (77%) has already been spent, which leaves a balance of R198 million for at the end of the year.

Funds available from top ten grantors as at 31 March 2020

The table below shows that the top ten grantors contribute a total of 93% (R696 million) of the total budget of R747 million. The remaining grantors collectively contribute 7% (R50 million) of the total budget. The top grantor remains the US Center for Disease Control (CDC) which contributes 49% (R363 million) of the total funds. Measures are being implemented to improve the grants process and ensure that grants are managed efficiently and to the satisfaction of all stakeholders.

Table 6: Distribution of grants awards by Grantor

Grantors	Awarded Budget	Number of Projects	Percentage
US Center for Disease Control (CDC)	363,398,953	33	49%
Department of Health, South Africa	130,958,521	2	18%
Department of Science & Technology, South Africa	43,620,000	4	6%
NHLS Research Trust	34,992,219	179	5%
The Biovac Institute	31,511,799	1	4%
South African Medical Research Council (SAMRC)	27,605,282	7	4%
MHSC	21,071,561	2	3%
World Health Organisation (WHO)	19,784,203	18	3%
EcoHealth Alliance	14,414,857	1	2%
The Aurum Institute	9,641,532	1	1%
Others	49,864,989	100	7%
Total	**746,863,916**	**348**	**100%**

Research funding

NHLS Research Trust

During the 2019/2020 financial year, a total of 84 applications for funding were received through the NHLS Research Trust as follows:

- 27 for research grants with an awarded amount of R500 000 per successful application;
- Three for research progression grants with an awarded amount of R250 000 per successful application; and
- 54 for development grants with an awarded amount of R100 000 per successful application.

The status of the applications is reflected in the table below.

Table 7: Status of NHLS Research Trust Applications

	Development	Research	Research progression	Grand Total
2019 Applications	42	27	3	72
Awarded	2	0	0	2
CC opened	14	0		14
Rejected	15	5	2	22
Reviewed - Pending Input	11	22	1	34
2020 Applications	12		0	12
Awarded	5			5
Rejected	3	0	0	3
Reviewed - pending Input	1			1
Sent for review	3	0	0	3
Grand Total	**54**	**27**	**3**	**84**

Scientific travel and events attendance support

A total of 947 NHLS staff members were funded for travel to scientific training, conferences and congresses;

of which 768 were local events and 159 were international events. R7.6 million was spent in total of which 76% was contributed by the NHLS and the remaining 24% was funded through grants.

Research output

Publications

A total of 632 journal articles that were co-authored by NHLS researchers were published in indexed journals during the financial year. Information on authorship by the university is indicated below.

Table 8: Peer reviewed publications by medical university co-affiliation

Medical University Co-Affiliation	Publications	First Author	Last Author
Sefako Makgatho University	7	2	3
University of Cape Town	80	20	25
University of Free State	11	3	4
University of KwaZulu-Natal	24	11	6
University of Pretoria	61	34	16
University of Stellenbosch	74	10	12
University of Witwatersrand	268	109	119
Walter Sisulu University	2	0	0
No university Affiliations	**2**	**20**	**37**

Pathology Research and Development Congress

A total of 513 delegates registered and attended PathReD 2019 which was held from 18-21 July 2019. PathRed focuses on the development of young and emerging researchers and therefore includes various training and developmental activities. Below is a summary of the various training sessions and workshops conducted.

PathReD 2019 workshops by discipline			
Discipline	**Workshop Title**	**Discipline**	**Workshop Title**
Chemical Pathology	Basic Clinical Chemistry Laboratory Statistics	**Microbiology**	Registrar Training and Examination Approaches
	Risk Management in the Clinical Laboratory	**Research Development and Training**	Do's and Don'ts: Preparing for Ethics Submission: Work Ethics and Time Management
			Crafting your Career in Science: Writing Successful Grant Applications for Funding
			Rate My Science: Applying for NRF Rating
Education	Developing registrar knowledge, skills and reflection of learning objectives and learning opportunities	**Virology**	Registrar Training and Examination Approaches
			Unlocking Informatics in Virology
Haematology and Immunology	Flowcytometry	**Anatomical Pathology**	Cytopathology Workshop Registrar Training, Examination
			Approaches and Assessments: Anatomical Pathology
	Coagulation Workshop	**Biobanking Seminar**	Bio banking - a resource for the future
	Autoimmune Disease Diagnosis - a Laboratory Perspective	**Support Services**	Laboratory Support Services – Gauteng
	Registrar Training and Examination Approaches	**Epidemiology**	Supporting surveillance and outbreak investigation for communicable diseases in RSA
	College of Pathologists Haematology Examiner Workshop	**Intellectual Property**	Enabling and supporting Innovation at the NHLS, the move towards the right direction

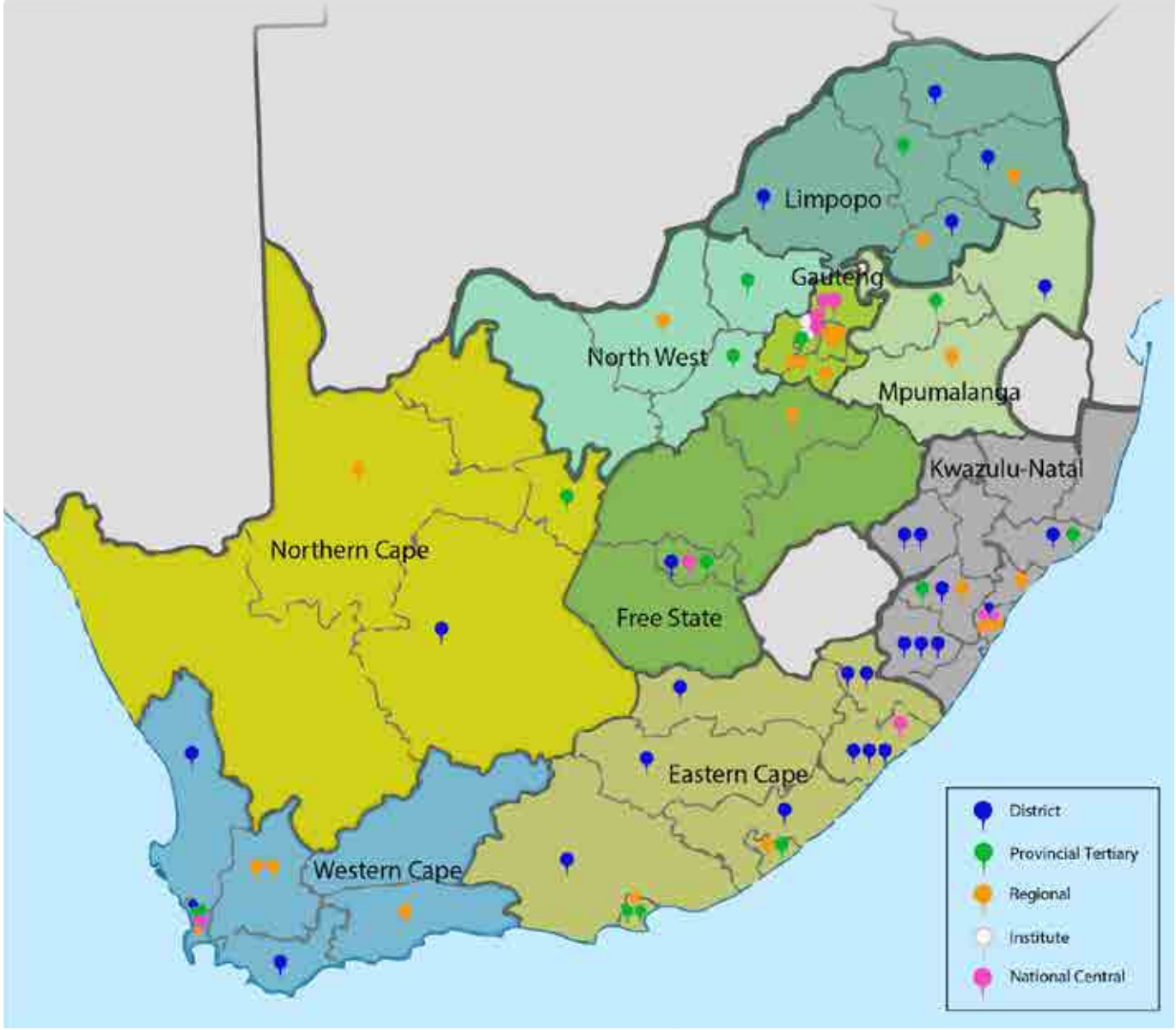
Quality Assurance Unit

Accreditation and certification

Accreditation of medical laboratories

As at 31 March 2020, there were nineteen (19) new facilities accredited by SANAS for the ISO 15189:2012 standard, versus twenty-one (21) in the previous financial year. As a result, there were a total of 80 accredited laboratories in all provinces and across 39 district municipalities at the end of the 2019/2020 financial year, compared to 61 accredited laboratories across 31 district municipalities at the end of the 2018/2019 financial year (figure 1). Twenty of these 80 laboratories (25%) were on the strengthening laboratory management towards accreditation (SLMTA) quality improvement programme.

Figure 1: Accredited laboratories in the 2019/2020 financial year



There are four tiers of laboratories within the NHLS as follows:

- National central (10 with 53 departments);
- Provincial tertiary (17);
- Regional (44); and
- District (146).

The figure below shows the number of accredited laboratories by tier.

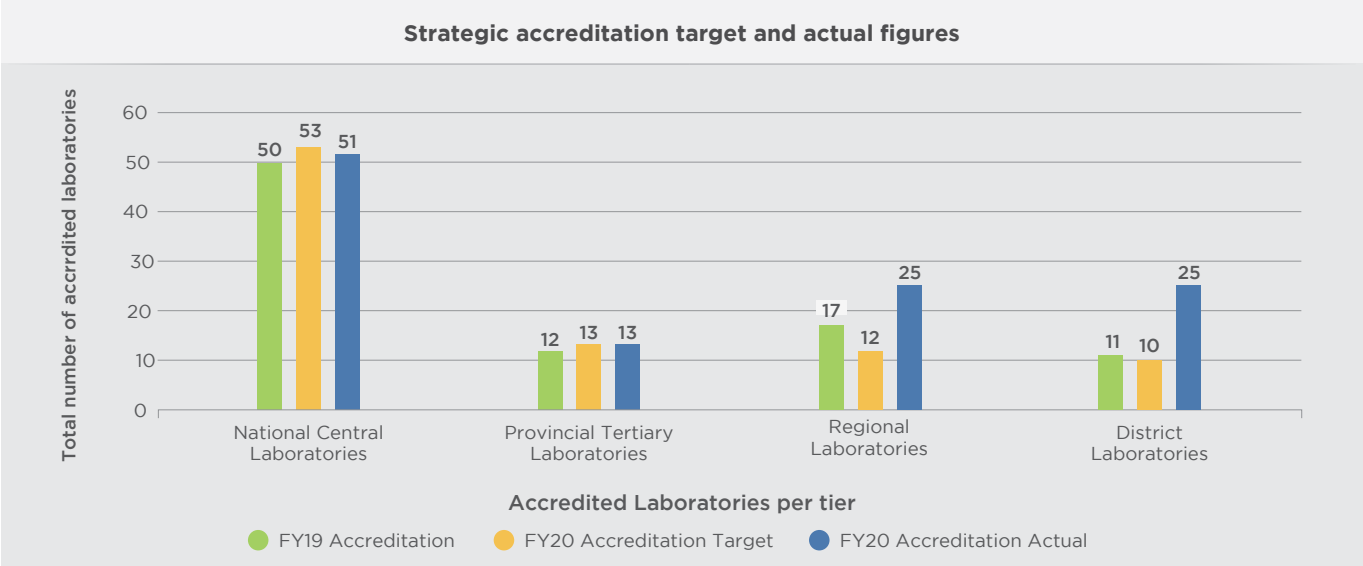


Figure 2: Accredited laboratories by tier in the 2019/2020 financial year

The Provincial target was reached while Tertiary, Regional and District laboratories have exceeded the target

ISO 9001 certification in diagnostic media products and support of service departments

During the 2019/2020 financial year, a total of 17 staff members attended the ISO 9001:2015 implementation training which increased the number of trained support services staff from 211 in the 2018/2019 financial year, to 228.

The two Diagnostic Media Products (DMP) facilities maintained certification. The national QA Department underwent a pre-certification audit during March 2020, to determine its readiness to apply for external audits for certification. A total of 10 non-conformities were identified and a re-audit is planned for the new financial year, subject to the resolution of these non-conformities.

Implementation is continuously monitored through internal audits. To date, three cycles of audits have been conducted as follows:

- Cycle 1 (22/33 units) in 2017/2018;
- Cycle 2 (13/33) in 2018/2019; and
- Cycle 3 (9/33) in 2019/2020.

Figure 3 below shows the trend analysis of compliance in all three cycles.

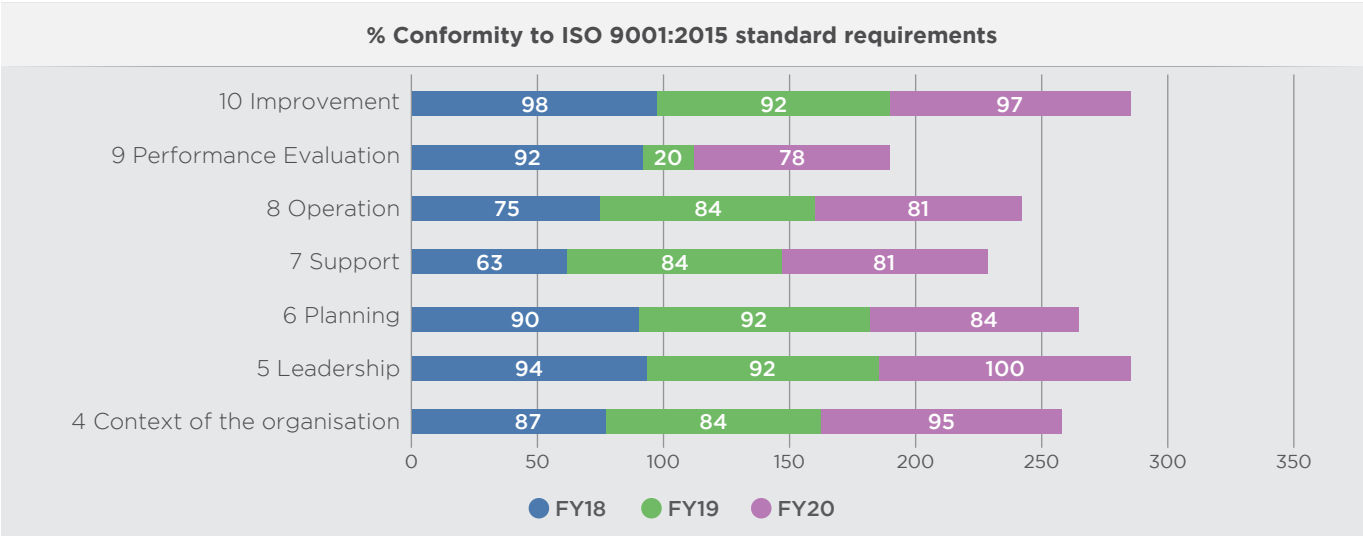


Figure 3: Percentage of compliance of support service departments in all three audit cycles

Proficiency testing schemes

The NHLS provides PTSs to measure the quality of the performance at laboratories, both within the NHLS and to 25 other countries outside of South Africa.

During the 2019/2020 financial year, the number of SANAS-accredited PTSs increased from sixteen (16) to twenty-two (22). Testing for beta hCG, cryptococcal latex antigen, d-dimer, mycology moulds, mycology yeast and VL successful passed the initial ISO 17043:2010 assessment and the other schemes maintained their accreditation.

The PTS performance of the NHLS continued to be above its annual strategic target of 90% over three years, with 96% of reporting laboratories achieving results of more than 80% as seen in figure 4.

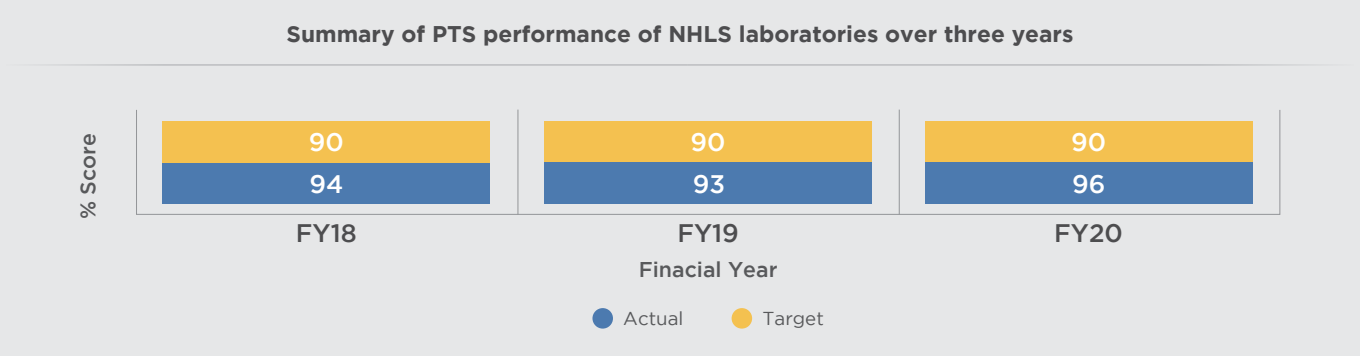


Figure 4: Average performce of NHLS laboratories on PTS over three years

Highlights for the year under review include:

- Two new schemes were introduced for VL and hepatitis B surface antigen;
- The NHLS QA Division continued its responsibilities as the Regional Centre of Excellence for SADC by hosting Botswana in July 2020 for benchmarking;
- Three staff members were sent to Oneworld Accuracy in Canada for a benchmarking exercise in Sep 2010 through the CDC grant;
- The tender for a web-based PTS was awarded and implementation commenced with the aim to go live during the 2020/2021 financial year; and
- The enrolment system was automated during the reporting period.

Quality compliance audits

A total of 152 laboratories were audited in 2019/2020 compared to 166 in 2018/2019. The reduction was caused by an increase in the number of accredited laboratories as they are excluded from the QCA audits. Even though the target of 90% was not reached, the number of laboratories that achieved a performance of more than 80% increased by 7% to 86% in 2019/2020 compared to 79% in 2018/2019 (figure 5). This shows an improvement in the implementation and maintenance of the Quality Management System (QMS)

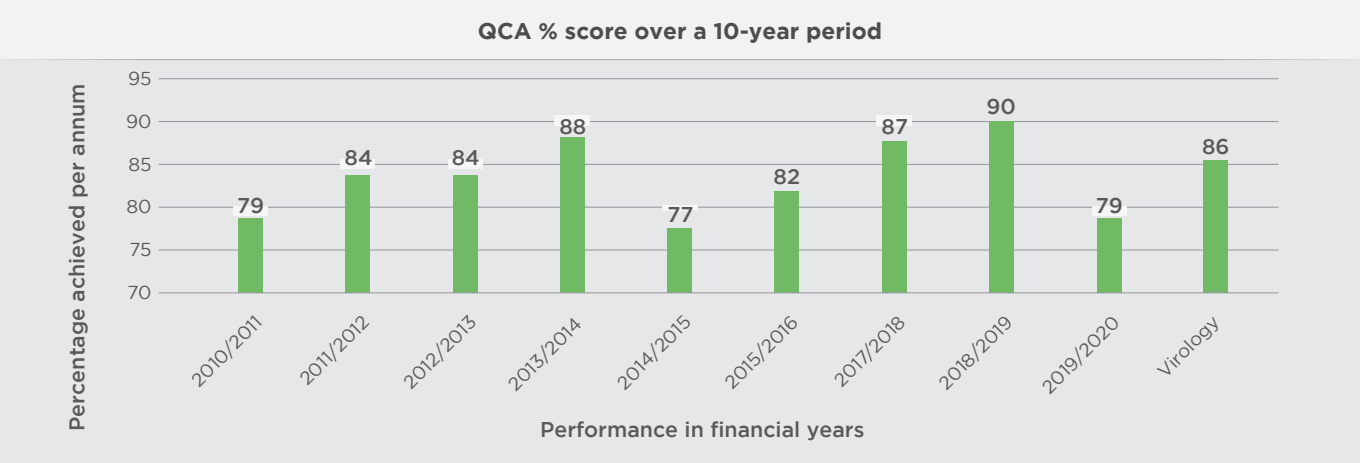


Figure 5: Quality compliance audit results over 10 years

Health Technology Assessment Unit

As the activities of the South African Health Products Regulatory Authority (SAHPRA) have increased in the 2019/2020 financial year, the NHLS HTA Unit became instrumental in assisting the regulator to implement its processes and acquire personnel. Members of the unit served on some of the expert committees to provide guidance.

The HTA Unit received a total of 58 applications for reagents, upgrades, POCT and laboratory devices in 2019/2020 compared to 63 in 2018/2019. The unit started working on horizon scanning and introduction of a new platform, after consultation with expert committees with input from both the Microbiology and Anatomical Pathology Sections. Evaluation of the digital platform has commenced during this financial year.

QA Department grant projects

The continuous quality improvement (CQI) project funded by CDC continues to complement activities in the QA Division for both accreditation and certification as well as implementing QMS at South African HIV POCT sites. The accreditation statistics are outlined in the relevant section of this report. Figure 6 below shows the names of accredited SLMTA laboratories per province from cohort 1 to 3 in eight provinces from FY16 to FY20.

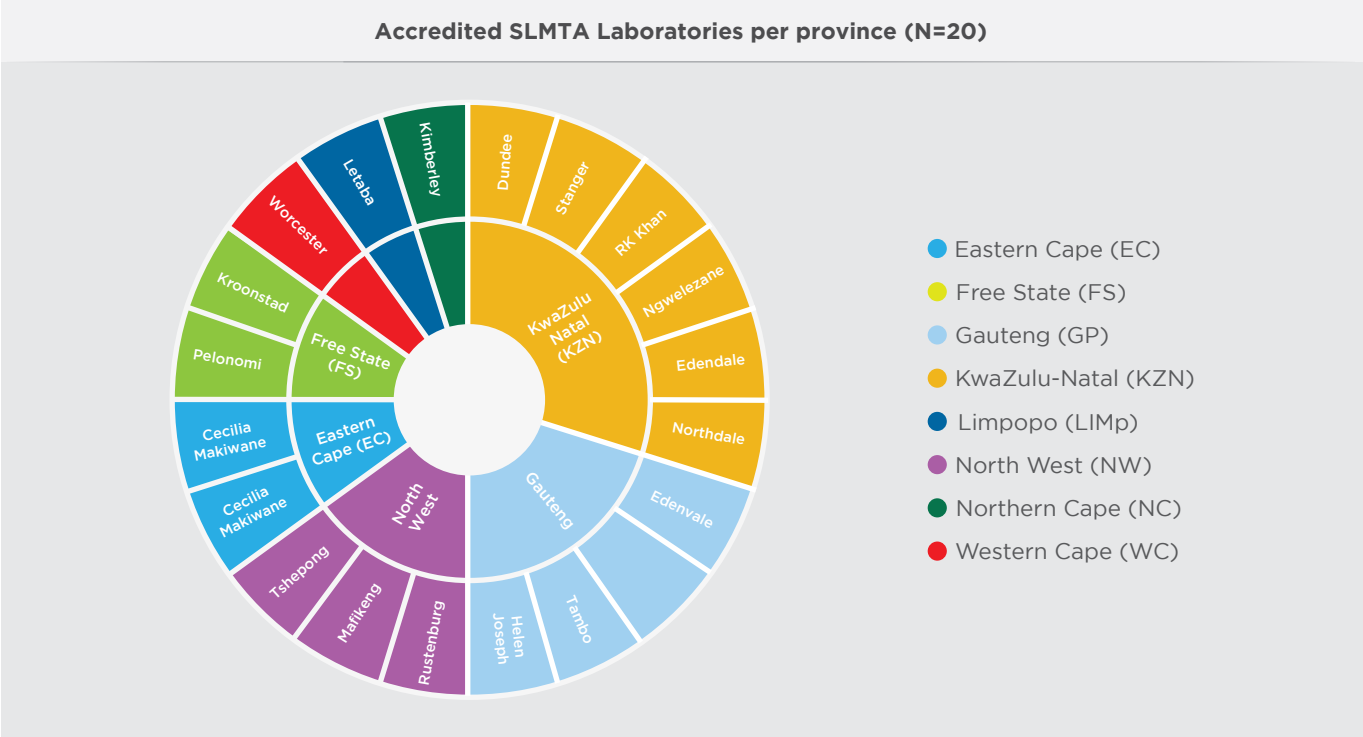


Figure 5: Accredited SLMTA laboratories from Cohort 1 to 3

There have been notable changes in the staff complement of the unit, due to numerous new recruitments, resignations and contracts that have ended between October 2019 and March 2020. The full time PTS staff has been instrumental in preparation of the panels.

QA programmes have been implemented at 4284 HIV POCT facilities during the reporting year, compared to 3854 in 2018/2019. The facilities have already been enrolled for both internal quality control (IQC) and PTSs. The overall performance of the health care facilities increased from 82% in 2018/2019 to 85% in 2019/2020.

2.4.3. Performance information by institutes

2.4.3.1. National Institute for Communicable Diseases

Prof Lynn Morris
Interim Executive Director

Introduction

The NICD plays a vital role in the early detection, containment and response to infectious disease threats across South Africa, the Southern African Development Community (SADC) and Africa. It provides technical support to the DoH, as well as the WHO, Africa CDC and other relevant bodies, through surveillance of communicable diseases, outbreak response, specialised diagnostic services, research and training, capacity building and provincial epidemiology services.

There are seven disease-focused centres within the NICD, plus a transversal Division of Public Health Surveillance and Response (DPHSR). Core surveillance activities are funded through a conditional grant from the National Treasury and project-specific activities and research are grant-funded from external agencies and other donors. The staff complement of 600 includes pathologists, scientists, epidemiologists, medical technologists and technicians, and surveillance officers.

Division of Public Health Surveillance and Response

The DPHSR, through the GERMS-SA surveillance platform, continues to support most of the surveillance activities within the seven NICD centres. These nationwide activities cover a broad range of pathogens and include laboratory surveillance supported by data from the CDW, enhanced surveillance at sentinel hospital sites and syndromic surveillance for respiratory and diarrhoeal disease.

The Provincial Epidemiology Team (PET), comprising eight epidemiologists placed in eight of the nine provinces, participated in districtwide training for the National Expanded Programme on Immunisation coverage survey, provided operational management for field teams and contributed to data analysis. The PET provided regular feedback to provinces, and contributed to bi-annual surveillance bulletins detailing outbreak and surveillance activities, data analysis and reports.

In 2020, the DPHSR played a pivotal role in the national COVID-19 pandemic response with activation of the Emergency Operations Centre (EOC) within the Outbreak Response Unit (ORU) and formation of an Incident Management Team, which initially comprised the DoH, NHLS and NICD. Preparatory response activities for the expected transmission of COVID-19 into South Africa began in mid-January, with development of policy and guidance documents required for outbreak readiness, as well as screening and monitoring tools. The DPHSR also supported provincial preparedness training.

Following diagnosis of the first case of SARS-CoV-2 on 5 March 2020, activities have been ongoing including initial contact tracing and monitoring, data management and analysis, development of reporting systems and epidemiological support, both centrally and at provincial level. The existing NICD clinicians' hotline service was significantly expanded to a full tollfree call centre. The need for a public hotline was accommodated by the NHLS and has become a significant part of the broader response to COVID-19.

The Notifiable Medical Conditions Surveillance System (NMCSS), which is designed for real-time data reporting, continued to expand across the country, receiving an average of 7 500 monthly notifications from the NHLS laboratories, and more than 3 800 private and public sector health facilities across the country. The proportion of clinical notifications submitted through the electronic case reporting platforms increased from 40% in January 2019 to about 74% in February 2020.

In March 2020, when the COVID-19 epidemic hit the country, a new module (or component) was added to the NMCSS to collect additional data elements required to guide the national response to the pandemic. The goal of creating the COVID-19 module was to enable the system to collect enriched epidemiological data on COVID-19, incorporate real-time data feeds from private medical laboratories, and streamline the timely dissemination of the data to provinces and districts for public health action.

The Centre for Emerging Zoonotic and Parasitic Diseases

The Centre for Emerging Zoonotic and Parasitic Diseases (CEZPD) continued to play an important role in supporting the malaria control and elimination agenda of the provincial, national and regional programmes. Several surveillance-linked research projects provided the basis for tackling residual malaria transmission in South Africa.

One of these was a community-based malaria prevalence and KAP survey that identified imported asymptomatic carriage in northern KwaZulu-Natal Province as a significant obstacle to malaria elimination.

Another project showed that a new approach to the control of vector mosquitoes, namely winter larviciding, is likely to add significant benefit to the reduction of malaria transmission in affected areas. This approach now forms part of South Africa's malaria control and elimination policy for the 2019 – 2023 period.

The CEZPD detected the first infant botulism case in South Africa. It was caused by a rare dual toxin-producing strain of *Clostridium botulinum*. This case illustrated the importance of maintaining a high level of clinical suspicion of botulism when assessing hypotonic infants.

A Limpopo Province resident was confirmed bacteriologically and molecularly as only the second indigenous human melioidosis case diagnosed in South Africa. Another cause of a unique opportunistic human infection was identified as the piroplasm parasite *Anthemosoma garnhami*, previously only found in wild rodents in Ethiopia and Namibia.

In collaboration with EcoHealth Alliance (USA) and a number of local institutions such as One Health, significant progress was made in understanding the ecology and epidemiology of Rift Valley fever (RVF) in South Africa, including identification of specific wetland habitats and soil properties associated with high disease mortalities and breeding habitats of RVF virus mosquito vectors.

In collaboration with UP, the CEZPD continued its bio-surveillance programme for zoonotic pathogens in local bat populations. The period of the highest Marburg virus shedding was determined by its detection in rectal swabs from Egyptian rousettes, signifying that faecal contamination of natural bat habitats represent a potential source of infection for humans. Identified genetic sequences are closely related to the Ravn strain of the virus, implying introduction of Marburg viruses from distant localities. Confirmation of the period for the highest virus exposure risk highlights the value of bio-surveillance and demonstrates that Marburg viruses continue endemic circulation in South Africa. This represents a potential threat, which needs to be communicated to at-risk communities as a part of evidence-based public health education and prevention of pathogen spill-over.

The Centre for Enteric Diseases

The Centre for Enteric Diseases (CED) provides the South African community with epidemiological and laboratory support in response to food and waterborne outbreaks. During the 2019/2020 financial year, the centre provided epidemiological and laboratory testing support for 32 outbreaks, and documented a further 118 outbreaks with insufficient epidemiological or sample testing data, which prohibited further investigation.

In outbreaks associated with bacterial pathogens, whole-genome sequencing (WGS) of isolates was conducted to assist with investigations. In addition, the centre continued to monitor all *Listeria* cases reported to the NMC system and conduct WGS on isolates submitted to ensure early detection of any potential outbreaks following the unprecedented *Listeria* outbreak in 2017/2018.

The centre also conducts routine diarrhoeal disease sentinel surveillance at selected sites. A decline in rotavirus prevalence (11%) was noted in 2019; notably, rotavirus was replaced by *Shigella* spp. as the leading cause of diarrhoeal hospitalisations in children <5 years in South Africa. Plans are underway to expand the current surveillance to two additional provinces and include all ages.

The centre engaged with the DoH on the Strategic Plan for Diarrhoeal Diseases, and published 10 papers in peer-reviewed journals. One paper on the *Listeria* outbreak in South Africa, was published in the prestigious *New England Journal of Medicine*.

Current areas of research in the centre include:

- Increasing the capacity for WGS of enteric bacteria to improve outbreak detection and investigation;
- Improved diagnosis of common enteric infections in Africa;
- Investigating a new injectable rotavirus vaccine;
- Examining the potential infectious causes of intussusception; and
- Determining the impact of secretor status and microbiome on rotavirus susceptibility.

The Centre for Healthcare-Associated Infections, Antimicrobial Resistance and Mycoses

The Centre for Healthcare-Associated Infections, Antimicrobial Resistance and Mycoses (CHARM), incorporates two national reference laboratories for antimicrobial resistance (AMR) and mycoses, and houses the National Biological Sample Collection of pathogenic bacteria and fungi. The centre serves as a WHO Collaborating Centre (CC) for AMR and is the national focal point for the WHO's Global Antimicrobial Resistance Surveillance System (GLASS). The centre's epidemiology team conducts community and healthcare-associated outbreak investigations and is involved in evaluation of large-scale public health programmes.

The centre implemented a real-time alert system to detect outbreaks of healthcare-associated bloodstream infections among neonates at secondary hospitals in four provinces. The hospital personnel were trained to use the outbreak alert mobile software application throughout 2019. Results of the pilot project will inform plans to roll out the mobile application to facilities with limited laboratory and epidemiologic capacity.

Senior members of the centre represented the NICD on the Ministerial Advisory Committee for AMR, WHO AMR Surveillance and Quality Assessment Collaborating Centres Network and the WHO Strategic and Technical Advisory Group for AMR. AMR surveillance is performed by means of national or sentinel isolate-based analyses for bacterial and fungal isolates, and electronic data analysis mapping AMR from patients who meet the surveillance case definitions.

The centre continued enhanced surveillance for cryptococcal meningitis to assess the impact of national reflex cryptococcal antigen screening and the use of 5-fluorocytosine (5-FC) for treatment. The centre led and participated in the investigations of several healthcare-associated outbreaks in neonatal units during the year under review. These investigations revealed that overcrowding, understaffing, sub-optimal IPC measures and lack of antimicrobial stewardship remain the driving factors for healthcare-associated outbreaks. Failure to address these underlying issues results in recurrent outbreaks.

As a WHO CC for AMR, the centre participated in the WHO AMR Surveillance and Quality Assessment CC Network, and provided external quality assessment on AMR to GLASS participants across the African continent.

The Centre for HIV and Sexually Transmitted Infections (CHIVSTI)

The Centre for HIV and Sexually Transmitted Infections (CHIVSTI) consists of four sections, namely HIV Virology; Cell Biology; HIV Molecular and Serology; and Sexually Transmitted Infections that collectively address the challenges of HIV and STI diseases through the following programmes:

- Surveillance of disease burden and antimicrobial resistance and antiviral;
- Measurement of endpoint infections in large trials and cohort studies;
- Broadly neutralising antibodies as part of prophylactic HIV vaccine and antibody-mediated protection clinical trials;
- Exploring an HIV "cure" strategy; and
- Development of reference diagnostics and implementation science.

HIV surveillance

Results were released from the 27th edition of the antenatal survey conducted between 1 October and 15 November 2017 at 1,589 sentinel sites selected across South Africa. The HIV prevalence data generated from the survey continues to contribute to the Thembisa and AIM HIV models, which provide yearly national projections on the total number of people living with HIV, new HIV infections and AIDS-related mortality in the country. Nationally, HIV prevalence among pregnant women remained stable at around 30%. The consistent decline in HIV prevalence observed among young women (15-24 years) is encouraging, as this population has traditionally been at increased risk of HIV acquisition. Knowledge of HIV status prior to the first antenatal care (ANC) visit was low, especially among young women (15-24 years), highlighting the gap in access to youth-

friendly reproductive health services. The 1st and 2nd targets of the WHO 90-90-90 strategy were reached among pregnant women across all provinces, which indicates the efficiency of the PMTCT programme in identifying HIV-positive pregnant women and enrolling them for treatment.

In 2019, a nationally-representative survey of HIV drug resistance (HIVDR) was implemented in adult patients with unsuppressed VL. Next Generation Sequencing (NGS) and drug level testing (DLT) using liquid chromatography mass spectrometry was performed on random samples from 16 NHLS laboratories. Of the 8,202 VL test specimens collected, 1,053 had unsuppressed VL of which 779 were selected for further testing. The survey showed that 72% of patients with unsuppressed VL, harbour resistance to ART. DLT confirmed that 55% of specimens had detectable levels of ART. HIVDR was lower in patients that had undetectable levels of ART ($p<0.0001$), presumably due to a lack of drug selection pressure. The use of residual specimens proved advantageous in that it allowed for proportion to size sampling, and reduced collection time and cost.

STI surveillance

The centre continued to strengthen the case-based surveillance of congenital syphilis (CS), a preventable medical condition that results from the transmission of *Treponema pallidum (T. pallidum)* infection from an infected pregnant woman to her foetus. *T.pallidum* infection has severe consequences for the foetus, resulting in early foetal deaths and *still-births*, neonatal deaths, preterm and low birthweight births and symptomatic disease in addition to asymptomatic infections. CS is a 'category two' NMC condition requiring notification within seven days of detection. The centre reported 362 cases of CS to the DoH for inclusion in the Global AIDS Monitoring (GAM) report. Although there was likely underreporting of CS, activities are underway to triangulate CS data with other data sources in a formal evaluation during the next financial year.

Aetiological surveillance of STI syndromes is essential for validating and updating the existing national STI syndromic management guidelines that are in use at PHCs throughout the country. South Africa is one of few African countries that submits *Neisseria gonorrhoeae* antimicrobial resistance data to the WHO global antimicrobial resistance surveillance system (GLASS). The latest 2018 version of the PHC STI guidelines based on sentinel surveillance data was ratified and released, and is available on the websites of the DoH and NICD. A chapter on the management of persistent and complicated STIs was added to the national Adult Hospital Level Guidelines, which were ratified and will be disseminated in 2020.

HIV research activities

The HIV Virology Section continued to support preclinical vaccine development and to define the determinants of broadly neutralising antibodies, widely assumed to be key for a future HIV vaccine. Understanding B cell repertoires using extremely high-throughput technologies, was a focus supported in part through the local development of a low-cost high-performance computing cluster as an alternative approach for resource-limited bioinformatic settings. In addition, a major focus was structural characterisation of the best of the broadly neutralising antibodies and engineering of such antibodies to enhance their function or tailor them for alternative expression vectored systems for passive immunisation studies.

A single-arm clinical trial, called LEOPARD-CT, which commenced in August 2015 at Rahima Moosa Mother and Child Hospital in Johannesburg, South Africa, completed recruitment and follow-up in April 2019. The trial was designed to improve the understanding of viral latency in early treated HIV-infected children to inform more effective treatment strategies with the ultimate goal of achieving a functional cure or viral remission. An observational cohort of mothers and their infants was followed in parallel, through a clinical trial called LEOPARD-O, which commenced in March 2015. Findings revealed that only half of the children attained and sustained VLs <50 RNA copies/ml, and only half of these sustained CD4% >30%. There was no difference in proportions of children attaining these endpoints according to starting ART within 48 hours or between two and 14 days of birth. Additional interventions over and above the early administration of ART must be considered to attain remission in children.

The Centre for Respiratory Diseases and Meningitis

The Centre for Respiratory Diseases and Meningitis (CRDM) is a resource of surveillance, diagnostics, expertise and research in the field of communicable respiratory diseases and meningitis for South Africa and the African continent.

The centre generates data and provides expertise related to respiratory diseases and meningitis of public health importance to the DoH, healthcare providers, regional and international collaborators, to assist with the planning of public health policies and programmes, and response to respiratory disease and meningitis outbreaks.

The CRDM is also a source of capacity building and formal training within South Africa and the African region.

During the year under review, the centre continued with the core function of surveillance, through syndromic and laboratory-based surveillance programmes. Syndromic surveillance programmes included the pneumonia and influenza-like illness (ILI) surveillance systems in public hospitals and PHCs, as well as the private general practitioner network (Viral Watch). The focus of these programmes is to describe the burden, seasonality and characteristics of influenza, respiratory syncytial virus (RSV) and *Bordetella pertussis* (pertussis). Laboratory-based surveillance programmes included long-standing pathogens under surveillance, such as the pneumococcus, meningococcus and *Haemophilus influenzae,* with a focus on outbreak detection and the impact of interventions.

The CRDM has been at the forefront of the response to COVID-19 pandemic in South Africa. Case definitions were developed for surveillance and laboratory testing of possible COVID-19 cases in January 2020. In collaboration with the DoH and other partners, COVID-19 guidelines for case-finding, diagnosis, management and public health response in South Africa, were developed and released in February 2020. These guidelines have subsequently been updated in line with the evolving epidemiology of the disease. Additional guidelines were developed for different sectors such as education, together with relevant partners.

The CRDM laboratory was the first in South Africa to implement diagnostic PCR testing for SARS-CoV-2, starting from 26 January 2020, and was the only testing laboratory in South Africa until early March 2020. The centre worked closely with laboratories to rapidly expand laboratory testing capacity in both the public and private sectors.

The CRDM laboratory became a WHO COVID-19 International Regional Reference Laboratory and has provided support to many African countries, in this capacity. Initially, this was done through testing, training and support to establish in-country testing, coupled with ongoing support for quality assurance and inter-laboratory comparisons.

Together with relevant partners, the CRDM supported a wealth of training activities on COVID-19. Additionally, the centre obtained funding to conduct a range of COVID-19-related research activities, mainly focused on the areas of burden of disease, transmission, sero-epidemiology and viral sequencing.

New pathogens (group A and group B streptococcus) were included in laboratory-based surveillance from 2019, and in enhanced surveillance from April 2020. Studies of burden of disease (influenza, RSV, pertussis and pneumococcus), vaccine effectiveness (influenza) and carriage (meningococcus) were conducted to assist policy makers with the implementation of vaccine strategies.

In 2020, four postgraduate students joined the CRDM as part of the NIH-funded South Africa-Pittsburgh Public Health Genomic Epidemiology Research Training Programme (SAPPHGenE), which aims to develop research in public health genomics in South Africa. Six 'category one' NMC conditions (acute rheumatic fever, COVID-19, diphtheria, meningococcal disease, pertussis and respiratory disease caused by a novel respiratory pathogen) and two 'category two' conditions (*Haemophilus influenzae* type b (Hib) and legionellosis) fall within the centre.

During the year under review, active reporting and real-time verification for the NMC programme have commenced. The CRDM responded to several outbreaks, including outbreaks of diphtheria meningococcus and influenza. Pertussis alerts and updates for clinicians were published. The diphtheria, and influenza guidelines were updated in 2019.

Centre for Vaccines and Immunology

The Centre for Vaccines and Immunology (CVI) was established in 2012, to provide laboratory and epidemiological support to the DoH. The centre serves as the National Surveillance Laboratory and the WHO Regional Reference Laboratory for acute flaccid paralysis (AFP), as well as measles and rubella surveillance. This includes receiving and testing samples from all nine provinces in South Africa.

In addition to testing samples from the Southern block countries: Angola, Botswana, Lesotho, Namibia, Madagascar, Mozambique, Malawi, Zambia, Zimbabwe and Swaziland, the centre also conducts other virological and immunological research projects on TB, viral hepatitis and other vaccine-preventable diseases.

During the 2019/2020 financial year, the CVI supported the African region for polio surveillance, notifying 16 countries and the WHO of results for immediate action. The centre provided laboratory support to three suspected measles outbreaks in South Africa, which enabled rapid responses by provincial health authorities.

The centre furthermore conducted laboratory-based surveillance for hepatitis A and hepatitis B, reporting results to the WHO. Working together with the NMC system, the centre reported two cases of neonatal tetanus, which indicates a requirement for strengthening maternal immunisation and antenatal education.

In addition, the centre reported four cases of congenital rubella syndrome, which indicates the requirement for the introduction of the rubella vaccine into the expanded programme on immunisation. The centre also contributed modelling documents to the National Advisory Group on Immunization, to guide the timing for rubella vaccine introduction.

Regarding teaching and training, one field epidemiologist (FETP) and two intern scientists completed their rotations in the centre. Staff also established the Basic Vaccinology and Advanced Immunology Modules of the new MSc Vaccinology, which was presented for the first time at Wits in 2019.

The Centre for Tuberculosis

The Centre for Tuberculosis (CTB) serves as the National TB Reference Laboratory (NTBRL) for South Africa and as a WHO Supranational TB Reference Laboratory globally.

Completion of the first national tuberculosis prevalence survey

The results of the national TB prevalence survey provided the first direct measurement of the burden through active case finding and identified a higher burden than currently reported. This negatively impacts achievement of “The End TB Strategy” targets. Poor health-seeking behaviour among males was identified as an important issue, while TB among HIV-negative patients and patients without reported symptoms are now recognised as important contributors to the gap.

Bedaquiline resistance emergence in SA: findings for a national surveillance programme

Bedaquiline is a therapeutic agent to treat DR-TB and has shown significant impact on the reduction of mortality, and improvement of overall treatment success. Universal use of the agent for treatment of DR-TB raised concerns of resistance emerging. A national surveillance programme was introduced, which determined an overall baseline bedaquiline resistance prevalence of 3.8% among DR-TB patients. Emergence of resistance during treatment occurred at a frequency of 2.3%. Patient outcomes were also poorer in those with bedaquiline resistance. These findings served to guide appropriate policy decisions.

Using data to drive public health responses

Regularised results for action (RfA) alerts were implemented for both drug susceptible and DR-TB, to drive public health action. In collaboration with external partners, the centre demonstrated the value of this data which resulted in an improvement in the percentage of individuals with DR-TB enrolling for treatment from below 80%-95%. This evidence supported the expansion of the RfA to also include drug-susceptible TB. In addition, the re-engineered NMS Surveillance System integrated these alerts with an automated reporting system, which is a major advancement.

Early findings from the South African tubercolosis inventory study

An inventory study is a useful approach to determine under-reporting of TB. There has been uncertainty of the true burden of TB in the private sector, which may be attributed to untraceable TB patients. In addition, the proportion of individuals diagnosed with TB but who have not enrolled for treatment, is a key concern. The centre merged data from the routine reporting of individuals on treatment and those with a laboratory-confirmed TB result in both the public and private sectors. Preliminary findings indicate that the total burden of laboratory-confirmed TB cases in the private sector is approximately 10 000, which equates to 5% or less of the total burden in SA. The project is still in progress and will also quantify the relative magnitude of loss to follow-up and overall under-reporting.

Use of a broth micro dilution assay for universal tuberculosis drug susceptibility testing

A critical requirement for the effective management of DR-TB, is access to a simple, user-friendly universal drug susceptibility test (DST) to guide treatment decisions. This is important as treatment involves at least four drugs with complex adverse effects. We defined criteria for a broth microdilution assay that provides phenotypic DST for 10 drugs simultaneously, which was cross-validated with WGS and demonstrated the quantitative value of the assay to guide treatment decisions.

National Cancer Registry

The National Cancer Registry is the primary pathology-based cancer surveillance system and most extensive population-based repository of cancer data in South Africa.

During the year under review, the NCR used multi-model supervised machine learning techniques to assign malignancy status to histology reports from the NHLS CDW and identify missing cancer records, which could not be identified by routine CDW algorithms. This greatly improved the completeness of the pathology-based registry for the years 2015, 2016 and 2017. Data from 2015 and 2016 were coded, cleaned and analysed and the 2015 report was published on the NCR website. The NCR created a "Stata Do" file to automate the calculation of age-standardised incidence rates and improve the timeliness of cancer incidence reports. Data for cancers diagnosed in 2017 were coded and the dataset is currently being cleaned, while 2018 data is currently being coded.

The Ekurhuleni population-based cancer registry (EPBCR) identified new data sources and improved case finding, which was shared during a stakeholder feedback meeting. This resulted in the reporting of an additional 1324 cases (39% increase) of cancer. A total of 4695 new cancers was reported for the year 2018, and common cancers in males were prostate, colorectal, lung, melanoma and oesophageal cancers. In women, the most common cancers were breast, cervical, colorectal, uterine and lung cancers.

In the 2019/2020 financial year, the NCR published key research in cancer epidemiology. The registry also examined national cancer trends and excess cancer risk in people living with HIV compared to those who are HIV-negative. It was determined that people living with HIV are at higher risk of AIDS-defining cancers namely, Kaposi sarcoma, non-Hodgkin's lymphoma and cervical cancer. They are also at increased risk of conjunctival cancer and human papillomavirus (HPV) - related cancers which include: penile, anal and vulvar cancer, compared to HIV-negative patients.

Squamous cell carcinoma of the skin was also determined to be HIV-associated. The risk of Kaposi sarcoma has declined as ART became available. The risk of conjunctival cancer and HPV-related anogenital cancers (cervical, anal, vulvar and penile cancers), however, continues to increase, despite widespread availability of ART. The findings of this study were used to inform a national HIV-associated cancer awareness campaign for the 2019 World AIDS Day.

Sequencing Core

The remit of the sequencing core facility is to provide high-level sequencing and analysis support, which enables multi-disciplinary research and surveillance projects to study pathogen genomes and host genetics, particularly in the context of public health priorities at the NICD. This is already ongoing with existing sequencing approaches, which include the PacBio SMRT sequel system and Illumina MiSeq sequencing platforms, as well as the most recently added Illumina NextSeq 550 instrument, which provides higher throughput capacity at a much-reduced rate.

During the 2019/2020 financial year, 4500 genomes were sequenced, with 31% focused on HIV research and surveillance, 27% on DR-TB surveillance , 17% on enteric pathogens (*Salmonella* spp., *L. monocytogenes, Shigella* sp and *V. cholerae*), 16% on respiratory pathogens (*S. pneumoniae, S. pyogenes,* influenza A and B, RSV), 7% on hospital-acquired infections, including fungal pathogens (*A. baumannii, S. aureus, K. pneumoniae and C. auris*) and the remaining 2% on zoonotic pathogens (arenaviruses, herpes simplex virus, *Brucella* sp,). The sequencing core facility generated the first SARS-CoV-2 genome in South Africa and is assisting other African countries through the Africa CDC partnership.

The South Africa Field Epidemiology Training Programme

The South Africa Field Epidemiology Training Programme (SAFETP) is a two-year competency-based training programme that was initiated in 2006 to build field epidemiology capacity for the country. The programme continued to strengthen field epidemiology capacity for health professionals in South Africa and neighbouring countries, through its advanced level and frontline level training.

During the 2019/2020 financial year, the programme offered in-service training to 115 provincial and district level frontline health professionals as follows: 25 in the Free State, 18 in Mpumalanga, 23 in KwaZulu-Natal and 24 in Gauteng. The programme had a cohort of eight first-year and 12 second-year advanced level trainees who were involved in 15 outbreak investigations, conducted 10 large database analyses and completed eight surveillance evaluation projects. Two of the residents were from other African countries, namely: Lesotho and Malawi. In the year under review, SAFETP staff and residents presented twelve (12) abstracts at national and international scientific conferences, and published three papers in peer-reviewed journals.

Division of Biosafety and Biosecurity

The Division of Biosafety and Biosecurity (DBB) successfully commissioned and fully operationalised a newly constructed biosafety level 3 (BSL3) laboratory, which, jointly with the biosafety level 4 (BSL4) laboratory, represents the most advanced high and maximum biocontainment infrastructure in the country and in Africa. These facilities make it possible to conduct diagnostic analyses and research on high-consequence dangerous pathogens with epidemic-prone potential, including Ebola and the newly emerged SARS-CoV-2 which is responsible for the ongoing COVID-19 pandemic.

The Communications Unit

Media coverage grew significantly from 2,021 news items in the previous financial year to 10,962 news items in the year under review. The NICD website attracted over 1.3 million visitors on average and over 7.3 million page views in the reporting period.

Social media exposure continued to grow extensively, as the Facebook following increased to 1,000,000 in the reporting period and Twitter to 70,000 as at the end of March 2020.

2.4.3.2. National Institute for Occupational Health

Dr Spo Kgalamono
Acting Executive Director

Introduction

The Communications Unit has been foremost in providing the South African public with up-to-date information on COVID-19 matters and building capacity for an informed citizenry. This included:

- Training of provincial public health communicators;
- Strengthening relations with bodies in the public and private sectors; and
- Production of topical communication material, including publications, reports, multimedia and campaigns.

Executive Director's Overview

The NIOH is recognised as a centre of excellence for occupational health and functions as a national and regional source of knowledge and expertise to the South African government, industry and labour, the SADC countries and the African continent. It provides advice and assistance, conducts research and develops capacity, through teaching and training, for the purpose of promoting healthy conditions in the workplace and improving occupational health.

Under the leadership of the NHLS, the NIOH had numerous highlights in the area of OHS during the period under review. The multidisciplinary teams of the institute participated in a substantial number of OHS engagements, in both the public and private sectors, ranging from partaking in cutting-edge research at a national and global level, to supporting innovative programmes to assist vulnerable workers. In the process, the NIOH collaborated with a significant number of key workplace role players; locally, nationally and internationally. This in turn contributed to the institute gaining a new body of knowledge that will enhance and supplement our future efforts to help ensure good OHS in all workplaces.

The NIOH implemented several targeted programmes, including training, for our key partners, local societies and stakeholders during the reporting period. These included collaborations and partnerships with: the departments of health (national and provincial); the Department of Employment and Labour and the Department of Mineral Resources and Energy (DMRE); the South African Society for Occupational Medicine (SASOM); the Africa Regional Association of Occupational Health(ARAOH); the South African Society for Occupational Health Nursing (SASOHN); the Southern African Institute for Occupational Hygiene (SAIOH); the Mine Medical Professionals Association (MMPA), the African Union Development Agency (AUDA-NEPAD), academia, trade union representatives, employers, employees, and public and private sector groups.

During the year under review, the NIOH focused on industrial sectors that are known to be poorly covered by OHS services. These included the informal, construction, and agricultural sectors. These sectors have workplace health risks that are inadequately quantified and new emerging risks that require attention, for example: artificial stone production causing silicosis. The NIOH has programmes in all three sectors but the extension of basic OHS services to prevent injury and disease and promote improved health among these vulnerable, underserved workers, requires a considerable multi-stakeholder, national effort.

There were some notable developments in occupational health and safety (OHS) in South Africa where NIOH played a role. A number of staff members represented the NIOH at the Department of Employment and Labour technical committees, drafting and revising occupational health legislation. The NIOH also launched its inaugural newsletter called the NIOH OccuZone. This newsletter, which has been welcomed by our partners, is disseminated quarterly and serves as a platform for sharing information about the institute's activities, events and accomplishments. The publication details research underway, specialised service delivery and teaching & training activities of the Institute, as per our core mandate. This newsletter creates awareness around emerging researchers and their work.

In addition, the NIOH increased its digital footprint through the effective utilisation of its social media presence on Twitter and YouTube platforms. These communication channels provided the opportunity for networking on a global scale, assisted with targeting specific stakeholders through tailored communication, and provided a diverse public platform to share information.

In 2020, the NHLS acquired the intellectual property (IP) of the Occupational Health and Safety Information System (OHASIS) with the aim to take sole ownership of this user-friendly system that supports surveillance, ensures compliance with OEHS legislation, enables online training and provides information for research analysis. It is increasingly being rolled out to several provinces, as well as neighbouring countries. Recently, the OHASIS has been adapted and updated to provide for the new challenges posed by COVID-19.

COVID-19 activities

Along with much of South Africa, the latter part of activities during the period under review has been dominated by the COVID-19 pandemic. Although the country's first patient was only diagnosed in the last month of the reporting period, which was also when a national State of Disaster was officially declared, preparation to respond to the impending epidemic and its effects on workplaces and working life began some months prior. The establishment of an Occupational Health Outbreak Response Team in February was opportune in the provision of information, advisory services and evidence for the formulation of policies, statutes, standards of practice and guidelines for workplaces.

The NIOH played a crucial role in the training of various occupational groups across numerous sectors, with the aim to equip industry with the tools required to protect and promote workers' health and safety, including the safe return to work, during the pandemic. As the demand for online COVID-19 training increased, the capacity of the online training platform had to be expanded to provide for more participants. A dedicated workplace hotline was also established, specifically for occupational health professionals, employees and employers. In the month of March 2020, over 8,000 participants were trained on COVID-19 topics and several guidelines and fact sheets were developed and translated into local languages. All these materials are accessible via the NIOH's zero-rated website.

The institute continued to provide OHS specialised services, biobanking, information and advisory services, and teaching and training during the year under review and rendered substantial support to government departments, both nationally and provincially. The research of the institute, which is cross-cutting and a core mandate of NIOH, needs special mention.

Research and surveillance

Producing new knowledge to prevent ill health and injury and to promote good health is typically a fundamental task of national institutes for occupational health. Collectively, the sections' reports that follow describe a large and varied inter-disciplinary research programme that covers a wealth of issues that are important to the improvement of workers' health and the health of communities living around workplaces. The topics of the scientific articles published over the year reveal the large variety of research requirements in OHS in the country. There were 33 peer-reviewed articles published, an increase from the previous year.

Surveillance of occupational health, morbidity, injury and mortality is inadequate in South Africa. Contributing to improved surveillance is a longstanding but increasingly important part of the work of the NIOH. For this reason, concerted efforts are being made to increase the publication of surveillance reports.

International

The NIOH fostered strong international relationships through dedicated collaboration and networking efforts with key international agencies such as the WHO; the International Labour Organization (ILO); the International Commission on Occupational Health (ICOH); the National Institute for Occupational Safety and Health, of the Centers for Disease Control & Prevention (NIOSH-CDC), USA; the Finnish Institute for Occupational Health (FIOH); the Health and Safety Laboratory (HSL) of the UK, Workplace Health Without Borders (WHWB) and the Organization for Economic Co-operation and Development (OECD).

The NIOH has been re-designated as a Collaborating Centre in Occupational Health by the WHO, during the period under review. This is a welcomed recognition of the NIOH's achievements in supporting the occupational health programmes of the WHO, and the continuation of opportunities for partnerships and projects with the network of Collaborating Centres around the world.

The NIOH also fulfilled a prominent role in the WHO's programme on vulnerable workers, such as those in the informal economy. The NIOH was invited to partner with the ILO on a mission to Ethiopia to advise the Ethiopian Department of Labour and Social Affairs on the establishment of an Ethiopian Institute for Occupational Safety and Health. The project is ongoing and the institute continues to offer support.

Moving to the new financial year - COVID-19 and a changing world of work

It is expected that COVID-19 and the consequent changing world of work will preoccupy much of the NIOH's planning, re-organisation and work for the near future. Many technical questions on protecting employees and employers from infection and its consequences must be answered. The research projects listed in the Immunology and Microbiology Section's report are illustrative of them.

All of working life may be altered to some extent: the way we work in the informal economy, businesses of all sizes, factories, mines and offices will change in unpredictable ways, and the work-related health effects that accompany these changes – some bad and some good – must be assessed and managed.

South Africa is unfortunately, all too familiar with unemployment and under-employment, but the expected increase due to the economic impact of the COVID-19 pandemic will have many negative consequences for workers. Although new to the NIOH, aspects of unemployment and worker health may therefore need consideration by the institute, preferably in collaboration with more experienced partners. The informal economy, which is already substantial, will likely expand rapidly and the NIOH's programmes on this economic sector will require a review.

Appreciation

I wish to thank the NHLS and the NIOH management teams for their strategic leadership that enabled the institute to deliver excellent results under resource-constrained circumstances. Staff at the NIOH continue to strive for excellence in their work and I appreciate their contribution and commitment towards ensuring healthy, safe and ultimately sustainable workplaces. Our partners, collaborators and stakeholders are acknowledged for contributing to the successes of the NIOH.

2.4.4. Support services performance

2.4.4.1. Information Technology

Sibongiseni Hlongwane
Chief Information Officer

Introduction

The NHLS Information Technology (IT) Department aims to continuously provide improved services to business through a number of application and infrastructure projects. To this end, the following modernisation projects have been successfully completed during the 2019/2020 financial year:

- **NHLS statutory national skills inventory automation:**

The inventory process is now automated which enables all NHLS employees to complete a digital skills inventory form and upload their qualification records on the electronic content management (ECM) system.

This ensures that all employees' qualification records are kept in a well-structured, central repository and enables NHLS executives to retrieve different statistical reports for decision-making purposes.

- **Reimaging project**

This is the first phase of refreshing the Oracle ERP system infrastructure. Reimaging the infrastructure will improve the application performance. In addition, the Oracle database has been upgraded to ensure that the system is operating on the latest version, which will in turn also improve performance.

- **Web service project**

This forms part of the billing optimisation project which aims to replace the current flat file-based claims interface with a new web service-based interface, which will enhance the efficiency of the billing process.

- **ECM asynchronous scanning solution**

The ECM asynchronous scanning solution contributes to the digitisation strategy by enabling scanning of the request forms received from all the NHLS laboratories throughout the country and making them available to relevant parties. The solution was expanded to provide for the Supply Chain Management (SCM) Department as well. The SCM Department processes substantial volumes of paper-based records in the form of tenders, contracts, RFQs, etc. Scanning of these records ensures that they are stored in an electronic format and that they can easily be accessed via a central repository.

- **The exception report solution**

This solution was developed to assist with the listing of all exceptions and episode numbers that were registered by laboratories during any given period on the TrakCare system, but cannot be found on the ECM content server.

- **Content server upgrade**

The upgrade includes several significant end-user enhancements and backend system improvements which will increase the business value.

- **Interfaces between third-party systems and TrakCare**

Interfaces are continuously developed to support replicable and context-appropriate online exchange of health information and clinical data.

Laboratory Information System (LIS)

Digitisation of the NHLS laboratory operations continued through the use of the health patient record number from the health patient record system - this allows for more consistent and accurate identification of patients. Ongoing support was provided to the Department of Health for rollout of the system; additional activities were initiated to integrate the provincial and national healthcare information systems, and connections to Tier.Net Interface and the hospital systems in the Eastern Cape were activated; In support of the COVID-19 pandemic, the LIS was rapidly modified and configured to enable SARS-CoV-2 PCR testing and onsite setup was done for automation of the testing; Additional configurations were completed to provide appropriate mechanisms for registering and reporting of community screening and testing samples; and a patient communication module was developed which makes it possible to send specific, targeted messages to patients who provided their cell phone numbers. Messages can for example be sent to remind patients on HIV and TB treatment programmes of their follow-up clinic appointments.

Data and Analytics

The NHLS' Central Data Warehouse (CDW) continues to be the strategic source for laboratory tests data which is presenting the NHLS with an opportunity to effectively use data and analytics to drive innovation, improve efficiencies and enable evidence based decision making. A number of dashboards and reports with actionable business insights have been produced using data from the CDW. These dashboards have enabled the NHLS to provide information in relation to among others, the COVID-19 tests. The plan is to further enhance the capabilities of CDW to be able to provide more business insights to improve cost optimisation, laboratory tests turnaround times among others.

Information Technology Operations

Information Technology infrastructure especially network connectivity and data storage capacity remain a business challenge for the NHLS. Very few infrastructure related projects were implemented in the 2019/20 financial year due to supply chain related challenges. The few projects implemented include conducting a network vulnerability assessment and hardening of the NHLS internet facing applications to improve security. Internet bandwidth upgrades were also done to enable the deployment of business collaboration tools such as video conferencing systems. The plan is to rollout these collaboration tools to the rest of the NHLS offices in the 2020/21 financial year.

2.4.4.2. Communication, Marketing and Public Relations

Mzimasi Gcukumana
Senior Communication Manager

Introduction

In the year under review, the Communication Department undertook various activities in efforts to share information about what the NHLS does, why, how and for whom. This was accomplished through a blend of communication activities such as public relations initiatives, editorial placements, photography, graphic design and website management.

Annual report

The department successfully produced the 2018/2019 NHLS annual report in line with National Treasury guidelines, through engaging the various departments and coordinating and consolidating input from them.

External communications

Exhibitions

During the year under review, the NHLS has successfully showcased its offerings and services at the following events, in collaboration with DMP:

- The 9th SA AIDS Conference 2019 which took place from 11–14 June 2019 at Durban ICC;
- The Medical Laboratory Professional Conference which was hosted in Bloemfontein from 25-27 October 2019; and
- The World AIDS Day celebrations that took place in Klerksdorp, in conjunction with the NPP.

Website

The NHLS website was revamped, adding more features to make it more user-friendly and enable easy access to information and resources such as the Procurement Open Bid. A link to the Lab Tests Online function was also added. Lab Tests Online is an award-winning health information web resource designed to help patients and caregivers better understand the many laboratory tests that are a vital part of medical care.

During the reporting period, the department mainly focused on actively sharing content on the various platforms of the NHLS. The website remains the most dynamic platform through which the organisation engages its stakeholders, including clients, service providers, the general public, and particularly, job seekers.

Health forums

As part of the DoH, the NHLS also participates in the Health Communicators Risk Forum. During the year under review, the focus was on preparation for and awareness about COVID-19. Staff from the Communication Department attended the National Health Communicators' Forum addressed by the Minister of Health, Dr Zweli Mkhize from 19-21 February 2020, where all health communicators were briefed on best approaches for handling media during the pandemic.

Internal communications

Critical components of the unit's function are to ensure that all stakeholders are informed about the work of the organisation, establish an interactive internal communications environment and build a cohesive organisational culture. This is done through the following:

Media relations

The department maintained good relationships with the media in the reporting period, by building the organisation's reputation, communicating key organisational events and rapidly responding to media queries, as and when necessary. During the year under review, the NHLS has received publicity to the value of R34 637 083 in advertising value equivalence (AVE) through earned media, reaching an audience of 145, 826, 668 people.

Graphic design services

The department's graphic design services undertook numerous creative projects, including the design and layout of conceptual artwork for several purposes, whilst ensuring that the organisational corporate identity and branding is consistent across all creative elements. This included the design of marketing brochures and newsletters and artwork for mailers and exhibition stands.

The team also designed academic posters for conferences in which the organisation's employees participated, including those who work for the NICD and the NIOH.

In addition, the graphic design unit conceptualised and designed branding for the 60 mobile laboratory units that were procured to assist with combating the spread of the coronavirus in South Africa.

Marketing

It is essential to showcase the corporate brand at all NHLS events. The department is responsible for executing this task through procuring and distributing promotional items to support all corporate events.

Web management services

The web management services unit is responsible for content management. It offers a specialist service, which keeps internal and external stakeholders informed of activities in the organisation through updating, uploading and communicating organisational information on the intranet, internet and all digital communication channels.

Photographic services

The department's photographic services are instrumental as it helps to ensure the maintenance of the organisational memory, through capturing and storing all corporate images. In the period under review, the unit produced a total of 3036 photographs compared to 2546 for 2018/19 financial year, several of which were captured at the various events in which the NHLS participated. All these photos are available on the ECM drive.

2.4.5. Performance information by subsidiary

2.4.5.1. South African Vaccine Producers

Megan Saffer
Director

Introduction

South African Vaccine Producers (SAVP), a wholly-owned subsidiary of the NHLS, are the only South African manufacturers of antivenom for the treatment of snake, scorpion and spider envenomation.

Snakebite envenoming (SBE) affects as many as 2.7 million people every year, most of whom live in some of the world's most remote, poorly developed communities. Annual mortality rates range between 81,000 and 138, 000 and currently 400, 000 surviving victims are suffering permanent physical and psychological disabilities *(source: PLOS Neglected Tropical Diseases).*

The following key facts are critical for an improved understanding of snakebites:

- Snakebites are common in impoverished rural areas;
- Snakebite envenoming is an occupational and environmental disease; and
- Snakebite envenoming leads to chronic disability, including amputations, post-traumatic stress disorder and blindness.

Intravenous administration of antivenom remains the only specific treatment for systemic envenoming.

SAVP sold 12,066 units of antivenom in the 2019/2020 financial year. The implementation of the national COVID-19 lockdown since March 2020, had a negative impact on the dispatch of export orders. Polyvalent antivenom remained the biggest seller, followed by scorpion, spider, Boomslang and Echis antivenoms.

Small Animal Unit

The Small Animal Unit supplies various universities with animals, including Wits, UKZN, SMU, the University of Johannesburg (UJ), UCT, UP, North-West University (NWU), Nelson Mandela University (NMU) and on occasion, institutions in the Eastern Cape. These activities are currently on hold due to the national COVID-19 lockdown and grounding of all domestic flights.

Phase I of the upgrade of the-specific-pathogen-free (SPF) animal unit (SPF1) has commenced, with the aim to reinstate the supply of SPF animals to institutions as soon as possible. Due to several challenges, such as financial and logistical issues with the contractors and operational limitations due to the COVID-19 pandemic, the upgrade project however had to be placed on hold. As soon as phase 1 of the upgrade is completed, the air handling equipment and services will also be upgraded.

The unit still supplies guinea pigs to the NHLS Malaria Research Unit for the feeding of the mosquitoes, twice a week. Prior to the outbreak of the COVID-19 pandemic, the unit also exported animals to the Namibian Standards Institute, twice a month, an activity which will hopefully resume as soon as international travel is re-implemented.

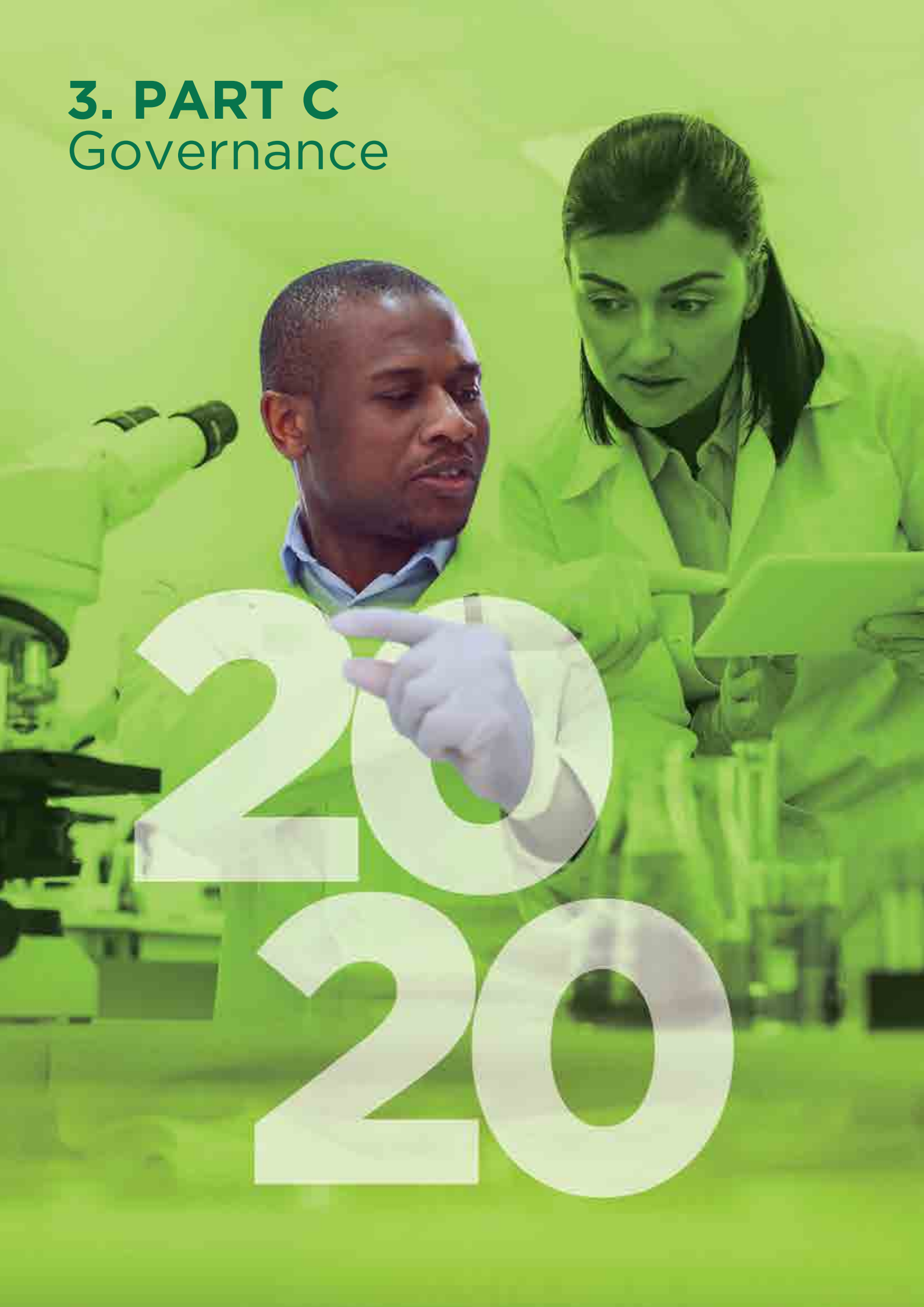
In addition, the Small Animal Unit plays a critical role in the support of QC processes in the antivenom department.

Stables

During the year under review, the staff facilities in the stables area have been renovated. This included the construction of restrooms for female staff members, as well as renovation of the change rooms and storerooms. The previous storeroom in the bleeding hall was converted into an office.

A total of was 968 500-ml bags of horse blood was sold in the 2019/2020 financial year, of which 287 units were sold to the NHLS, and 681 units to private laboratories. A total of 62 500-ml bags of sheep blood was sold, of which two were sold to the NHLS, and 60 units to private laboratories.

3. PART C
Governance



3. Governance

Advocate Mpho Mphelo
Company Secretary

3.1. Introduction

The NHLS ensures that its processes and practices are reviewed on an ongoing basis to ensure, compliance with legal obligations, use of funds in an economic, efficient and effective manner and adherence to good corporate governance practices. Processes and practices are characterised by reporting on economic, environmental and social responsibilities. Such reporting is underpinned by the principles of openness, integrity and accountability and is an inclusive approach that recognises the importance of all stakeholders with respect to the viability and sustainability of the NHLS.

Corporate governance is concerned with structures and processes for decision making, accountability, control and behaviour, beginning at the top level of the organisation. Corporate governance sets the tone for behaviour down to the lowest levels.

3.2. Parliamentary Portfolio Committee

The Parliamentary Portfolio Committee (PPC) on Health exercises oversight over service delivery performance of the public entities reporting to the DoH.

The NHLS appeared before the PPC on Health on the dates set out below:

Date	Parliamentary structure	Activity/focus
18 September 2019	Portfolio Committee on Health	Presentation of the Annual Performance Plan and the budget 2019/2020
15 October 2019	Portfolio Committee on Health	Presentation of the Annual Financial Statement and 2018/2019 Annual Report
10 June 2020	Portfolio Committee on Health	Presentation on NHLS SARS-CoV-2 preparedness and scale-up plan

3.3. Report of the Accounting Authority

The Accounting Authority submits its report for the financial year that ended 31 March 2020.

Statement of Commitment

The Accounting Authority is committed to business integrity, transparency and professionalism in all its activities. As part of this commitment, the Accounting Authority supports the highest standards of corporate governance and the ongoing development of best practice.

The mandate of the Board

The mandate of the NHLS Board is set out in the NHLS Act and is encapsulated in the NHLS Board Charter. The mandate of the Board as set out in the Board Charter is aligned to the requirements stipulated by the Protocol on Governance in Public Entities.

Independence of the Board

Board members are appointed by the Minister of Health. The Board considers submissions and recommendations made by management and makes independent decisions based on their fiduciary responsibilities and the strategic direction of the service. The various Board committees meet independently and then report back to the Board. Each committee has a formal charter that clearly defines its roles and responsibilities.

The Audit and Risk Committee (ARC) regularly meets individually with the external and internal auditors. Furthermore, the Board, its committees and individual Board members may engage independent counsel and advisors upon request and at the discretion of the Board.

Board composition

The Accounting Authority is a Unitary Board comprising a majority of non-executive members. The members of the Board are appointed by the Minister in accordance with section 7 of the NHLS Act.

In terms of the NHLS Act No. 37 of 2000, the Board should comprise twenty-two (22) members including the Chief Executive Officer, Chairperson and Vice Chairperson of the Board. In terms of Section 9 of the NHLS Act, the Minister of Health has appointed a chairperson and a vice chairperson.

The Board members of the entity during the year under review and as at the date of this report are as follows:

Board composition

#	TITLE	Surname	Innitials/ First name	Constituency	Date of appointment	Term end
1	**Prof**	**Buch (Chairperson)**	**Eric**	Minister of Health	01 January 2017 Re-appointed 01 May 2018	30 April 2018 30 April 2021
2	**Mr**	**Durham**	**Ben**	Department of Science and Technology	01 November 2014 Re-appointed 01 February 2018	01 November 2017 31 January 2021
3	**Dr**	**Goosen**	**Gerhard**	Mpumalanga Province	01 November 2015 Re-appointed 01 November 2018	01 November 2018 31 October 2021
4	**Mr**	**Mallet**	**Jonathan**	Northern Cape Province	18 January 2020	18 January 2023
5	**Dr**	**Mavuso**	**Zwelibanzi**	SALGA	21 December 2016	21 December 2019
6	**Mrs**	**Van der Westhuizen**	**Nicolene**	Western Cape Province	01 May 2018	30 April 2021
7	**Mr**	**Van der Merwe**	**Ian**	Department of Health	01 February 2018	31 January 2021
8	**Dr**	**Chetty**	**Kamy**	Chief Executive Officer (CEO)	01 January 2020	31 December 2025
9	**Dr**	**Mzangwa**	**Balekile**	Free State Province	18 November 2016 Re-appointed 18 January 2020	18 November 2019 18 January 2023
10	**Ms**	**Mkhize**	**Nelisiwe**	KwaZulu-Natal Province	01 September 2015 Re-appointed 01 September 2018	01 September 2018 01 September 2021 (Resigned from KZN and Board on 20 January 2020)
11	**Ms**	**Mayinga**	**S'phiwe**	Public Nominee: Legal	20 April 2017	20 April 2020
12	**Dr**	**Ross**	**Mary**	Gauteng	01 September 2015 Re-appointed 14 September 2018	01 September 2018 14 September 2021
13	**Prof**	**Mariba**	**Thanyani**	Limpopo Province	18 January 2020	18 January 2023
14	**Mr**	**Shingange**	**Michael**	Organised Labour (NEHAWU)	01 February 2015 Re-appointed 01 February 2018	01 February 2018 31 January 2021
15	**Prof**	**Obi**	**Larry**	Council on Higher Education (CHE)	20 April 2017	20 April 2020
16	**Dr**	**Tucker**	**Tim**	Public Nominee: Research	01 January 2016	31 December 2019
17	**Dr**	**Tom**	**Monde**	Public Nominee: Finance	14 November 2017	31 December 2019

Board Member qualifications and external directorships

The NHLS Board members have the relevant skills, knowledge and experience to bring judgement to bear on the business of the NHLS. In situations where Board members may lack experience, detailed induction and formal mentoring and support programmes are implemented.

The Chairperson, together with the Board, carefully considered outside chairpersonships that members hold. The relative size and complexity of companies in question have been taken into account. The Board members are satisfied that they have the ability and capacity to discharge their duties.

The qualifications and external directorships of NHLS Board members are disclosed in the table below:

Names	Qualifications and external directorships
Prof Eric Buch	**Qualifications** MBBCh, MSc (Med), FFCH (cm)(SA), DTM&H, DOH **Directorships** None
Dr Tim Tucker	**Qualifications** MBChB, PhD, FCPath (SA)Viro, Wits Dip (Business Strategy) **Directorships** SEAD Consulting, NHLS Research Trust, SA HIV Clinicians' Society, Tucker Family Trust
Mr Jonathan Mallet	**Qualifications** BA: Business Administration (Current), Advanced Health Management Certificate, BTech: Biomedical Technology **Directorships** None
Prof Mary Ross	**Qualifications** BSc (Hons), MBChB, Dip (Data metrics), Dip (Health Admin, DTM&H, DPH, DOH, FCPHM, FOM (UK), FPH(UK), FFTM (RCP and S GLASGOW), FACTM (Australia) **Directorships** None
Mr Ben Durham	**Qualifications** MSc, BSc Hons, BSc, currently pursuing PhD in Technology and Innovation Management **Directorships** None
Mr Michael Shingange	**Qualifications** Cert Negotiating Skills, Dip Trade Union Movement, Cert Governance **Directorships** 1st Deputy President NEHAWU
Ms. Nelisiwe Mkhize	**Qualifications** MBA, PG Dip (Public Health Management), BSc Hons, ND Med Tech, HND Med Tech **Directorships** None
Dr Gerhard Goosen	**Qualifications** MBChB, Dip Obst (SA) **Directorships** ALENTI 25 (Not for Profit)
Dr Zwelibanzi Abie Mavuso	**Qualifications** Dental Therapy, MBBCh, MBA **Directorships** None

Names	Qualifications and external directorships
Dr Balekile E Mzangwa	**Qualifications** MBChB **Directorships** None
Dr Monde Tom	**Qualifications** PhD, MSc: Financial Economics, Post Grad Dip: Economic Principles, BSc: Applied Maths, Nat Dip: Cost Management. **Directorships** IkweziLomso Investments, Vice-President: Alexander Country Club
Mr. Ian van der Merwe	**Qualifications** B. Com, B. Com (Hons), MBA **Directorships** None
Ms S'phiwe Mayinga	**Qualifications** BProc, LLB, LLM, MAP, SLDP, Advanced Banking Law, Corporate Governance, Compliance Management **Directorships** Tiyisela Construction, UNISA SBL (Member of Risk and Audit Committee and Chairperson of Remuneration and Human Resources Committee)
Prof Obi Chikwelu Lawrence	**Qualifications** BSc Hons, MSc, PhD **Directorships** None
Dr Kamy Chetty	**Qualifications** MBChB, MSc URP, FFCH **Directorships** Hospice Wits
Prof Thanyani Mariba	**Qualifications** MBChB, FCP (SA), Cert Cardiology, Diploma in Echo Cardiology **Directorships** None

Changes in Board membership

Upon the expiration of a committee member's term of office as a member of the Accounting Authority, the member may be eligible for re-appointment for a further term of office, provided that no committee member may be appointed to serve in the same committee for more than two consecutive terms. The table below indicates the changes to Board membership that took place during the financial year under review:

Name	Constituency/ representing	Date of appointment/ * re-appointment	Date of resignation/ * retirement
Ms Nelisiwe Mkhize	KwaZulu-Natal	01 September 2015 Re-appointed 01 September 2018	20 January 2020
Dr Tim Tucker	Public Nominee: Research	01 January 2016	31 December 2019
Dr Zwelibanzi Mavuso	SALGA	21 December 2016	21 December 2019
Dr Monde Tom	Public Nominee: Finance	14 November 2017	31 December 2019

Committees of the Board

The Board as the Accounting Authority takes full ownership of the overall decision making across the entity to ensure it retains proper direction and control of the NHLS.

The Board delegated certain powers to the CEO and to management, but reserved certain powers exclusively for the Board and these are set out in the Board Charter.

The Board also appointed several committees to help meet these responsibilities. Delegating various functions and authorities to committees and management however does not absolve the Board and its directors of their duties and responsibilities.

Without abdicating its own responsibilities, the Board delegated certain functions to the following committees:

- Audit and Risk Committee (ARC);
- Remuneration and Human Resources Committee (RHRC);
- Information Technology Governance Committee (ITGC);
- Governance, Social and Ethics Committee (GSEC), an ad hoc committee;
- Finance Committee (FinCom);
- National Academic and Pathology Committee (NAPC);
- Research and Innovation Committee (RIC); and
- Executive Committee (EXCO).

The various committees of the Board each have formal ToRs embodied in a charter which further defines the mandates, roles and responsibilities of each committee. The charters are reviewed and updated on an annual basis, as and when required.

The NHLS Board is governed by the NHLS Act 2000 (Act No 37 of 2000) and the NHLS Rules made in terms of the Act supra. The Board complies with the PFMA. In addition, the NHLS Board subscribes to the principles of King IV.

During the period under review, the Board complied with its ToR as detailed in the NHLS Rules. In addition, the Board provided strategic direction to the organisation, as guided by King IV.

Minutes of meetings were held and entered in the minute book as a true and accurate representation of the content of these meetings.

The majority of the Board members attended the meetings for the year. Board resolutions were captured in the board resolution file.

Board meeting attendance

The Board meets on pre-arranged dates at least once a quarter and at other times, as deemed necessary. The Board conducts annual workshops to review the NHLS strategy and to conduct an annual risk assessment. In the reporting year, the Board convened twelve (12) times (including special meetings). The NHLS Board is required to hold at least four meetings per year. Only members of the Board voted at its meetings and all decisions were arrived at by consensus. In each of these meetings, the quorum of the meeting was met. In each meeting, members were also provided with the opportunity to declare any personal conflict of interest to be recused from the deliberation of the matter in which a member was involved.

The table below and accompanying legend illustrates meeting attendance of Board members for the financial year under review:

NHLS Board meeting attendance for 1 April 2019 to 31 March 2020

Name	01/ 05/ 2019	22/ 05/ 2019	23/ 05/ 2019	20/ 06/ 2019	21/ 06/ 2019	29/ 07/ 2019	21/ 08/ 2019	22/ 10/ 2019	23/ 10/ 2019	18/ 11/ 2019	27/ 01/ 2020	26/ 02/ 2020	TOTAL
Prof Eric Buch	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	12
Ms Nelisiwe Mkhize	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	X	10
Dr Monde Tom	✓	A	A	A	A	A	A	A	A	A	X	X	1
Dr Zwelibanzi Mavuso	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	X	10
Dr Gerhard Goosen	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	12
Mr Ian Van der Merwe	✓	✓	✓	✓	A	✓	A	A	✓	A	✓	✓	8
Dr Balekile Mzangwa	✓	A	A	✓	✓	A	A	A	A	A	✓	✓	5
Prof Larry Obi	✓	✓	✓	✓	✓	✓	✓	✓	✓	A	✓	✓	11
Dr Tim Tucker	✓	A	A	✓	✓	✓	✓	A	A	✓	X	X	6
Mr Michael Shingange	✓	✓	✓	A	A	✓	✓	✓	A	✓	A	A	7
Mr Ben Durham	✓	✓	✓	A	A	✓	✓	✓	✓	✓	✓	✓	10
Mrs Nicolene Van der Westhuizen	✓	✓	✓	A	A	✓	✓	✓	✓	✓	✓	✓	10
Ms S'phiwe Mayinga	✓	✓	✓	A	A	✓	✓	✓	✓	✓	✓	✓	10
Prof Mary Ross	✓	✓	✓	✓	✓	✓	✓	A	A	✓	✓	✓	10
Dr Kamy Chetty	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	12
Prof Thanyani Mariba	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	✓	✓	2
Mr Jonathan Mallet	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	✓	✓	2
Total number of meetings	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**12**

Notes:

X Ms Mkhize retired on 20 January 2020

X Dr Monde Tom retired on 31 December 2019

* Prof Thanyani Mariba was appointed on 18 January 2020

X Dr Tim Tucker retired on 31 December 2019

X Dr Zwelibanzi Mavuso retired on 21 December 2019

* Mr Jonathan Mallet was appointed on 18 January 2020

Legend:

✓ = Present * = Appointed A = Apology ** = Appointed B = Absent n/m = Not a member % = Retired/ Resigned

Organisational group profile

Business and operations

The NHLS is a national public entity established in terms of the NHLS Act 37 of 2000 to provide quality, affordable and sustainable health laboratory and related public health services.

The NHLS is the main provider of clinical support services to the national, provincial and local departments of health through its countrywide network of quality-assured diagnostic laboratories. The NHLS also provides surveillance support for communicable diseases, occupational health and cancer, and thus endeavours to align its strategy to the priorities of both the DoH and the National and Regional Burden of Disease.

The NHLS is managed according to the provisions of the NHLS Act 37 of 2000, as well as the NHLS Rules, gazetted in July 2007, and the PFMA No. 1 of 1999. It is a state-owned organisation governed by a Board and a CEO. The NHLS has a clear organisational structure consisting of a Head Office in Sandringham, Johannesburg, six areas (Mpumalanga and Limpopo, KwaZulu-Natal, Eastern Cape, Western and Northern Cape, Free State and North West and Gauteng) and three institutes, namely the NICD, NIOH and NCR.

Each area is headed by a business area manager who reports directly to a chief operations officer. The six regions were purposefully established to ensure that the NHLS plans, agrees on budgets and monitors laboratory services jointly with provincial health partners with the aim to position laboratory services as an

integral part of the public health delivery system. POCT is increasingly being used to accelerate diagnosis within health facilities and the NHLS recognises the value of it.

The NHLS delivers services throughout the public sector from PHC to tertiary level. The level of complexity and sophistication of services increase from the peripheral laboratories to the central urban laboratories (with specialised surveillance infrastructure existing at isolated sites). Due to the legacy of Apartheid, the health laboratory services in South Africa are mainly concentrated in Gauteng, KwaZulu-Natal and Western Cape Provinces, in line with the spread of the previously advantaged institutions of higher learning.

Public sector laboratories are situated within the health facilities owned by the DoH, and in some cases, by universities. The condition of the infrastructure therefore depends on the quality of the health facility in which the laboratory is located. Great disparities still exist between urban and rural facilities. Some central urban facilities are currently being upgraded as part of the Hospital Revitalisation Programme. Many remote rural facilities however still require access to basic services.

SAVP

SAVP is a wholly-owned subsidiary of the NHLS that provides the following services:

1. Manufacturing of biologicals, namely anti-venom which includes:
    i) Polyvalent antivenom
    ii) Echis antivenom
    iii) Boomslang antivenom
    iv) Spider antivenom
    v) Scorpion antivenom
2. Safety testing for pharmaceutical companies;
3. Research on routine products authorised via the animal ethics committee involving animals;
4. Preparation of horse and sheep serum; and
5. Preparation and sampling of horse blood.

Governance, commitments and stakeholder engagement

Legislative and governance framework

The NHLS is required to comply with, inter alia, the following:

- NHLS Act No.37 of 2000;
- General rules made in terms of S27 of the NHLS Act;
- National Health Act No. 61 of 2003;
- Companies Act No 71. of 2008;
- Protocol on Good Corporate Governance in the Public Sector,
- PFMA No.1 of 1999 (as amended);
- Treasury Regulations issued in terms of PFMA, 1999;
- Preferential Procurement Framework Act No. 5 of 2000;
- Relevant legislation applicable to the health sector;
- King IV Code on Good Corporate Governance; and
- The Constitution of the Republic of South Africa, Act No.108 of 1996.

Role and function of the Accounting Authority

The Board is the Accounting Authority of the NHLS in terms of the NHLS Act and PFMA.

The Board is scheduled to meet on a quarterly basis and is responsible for providing strategic direction and leadership, ensuring good corporate governance and ethics, determining policy, agreeing on performance criteria and delegating the detailed planning and implementation of policy to the EXCO.

The Board comprise twenty-two (22) members, including the CEO, Chairperson and Vice Chairperson of the Board (twenty-one members are non-executive members and one member is an executive).

The Board evaluates and monitors management's compliance with policy and achievements against objectives. A structured approached is followed for delegation, reporting and accountability, which includes reliance on various Board committees. The Chairperson guides and monitors the input and contribution of the Board members.

The Board has unlimited access to professional advice on matters concerning the affairs of the economic entity, at the economic entity's expense. The Board approved a Code of Corporate Practice and Conduct, which includes the ToR, which provides guidance to the Board members in discharging their duties and responsibilities.

The Board evaluates its effectiveness on an annual basis and formulates plans to mitigate any shortcomings identified by the evaluation process.

Chairperson and Chief Executive

The Chairperson is a non-executive and independent director (as recommended by good corporate governance practices) and is a standing member of all committees of the Board.

The roles of the Chairperson and Chief Executive are separate, with responsibilities divided between them, so that no individual has unfettered powers of discretion.

Remuneration and Human Resources Committee

In terms of the NHLS Act, the RHRC serves to assist the Board with the performance of its functions and exercising of its powers. The committee reports on employment equity, employee turnover, skills development and labour relations.

As part of the CPD programme, the Board invites corporate governance experts as recommended by the Institute of Directors from time to time to present on topical matters and latest developments in corporate governance practices.

In terms of good corporate governance practices, the RHRC has met on five (5) separate occasions during the financial year. A joint RHRC and FinCom meeting was convened on 22 August 2018 to consider the cost of the proficiency projects and final results of the proficiency assessments. During the period under review the committee met four (4) times.

Name	10/04/2019	26/07/2019	28/08/2019	18/10/2019	20/02/2020	TOTAL
Ms Nelisiwe Mkhize (Chairperson)	✓	✓	✓	✓	n/m	4
Dr Balekile Mzangwa (Deputy Chair)	✓	✓	A	A	A	2
Dr Gerhard Goosen	✓	✓	✓	✓	✓	5
Dr Zwelibanzi Mavuso	✓	✓	A	✓	n/m	3
Ms S'phiwe Mayinga	A	A	✓	✓	✓	3
Mr Michael Shingange	A	A	A	A	A	0
Prof Larry Obi	✓	✓	✓	✓	✓	5
Dr Kamy Chetty (CEO)	✓	✓	A	✓	✓	4
Total number of meetings	**5**					

Notes:

% Ms Nelisiwe Mkhize retired on 20 January 2020 % Dr Zwelibanzi Mavuso retired on 21 December 2019.

Legend:

✓ = Present * = Appointed A = Apology ** = Appointed B = Absent n/m = Not a member % = Retired/ Resigned

3.4. The Executive Committee

In terms of the NHLS Act, the Accounting Authority appointed the EXCO, which consists of:

a) The CEO, who also acts as Chairperson; and
b) Regional executive managers and executive managers from Support Services.

Name	01/ 04/ 2019	02/ 04/ 2019	06/ 05/ 2019	03/ 06/ 2019	20/ 06/ 2019	21/ 06/ 2019	01/ 07/ 2019	02/ 07/ 2019	12/ 08/ 2019	13/ 08/ 2019	02/ 09/ 2019
Dr Kamy Chetty (Chairperson)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mr Michael Sass (CFO)	✓	✓	✓	✓	✓	✓	✓	✓	A	A	✓
Mr Melusi Nkosi (Acting CIO)	✓	A	A	✓	✓	✓	A	✓	✓	✓	✓
Mr Sibongiseni Hlongwane (CIO)	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
Mr Shaun Grimett (Acting CIO)	n/m	n/m	✓	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
Prof Lynn Morris (Interim Director NICD)	✓	A	✓	✓	✓	✓	✓	✓	✓	✓	✓
Dr Muzimkhulu Zungu (Acting NIOH Director)	A	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
Dr Spo Kgalamono (Acting NIOH Director)	✓	A	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ms Ntokozo Majozi (Acting SM: Communications)	✓	A	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mr Mzi Gcukumana (SM: Communications)	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	✓
Prof Koleka Mlisana	✓	✓	✓	✓	✓	✓	A	✓	✓	✓	✓
Dr Mojaki Mosia	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Advocate Mpho Mphelo	✓	✓	A	✓	✓	✓	✓	✓	A	A	✓
Prof Wendy Stevens	✓	A	✓	A	✓	✓	✓	✓	A	A	A
Ms Violet Gabashane	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mr Jone Mofokeng	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ms Tabita Makula	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mr Sibulele Bandezi	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mr Jacob Lebudi	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
Ms Nasima Mohamed	✓	✓	✓	✓	✓	✓	✓	✓	A	A	✓
Mr Bahule Motlonye	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
Prof Meshack Bida (EC Chair)	A	A	✓	A	✓	✓	✓	✓	A	A	A
Mr Johan Potgieter (Acting EC Chair)	✓	n/m	n/m	✓	n/m	n/m	n/m	n/m	✓	✓	✓
Mr Nkosinathi Khumalo	✓	A	✓	✓	✓	✓	✓	✓	✓	A	✓
Total number of meetings	**24**										

Legend:
n/m = Not a member ✓ = Present A = Apology

The EXCO is responsible for the management of the NHLS in accordance with the policy of the NHLS and assists with performance of the Accounting Authority's functions and the exercise of its powers. In terms of good corporate governance practices, the EXCO met twenty-four (24) times during the financial year.

	03/09/2019	08/10/2019	09/10/2019	04/11/2019	11/11/2019	09/12/2019	10/12/2019	20/01/2020	21/01/2020	10/02/2020	11/02/2020	09/03/2020	10/03/2020	TOTAL
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	24
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	22
	✓	✓	✓	✓	A	✓	✓	n/m	n/m	n/m	n/m	n/m	n/m	14
	n/m	n/m	n/m	n/m	n/m	n/m	n/m	✓	✓	✓	✓	✓	✓	6
	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	1
	✓	✓	✓	✓	A	✓	✓	✓	A	✓	A	✓	✓	20
	n/m	n/m	✓	n/m	n/m	✓	✓	n/m	n/m	n/m	n/m	✓	✓	5
	✓	A	A	✓	✓	A	A	✓	✓	✓	✓	A	A	17
	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m	6
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	14
	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	22
	✓	✓	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	23
	✓	✓	✓	A	✓	✓	✓	✓	✓	✓	✓	✓	A	19
	✓	✓	✓	✓	✓	A	A	A	A	A	A	✓	✓	13
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	24
	✓	✓	✓	A	✓	✓	✓	✓	✓	✓	✓	A	✓	22
	✓	✓	✓	✓	✓	✓	A	✓	✓	✓	✓	A	✓	22
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A	✓	23
	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A	✓	21
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A	✓	21
	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A	✓	21
	A	✓	✓	✓	✓	✓	A	n/m	n/m	n/m	n/m	n/m	n/m	10
	✓	n/m	n/m	n/m	n/m	n/m	n/m	✓	✓	✓	✓	✓	✓	12
	✓	✓	✓	✓	✓	✓	A	✓	✓	A	A	A	✓	18

The Finance Committee

The FinCom assists the Accounting Authority on an ongoing basis in fulfilling its oversight responsibilities and all matters relating to the financial practices and condition of the economic entity by:

- Reviewing the entity's financial policies and procedures;
- Remaining informed of the entity's financial conditions, requirements for funds, and access to liquidity; and
- Considering and advising the Accounting Authority on the entity's sources and use of funds.

In terms of good corporate governance practices, the FinCom met on four (4) separate occasions during the financial year under review.

Attendance at the Finance Committee meetings from 1 April 2019 to 31 March 2020:

Name	03/07/2019	27/07/2019	11/10/2019	20/02/ 2020	TOTAL
Mr Ian Van der Merwe (Chairperson)	A	✓	✓	A	2
Dr Gerhard Goosen (Deputy Chair)	✓	A	✓	✓	3
Dr Balekile Mzangwa	A	A	A	✓	1
Mr Michael Shingange	✓	A	A	A	1
Ms Nelisiwe Mkhize	✓	✓	✓	n/m	3
Dr Kamy Chetty (CEO)	✓	✓	✓	✓	4
Total number of meetings	**4**				

Notes:

% Ms Nelisiwe Mkhize retired on 20 January 2020

Legend:

✓ = Present * = Appointed A = Apology ** = Appointed B = Absent n/m = Not a member % = Retired/ Resigned

The Audit and Risk Committee

In keeping with Treasury Regulation 27 of the PFMA, the Board appointed the ARC to assist in the discharge of its duties by reviewing and reporting on the governance responsibilities of the Board and the NHLS. The Board approved the ToR, duties and functions, composition and modus operandi of the ARC.

In terms of good corporate governance practices, the ARC met on five (5) separate occasions during the financial year under review.

Attendance at the Audit and Risk Committee meetings from 1 April 2019 to 31 March 2020:

Name	20/05/2019	20/05/2019	27/07/2019	20/08/2019	13/11/2020	TOTAL
Dr Monde Tom (Chair)	✓	✓	✓	A	A	3
Ms S'phiwe Mayinga (Deputy Chair)	✓	A	A	✓	✓	3
Mr Goolam Manack (Independent member)	✓	✓	✓	✓	✓	5
Mr Ian Van der Merwe	A			A	✓	3
Dr Kamy Chetty (CEO)	✓	✓	✓	✓	✓	5
Total number of meetings	**5**					

Legend:

✓ = Present A = Apology

The National Academic and Pathology Committee

The functions of the NAPC is to facilitate formulation of policy with regard to:

a. Conduct of basic research in association or partnership with any tertiary educational institution;

b. Cooperation with persons and institutions undertaking basic research in the Republic, and in other countries, through the exchange of scientific knowledge and the provision of access to the resources and specimens available to the service;

c. Participation in joint research operations with departments of state, universities, UoTs, colleges, museums, scientific institutions and other persons;

d. Cooperation with educational authorities and scientific or technical societies or industrial institutions representing employers and employees, respectively, for the promotion of the instruction and training of pathologists, technologists, technicians, scientists, researchers, technical experts and other supporting personnel in universities, UoTs and colleges; and

e. Any other matter as may be referred to the committee from time to time by the Board.

The committee is also responsible for monitoring and managing the agreements entered into between the NHLS and each tertiary education institution, including:

a. Development of policies and guidelines to determine the numbers of registrars for each discipline and the distribution of the registrar posts between the laboratories associated with each university health science faculty;

b. Development of policies and guidelines to determine the numbers of technologist training posts for each discipline and the distribution of the posts between the laboratories identified for this purpose;

c. Proposing guidelines relating to part-time, honorary and guest appointments of employees of the NHLS by tertiary education institutions;

d. Monitoring the guidelines for consultant appointments of personnel of tertiary education institutions in the NHLS as determined by the agreement between the service and the universities;

e. Ensuring that the process of CPD programmes provided by tertiary education institutions in the NHLS is used by its employees to comply with the CPD requirements;

f. Reviewing and managing arrangements for research undertaken by tertiary education institutions in the laboratories of the NHLS;

g. Advising the EXCO on matters relating to indemnity for employees of the NHLS or a tertiary education institution working between the facilities of both partners;

h. Advising the EXCO on matters relating to discipline of personnel of the NHLS or a tertiary education institution working between the facilities of both partners;

i. Advising the EXCO on financial matters, such as subsidies, bursaries and payment for academic related services;

j. Monitoring, evaluating and managing SLAs and performance measures;

k. Advising, monitoring and evaluating the resolution of disputes as and when they arise;

l. Ensuring the integrity of the process of managing partnerships;

m. Ensuring that professional ethics are adhered to; and

n. Ensuring the NHLS complies with the requirements of the HPCSA in respect of registration requirements, ethics and conduct.

The NAPC met on three (3) separate occasions during the financial year under review. The attendance schedule is as follows:

Name	20/05/2019	02/08/2019	06/11/2019	TOTAL
Dr Tim Tucker (Chairperson)	✓	✓	✓	3
Ms Nelisiwe Mkhize (Chairperson SC1)	✓	✓	✓	3
Mr Ben Durham	A	✓	✓	2
Mrs Nicolene Van der Westhuizen	✓	✓	✓	3
Prof Mary Ross	✓	✓	A	2
Prof Larry Obi	✓	✓	✓	3
Dr Kamy Chetty (CEO)	✓	✓	✓	3
Total number of meetings	**3**			

Legend:

✓ = Present A = Apology

Governance and Social Ethics Committee

The GSEC was established to assist the Board with the oversight of corporate governance, social and ethical matters and to ensure that the organisation is and remains a committed socially responsible corporate citizen.

The commitment to sustainable development involves ensuring that the organisation conducts business in a manner that meets existing needs without knowingly compromising the ability of future generations to meet their needs.

The committee's primary role is to supplement, support, advise and provide guidance on the effectiveness or otherwise of management's efforts in respect of governance, social and ethics matters, as well as sustainable development related matters which, inter alia, include the following:

a) Safety;

b) Health and wellness, including occupational hygiene;

c) Environmental management;

d) Climate change;

e) Ethics management;

f) Corporate social investment;

g) Mine community development

h) Stakeholder engagement; and

i) Protection of company assets.

The committee is furthermore responsible for:

a. Reviewing and approving the policy, strategy and structure to manage governance, social and ethics issues in the organisation;

b. Overseeing the monitoring, assessment and measurement of the organisation's activities relating to social and economic development, including the organisation's standing in terms of the goals and purposes of:

   i. The 10 principles set out in the UN Global Compact Principles
   ii. The OECD recommendations regarding corruption;
   iii. The Employment Equity Act; and
   iv. The Broad-Based Black Economic Empowerment Act;

c. Overseeing the monitoring, assessment and measurement of the organisation's activities relating to good corporate citizenship, including the organisation's promotion of equality, prevention of unfair discrimination, addressing of corruption, contribution to development of the communities in which its activities are predominantly conducted or within which its services are predominantly marketed, and recording of sponsorship, donations and charitable giving;

d. Overseeing the monitoring, assessment and measurement of the organisation's activities relating to the environment, health and public safety, including the impact of the organisation's activities and of its services;

e. Overseeing the monitoring, assessment and measurement of the organisation's stakeholder relationships, including its advertising, public relations and compliance with consumer protection laws to ensure that the organisation adheres to its values;

f. Overseeing the monitoring of the organisation's labour and employment, including its standing in terms of the ILO protocol on decent work and working conditions, the organisation's employment relationships, and its contribution toward the educational development of its employees;

g. Reviewing the adequacy and effectiveness of the organisation's engagement and interaction with its stakeholders;

h. Considering substantive national and international regulatory developments, as well as practices in the fields of social and ethics management;

i. Reviewing and approving the policy and strategy pertaining to the organisation's programme for corporate social investment;

j. Determining clearly articulated ethical standards (Code of Ethics) and ensuring that the organisation implements measures to achieve adherence to these in all aspects of the business, thus achieving a sustainable ethical corporate culture;

k. Monitoring that management develops and implements programmes, guidelines and practices congruent with its social and ethics policies;

l. Reviewing the material risks and liabilities relating to the provisions of the Code of Ethics and ensuring that such risks are managed as part of a risk management programme;

m. Obtaining external assurance of the organisation's ethics performance on an annual basis, and facilitation of the inclusion in the integrated report and assurance statement related to the ethics performance of the organisation; and

n. Ensuring that management allocates adequate resources to comply with social and ethics policies, codes of best practice and regulatory requirements.

During the period under review the committee met five (5) times.

Attendance of the Governance and Social Ethics Committee for the period under review:

Name	16/05/2019	16/05/2019	16/05/2019	15/11/2019	19/02/2020	TOTAL
Prof Eric Buch (Chairperson)	✓	✓	✓	✓	✓	5
Ms Nelisiwe Mkhize (Chair RHRC)	✓	✓	✓	✓	n/m	4
Dr Monde Tom (Chair ARC)	A	✓	A	A	n/m	1
Mr Ian Van der Merwe (Chair FinCom)	✓	A	✓	A	✓	3
Dr Tim Tucker (Chair NAPC)	✓	✓	✓	✓	n/m	4
Ms S'phiwe Mayinga (Deputy Chair ARC)	A	✓	✓	✓	✓	4
Prof Mary Ross (Chair RIC)	A	✓	✓	✓	✓	4
Prof Thanyani Mariba (Chair NAPC)	n/m	n/m	n/m	n/m	A	0
Dr Kamy Chetty (CEO)	✓	✓	A	✓	✓	4
Total number of meetings	**5**					

Notes:

% Prof Thanyani Mariba was appointed on 18 January 2020

% Dr Monde Tom retired on 31 December 2019

% Ms Nelisiwe Mkhize retired on 20 January 2020

% Dr Tim Tucker retired on 31 December 2019

Legend:

✓ = Present * = Appointed A = Apology ** = Appointed B = Absent n/m = Not a member % = Retired/ Resigned

Research and Innovation Committee

The RIC committee was established as a vehicle for ensuring that the NHLS research mandate receives attention at a Board level. Members of the RIC may be called on from time to time to interact with external stakeholders and funding agencies.

The role of the RIC is to advise the NHLS Board and the NAPC on research policies, strategies, initiatives and innovation that promote the research interests of the organisation and that nurture and enable high quality research.

The objectives of the RIC are aligned with those stipulated in the South African Health Research Policy of 2001, the DoH 10-point plan, as well as the National Health Research Committee (NHRC).

Attendance at the Research and Innovation Committee ("RIC") for the period from 1 April 2019 to 31 March 2020:

Name	02/05/2019	01/08/2019	05/11/2019	12/02/2020	TOTAL
Prof Mary Ross (Chairperson)	✓	✓	A	✓	3
Mr Ben Durham (Deputy Chair)	✓	✓	✓	✓	4
Dr Tim Tucker	✓	✓	✓	n/m	3
Prof Larry Obi					4
Dr Kamy Chetty (CEO)	✓	A	✓	✓	3
Total number of meetings	**4**				

Notes:

% Dr Tim Tucker retired on 31 December 2019

Legend:

✓ = Present * = Appointed A = Apology ** = Appointed B = Absent n/m = Not a member % = Retired/ Resigned

Company Secretary

The Company Secretary fulfils critical functions in providing secretarial and advisory services to the Board and its committees. The Company Secretary furthermore serves as a liaison officer between management and the Board, and between the Board and the shareholder on issues relating to governance, thus giving effect to governance protocols. The Company Secretary is the custodian of the register of Board and the decisions of the committees.

The Company Secretary provides guidance to both the executive and non-executive members of the Board in the discharge of their fiduciary duties and ensures that Board proceedings are executed in accordance with the relevant legislative requirements.

The Company Secretary is well-experienced and qualified to fulfil the following responsibilities:

- Induction of new Board members;
- Providing Board members with guidance as to their duties, responsibilities and powers, collectively and individually;
- Advising Board members of any laws relevant to or affecting the entity;
- Providing guidance to and advising the Board on ethical matters and good governance principles; and
- Recording of Board and committee proceedings;
- Board members have unlimited access to the advice and services of the Company Secretary.

Audit and Risk Committee Report

The committee is pleased to present its report for the financial year that ended 31 March 2020.

Audit and Risk Committee responsibility

The committee reports that appropriate formal Terms of reference was adopted in its charter, in line with the requirements of section 51(1)(a) (ii) of the PFMA and Treasury Regulation 27. The committee further reports that its affairs were conducted in compliance with this charter.

The effectiveness of internal control

The committee reviewed various reports prepared by the internal and external auditors on the adequacy and effectiveness of the control environment as well as on the Annual Financial Statements (AFS). The committee assessment of internal control systems is depicted on the heat map below and is based on eight (8) business processes.

No	Business process	Control assessment		
1	Compliance		😐	
2	Financial health	☺		
3	Financial management		😐	
4	Human resources	☺		
5	Information technology			☹
6	Procurement and contract management			☹
7	Performance management		😐	
8	Oversight and monitoring	☺		

Heat map legend: Satisfactory Weak Unsatisfactory

The committee is concerned with the business processes that were assessed as weak or unsatisfactory and received a commitment from management that controls will be implemented to improve the control environment. This will be monitored at every ARC meeting.

The committee also notes with concern that management did not resolve all findings that were reported by external auditors in the management report of the previous financial year. Management made a commitment to resolve findings reported by auditors. The committee instructed Internal Audit Function to perform follow up audit to ensure that management has implemented corrective actions to address external audit findings and provide feedback to the committee during quarterly meetings.

Internal audit

The committee is satisfied with the role the internal audit function is playing in the organisation and acknowledges that the function needs to be adequately capacitated and resourced in order to fulfil its responsibilities. The committee is satisfied that 88% of the internal audit reviews included in the approved Annual Internal Audit Plan were completed and only 12 % was deferred due to the outbreak of corona virus. The committee reviewed the internal audit reports and heightened the need for management to address reported findings. The reports reviewed include the following:

- Property, plant and equipment;
- Revenue and accounts receivable;
- Procurement and accounts payable;
- Contract management;
- Payroll and human resources;
- Audit of performance information;
- Laboratory reviews;
- IT general and application controls reviews;
- Tender Compliance reviews; and
- Follow-ups on reported audit findings.

Risk management

The responsibility for risk management resides with management at all levels with the Board playing an oversight role as such risk management is embedded throughout the organisation, from members of the Board to all employees. The approach followed by the NHLS is to ensure that significant risks are identified and managed.

The NHLS has a dedicated Risk Management and Internal Audit Department to coordinate the implementation of its risk management approach and strategy, as approved by the Board. The Board continues to discharge this responsibility through the ARC. The strategic and operational risks assessment workshops were facilitated during the financial year and the results thereof were reviewed by the ARC. The progress on implementation of strategic risks mitigation actions plan was submitted during quarterly meetings to enable the committee to evaluate the adequacy and effectiveness of these actions to mitigate identified risks. The committee is satisfied with the management action plan to mitigate identified risks.

Fraud and corruption

The anonymous tip off platforms for reporting fraud, corruption and unethical behaviours were operational during the financial year. These platforms are administered by the independent service provider. The committee received the final investigation reports with findings, conclusions and recommendations on the reported allegations during quarterly meetings. The committee received assurance from management that the recommendations of the investigation reports were being implemented.

The committee is satisfied with the management processes that were implemented pertaining to the previous financial year's three (3) procurement irregularities which amounted to approximately R200 million. Three (3) former senior NHLS employees appeared in the Johannesburg Special Commercial Crime Court relating to these irregularities. The committee trusts that the implemented actions will lead to successful convictions of all those implicated in fraud and corruption.

The committee notes with concern the emergency procurement transactions that were undertaken by management during the outbreak of corona virus. Management committed to implement appropriate processes such as obtaining a condonation and approval of these transactions by delegated governance structures including National Treasury. The committee was satisfied with management action of reporting service providers that charged prices that were above National Treasury recommended prices to the Competition Commission for further investigation. The committee was informed by management that NHLS was assisting the Directorate for Priority Crime Investigation (Hawks) and provided information of some service providers that dealt with NHLS during emergency procurement which are being investigated by Hawks.

Quarterly reports

The committee appreciates the content and quality of quarterly reports prepared and issued by management of the NHLS during the year under review, but requested certain improvements to the reports. The committee is satisfied with the commitment from management to resolve this matter.

Competency of the finance department

In compliance with governance principles 8. 59(f) of the King IV code of governance principles, the committee acknowledges that there are inadequate resources and competency gaps in the Finance Department. Management committed to correct the identified gaps in order to strengthen the skills and competency of the Finance Department.

Evaluation of the Group Annual Financial Statements

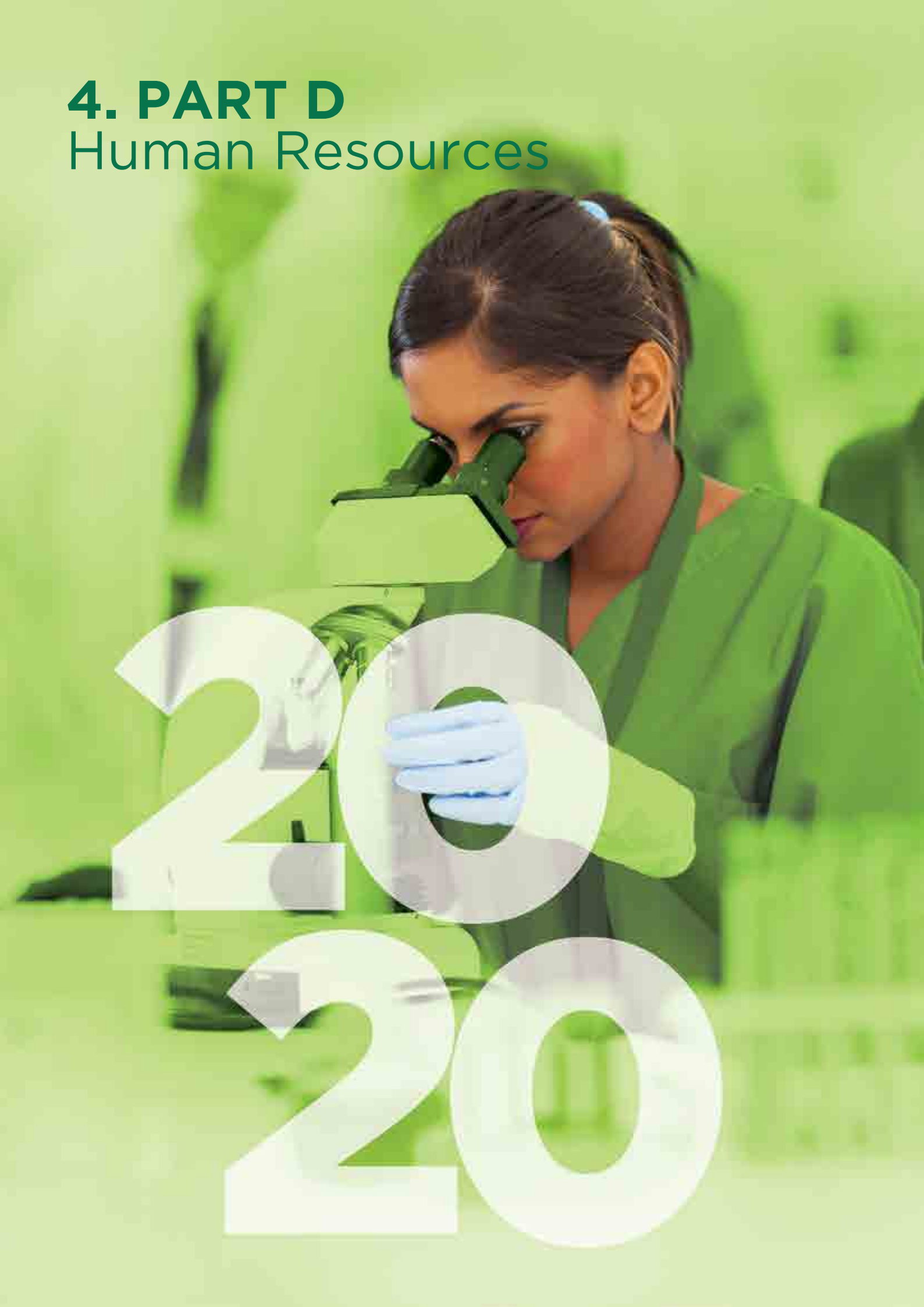
During the reporting year, the committee has reviewed the following:

- The audited Group AFS with the external auditors (Nexia SAB&T);
- Nexia SAB&T's management report and management's response thereto;
- Accounting policies and practices;
- The entity's compliance with legal and regulatory provisions; and
- Significant adjustments resulting from the external audit.

The committee concurs with and accepts the external auditors' report on the Group AFS and is of the opinion that the audited Group AFS should be accepted. Moreover, having had regard to its statutory and other responsibilities as well as all factors that may have an impact on the integrity of the financial statements, the committee agrees that the adoption of the going concern premise is appropriate in preparing the Group AFS for the 2019/2020 financial year. The committee therefore recommended the adoption of the Group AFS by the NHLS Board at the meeting held on 20th of October 2020.

Chairperson: Audit and Risk Committee
Mr Michael Sachs
(Appointed: 08 May 2020)

4. PART D
Human Resources



Human Resources

Dr Mojaki Mosia
Executive Manager

Executive summary

As at 31 March 2020, the NHLS had a permanent staff compliment of 7,142 with a retention rate of 87.9% and 12.4% new appointments across various job categories.

The total salary bill of the NHLS for the year under review was R3.9 billion, of which 47% was paid to health professionals such as pathologists and medical scientists, technologists and technicians, who also represent 36.6% (2,762) of the total workforce. The strategic plan of the NHLS outlines the organisation's commitment to delivering on its mandate of excellence in teaching, research, and diagnostic services through strategic, innovative, and flexible policies, practices, programmes, and services that:

(i) Attract, develop, reward, and retain a diverse and talented workforce;

(ii) Foster a productive work environment where people feel valued and respected;

(iii) Support the changing nature of work and the work environment;

(iv) Add value and reflect good stewardship of resources; and

(v) Ensure practices that are fair, ethical, and legally compliant.

Table 9: Personnel cost by programme/activity/objective

Programme/activity/ objective	Total expenditure of the entity	Personnel expenditure	Personnel expenditure as a % of the total expenditure	No. of employees	Average personnel cost per employee
	(R'000)	(R'000)	(R'000)		(R'000)
Total remuneration cost	**8 593 563 806,53**	**3 938 244 501,66**	**46%**	**7563**	**520 725,18**

The total annual salary bill/ personnel expenditure for the Financial year April 2019 - March 2020 amounts to R3.9 billion, with a total number of 7563 employees across all levels as detailed in Table 10. This personnel expenditure constitutes 46% of NHLS total expenditure.

Table 10: Personnel cost by salary band

Programme/activity/objective	Personnel expenditure	Personnel expenditure as a % of the total expenditure	No. of employees	Average personnel cost per employee
	(R'000)	(R'000)		(R'000)
Top management	14 205 594,80	0,4%	7	2 029 370,69
Senior management	103 395 754,89	2,6%	51	2 027 367,74
Professional qualified	1 058 581 894,90	27%	907	1 167 124,47
Skilled	1 750 133 090,85	44,4%	3036	576 460,17
Semi-skilled	850 705 226,13	21,6%	2435	349 365,60
Unskilled	105 700 672,17	2,7%	791	133 629,17
Training (interns)	55 522 267,92	1,3%	336	165 244,85
Total	**3 938 244 501,66**	**100%**	**7563**	**520 725,18**

Majority of the NHLS staff is found within the Skilled occupational level representing 44.4% of total staff compliment and their personnel expenditure sitting at R1,7billion which has increased when compared to the previous years (R1,6bil). These is followed by the professionally qualified group sitting at R1mil, which seems to have significantly increased when compared to the previous year were it was at R829mil. Training of students/ interns such as Medical Technicians, Technologists, Scientists and Laboratory Assistant constitutes on 1,3% of the total personnel cost with Top Management constituting only 0.4%.

It is worth noting that the personnel expenditure has considerably increased in this financial year, which can be attributed to the Proficiency Project for health care professionals (at cost of R60k, which represents 2% of personnel expenditure), Annual Salary Increase (at a cost of R 170m, which represents 4% of personnel expenditure) and Performance Pay Progression (1.5%) that was paid out in the FY 2019/2020.

Table 11: Cost per job category

Job Category	No. of employees	Personnel expenditure	% of total personnel cost
		(R'000)	(R'000)
Pathologists	224	407 088 105,40	10%
Scientists	218	164 095 529,32	4%
Technologists	1531	897 440 869,99	23%
Technicians	789	384 968 725,99	10%
Trainees (registrars, interns)	589	328 805 547,42	8%
Laboratory support personnel	2571	1 166 858 168,29	30%
Other support personnel	1641	588 987 555,25	15%
Grand Total	**7563**	**3 938 244 502**	**100%**

The above table depicts that 77% of NHLS employees are within the healthcare field, with majority of the four key medical roles being Medical Technologists (at 23%). The bulk of the employees are sitting at laboratory support services with a personnel expenditure of R1,1 billion, as such the total attraction and remuneration costs is towards direct labour.

Most of the training platform of students is directed at the healthcare roles also, showing an 8% of the personnel expenditure, which includes Registrars, Medical Scientists, Medical Technologist and Laboratory Assistants. Also worth noting that the general and management employees represent 15% of the overall cohort with personnel expenditure of R588,987,555.25 mil.

Table 12: Performance rewards

Programme/activity/ objective	Performance rewards	Personnel expenditure	% of performance rewards of total personnel cost
		(R'000)	(R'000)
Top Management	59 885,61	14 205 594,80	0,42%
Senior Management	528 316,88	103 395 754,89	0,06%
Professional Qualified	4 636 203,95	1 058 581 894,90	0,01%
Skilled	9 330 349,96	1 750 133 090,85	0,00%
Semi-skilled	5 047 845,99	850 705 226,13	0,01%
Unskilled	382 527,26	105 700 672,17	0,06%
Total	**19 985 129,64**	**3 882 722 233,74**	**0,55%**

The NHLS implemented Performance Pay Progression ("PpP") during the FY 2019-2020, which is linked to the overall organisational performance. A total of 3609 employees were eligible for the performance reward payout, which was made up of 1.5% of package. The PpP constitutes 0.55% of personnel expenditure.

It is worth noting that there are still exceptions which needed to be investigated and as such there are still employees who were not paid the 1,5% with possibility of being eligible. Also these a once-off bonus that is due for employees with 4 (1%) and 5 (1,5%) rating, which upon audit review and board decision would be due for 1,5% or 1% once-off bonus. This will increase the overall costs of the performance rewards for the reporting period.

Table 13: Training costs

Training type	Personnel Expenditure	Training Expenditure	Training Expenditure as a % of Personnel Cost (%)	No. of Employees Trained	Average Training Cost per Employee (R)
	R'000	R'000			
Non-PIVOTAL* programmes (short courses, workshops, seminars, congresses and continuous professional development interventions)	3 929 241	45 067	1.15%	5 880	7 664
PIVOTAL programmes for non-employees (higher education qualifications)		780		12	65 000
PIVOTAL programmes for non-employees participating in learnerships, on-the-job training and workplace experience	21 000	21 000		218	96 330

* **PIVOTAL** = Professional, Vocational, Technical and Academic learning programmes that result in occupational qualifications or part qualifications on the National Qualifications Framework.
The NHLS continues to fulfil its role in promoting and prioritising skills development through the analysis of its employees' skills needs by implementing the Workplace Skills Plan. Multiple learning programmes were offered through short learning programmes, in-service conferences and congresses, as well as continuing professional development programmes to enable the organisation to comply with legislation, improve quality of services, ensure business continuity and assist in the mitigation of risks.

In the financial year under review, the NHLS achieved 72% of the planned training target as compared to the legislated target of 60% which reflected an amount of 5880 employees who had attended technical and non-technical short learning programmes, workshops, seminars, on-the-job training and conferences in the 2019-20 period.

In addition to the regular training for learnership and professional registrations, 12 scholarships were awarded to needy students across the country studying towards the National Diploma in Biomedical Technology and the Bachelor of Health Science, and 328 bursaries for an amount of R7,5million were awarded to NHLS staff wishing to pursue their career development by way of formal qualifications.

Table 14: Employment and vacancies

Programme/activity/ objective	2018/2019 no. of employees	2018/2019 approved posts	2019/2020 no. of employees	2019/2020 vacancies	% of vacancies
Top management	8	10	7	3	30.0
Senior management	49	57	51	6	10.5
Professional qualified	896	1106	935	171	15.5
Skilled	2810	3305	3036	269	8.1
Semiskilled	2584	2669	2427	242	9.1
Unskilled	790	832	790	42	5.0
Training (interns)	288	289	283	6	2.1
Total	**7425**	**8268**	**7529**	**739**	**8.9**

Table 14 above, reflects vacancy rate of 8.9%. It may appear that there is a high number of vacant positions at the end of the reporting period, this is due to the fact that a very few bulletins were issued, with higher priority given to the attraction of Health Professionals and Laboratory support. During this reporting period, there were a few critical IT positions that we managed to fill, which have been vacant for too long. The highest number of new recruits was the intake of Medical Technologist- students at 23%, followed by Medical Technologists at 13% of the Total Appointments.

The appointments of Health Professionals and laboratory support were 69% of the total appointments, and this means a high percentage of new recruits were directed towards direct labour.

Table 15: Employment changes

Programme/activity/ objective	Employment at beginning of period	Appointments	Terminations	Employment at end of the period
Top management	8	1	2	7
Senior management	49	3	0	51
Professional qualified	896	177	130	935
Skilled	2810	247	200	3036
Semi-skilled	2584	187	159	2427
Unskilled	790	55	99	790
Training (interns)	288	265	241	283
Total	**7425**	**935**	**831**	**7529**

The percentage of Top management remain the same, even though there were two separations, as the Headcount did not change. During the current reporting period FY2019-20, Senior Management category increased by 6%, Professional Qualified by 5% and Skilled category by 1.6%. Even though most of the Health Professionals progressed to higher grade levels during proficiency assessments, majority of them are still in the same occupational levels as last year. Recruitment for medical students undergoing training in our training platforms increased by 24% compared to the past financial year. The highest number of new recruits was the intake of Medical Technologist-Students at 23%, followed by Medical Technologists at 13%. Total number of Pathologists recruited during FY 2019/20 equals to thirty-nine (39). It is worth noting that 64% of the Total Pathologist appointees are Registrars from our training platforms who qualified in various pathology disciplines during FY2019/20 financial year. During this reporting period, NHLS gave an opportunity to 188 university students to undergo experiential training in various sections within the organization, and this intake of experiential students (188) is not included in the total appointments on Table 15.

Table 16: Reasons for leaving

Reason	Number	% of total no. of staff leaving
Death	17	0.2
Resignation	236	3.4
Dismissal	21	0.3
Retirement	86	1.2
Ill health	8	0.1
Expiry of contract	424	6.2
Other	39	0.6
Total	**831**	**12.1**

Total terminations for the period FY 2019-20 were 831, with voluntary resignations of 236, which constitutes to 28% of the total terminations, with Retirement at 1.2%.

During the financial period 2019/20, about thirty-seven (37) employees left the organization without serving notice, and this constitutes 4.4% of the total terminations.

It is worth noting that the dismissals have decreased by 23% compared to last year and the percentage of employees who left the organization suffering from ill health have also dropped by 20% compared FY2018-19.

The staff turnover at the end of the reporting period equals to 3.1% of total workforce as at 31 March 2020, and this is considered a healthy turnover for any organization. The overall Turnover rate excluding end of contracts equals to 5.4%.

Table 17: Labour relations - misconduct and disciplinary action

Nature of disciplinary Action	Count
Verbal warning	38
Written warning	36
Final written warning	37
Dismissal	21
Not guilty	8
Pending	71
Total	**211**

The above table depicts the number of cases attended and outcomes.

Table 18 a): Employment equity per target and status - Males per ethnic group

Levels	Male							
	African		Coloured		Indian		White	
	Current	Target	Current	Target	Current	Target	Current	Target
Top management	3	4	0	1	0	0	1	0
Senior management	8	13	1	2	3	4	7	9
Professional qualified	111	192	25	28	50	47	99	94
Skilled	688	886	73	103	54	52	54	104
Semi-skilled	687	918	61	74	36	40	10	21
Unskilled	294	327	8	18	0	1	1	2
Total	**1791**	**2340**	**168**	**226**	**143**	**144**	**172**	**231**

The above table reveals that African and Coloured Males remain under-represented across all the 3 job levels (i.e Skilled, Professionals & Snr Management), while Indians are on target and White Males are significantly over-represented relative to the Economically Active Populations (EAP) compliance target of 5.3%.

Table 18 b): Employment equity per target and status - Females per ethnic group

Levels	Female							
	African		Coloured		Indian		White	
	Current	Target	Current	Target	Current	Target	Current	Target
Top management	1	0	0	0	1	0	1	0
Senior management	9	10	2	3	6	8	12	18
Professional qualified	267	278	32	39	112	106	196	189
Skilled	1541	1500	175	173	172	174	240	246
Semi-skilled	1319	1319	174	179	45	50	62	69
Unskilled	456	455	21	28	1	2	0	2
Total	**3593**	**3562**	**404**	**422**	**337**	**340**	**511**	**524**

The above table reveals that as at date of review African & Coloured Females are relatively within target range, towards making NHLS an equal opportunity employer. Conversely; Indian & White Females are 3% above their respective EAPs (1% & 4.2%), making them to be significantly over-represented.

Table 18 c): Employment equity per target and status - people with disabilities

Levels	Disabled Staff			
	Male		Female	
	Current	Target	Current	Target
Top management	0	0	0	0
Senior management	0	1	1	2
Professional qualified	0	2	0	2
Skilled	2	3	17	18
Semi-skilled	4	5	5	6
Unskilled	2	3	3	4
Total	**8**	**14**	**26**	**32**

The above table reveals that People with Disabilities (PwD) within NHLS make 0.5% relative to the compliance target of 2%.

Conclusion

Notwithstanding the above revelations, within the reporting period NHLS has made some progress towards equal representation across the key job levels, as such improved inclusion. The African and Coloured Males improved by 4.6% while Females improved by 6.3%, across the C, D & E bands. Given our environment, the only opportunities presented to us are through terminations – which is at 6% excluding those who left due to end of contract and were not replaced.

Across the combined key target job levels (i.e Skilled, Professional and Senior Management) African Males remain the most under-represented (by 22.4%) as compared to White Females who are most over represented (by 7.4%) as at 31 March 2020. Of importance to note, is the unique over-representation of African Females (by 9.8%) at skilled level relative to their EAP. This is attributable to a high number of females across the medical technologists and scientists' cohort employed from the graduates.

5. PART E
Financial Information

General Information

Country of incorporation and domicile	South Africa
Nature of business and principal activities	Healthcare, research and training
Board members	B. Durham B.E. Mzangwa E. Buch G. Goosen I. van der Merwe K. Chetty T. Mariba M. Ross M. Shingange T. Mariba J. Mallet C.L. Obi S. Mayinga T. Tucker N. Van der Westhuizen Z.A. Mavuso
Registered office	1 Modderfontein Road Rietfontein Sandringham Johannesburg 2000
Postal address	Private Bag X 8 Johannesburg 2131
Shareholder	National Department of Health
Bankers	First National Bank Ltd Nedbank Ltd Investec Ltd Rand Merchant Bank Ltd
Attorneys	Hogan Lovells Inc. Gildenhuys Malatji Inc. Cliffe Dekker Hofmeyr Cheadle Thompson & Hayson Diale Mogashoa Attorneys Mkhabela Huntley Attorneys Inc Mohammed Noushad Hoosen Attorneys HM Chaane Attorneys Vezi & De Beer Attorneys Magagula George Mcetywa Attorneys Thomson Wilks Attorneys Goldberg & De Villers Inc
Auditors	Nexia SAB&T
Website	www.nhls.ac.za
Practice number	PR5200296

Legislation governing NHLS operations	The National Health Laboratory Service (NHLS) Act, no. 37 of 2000 The Public Finance Management (PFMA) Act, no. 1 of 1999 Treasury regulations in terms of PFMA, 1999 The Companies Act, No. 71 of 2008 The National Health Act, No. 61 of 2003
Published	30 October 2020

Table of Contents

The reports and statements set out below comprise the group annual financial statements presented to the parliament:

Chief Financial Officer's report.

Michael Sass
Chief Financial Officer

Overview: Statement of Financial Performance

During the 2019/2020 fiscal year, the National Health Laboratory Service (NHLS) generated a surplus of R1.082 billion, which is an increase from the revised R995.8 billion of the previous financial year.

The organisation's revenue also grew from R8.5 billion to R9.3 billion, of which 89% was generated by the provincial departments. This increase in test revenue can predominantly be attributed to an increase in tests for viral load (VL), profile discrete analyser urea and electrolyte (U&E), GeneXpert procalcitonin (PCT) tuberculosis (TB), automated creatinine, full blood count (FBC), including platelets, HIV polymerase chain reaction (PCR), panleucogated (PLG) CD4, liquid-based cytology (LBC), C-reactive protein using a laser-nephelometer, thyroid-stimulating hormone (TSH) and alanine aminotransferase (ALT).

Production costs, which includes direct labour and material, grew from R6.7 billion to R7.4 billion. This equates to a 9% increase which was mainly due to increases in labour, the volume of tests, price increases and fluctuations in the exchange rate. Labour costs constituted 42% of the total production costs, compared to 43% in the previous financial year. Operational costs increased by 6%, this was in line with inflation.

Overview: Statement of Financial Position

The assets of the NHLS increased from a revised R5.7 billion to R6.9 billion, which constitutes a 20% increase, which can mainly be attributed to an 86% (R1.9 billion) increase in cash. The closing bank balance ended at R4.1 billion compared to R2.2 billion in the previous financial year, which indicates a net cash inflow of R1.9 billion.

Current liabilities increased from R1.4 billion to R1.5 billion (6% increase) due to an increase in the provision of leave pay and utilities. The creditors days have reduced from 30 days to 28 days.

The NHLS continues to grow its business, which is demonstrated by the 3% increase in test volumes as well as a 9% increase in revenue. The NHLS collected R8.7 billion from provincial departments compared to R7.4 billion in the prior year. The debtors days improved from 127 days to 105 days. The NHLS will continue to engage the provinces with regards to timely payments of debt in arrears.

The financial viability of the NHLS has improved when compared to the prior year, with all liquidity ratios indicating positive movement. The solvency position of the NHLS also improved significantly, which is an indication of its sustainability in the provision of services to hospitals and clinics. Overall, the NHLS is in a more advantageous position to deliver on its mandate.

Cash flow

During the financial year under review, the NHLS received R10.5 billion (2018/2019: R9.1 billion) from customers. Of the R10.5 billion, 3.9billion in 2020 and 3.6billion in 2019 was utilised for personnel costs and 4.5billion in 2020 and 4.2billion in 2019 was utilised for goods and services.

The outstanding accounts payable balances from the procurement of goods and services decreased slightly at 3% from R392 million to R384 million. The creditors days have reduced from 30 days to 28 days.

Budget variance analysis

The total revenue was 6% over budget (R565 million), due to an increase in the demand for diagnostic laboratory services and increases in interest received. The positive variance is mainly attributable to the increase in priority tests as per alignment with the protocols of the Department of Health (DoH).

Compared to the budget, personnel costs were underspent by 9%, due to the fact that not all the vacancies budgeted for were filled at year end.. Material expenditure, as a percentage of the test revenue, was at 42% for the year under review (2018:19 41%).

Going concern

Given its significance in the public and private health sectors and its ability to deliver affordable pathology health services to the South African public, the DoH has neither the intention nor the need to liquidate or curtail the scale of the NHLS.

Management considered a wide range of factors in determining whether the organisation is a going concern. These factors include its current and expected performance as a Schedule 3A public entity, its restructuring plans and the likelihood of future government funding. For the financial period under review, the NHLS improved its cash collection as well as improved debt collection as shown by the improved debtors days.

For the financial period under review, the NHLS improved its cash collection as well as improved debt collection as shown by the improved debtors days.

Despite the continued difficulty in receiving regular payments from all the provinces for the debt owed for services rendered by the NHLS, it is anticipated that the settlement of disputes will be resolved. The group's annual financial statements (AFS) were therefore prepared based on the accounting policies applicable to a going concern.

In line with the applicable accounting standards, this basis presumes that funds will be available to finance future operations, and that the realisation of assets and liabilities, contingent obligations and commitments will occur in the ordinary course of business. This specifically assumes that the debt owed by all the provinces will be settled.

Outstanding debt owed by provinces

The collection of money from the provincial DoHs has been an ongoing issue for many years. By 31 March 2020, the DoH debt payable amounted to R4.7 billion (2018/2019: R5.3 billion). The majority of the debt is owed by KwaZulu-Natal and Gauteng constitutes R3.8 billion or 80% of trade receivables. A settlement agreement was reached with the Gauteng DoH on debt in arrears and there are ongoing negotiations with KwaZulu-Natal DoH regarding the settlement of overdue amounts owed to the NHLS.

Maintenance of financial control systems

The Board is ultimately responsible for systems of internal financial control within the NHLS and places considerable importance on maintaining a strong control environment. Based on assessments of internal and external audits, assurance is provided that the NHLS's internal controls are effective.

Events after the reporting date: COVID-19

Since the coronavirus has spread to South Africa and our president declared a national state of disaster on 15 March 2020, the NHLS has played a pivotal role in fighting this global pandemic which includes the provision of pathology services and testing for COVID-19.

Availability and costs of all items related to performing COVID-19 tests have been a major challenge and the NHLS is currently in the process of sourcing the relevant goods and suitable suppliers for this purpose.

The demand for testing has steadily been increasing on a daily basis, which has in turn placed significant strain on the resources and capacity of the laboratory services and system. This situation is not unique to South Africa, as multiple countries that are affected by COVID-19 are dealing with similar challenges.

By the end of September 2020, the NHLS has procured goods and services to the value of R3,38 billion for COVID-19-related services and tests which include items such as equipment, reagent testing kits, protective gear, consumables, etc.

The NHLS started billing provincial departments as at the 07 June 2020. The NHLS have not been charging government customers prior to 07 June 2020 for COVID-19 tests being performed however NHLS have received a grant from the Solidarity Fund to the value of R250m which has subsidised a large amount of tests performed at no charge. NHLS will continue to bill for COVID-19 testing based on its current billing model.

Despite the uncertainties around the impact and time frame of it, the NHLS has positioned itself to respond to the COVID-19 pandemic in the foreseeable future.

Borrowing limitations

In terms of the NHLS rules, the Board may exercise all the powers of the economic entity to borrow money as they consider appropriate, in accordance with the Public Finance Management Act (PFMA). During the financial year under review, the entity did not borrow funds to finance its operations.

Chief Financial Officer
Michael Sass

Accounting Authority's Responsibilities and Approval

The Accounting Authority is required by the Public Finance Management Act (Act 1 of 1999), to maintain adequate accounting records and is responsible for the content and integrity of the audited group Annual Financial Statements and related financial information included in this report. It is the responsibility of the Accounting Authority to ensure that the audited group Annual Financial Statements fairly present the state of affairs of the economic entity as at the end of the financial year and the results of its operations and cash flows for the year then ended. The external auditors are engaged to express an independent opinion on the audited group Annual Financial Statements and was given unrestricted access to all financial records and relateddata. The audited group Annual Financial Statements have been prepared in accordance with Standards of Generally Recognised Accounting Practice (GRAP) including any interpretations, guidelines and directives issued by the Accounting Standards Board.

The audited group Annual Financial Statements are based upon appropriate accounting policies consistently applied and supported by reasonable and prudent judgements and estimates.

The Acccounting Authority acknowledges that it is ultimately responsible for the system of internal financial control established by the economic entity and place considerable importance on maintaining a strong control environment. To enable the Accounting Authority to meet these responsibilities, the Accounting Authority sets standards for internal control aimed at reducing the risk of error or deficit in a cost effective manner. The standards include the proper delegation of responsibilities within a clearly defined framework, effective accounting procedures and adequate segregation of duties to ensure an acceptable level of risk. These controls are monitored throughout the economic entity and all employees are required to maintain the highest ethical standards in ensuring the economic entity's business is conducted in a manner that in all reasonable circumstances is above reproach. The focus of risk management in the economic entity is on identifying, assessing, managing and monitoring all known forms of risk across the economic entity. While operating risk cannot be fully eliminated, the economic entity endeavours to minimise it by ensuring that appropriate infrastructure, controls, systems and ethical behaviour are applied and managed within predetermined procedures andconstraints.

The Accounting Authority is of the opinion, based on the information and explanations given by management, that the system of internal control provides reasonable assurance that the financial records may be relied on for the preparation of the audited group Annual Financial Statements. However, any system of internal financial control can provide only reasonable, and not absolute, assurance against material misstatement orerror.

The Accounting Authority have reviewed the economic entity's cash flow forecast and, in the light of this review and the current financial position, they are satisfied that the economic entity has access to adequate resources to continue in operational existence for the foreseeablefuture.

The economic entity is wholly dependent on public healthcare providers for continued funding of operations. The audited group annual financial statements are prepared on the basis that the economic entity is a going concern and that the National Department of Health has neither the intention nor the need to liquidate or curtail materially the scale of the economic entity.

Although the Accounting Authority is primarily responsible for the financial affairs of the economic entity, it is supported by the economic entity's internal auditors.

The audited group Annual Financial Statements set out on pages 155 to 223, which have been prepared on the going concern basis, were approved by the Accounting Authority on 30 October 2020 and were signed on its behalf by:

Chief Executive Officer
Dr.Kamy Chetty

Chairperson: Accounting Authority
Prof. Eric Buch

Independent auditor's report to Parliament on National Health Laboratory Service

Report on the audit of the consolidated and separate financial statements

Opinion

1. We have audited the consolidated and separate financial statements of the National Health Laboratory Service and its subsidiary (the group) set out on pages 155 to 223, which comprise the consolidated and separate statement of financial position as at 31 March 2020, consolidated and separate statement of financial performance, statement of changes in net assets, cash flow statement and Statement of Comparison of Budget and Actual Amounts for the year then ended, as well as the notes to the consolidated and separate financial statements, including a summary of significant accounting policies.

2. In our opinion, the consolidated and separate financial statements present fairly, in all material respects, the consolidated and separate financial position of the group as at 31 March 2020, and its consolidated and separate financial performance and consolidated and separate cash flows for the year then ended in accordance with Standards of Generally Recognised Accounting Practice (Standards of GRAP) and the requirements of the Public Finance Management Act of South Africa, 1999 (Act No. 1 of 1999) (PFMA).

Basis for opinion

3. We conducted our audit in accordance with the International Standards on Auditing (ISAs). Our responsibilities under those standards are further described in the auditor's responsibilities for the audit of the consolidated and separate financial statements section of this auditor's report.

4. We are independent of the group in accordance with sections 290 and 291 of the Independent Regulatory Board for Auditors' Code of professional conduct for Registered Auditors (Revised January 2018), parts 1 and 3 of the Independent Regulatory Board for Auditors' Code of Professional Conduct for Registered Auditors (Revised November 2018) (together the IRBA Codes) and other independence requirements applicable to performing audits of financial statements in South Africa. We have fulfilled our other ethical responsibilities, as applicable in accordance with the IRBA Codes and in accordance with other ethical requirements applicable to performing audits in South Africa. The IRBA Codes are consistent with the corresponding sections of the International Ethics Standards Board for Accountants' Code of ethics for professional accountants and the International Ethics Standards Board for Accountants' International code of ethics for professional accountants (including International Independence Standards) respectively.

5. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Emphasis of matters

6. We draw attention to the matters below. Our opinion is not modified in respect of these matters.

Restatement of corresponding figures

7. As disclosed in Note 41 to the financial statements, the corresponding figures for 31 March 2019 were restated as a result of an error in the financial statements of the group for the year ended, 31 March 2020.

Events after the reporting date - COVID 19

8. We draw attention to note 44 in the financial statements, which deals with subsequent events and specifically the possible effects of the future implications of Covid-19 on the group's future prospects, performance and cash flows. Management have also described how they plan to deal with these events and circumstances.

Material impairments – trade debtors

9. As disclosed in Note 5 to the financial statements, material impairment of R241 871 000 was incurred as a result of uncertainty in the recoverability of the amounts owed by the debtors.

Other matter

10. We draw attention to the matter below. Our opinion is not modified in respect of this.

Unaudited supplementary information

11. The supplementary information set out on pages 224 to 225 does not form part of the financial statements and is presented as additional information. We have not audited this schedule and, accordingly, we do not express an opinion on it.

Responsibilities of accounting authority for the financial statements

12. The board of directors, which constitutes the accounting authority, is responsible for the preparation and fair presentation of the consolidated and separate financial statements in accordance with Standards of GRAP and the requirements of the PFMA and for such internal control as the accounting authority determines is necessary to enable the preparation of consolidated and separate financial statements that are free from material misstatement, whether due to fraud or error.

13. In preparing the consolidated and separate financial statements, the accounting authority is responsible for assessing the group's ability to continue as a going concern, disclosing, as applicable, matters relating to going concern and using the going concern basis of accounting unless the accounting authority either intends to liquidate the group or to cease operations, or has no realistic alternative but to do so.

Auditor's responsibilities for the audit of the consolidated and separate financial statements

14. Our objectives are to obtain reasonable assurance about whether the consolidated and separate financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with the ISAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated and separate financial statements.

15. A further description of our responsibilities for the audit of the consolidated and separate financial statements is included in the annexure to this auditor's report.

Report on the audit of the annual performance report

Introduction and scope

16. In accordance with the Public Audit Act of South Africa of 2004 (PAA) and the general notice issued in terms thereof, we have a responsibility to report on the usefulness and reliability of the reported performance information against predetermined objectives for selected programme presented in the annual performance report. We performed procedures to identify material findings but not to gather evidence to express assurance.

17. Our procedures address the usefulness and reliability of the reported performance information, which must be based on the approved performance planning documents of the group. We have not evaluated the completeness and appropriateness of the performance indicators/ measures included in the planning documents. Our procedures do not examine whether the actions taken by the group enabled service delivery. Our procedures also do not extend to any disclosures or assertions relating to planned performance strategies and information in respect of future periods that may be included as part of the reported performance information. Accordingly, our findings do not extend to these matters.

18. We evaluated the usefulness and reliability of the reported performance information in accordance with the criteria developed from the performance management and reporting framework, as defined in the general notice, for the following selected programme presented in the annual performance report of the group for the year ended 31 March 2020:

Programme	Pages in the annual performance report
Programme 5 – Laboratory service	46 – 49

19. We performed procedures to determine whether the reported performance information was properly presented and whether performance was consistent with the approved performance planning documents. We performed further procedures to determine whether the indicators and related targets were measurable and relevant, and assessed the reliability of the reported performance information to determine whether it was valid, accurate and complete.

20. We did not identify any material findings on the usefulness and reliability of the reported performance information for the programme.

Other matter

21. We draw attention to the matter below. Our opinion is not modified in respect of this matter.

Achievement of planned targets

22. Refer to the annual performance report on pages 34 to 49 for information on the achievement of planned targets for the year and explanations provided for the under / over-achievement of a number of targets.

Report on the audit of compliance with legislation

Introduction and scope

23. In accordance with the PAA and the general notice issued in terms thereof, we have a responsibility to report material findings on the group' compliance with specific matters in key legislation. We performed procedures to identify findings but not to gather evidence to express assurance.

24. The material findings on compliance with specific matters in key legislations are as follows:

Annual financial statements

25. The financial statements submitted for auditing were not prepared in accordance with the prescribed financial reporting framework as required by section 55(1)(b) of the PFMA.

26. There were material misstatements in the submitted financial statements regarding accuracy, classification and completeness of property, plant and equipment; provisions, accruals and disclosure items. The group subsequently corrected the financial statements, resulting in an unqualified audit opinion being issued.

Expenditure management

27. Effective and appropriate steps were not taken to prevent irregular expenditure amounting to R776 388 000 as disclosed in Note 40 to the annual financial statements, as required by section 51(1)(b)(ii) of the PFMA.

Procurement and contract management

28. Some of the invitations for competitive bidding were not advertised for a required minimum period, as required by treasury regulations 16A6.3(c).

29. In some instances, persons in service of the group whose close family members, partners or associates had a private or business interest in contracts awarded by the group failed to disclose such interest, as required by treasury regulation 16A8.4. Similar non-compliance was also reported in the prior year.

Other information

30. The accounting authority is responsible for the other information. The other information comprises the information included in the annual report, Foreword by the Chairperson of the Board, Chief Executive Officer's Overview, Chief Financial Officer's Report, Accounting Authority's Responsibility and Approval and Report of the Audit and Risk Committee. The other information does not include the consolidated and separate financial statements, the auditor's report and the selected programme presented in the annual performance report that have been specifically reported in this auditor's report.

31. Our opinion on the financial statements and our findings on the reported performance information and compliance with legislation do not cover the other information and we do not express an audit opinion or any form of assurance conclusion thereon.

32. In connection with our audit, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the consolidated and separate financial statements and the selected programme presented in the annual performance report, or our knowledge obtained in the audit, or otherwise appears to be materially misstated.

33. If based on the work we have performed, we conclude that there is a material misstatement in this other information, we are required to report that fact. We have nothing to report in this regard.

Internal control deficiencies

34. We considered internal control relevant to our audit of the consolidated and separate financial statements, reported performance information and compliance with applicable legislation; however, our objective was not to express any form of assurance on it. The matter reported below is limited to the significant internal control deficiencies that resulted in the finding on the annual performance report and the findings on compliance with legislation included in this report.

35. Management did not implement effective controls to ensure accurate financial reporting nor did they exercise adequate oversight responsibility over compliance with applicable legislation, which resulted in irregular expenditure and material adjustments made to the financial statements.

Other reports

36. We draw attention to the following engagements conducted by various parties which had, or could have, an impact on the matters reported in the group's financial statements, reported performance information, compliance with applicable legislation and other related matters. These reports did not form part of our opinion on the financial statements or our findings on the reported performance information or compliance with legislation.

37. The Special Investigations Unit is currently investigating allegations of the possible procurement and contract management irregularities at the request of the President of the Republic of South Africa (Proclamation No R.18 of 2019), covering the period 2016 to 2017. The investigations were still in progress at the date of this auditor's report.

38. The Directorate for Priority Crime Investigation ("The Hawks") is currently investigating allegations of the possible procurement and contract management irregularities. The investigations were still in progress at the date of this auditor's report.

39. An agreed upon procedures engagement was performed by an independent firm on the grants received and expenditure incurred specific to the Medical Research Council Grant. The report covered the period 2017 to 2019, and was issued to the group on 24 January 2020.

40. An audit was performed by an independent firm on the grants received and expenditure incurred specific to the National Research Foundation Grant. The report covered the period 1 January 2019 to 31 December 2019, and was issued to the group on 28 July 2020.

Auditor tenure

41. We report that Nexia SAB&T has been the auditor of National Health Laboratory Service for 1 year.

Nexia SAB&T
N.C Soopal
Director
Registered Auditor
30 October 2020

119 Witch-Hazel Avenue
Highveld Techno-park
Centurion
0157

Annexure – Auditor's responsibility for the audit

1. As part of an audit in accordance with the ISAs, we exercise professional judgement and maintain professional scepticism throughout our audit of the consolidated and separate financial statements, and the procedures performed on reported performance information for selected programme and on the group's compliance with respect to the selected subject matters.

Financial statements

2. In addition to our responsibility for the audit of the consolidated and separate financial statements as described in this auditor's report, we also:

    - identify and assess the risks of material misstatement of the consolidated and separate financial statements whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control
    - obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the group's internal control
    - evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the board of directors, which constitutes the accounting authority.
    - conclude on the appropriateness of the board of directors, which constitutes the accounting authority's use of the going concern basis of accounting in the preparation of the financial statements. We also conclude, based on the audit evidence obtained, whether a material uncertainty exists relating to events or conditions that may cast significant doubt on the ability of National Health Laboratory Service and its subsidiary to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements about the material uncertainty or, if such disclosures are inadequate, to modify our opinion on the financial statements. Our conclusions are based on the information available to us at the date of this auditor's report. However, future events or conditions may cause an group to cease operating as a going concern
    - evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and determine whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation
    - obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the group to express an opinion on the consolidated financial statements. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinion.

Communication with those charged with governance

3. We communicate with the accounting authority regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

4. We also confirm to the accounting authority that we have complied with relevant ethical requirements regarding independence, and communicate all relationships and other matters that may reasonably be thought to have a bearing on our independence and, where applicable, actions taken to eliminate threats or safeguards applied.

Statement of Financial Position as at 31 March 2020

	Note(s)	Economic entity 2020 R'000	Economic entity 2019 Restated* R'000	Controlling entity 2020 R'000	Controlling entity 2019 Restated* R'000
Assets					
Current Assets					
Inventories	3	173,577	165,260	167,757	156,371
Receivables from exchange transactions**	4	1,093,533	1,838,465	1,091,571	1,835,991
Receivables from non-exchange transactions	6	414,094	431,468	414,094	431,468
Cash and cash equivalents	7	4,105,760	2,208,093	4,094,633	2,201,737
		5,786,964	**4,643,286**	**5,768,055**	**4,625,567**
Non-Current Assets					
Property, plant and equipment	8	1,048,202	1,088,830	1,046,456	1,087,123
Intangible assets	9	4,799	964	4,799	964
Deferred tax	18	-	5	-	-
		1,053,001	**1,089,799**	**1,051,255**	**1,088,087**
Total Assets		**6,839,965**	**5,733,085**	**6,819,310**	**5,713,654**
Liabilities					
Current Liabilities					
Other financial liabilities	12	4,824	4,228	4,824	4,228
Current tax payable		1,693	1,924	-	-
Finance lease obligation	13	18,148	16,933	18,148	16,933
Payables from exchange transactions**	14	555,237	549,323	551,132	547,233
VAT payable		165	286	-	-
Post retirement medical benefit plan	15	34,905	30,879	34,905	30,879
Unspent conditional grants and receipts	16	35,581	28,669	35,581	28,669
Provisions	17	841,392	772,415	841,392	772,415
		1,491,945	**1,404,657**	**1,485,982**	**1,400,357**
Non-Current Liabilities					
Other financial liabilities	12	5,056	9,712	5,056	9,712
Finance lease obligation	13	18,982	38,191	18,982	38,191
Post retirement medical benefit plan	15	918,492	957,536	918,492	957,536
Deferred tax	18	242	-	-	-
		942,772	**1,005,439**	**942,530**	**1,005,439**
Total Liabilities		**2,434,717**	**2,410,096**	**2,428,512**	**2,405,796**
Net Assets		**4,405,248**	**3,322,989**	**4,390,798**	**3,307,858**
Share capital / contributed capital	19	332	332	332	332
Reserves					
Revaluation reserve	20	654,919	654,919	654,919	654,919
Accumulated surplus		3,749,997	2,667,738	3,735,547	2,652,607
Total Net Assets		**4,405,248**	**3,322,989**	**4,390,798**	**3,307,858**

*** There was a change in classification from Payables from exchange to Receivables from exchange. Refer to Note 41 for details of the reclassification.*

Statement of Financial Performance

	Note(s)	Economic entity		Controlling entity	
		2020	2019 Restated*	2020	2019 Restated*
		R'000	R'000	R'000	R'000
Revenue	21	9,250,665	8,502,475	9,221,548	8,475,720
Cost of sales	22	(7,357,448)	(6,746,090)	(7,332,094)	(6,727,349)
Gross surplus		**1,893,217**	**1,756,385**	**1,889,454**	**1,748,371**
Other income	23	180,681	276,511	180,680	276,508
Operating expenses (by function)	29	(1,300,400)	(1,230,455)	(1,296,253)	(1,227,695)
Operating surplus	24	**773,498**	**802,441**	**773,881**	**797,184**
Interest income	25	315,841	183,512	315,212	183,051
Fair value adjustments		(23)	22,701	-	22,665
Interest expense	26	(6,278)	(10,753)	(6,153)	(10,379)
Surplus before taxation		**1,083,038**	**997,901**	**1,082,940**	**992,521**
Taxation	27	(816)	(2,090)	-	-
Surplus for the year		**1,082,222**	**995,811**	**1,082,940**	**992,521**

Statement of Changes in Net Assets

	Share capital / contributed capital	Revaluation reserve	Accumulated surplus	Total net assets
	R'000	R'000	R'000	R'000
Economic entity				
Opening balance as previously reported	332	688,072	1,673,008	2,361,412
Adjustments				
Correction of errors*	-	(33,153)	(1,081)	(34,234)
Balance at 01 April 2018 as restated*	**332**	**654,919**	**1,671,927**	**2,327,178**
Changes in net assets				
Restated Surplus for the year *	-	-	995,811	995,811
Total changes	**-**	**-**	**995,811**	**995,811**
Opening balance as previously reported	332	654,919	2,669,420	3,324,671
Adjustments				
Correction of errors	-	-	(1,645)	(1,645)
Restated* Balance at 01 April 2019	**332**	**654,919**	**2,667,775**	**3,323,026**
Changes in net assets				
Surplus for the year	-	-	1,082,222	1,082,222
Total changes	**-**	**-**	**1,082,222**	**1,082,222**
Balance at 31 March 2020	**332**	**654,919**	**3,749,997**	**4,405,248**
Controlling entity				
Opening balance as previously reported	332	688,072	1,661,195	2,349,599
Adjustments				
Correction of errors*	-	(33,153)	(1,109)	(34,262)
Balance at 01 April 2018 as restated*	**332**	**654,919**	**1,660,086**	**2,315,337**
Changes in net assets				
Restated surplus for the year *	-	-	992,521	992,521
Total changes	-	-	992,521	992,521
Opening balance as previously reported	332	654,919	2,654,324	3,309,575
Adjustments				
Correction of errors*	-	-	(1,717)	(1,717)
Restated* Balance at 01 April 2019	**332**	**654,919**	**2,652,607**	**3,307,858**
Changes in net assets				
Surplus for the year		-	1,094,582	1,094,582
Total changes	-		1,082,940	1,082,940
Balance at 31 March 2020	**332**	**654,919**	**3,735,547**	**4,390,798**

** See Note 41*

Cash Flow Statement

	Note(s)	Economic entity 2020 R'000	Economic entity 2019 Restated* R'000	Controlling entity 2020 R'000	Controlling entity 2019 Restated* R'000
Cash flows from operating activities					
Receipts					
Sale of goods and services		9,433,705	8,182,601	9,404,075	8,156,311
Grants		785,506	790,226	785,506	790,226
Interest income		313,899	186,577	313,270	186,116
		10,533,110	**9,159,404**	**10,502,851**	**9,132,653**
Payments					
Employee costs		(3,938,110)	(3,630,580)	(3,922,283)	(3,615,479)
Suppliers		(4,555,280)	(4,288,149)	(4,546,804)	(4,279,775)
Interest expense		(136)	(377)	(11)	(3)
Taxes on surpluses	33	(801)	(977)	-	-
		(8,494,327)	(7,920,083)	(8,469,098)	(7,895,257)
Net cash flows from operating activities	32	**2,038,783**	**1,239,321**	**2,033,753**	**1,237,396**
Cash flows from investing activities					
Purchase of property, plant and equipment	8	**(109,327)**	**(101,487)**	**(109,068)**	**(101,203)**
Proceeds from sale of property, plant and equipment	8	**886**	**39**	**886**	**12**
Purchase of other intangible assets	9	**(4,479)**	**(45)**	**(4,479)**	**(45)**
Net cash flows from investing activities		**(112,920)**	**(101,493)**	**(112,661)**	**(101,236)**
Cash flows from financing activities					
Repayment of other financial liabilities		(4,060)	(25,353)	(4,060)	(25,353)
Finance lease payments		(24,136)	(23,526)	(24,136)	(23,526)
Net cash flows from financing activities		**(28,196)**	**(48,879)**	**(28,196)**	**(48,879)**
Net increase in cash and cash equivalents		**1,897,667**	**1,088,949**	**1,892,896**	**1,087,281**
Cash and cash equivalents at the beginning of the year		2,208,093	1,119,144	2,201,737	1,114,456
Cash and cash equivalents at the end of the year	7	**4,105,760**	**2,208,093**	**4,094,633**	**2,201,737**

** See Note 41.*

Statement of Comparison of Budget and Actual Amounts

Budget on Accrual Basis	Approved budget	Adjustments	Final Budget	Actual amounts on comparable basis	Difference between final budget and actual	Reference
	R'000	R'000	R'000	R'000		
Economic entity						
Statement of Financial Performance						
Revenue						
Revenue from exchange transactions						
Sale of goods	29,074	-	**29,074**	29,117	**43**	
Rendering of services	8,168,603	-	**8,168,603**	8,428,133	**259,530**	
Miscellaneous other revenue	6,200	-	**6,200**	7,909	**1,709**	
Royalties received	428	-	**428**	4,407	**3,979**	
Discount received	1,303	-	**1,303**	608	**(695)**	
Bad debts recovered	4,283	-	**4,283**	970	**(3,313)**	
Internal Recoveries	-	-	**-**	7	**7**	
Teaching Income	61,062	-	**61,062**	63,761	**2,699**	
Sundry income	15,347	-	**15,347**	3,444	**(11,903)**	43.1
Grant income recognised	-	-	**-**	102,880	**102,880**	
Public Contributions and Donations	-	-	**-**	4,604	**4,604**	
Interest received	110,680	-	**110,680**	315,841	**205,161**	43.2
Total revenue from exchange transactions	**8,396,980**	**-**	**8,396,980**	**8,961,681**	**564,701**	
Revenue from non-exchange transactions						
Transfer revenue						
Government grants & subsidies	786,248	-	**786,248**	785,506	**(742)**	
Total revenue	**9,183,228**	**-**	**9,183,228**	**9,747,187**	**563,959**	
Expenditure						
Personnel	(4,313,180)	-	**(4,313,180)**	(3,930,643)	**382,537**	
Depreciation and amortisation	(192,175)	-	**(192,175)**	(144,891)	**47,284**	
Finance costs	(4,507)	-	**(4,507)**	(6,278)	**(1,771)**	
Lease rentals on operating lease	(47,339)	-	**(47,339)**	(38,733)	**8,606**	
Debt Impairment	(3,671)	-	**(3,671)**	(241,871)	**(238,200)**	43.2
General Expenses	(4,525,727)	-	**(4,525,727)**	(4,293,947)	**231,780**	
Total expenditure	**(9,086,599)**	**-**	**(9,086,599)**	**(8,656,363)**	**430,236**	
Operating surplus	**96,629**	**-**	**96,629**	**1,090,824**	**994,195**	
Loss on disposal of assets and liabilities	(41)	-	**(41)**	**(3,815)**	**(3,774)**	
Loss on foreign exchange	-	-	**-**	(3,880)	**(3,880)**	
Fair value adjustments	-	-	-	(23)	**(23)**	
	(41)	**-**	**(41)**	**(7,718)**	**(7,677)**	
Surplus before taxation	**96,588**	**-**	**96,588**	**1,083,106**	**986,518**	
Taxation	**-**	**-**	**-**	**816**	**816**	
Actual Amount on Comparable Basis as Presented in the Budget and Act al Comparative Statement	**96,588**	**-**	**96,588**	**1,082,290**	**985,702**	

1. Presentation of Audited Group Annual Financial Statements

The audited group annual financial statements have been prepared in accordance with the Standards of Generally Recognised Accounting Practice (GRAP), issued by the Accounting Standards Board in accordance with Section 91(1) of the Public Finance Management Act (Act 1 of 1999).

These group annual financial statements have been prepared on an accrual basis of accounting and are in accordance with historical cost convention as the basis of measurement, unless specified otherwise.

A summary of the significant accounting policies, which have been consistently applied in the preparation of these group annual financial statements, are disclosed below.

These accounting policies are consistent with the previous period, except for the changes set out in the Changes in accounting policy note.

1.1 Presentation currency

These group annual financial statements are presented in South African Rand, which is the functional currency of the economic entity and all values are rounded to the nearest thousand (R000), except when otherwise indicated.

1.2 Going concern assumption

These group annual financial statements have been prepared based on the expectation that the economic entity will continue to operate as a going concern for at least the next 12 months.

1.3 Significant judgements and sources of estimation uncertainty

In preparing the group annual financial statements, management is required to make estimates and assumptions that affect the amounts represented in the group annual financial statements and related disclosures. Use of available information and the application of judgement is inherent in the formation of estimates. Actual results in the future could differ from these estimates which may be material to the group annual financial statements. Significant judgements include:

Trade and other receivables

The economic entity assesses its trade and other receivables for impairment at the end of each reporting period. In determining whether an impairment loss should be recorded in surplus or deficit, the economic entity makes judgements as to whether there is observable data indicating a measurable decrease in the estimated future cash flows from a financial asset.

The impairment for trade and other receivables is calculated on a individual basis for major customers (others are grouped on a portfolio basis), based on historical loss ratios, adjusted for national and industry-specific economic conditions and other indicators present at the reporting date that correlate with defaults on the customer. These annual loss ratios are applied to loan balance of the customer or the portfolio and scaled to the estimated loss emergence period.

The impairment is measured as the difference between the debtors carrying amount and the present value of estimated future cash flows discounted at the effective interest rate, computed at initial recognition.

Allowance for slow moving, damaged and obsolete stock

An allowance is raised to write stock down to the lower of cost or net realisable value. Management have made estimates of the selling price and direct cost to sell on certain inventory items.

Impairment testing

The recoverable amounts of cash-generating units and individual assets are determined based on the higher of value-in-use calculations and fair values less costs to sell. These calculations require the use of estimates and assumptions. It is reasonably possible that the key assumptions may change which may then impact our estimations and may then require a material adjustment to the carrying value of tangible assets.

The economic entity reviews and tests the carrying value of assets when events or changes in circumstances suggest that the carrying amount may not be recoverable. Assets are grouped at the lowest level for which identifiable cash flows are largely independent of cash flows of other assets and liabilities. If there are indications that impairment may have occurred, estimates are prepared of expected future cash flows for each group of assets. Expected future cash flows used to determine the value in use of tangible assets are inherently uncertain and could materially change over time. They are significantly affected by a number of factors including including production estimates, together with economic factors such as exchange rates, inflation rates and interest rates.

Provisions

Provisions were raised and management determined an estimate based on the information available. Additional disclosure of these estimates of provisions are included in note 17 - Provisions.

Useful lives of property, plant and equipment

The economic entity's management determines the estimated useful lives and related depreciation charges for property, plant and equipment. This estimate is based on industry norm. Management will increase the depreciation charge where useful lives are less than previously estimated useful lives.

Post-retirement benefits

The present value of the post retirement obligation depends on a number of factors that are determined on an actuarial basis using a number of assumptions. The assumptions used in determining the net cost (income) include the discount rate, healthcare cost inflation, expected retirement age and withdrawal rate. Any changes in these assumptions will impact on the carrying amount of post retirement obligations.

The economic entity determines the appropriate discount rate at the end of each year. This is the interest rate that should be used to determine the present value of estimated future cash outflows expected to be required to settle the medical obligations. In determining the appropriate discount rate, the economic entity considers the interest rates of high-quality government bonds that are denominated in the currency in which the benefits will be paid, and that have terms to maturity approximating the terms of the related medical liability.

Other key assumptions for medical obligations are based on current market conditions. Additional information is disclosed in Note 15.

1.4 Property, plant and equipment

Property, plant and equipment are tangible non-current assets (including infrastructure assets) that are held for use in the production or supply of goods or services, rental to others, or for administrative purposes, and are expected to be used during more than one period.

The cost of an item of property, plant and equipment is recognised as an asset when:

- it is probable that future economic benefits or service potential associated with the item will flow to the economic entity; and
- the cost of the item can be measured reliably.

Property, plant and equipment is initially measured at cost.

The cost of an item of property, plant and equipment is the purchase price and other costs attributable to bring the asset to the location and condition necessary for it to be capable of operating in the manner intended by management. Trade discounts and rebates are deducted in arriving at the cost.

Where an asset is acquired through a non-exchange transaction, its cost is its fair value as at date of acquisition.

Where an item of property, plant and equipment is acquired in exchange for a non-monetary asset or monetary assets, or a combination of monetary and non-monetary assets, the asset acquired is initially measured at fair value (the cost). If the acquired item's fair value was not determinable, it's deemed cost is the carrying amount of the asset(s) given up.

When significant components of an item of property, plant and equipment have different useful lives, they are accounted for as separate items (major components) of property, plant and equipment.

Costs include costs incurred initially to acquire an item of property, plant and equipment and costs incurred subsequently to add to, replace part of, or service it. If a replacement cost is recognised in the carrying amount of an item of property, plant and equipment, the carrying amount of the replaced part is derecognised.

Recognition of costs in the carrying amount of an item of property, plant and equipment ceases when the item is in the location and condition necessary for it to be capable of operating in the manner intended by management.

Items such as spare parts, standby equipment and servicing equipment are recognised when they meet the definition of property, plant and equipment.

Major inspection costs which are a condition of continuing use of an item of property, plant and equipment and which meet the recognition criteria above are included as a replacement in the cost of the item of property, plant and equipment. Any remaining inspection costs from the previous inspection are derecognised.

Property, plant and equipment is subsequently carried at cost less accumulated depreciation and any impairment losses except for Land and Buildings. Buildings is carried at revalued amount being the fair value at the date of revaluation less any subsequent accumulated depreciation and subsequent accumulated impairment losses. Land is not depreciated but carried at revalued amount less accumulated impairment losses.

Revaluations are made with sufficient regularity such that the carrying amount does not differ materially from that which would be determined using fair value at the end of the reporting period.

When an item of property, plant and equipment is revalued, any accumulated depreciation at the date of the revaluation is eliminated against the gross carrying amount of the asset and the net amount restated to the revalued amount of the asset.

Any increase in an asset's carrying amount, as a result of a revaluation, is credited directly to a revaluation surplus. The increase is recognised in surplus or deficit to the extent that it reverses a revaluation decrease of the same asset previously recognised in surplus or deficit.

Any decrease in an asset's carrying amount, as a result of a revaluation, is recognised in surplus or deficit in the current period. The decrease is debited directly to a revaluation surplus to the extent of any credit balance existing in the revaluation surplus in respect of that asset.

The revaluation surplus in equity related to a specific item of property, plant and equipment is transferred directly to retained earnings when the asset is derecognised.

Property, plant and equipment are depreciated on the straight line basis over their expected useful lives to their estimated residual value.

Sheep and horses that are used for research purposes are initially measured at cost and subsequently carried at cost less any accumulated depreciation and any accumulated impairment losses.

When significant components of an item of property, plant and equipment have different useful lives, they are accounted for as separate items (major components) of property, plant and equipment.

Costs include costs incurred initially to acquire an item of property, plant and equipment and costs incurred subsequently to add to, replace part of, or service it. If a replacement cost is recognised in the carrying amount of an item of property, plant and equipment, the carrying amount of the replaced part is derecognised.

Recognition of costs in the carrying amount of an item of property, plant and equipment ceases when the item is in the location and condition necessary for it to be capable of operating in the manner intended by management.

Items such as spare parts, standby equipment and servicing equipment are recognised when they meet the definition of property, plant and equipment.

Major inspection costs which are a condition of continuing use of an item of property, plant and equipment and which meet the recognition criteria above are included as a replacement in the cost of the item of property, plant and equipment. Any remaining inspection costs from the previous inspection are derecognised.

Property, plant and equipment is subsequently carried at cost less accumulated depreciation and any impairment losses except for Land and Buildings. Buildings is carried at revalued amount being the fair value at the date of revaluation less any subsequent accumulated depreciation and subsequent accumulated impairment losses. Land is not depreciated but carried at revalued amount less accumulated impairment losses.

Revaluations are made with sufficient regularity such that the carrying amount does not differ materially from that which would be determined using fair value at the end of the reporting period.

When an item of property, plant and equipment is revalued, any accumulated depreciation at the date of the revaluation is eliminated against the gross carrying amount of the asset and the net amount restated to the revalued amount of the asset.

Any increase in an asset's carrying amount, as a result of a revaluation, is credited directly to a revaluation surplus. The increase is recognised in surplus or deficit to the extent that it reverses a revaluation decrease of the same asset previously recognised in surplus or deficit.

Any decrease in an asset's carrying amount, as a result of a revaluation, is recognised in surplus or deficit in the current period. The decrease is debited directly to a revaluation surplus to the extent of any credit balance existing in the revaluation surplus in respect of that asset.

The revaluation surplus in equity related to a specific item of property, plant and equipment is transferred directly to retained earnings when the asset is derecognised.

Property, plant and equipment are depreciated on the straight line basis over their expected useful lives to their estimated residual value.

Sheep and horses that are used for research purposes are initially measured at cost and subsequently carried at cost less any accumulated depreciation and any accumulated impairment losses.

The useful lives of items of property, plant and equipment have been assessed as follows:

Item	Depreciation method	Average useful life
Buildings	Straight line	30 - 52 years
Laboratory equipment	Straight line	4 - 10 years
Plant and machinery	Straight line	5 years
Furniture and fixtures	Straight line	10 – 20 years
Motor vehicles	Straight line	5 years
Office equipment	Straight line	3 – 10 years
Computer equipment	Straight line	3 - 5 years
Leasehold improvements	Straight line	5 - 8 years
Mobile units	Straight line	6 – 10 years
Buildings - air systems	Straight line	5 years
Sheep	Straight line	5 years
Horses	Straight line	15 years

The depreciable amount of an asset is allocated on a systematic basis over its useful life.
Each part of an item of property, plant and equipment with a cost that is significant in relation to the total cost of the item is depreciated separately.

The depreciation method used reflects the pattern in which the asset's future economic benefits or service potential are expected to be consumed by the economic entity. The depreciation method applied to an asset is reviewed at least at each reporting date and, if there has been a significant change in the expected pattern

of consumption of the future economic benefits or service potential embodied in the asset, the method is changed to reflect the changed pattern. Such a change is accounted for as a change in an accounting estimate.

The economic entity assesses at each reporting date whether there is any indication that the economic entity expectations about the residual value and the useful life of an asset have changed since the preceding reporting date. If any such indication exists, the economic entity revises the expected useful life and/or residual value accordingly. The change is accounted for as a change in an accounting estimate.

The depreciation charge for each period is recognised in surplus or deficit unless it is included in the carrying amount of inventory.

Items of property, plant and equipment are derecognised when the asset is disposed of or when there are no further economic benefits or service potential expected from the use of the asset.

The gain or loss arising from the derecognition of an item of property, plant and equipment is included in surplus or deficit when the item is derecognised. The gain or loss arising from the derecognition of an item of property, plant and equipment is determined as the difference between the net disposal proceeds, if any, and the carrying amount of the item.

The economic entity separately discloses expenditure to repair and maintain property, plant and equipment in the notes to the financial statements (see note 8).

1.5 Intangible assets

An intangible asset is identifiable if it either:

- is separable, i.e. is capable of being separated or divided from an entity and sold, transferred, licensed, rented or exchanged, either individually or together with a related contract, identifiable assets or liability, regardless of whether the entity intends to do so; or
- arises from binding arrangements (including rights from contracts), regardless of whether those rights are transferable or separable from the economic entity or from other rights and obligations.

A binding arrangement describes an arrangement that confers similar rights and obligations on the parties to it as if it were in the form of a contract.

An intangible asset is recognised when:

- it is probable that the expected future economic benefits or service potential that are attributable to the asset will flow to the economic entity; and
- the cost or fair value of the asset can be measured reliably.

The economic entity assesses the probability of expected future economic benefits or service potential using reasonable and supportable assumptions that represent management's best estimate of the set of economic conditions that will exist over the useful life of the asset.

Where an intangible asset is acquired through a non-exchange transaction, its initial cost at the date of acquisition is measured at its fair value as at that date.

Intangible assets are carried at cost less any accumulated amortisation and any impairment losses.

The amortisation period and the amortisation method for intangible assets are reviewed at each reporting date.

Amortisation is provided to write down the intangible assets, on a straight line basis, to their residual values as follows:

Item	Depreciation method	Average useful life
Patents	Straight line	20 years
Computer software	Straight line	5 - 10 years

Intangible assets are derecognised:

- on disposal; or
- when no future economic benefits or service potential are expected from its use or disposal.

The gain or loss arising from the derecognition of intangible assets is included in surplus or deficit when the asset is derecognised.

1.6 Investments in controlled entities

Economic entity unaudited group annual financial statements

Investment in controlled entity is consolidated in the economic entity unaudited group Annual Financial Statements. Refer to the accounting policy on Consolidations (Note).

Controlling entity unaudited group annual financial statements

In the economic entity's separate unaudited group Annual Financial Statements, investments in controlled entity are carried at cost.

1.7 Financial instruments

A financial instrument is any contract that gives rise to a financial asset of one entity and a financial liability or a residual interest of another entity.

The amortised cost of a financial asset or financial liability is the amount at which the financial asset or financial liability is measured at initial recognition minus principal repayments, plus or minus the cumulative amortisation using the effective interest method of any difference between that initial amount and the maturity amount, and minus any reduction (directly or through the use of an allowance account) for impairment or uncollectibility.

Credit risk is the risk that one party to a financial instrument will cause a financial loss for the other party by failing to discharge an obligation.

Currency risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in foreign exchange rates.

Derecognition is the removal of a previously recognised financial asset or financial liability from an entity's statement of financial position.

The effective interest method is a method of calculating the amortised cost of a financial asset or a financial liability (or group of financial assets or financial liabilities) and of allocating the interest income or interest expense over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash payments or receipts through the expected life of the financial instrument or, when appropriate, a shorter period to the net carrying amount of the financial asset or financial liability. When calculating the effective interest rate, an entity estimates cash flows considering all contractual terms of the financial instrument but does not consider future credit losses. The calculation includes all fees and points paid or received between parties to the contract that are an integral part of the effective interest rate, transaction costs, and all other premiums or discounts. In cases when it is not possible to reliably estimate the cash flows or the expected life of a financial instrument (or group of financial instruments), the entity uses the contractual cash flows over the full contractual term of the financial instrument (or group of financial instruments). Fair value is the amount for which an asset could be exchanged, or a liability settled, between knowledgeable willing parties in an arm's length transaction.

A financial asset is:

- cash;
- a residual interest of another entity; or
- a contractual right to:
  - receive cash or another financial asset from another entity; or
  - exchange financial assets or financial liabilities with another entity under conditions that are potentially favourable to the entity.

A financial liability is any liability that is a contractual obligation to:

- deliver cash or another financial asset to another entity; or
- exchange financial assets or financial liabilities under conditions that are potentially unfavourable to the entity.

Interest rate risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market interest rates.

Liquidity risk is the risk encountered by an entity in the event of difficulty in meeting obligations associated with financial liabilities that are settled by delivering cash or another financial asset.

Loans payable are financial liabilities, other than short-term payables on normal credit terms.

Market risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market prices. Market risk comprises three types of risk: currency risk, interest rate risk and other price risk.

Other price risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market prices (other than those arising from interest rate risk or currency risk), whether those changes are caused by factors specific to the individual financial instrument or its issuer, or factors affecting all similar financial instruments traded in the market.

A financial asset is past due when a counterparty has failed to make a payment when contractually due.

Transaction costs are incremental costs that are directly attributable to the acquisition, issue or disposal of a financial asset or financial liability. An incremental cost is one that would not have been incurred if the entity had not acquired, issued or disposed of the financial instrument.
Financial instruments at amortised cost are non-derivative financial assets or non-derivative financial liabilities that have fixed or determinable payments, excluding those instruments that:

- the entity designates at fair value at initial recognition; or
- are held for trading.

Financial instruments at cost are investments in residual interests that do not have a quoted market price in an active market, and whose fair value cannot be reliably measured.

Classification

The entity has the following types of financial assets (classes and category) as reflected on the face of the statement of financial position or in the notes thereto:

Class	Category
Trade and other receivables	Financial asset measured at amortised cost
Cash and cash equivalents	Financial asset measured at amortised cost

The entity has the following types of financial liabilities (classes and category) as reflected on the face of the statement of financial position or in the notes thereto:

Class	Category
Trade and other payables	Financial liability measured at amortised cost
Cash and cash liabilities	Financial liability measured at amortised cost

The econonomic entity recognises a financial asset or a financial liability in its statement of financial position when the entity becomes a party to the contractual provisions of the instrument.

The economic entity recognises financial assets using trade date accounting. This the date at which an agreement has been entered, instead of on the date the transaction has been finalised.

Initial measurement of financial assets and financial liabilities

The economic entity measures a financial asset and financial liability initially at its fair value plus transaction costs that are directly attributable to the acquisition or issue of the financial asset or financial liability.

Subsequent measurement of financial assets and financial liabilities

The economic entity measures all financial assets and financial liabilities after initial recognition using the following categories:

- Financial instruments at amortised cost.
- Financial instruments at cost.

All financial assets measured at amortised cost, or cost, are subject to an impairment review.

Gains and losses

For financial assets and financial liabilities measured at amortised cost or cost, a gain or loss is recognised in surplus or deficit when the financial asset or financial liability is derecognised or impaired, or through the amortisation process.

Impairment and uncollectibility of financial assets

The economic entity assesses at the end of each reporting period whether there is any objective evidence that a financial asset or group of financial assets is impaired.

Financial assets measured at amortised cost:

If there is objective evidence that an impairment loss on financial assets measured at amortised cost has been incurred, the amount of the loss is measured as the difference between the asset's carrying amount and the present value of estimated future cash flows (excluding future credit losses that have not been incurred) discounted at the financial asset's original effective interest rate. The carrying amount of the asset is reduced through the use of an allowance account. The amount of the loss is recognised in surplus or deficit.

If, in a subsequent period, the amount of the impairment loss decreases and the decrease can be related objectively to an event occurring after the impairment was recognised, the previously recognised impairment loss is reversed by adjusting an allowance account. The reversal does not result in a carrying amount of the financial asset that exceeds what the amortised cost would have been had the impairment not been recognised at the date the impairment is reversed. The amount of the reversal is recognised in surplus or deficit.

Financial assets measured at cost:

If there is objective evidence that an impairment loss has been incurred on an investment in a residual interest that is not measured at fair value because its fair value cannot be measured reliably, the amount of the impairment loss is measured as the difference between the carrying amount of the financial asset and the present value of estimated future cash flows discounted at the current market rate of return for a similar financial asset. Such impairment losses are not reversed.

Derecognition

Financial assets

The economic entity derecognises financial assets using trade date accounting.

The economic entity derecognises a financial asset only when:

- the contractual rights to the cash flows from the financial asset expire, are settled or waived;
- the economic entity transfers to another party substantially all of the risks and rewards of ownership of the financial asset; or
- the economic entity, despite having retained some significant risks and rewards of ownership of the financial asset, has transferred control of the asset to another party and the other party has the practical ability to sell the asset in its entirety to an unrelated third party, and is able to exercise that ability unilaterally and without needing to impose additional restrictions on the transfer. In this case, the entity :
  - derecognise the asset; and
  - recognise separately any rights and obligations created or retained in the transfer.

The carrying amounts of the transferred asset are allocated between the rights or obligations retained and those transferred on the basis of their relative fair values at the transfer date. Newly created rights and obligations are measured at their fair values at that date. Any difference between the consideration received and the amounts recognised and derecognised is recognised in surplus or deficit in the period of the transfer.

If the economic entity transfers a financial asset in a transfer that qualifies for derecognition in its entirety and retains the right to service the financial asset for a fee, it recognise either a servicing asset or a servicing liability for that servicing contract. If the fee to be received is not expected to compensate the entity adequately for performing the servicing, a servicing liability for the servicing obligation is recognised at its fair value. If the fee to be received is expected to be more than adequate compensation for the servicing, a servicing asset is recognised for the servicing right at an amount determined on the basis of an allocation of the carrying amount of the larger financial asset.

If, as a result of a transfer, a financial asset is derecognised in its entirety but the transfer results in the entity obtaining a new financial asset or assuming a new financial liability, or a servicing liability, the entity recognise the new financial asset, financial liability or servicing liability at fair value.

On derecognition of a financial asset in its entirety, the difference between the carrying amount and the sum of the consideration received is recognised in surplus or deficit.

If the transferred asset is part of a larger financial asset and the part transferred qualifies for derecognition in its entirety, the previous carrying amount of the larger financial asset is allocated between the part that continues to be recognised and the part that is derecognised, based on the relative fair values of those parts, on the date of the transfer. For this purpose, a retained servicing asset is treated as a part that continues to be recognised. The difference between the carrying amount allocated to the part derecognised and the sum of the consideration received for the part derecognised is recognised in surplus or deficit.

If a transfer does not result in derecognition because the economic entity has retained substantially all the risks and rewards of ownership of the transferred asset, the economic entity continues to recognise the transferred asset in its entirety and recognise a financial liability for the consideration received. In subsequent periods, the economic entity recognises any revenue on the transferred asset and any expense incurred on the financial liability. Neither the asset, and the associated liability nor the revenue, and the associated expenses are offset.

Financial liabilities

The economic entity removes a financial liability (or a part of a financial liability) from its statement of financial position when it is extinguished — i.e. when the obligation specified in the contract is discharged, cancelled, expires or waived.

An exchange between an existing borrower and lender of debt instruments with substantially different terms is accounted for as having extinguished the original financial liability and a new financial liability is recognised. Similarly, a substantial modification of the terms of an existing financial liability or a part of it is accounted for as having extinguished the original financial liability and having recognised a new financial liability.

The difference between the carrying amount of a financial liability (or part of a financial liability) extinguished or transferred to another party and the consideration paid, including any non-cash assets transferred or liabilities assumed, is recognised in surplus or deficit. Any liabilities that are waived, forgiven or assumed by another entity by way of a non-exchange transaction are accounted for in accordance with the Standard of GRAP on Revenue from Non-exchange Transactions (Taxes and Transfers).

Presentation

Interest relating to a financial instrument or a component that is a financial liability is recognised as revenue or expense in surplus or deficit.

Losses and gains relating to a financial instrument or a component that is a financial liability is recognised as revenue or expense in surplus or deficit.

A financial asset and a financial liability are only offset and the net amount presented in the statement of financial position when the economic entity currently has a legally enforceable right to set off the recognised amounts and intends either to settle on a net basis, or to realise the asset and settle the liability simultaneously.

In accounting for a transfer of a financial asset that does not qualify for derecognition, the economic entity does not offset the transferred asset and the associated liability.

Loans from economic entities

These include loans to and from controlling entities and controlled entity, are recognised initially at fair value plus direct transaction costs.

Loans from economic entities are classified as financial liabilities measured at amortised cost.

Receivables from exchange transactions

Trade receivables are measured at initially measured at fair value plus or minus transaction costs, and are subsequently measured at amortised cost using the effective interest rate method. Appropriate allowances for debt for estimated irrecoverable amounts are recognised in surplus or deficit when there is objective evidence that the asset is impaired. Significant financial difficulties of the debtor, probability that the debtor will enter bankruptcy or financial reorganisation, and default or delinquency in payments (more than 30 days overdue) are considered indicators that the trade receivable is impaired. The allowance recognised is measured as the difference between the asset's carrying amount and the present value of estimated future cash flows discounted at the effective interest rate computed at initial recognition.

The carrying amount of the asset is reduced through the use of an allowance account, and the amount of the deficit is recognised in surplus or deficit within operating expenses. When a trade receivable is uncollectible, it is written off against the allowance account for trade receivables. Subsequent recoveries of amounts previously written off are credited against operating expenses in surplus or deficit.

Payables from exchange transactions

Trade payables are initially measured at fair value added to or subtracted from transaction costs, and are subsequently measured at amortised cost, using the effective interest rate method.

Cash and cash equivalents

Cash and cash equivalents comprise cash on hand and demand deposits, and other short-term highly liquid investments that are readily convertible to a known amount of cash and are subject to an insignificant risk of changes in value. These are initially measured at fair value and subsequently recognised at amortised cost.

Other financial liabilities and finance lease obligations

Financial liabilities are measured at initial recognition at fair value, and are subsequently measured at amortised cost using the effective interest rate method.

Statutory receivables are receivables that arise from legislation, supporting regulations, or similar means, and require settlement by another entity in cash or another financial asset.

Carrying amount is the amount at which an asset is recognised in the statement of financial position.

The cost method is the method used to account for statutory receivables that requires such receivables to be measured at their transaction amount, plus any accrued interest or other charges (where applicable) and, less any accumulated impairment losses and any amounts derecognised.

Nominal interest rate is the interest rate and/or basis specified in legislation, supporting regulations or similar means.

The transaction amount (for purposes of this Standard) for a statutory receivable means the amount specified in, or calculated, levied or charged in accordance with, legislation, supporting regulations, or similar means.

1.8 Tax

Current tax assets and liabilities

Current tax for current and prior periods is, to the extent unpaid, recognised as a liability. If the amount already paid in respect of current and prior periods exceeds the amount due for those periods, the excess is recognised as an asset.

Current tax liabilities (assets) for the current and prior periods are measured at the amount expected to be paid to (recovered from) the tax authorities, using the tax rates (and tax laws) that have been enacted or substantively enacted by the end of the reporting period.

Deferred tax assets and liabilities

A deferred tax liability is recognised for all taxable temporary differences, except to the extent that the deferred tax liability arises from the initial recognition of an asset or liability in a transaction which at the time of the transaction, affects neither accounting surplus nor taxable profit (tax loss).

A deferred tax asset is recognised for all deductible temporary differences to the extent that it is probable that taxable surplus will be available against which the deductible temporary difference can be utilised. A deferred tax asset is not recognised when it arises from the initial recognition of an asset or liability in a transaction at the time of the transaction, affects neither accounting surplus nor taxable profit (tax loss).

A deferred tax asset is recognised for the carry forward of unused tax losses to the extent that it is probable that future taxable surplus will be available against which the unused tax losses.

Deferred tax assets and liabilities are measured at the tax rates that are expected to apply to the period when the asset is realised or the liability is settled, based on tax rates (and tax laws) that have been enacted or substantively enacted by the end of the reporting period.

Tax expenses

Current and deferred taxes are recognised as income or an expense and included in surplus or deficit for the period, except to the extent that the tax arises from:

- a transaction or event which is recognised, in the same or a different period, to net assets; or
- a business combination.

Current tax and deferred taxes are charged or credited to net assets if the tax relates to items that are credited or charged, in the same or a different period, to net assets.

1.9 Leases

A lease is classified as a finance lease if it transfers substantially all the risks and rewards incidental to ownership. A lease is classified as an operating lease if it does not transfer substantially all the risks and rewards incidental to ownership.

When a lease includes both land and buildings elements, the entity assesses the classification of each element separately.

Finance leases - lessee

Finance leases are recognised as assets and liabilities in the statement of financial position at amounts equal to the fair value of the leased property or, if lower, the present value of the minimum lease payments. The corresponding liability to the lessor is included in the statement of financial position as a finance lease obligation.

The discount rate used in calculating the present value of the minimum lease payments is the interest rate implicit in the lease.

Minimum lease payments are apportioned between the finance charge and reduction of the outstanding liability. The finance charge is allocated to each period during the lease term so as to produce a constant periodic rate on the remaining balance of the liability.

Any contingent rents are expensed in the period in which they are incurred.

Operating leases - lessee

Operating lease payments are recognised as an expense on a straight-line basis over the lease term. The difference between the amounts recognised as an expense and the contractual payments are recognised as an operating lease asset or liability.

1.10 Inventories

Inventories comprise of raw materials, work in progress, finished goods and consumable stores. These are initially measured at cost except where inventories are acquired through a non-exchange transaction, then their costs are their fair value as at the date of acquisition.

Subsequently inventories are measured at the lower of cost and net realisable value.

Net realisable value is the estimated selling price in the ordinary course of operations less the estimated costs of completion and the estimated costs necessary to make the sale, exchange or distribution.

The cost of inventories comprises of all costs of purchase, costs of conversion and other costs incurred in bringing the inventories to their present location and condition.

The cost of inventories is assigned using the weighted average cost formula. The same cost formula is used for all inventories having a similar nature and use to the economic entity.

When inventories are sold, the carrying amounts of those inventories are recognised as an expense in the period in which the related revenue is recognised. If there is no related revenue, the expenses are recognised when the goods are distributed, or related services are rendered. The amount of any write-down of inventories to net realisable value or current replacement cost and all losses of inventories are recognised as an expense in the period the write-down or loss occurs. The amount of any reversal of any write-down of inventories, arising from an increase in net realisable value or current replacement cost, are recognised as a reduction in the amount of inventories recognised as an expense in the period in which the reversal occurs.

1.11 Impairment of cash-generating assets

Cash-generating assets are assets used with the objective of generating a commercial return. Commercial return means that positive cash flows are expected to be significantly higher than the cost of the asset.

Impairment is a loss in the future economic benefits or service potential of an asset, over and above the systematic recognition of the loss of the asset's future economic benefits or service potential through depreciation (amortisation).

Carrying amount is the amount at which an asset is recognised in the statement of financial position after deducting any accumulated depreciation and accumulated impairment losses thereon.

A cash-generating unit is the smallest identifiable group of assets used with the objective of generating a commercial return that generates cash inflows from continuing use that are largely independent of the cash inflows from other assets or groups of assets.

Costs of disposal are incremental costs directly attributable to the disposal of an asset, excluding finance costs and income tax expense.

Depreciation (Amortisation) is the systematic allocation of the depreciable amount of an asset over its useful life.

Fair value less costs to sell is the amount obtainable from the sale of an asset in an arm's length transaction between knowledgeable, willing parties, less the costs of disposal.

Recoverable amount of an asset or a cash-generating unit is the higher its fair value less costs to sell and its value in use.

Useful life is the period of time over which an asset is expected to be used by the economic enty. Judgements made by management in applying the criteria to designate assets as cash-generating assets or non-cash-generating assets, are as follows:

Designation

At initial recognition, the economic entity designates an asset as non-cash-generating, or an asset or cash-generating unit as cash-generating. The designation is made on the basis of an economic entity's objective of using the asset.

The economic entity designates an asset or a cash-generating unit as cash-generating when:

- its objective is to use the asset or a cash-generating unit in a manner that generates a commercial return; such that
- the asset or cash-generating unit will generate positive cash flows, from continuing use and its ultimate disposal, that are expected to be significantly higher than the cost of the asset.

An asset used with the objective of generating a commercial return and service delivery, is designated either as a cash-generating asset or non-cash-generating asset based on whether the economic entity expects to use that asset to generate a commercial return. When it is not clear whether the objective is to use the asset to generate commercial return, the economic entity designates the asset as a non-cash-generating asset and applies the accounting policy on Impairment of Non-cash- generating assets, rather than this accounting policy.

Identification

When the carrying amount of a cash-generating asset exceeds its recoverable amount, it is impaired.

The economic entity assesses at each reporting date whether there is any indication that a cash-generating asset may be impaired. If any such indication exists, the economic entity estimates the recoverable amount of the asset.

Value in use

Value in use of a cash-generating asset is the present value of the estimated future cash flows expected to be derived from the continuing use of an asset and from its disposal at the end of its useful life.

When estimating the value in use of an asset, the economic entity estimates the future cash inflows and outflows to be derived from continuing use of the asset and from its ultimate disposal and the economic entity applies the appropriate discount rate to those future cash flows.

Basis for estimates of future cash flows

In measuring value in use the economic entity:

- base cash flow projections on reasonable and supportable assumptions that represent management's best estimate of the range of economic conditions that will exist over the remaining useful life of the asset. Greater weight is given to external evidence;
- base cash flow projections on the most recent approved financial budgets, but excludes any estimated future cash inflows or outflows expected to arise from future restructuring's or from improving or enhancing the asset's performance. Projections based on these budgets covers a maximum period of five years; and
- estimate cash flow projections beyond the period covered by the most recent budgets by extrapolating the projections based on the budgets using a steady growth rate for subsequent years. This growth rate does not exceed the long-term average growth rate for the products, industries in which the NHLS operates, or for the market in which the asset is used.

Composition of estimates of future cash flows

Estimates of future cash flows include:

- projections of cash inflows from the continuing use of the asset;

- projections of cash outflows that are necessarily incurred to generate the cash inflows from continuing use of the asset (including cash outflows to prepare the asset for use) and can be directly attributed, or allocated on a reasonable and consistent basis, to the asset; and
- net cash flows, if any, to be received (or paid) for the disposal of the asset at the end of its useful life.

Estimates of future cash flows exclude:

- cash inflows or outflows from financing activities; and
- income tax receipts or payments.

The estimate of net cash flows to be received (or paid) for the disposal of an asset at the end of its useful life is the amount that the economic entity expects to obtain from the disposal of the asset in an arm's length transaction between knowledgeable, willing parties, after deducting the estimated costs of disposal.

Discount rate

The discount rate is a pre-tax rate that reflects current market assessments of the time value of money, represented by the current risk-free rate of interest and the risks specific to the asset for which the future cash flow estimates have not been adjusted.

Recognition and measurement (individual asset)

If the recoverable amount of a cash-generating asset is less than its carrying amount, the carrying amount of the asset is reduced to its recoverable amount. This reduction is an impairment loss.

An impairment loss is recognised immediately in surplus or deficit.

Any impairment loss of a revalued cash-generating asset is treated as a revaluation decrease.

When the amount estimated for an impairment loss is greater than the carrying amount of the cash-generating asset to which it relates, the economic entity recognises a liability only to the extent that is a requirement in the Standard of GRAP.

After the recognition of an impairment loss, the depreciation (amortisation) charge for the cash-generating asset is adjusted in future periods to allocate the cash-generating asset's revised carrying amount, less its residual value (if any), on a systematic basis over its remaining useful life.

Cash-generating units

If there is any indication that an asset may be impaired, the recoverable amount is estimated for the individual asset. If it is not possible to estimate the recoverable amount of the individual asset, the economic entity determines the recoverable amount of the cash-generating unit to which the asset belongs (the asset's cash-generating unit).

If an active market exists for the output produced by an asset or group of assets, that asset or group of assets is identified as a cash-generating unit, even if some or all of the output is used internally. If the cash inflows generated by any asset or cash- generating unit are affected by internal transfer pricing, the economic entity use management's best estimate of future price(s) that could be achieved in arm's length transactions in estimating:

- the future cash inflows used to determine the asset's or cash-generating unit's value in use; and
- the future cash outflows used to determine the value in use of any other assets or cash-generating units that are affected by the internal transfer pricing.

Cash-generating units are identified consistently from period to period for the same asset or types of assets, unless a change is justified.

The carrying amount of a cash-generating unit is determined on a basis consistent with the way the recoverable amount of the cash-generating unit is determined.

An impairment loss is recognised for a cash-generating unit if the recoverable amount of the unit is less than the carrying amount of the unit. The impairment is allocated to reduce the carrying amount of the cash-generating assets of the unit on a pro rata basis, based on the carrying amount of each asset in the unit. These reductions in carrying amounts are treated as impairment losses on individual assets.

In allocating an impairment loss, the entity does not reduce the carrying amount of an asset below the highest of:

- its fair value less costs to sell (if determinable);
- its value in use (if determinable); and
- zero.

The amount of the impairment loss that would otherwise have been allocated to the asset is allocated pro rata to the other cash-generating assets of the unit.

Where a non-cash-generating asset contributes to a cash-generating unit, a proportion of the carrying amount of that non- cash-generating asset is allocated to the carrying amount of the cash-generating unit prior to estimation of the recoverable amount of the cash-generating unit.

Reversal of impairment loss

The economic entity assesses at each reporting date whether there is any indication that an impairment loss recognised in prior periods for a cash-generating asset may no longer exist or may have decreased. If any such indication exists, the entity estimates the recoverable amount of that asset.

An impairment loss recognised in prior periods for a cash-generating asset is reversed if there has been a change in the estimates used to determine the asset's recoverable amount since the last impairment loss was recognised. The carrying amount of the asset is increased to its recoverable amount. The increase is a reversal of an impairment loss. The increased carrying amount of an asset attributable to a reversal of an impairment loss does not exceed the carrying amount that would have been determined (net of depreciation or amortisation) had no impairment loss been recognised for the asset in prior periods.

A reversal of an impairment loss for a cash-generating asset is recognised immediately in surplus or deficit. Any reversal of an impairment loss of a revalued cash-generating asset is treated as a revaluation increase.

After a reversal of an impairment loss is recognised, the depreciation (amortisation) charge for the cash-generating asset is adjusted in future periods to allocate the cash-generating asset's revised carrying amount, less its residual value (if any), on a systematic basis over its remaining useful life.

A reversal of an impairment loss for a cash-generating unit is allocated to the cash-generating assets of the unit pro rata with the carrying amounts of those assets. These increases in carrying amounts are treated as reversals of impairment losses for individual assets. No part of the amount of such a reversal is allocated to a non-cash-generating asset contributing service potential to a cash-generating unit.

In allocating a reversal of an impairment loss for a cash-generating unit, the carrying amount of an asset is not increased above the lower of:

- its recoverable amount (if determinable); and
- the carrying amount that would have been determined (net of amortisation or depreciation) had no impairment loss been recognised for the asset in prior periods.

The amount of the reversal of the impairment loss that would otherwise have been allocated to the asset is allocated pro rata to the other assets of the unit.

Redesignation

The redesignation of assets from a cash-generating asset to a non-cash-generating asset or from a non-cash-generating asset to a cash-generating asset only occur when there is clear evidence that such a redesignation is appropriate.

1.12 Share capital / contributed capital

Contributed capital is the initial funding received from the shareholder upon establishment of the National Health Laboratory Service.

Contributed capital is stated at par value.

1.13 Employee benefits

Employee benefits are all forms of consideration given by an economic entity in exchange for service rendered by employees.

A qualifying insurance policy is an insurance policy issued by an insurer that is not a related party (as defined in the Standard of GRAP on Related Party Disclosures) of the reporting economic entity, if the proceeds of the policy can be used only to pay or fund employee benefits under a defined benefit plan and are not available to the reporting econonomic entity's own creditors (even in liquidation) and cannot be paid to the reporting entity, unless either:

- the proceeds represent surplus assets that are not needed for the policy to meet all the related employee benefit obligations; or
- the proceeds are returned to the reporting entity to reimburse it for employee benefits already paid.
- Termination benefits are employee benefits payable as a result of either:
- an entity's decision to terminate an employee's employment before the normal retirement date; or
- an employee's decision to accept voluntary redundancy in exchange for those benefits.

Other long-term employee benefits are employee benefits (other than post-employment benefits and termination benefits) that are not due to be settled within twelve months after the end of the period in which the employees render the related service.

Vested employee benefits are employee benefits that are not conditional on future employment.

A constructive obligation is an obligation that derives from an entity's actions where by an established pattern of past practice, published policies or a sufficiently specific current statement, the entity has indicated to other parties that it will accept certain responsibilities and as a result, the entity has created a valid expectation on the part of those other parties that it will discharge those responsibilities.

Short-term employee benefits

Short-term employee benefits are employee benefits (other than termination benefits) that are due to be settled within twelve months after the end of the period in which the employees render the related service.

Short-term employee benefits include items such as:

- wages, salaries and social security contributions;
- short-term compensated absences (such as paid annual leave and paid sick leave) where the compensation for the absences is due to be settled within twelve months after the end of the reporting period in which the employees render the related employee service;
- bonus, incentive and performance related payments payable within twelve months after the end of the reporting period in which the employees render the related service; and
- non-monetary benefits (for example, medical care, and free or subsidised goods or services such as housing, cars and cellphones) for current employees.

When an employee has rendered service to the entity during a reporting period, the entity recognise the undiscounted amount of short-term employee benefits expected to be paid in exchange for that service:

- as a liability (accrued expense), after deducting any amount already paid. If the amount already paid exceeds the undiscounted amount of the benefits, the entity recognise that excess as an asset (prepaid expense) to the extent that the prepayment will lead to, for example, a reduction in future payments or a cash refund; and
- as an expense, unless another Standard requires or permits the inclusion of the benefits in the cost of an asset.

The expected cost of compensated absences is recognised as an expense as the employees render services that increase their entitlement or, in the case of non-accumulating absences, when the absence occurs. The entity measures the expected cost of accumulating compensated absences as the additional amount that the entity expects to pay as a result of the unused entitlement that has accumulated at the reporting date.

The entity recognise the expected cost of bonus, incentive and performance related payments when the entity has a present legal or constructive obligation to make such payments as a result of past events and a reliable estimate of the obligation can be made. A present obligation exists when the entity has no realistic alternative but to make the payments.

Post-employment benefits

Post-employment benefits are employee benefits (other than termination benefits) which are payable after the completion of employment.

Post-employment benefit plans are formal or informal arrangements under which an entity provides post-employment benefits for one or more employees.

Multi-employer plans are defined contribution plans (other than state plans) or defined benefit plans (other than state plans) that pool the assets contributed by various entities that are not under common control and use those assets to provide benefits to employees of more than one entity, on the basis that contribution and benefit levels are determined without regard to the identity of the entity that employs the employees concerned.

Multi-employer plans and/or State plans

Where a plan is a defined contribution plan, the entity accounts for in the same way as for any other defined contribution plan.

Post-employment benefits: Defined contribution plans

Defined contribution plans are post-employment benefit plans under which an entity pays fixed contributions into a separate entity (a fund) and will have no legal or constructive obligation to pay further contributions if the fund does not hold sufficient assets to pay all employee benefits relating to employee service in the current and prior periods.

When an employee has rendered service to the entity during a reporting period, the entity recognise the contribution payable to a defined contribution plan in exchange for that service:

- as a liability (accrued expense), after deducting any contribution already paid. If the contribution already paid exceeds the contribution due for service before the reporting date, the entity recognise that excess as an asset (prepaid expense) to the extent that the prepayment will lead to, for example, a reduction in future payments or a cash refund; and
- as an expense, unless another Standard requires or permits the inclusion of the contribution in the cost of an asset.

Where contributions to a defined contribution plan do not fall due wholly within twelve months after the end of the reporting period in which the employees render the related service, they are discounted. The rate used to discount reflects the time value of money. The currency and term of the financial instrument selected to reflect the time value of money is consistent with the currency and estimated term of the obligation.

Post-employment benefits: Defined benefit plans

Defined benefit plans are post-employment benefit plans other than defined contribution plans.

Actuarial gains and losses comprise experience adjustments (the effects of differences between the previous actuarial assumptions and what has actually occurred) and the effects of changes in actuarial assumptions. In measuring its defined benefit liability the entity recognise actuarial gains and losses in surplus or deficit in the reporting period in which they occur.

Current service cost is the increase in the present value of the defined benefit obligation resulting from employee service in the current period.

Interest cost is the increase during a period in the present value of a defined benefit obligation which arises because the benefits are one period closer to settlement.

Past service cost is the change in the present value of the defined benefit obligation for employee service in prior periods, resulting in the current period from the introduction of, or changes to, post-employment benefits

or other long-term employee benefits. Past service cost may be either positive (when benefits are introduced or changed so that the present value of the defined benefit obligation increases) or negative (when existing benefits are changed so that the present value of the defined benefit obligation decreases). In measuring its defined benefit liability the entity recognise past service cost as an expense in the reporting period in which the plan is amended.

The present value of a defined benefit obligation is the present value of expected future payments required to settle the obligation resulting from employee service in the current and prior periods.

The economic entity account not only for its legal obligation under the formal terms of a defined benefit plan, but also for any constructive obligation that arises from the entity's informal practices. Informal practices give rise to a constructive obligation where the entity has no realistic alternative but to pay employee benefits. An example of a constructive obligation is where a change in the entity's informal practices would cause unacceptable damage to its relationship with employees.

The amount recognised as a defined benefit liability is the net total of the following amounts:

- the present value of the defined benefit obligation at the reporting date;
- plus any liability that may arise as a result of a minimum funding requirement

The entity determines the present value of defined benefit obligations with sufficient regularity such that the amounts recognised in the unaudited group annual financial statements do not differ materially from the amounts that would be determined at the reporting date.

The entity recognises the net total of the following amounts in surplus or deficit, except to the extent that another Standard requires or permits their inclusion in the cost of an asset:

- current service cost;
- interest cost;
- actuarial gains and losses;
- past service cost;
- the effect of any curtailments or settlements; and
- the effect of applying the limit on a defined benefit asset (negative defined benefit liability).

The entity uses the Projected Unit Credit Method to determine the present value of its defined benefit obligations and the related current service cost and, where applicable, past service cost. The Projected Unit Credit Method (sometimes known as the accrued benefit method pro-rated on service or as the benefit/years of service method) sees each period of service as giving rise to an additional unit of benefit entitlement and measures each unit separately to build up the final obligation.

In determining the present value of its defined benefit obligations and the related current service cost and, where applicable, past service cost, entity attributes benefit to periods of service under the plan's benefit formula. However, if an employee's service in later years will lead to a materially higher level of benefit than in earlier years, an entity attributes benefit on a straight-line basis from:

- the date when service by the employee first leads to benefits under the plan (whether or not the benefits are conditional on further service); until
- the date when further service by the employee will lead to no material amount of further benefits under the plan, other than from further salary increases.

Actuarial valuations are conducted on an annual basis by independent actuaries separately for each plan. The results of the valuation are updated for any material transactions and other material changes in circumstances (including changes in market prices and interest rates) up to the reporting date.

The entity recognises gains or losses on the curtailment or settlement of a defined benefit plan when the curtailment or settlement occurs. The gain or loss on a curtailment or settlement comprises of any resulting change in the present value of the defined benefit obligation.

Before determining the effect of a curtailment or settlement, the entity re-measure the obligation (and the related plan assets, if any) using current actuarial assumptions (including current market interest rates and other current market prices).

The entity offsets an asset relating to one plan against a liability relating to another plan when the entity has a legally enforceable right to use a surplus in one plan to settle obligations under the other plan and intends either to settle the obligations on a net basis, or to realise the surplus in one plan and settle its obligation under the other plan simultaneously.

Actuarial assumptions

Actuarial assumptions are unbiased and mutually compatible.

Financial assumptions are based on market expectations, at the reporting date, for the period over which the obligations are to be settled.

The rate used to discount post-employment benefit obligations reflect the time value of money. The currency and term of the financial instrument selected to reflect the time value of money is consistent with the currency and estimated term of the post- employment benefit obligations.

Post-employment benefit obligations are measured on a basis that reflects:

- estimated future salary increases;
- the benefits set out in the terms of the plan (or resulting from any constructive obligation that goes beyond those terms) at the reporting date; and
- estimated future changes in the level of any state benefits that affect the benefits payable under a defined benefit plan, if, and only if, either:
- those changes were enacted before the reporting date; or
- past history, or other reliable evidence, indicates that those state benefits will change in some predictable manner, for example, in line with future changes in general price levels or general salary levels.

Assumptions about medical costs take account of estimated future changes in the cost of medical services, resulting from both inflation and specific changes in medical costs.

Termination benefits

The entity recognises termination benefits as a liability and an expense when the entity is demonstrably committed to either:

- terminate the employment of an employee or group of employees before the normal retirement date; or
- provide termination benefits as a result of an offer made in order to encourage voluntary redundancy.

The entity is demonstrably committed to a termination when the entity has a detailed formal plan for the termination and is without realistic possibility of withdrawal. The detailed plan includes [as a minimum]:

- the location, function, and approximate number of employees whose services are to be terminated;
- the termination benefits for each job classification or function; and
- the time at which the plan will be implemented.

Implementation begins as soon as possible and the period of time to complete implementation is such that material changes to the plan are not likely.

Where termination benefits fall due more than 12 months after the reporting date, they are discounted using an appropriate discount rate. The rate used to discount the benefit reflects the time value of money. The currency and term of the financial instrument selected to reflect the time value of money is consistent with the currency and estimated term of the benefit.

In the case of an offer made to encourage voluntary redundancy, the measurement of termination benefits shall be based on the number of employees expected to accept the offer.

1.14 Provisions and contingencies

Provisions are recognised when:

- the economic entity has a present obligation as a result of a past event;
- it is probable that an outflow of resources embodying economic benefits or service potential will be required to settle the obligation; and
- a reliable estimate can be made of the obligation.

The amount of a provision is the best estimate of the expenditure expected to be required to settle the present obligation at the reporting date.

Where the effect of time value of money is material, the amount of a provision is the present value of the expenditures expected to be required to settle the obligation.

The discount rate is a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the liability.

Where some or all of the expenditure required to settle a provision is expected to be reimbursed by another party, the reimbursement is recognised when, and only when, it is virtually certain that reimbursement will be received if the economic entity settles the obligation. The reimbursement is treated as a separate asset. The amount recognised for the reimbursement does not exceed the amount of the provision.

Provisions are reviewed at each reporting date and adjusted to reflect the current best estimate. Provisions are reversed if it is no longer probable that an outflow of resources embodying economic benefits or service potential will be required, to settle the obligation.

Where discounting is used, the carrying amount of a provision increases in each period to reflect the passage of time. This increase is recognised as an interest expense.

A provision is used only for expenditures for which the provision was originally recognised. Provisions are not recognised for future operating write offs.

For onerous contracts, the economic entity recognises and measures the present obligation (net of recoveries) under the contract as a provision.

Contingent assets and contingent liabilities are not recognised. Contingencies are disclosed in note 36.

1.15 Commitments

Items are classified as commitments when the economic entity has committed itself to future transactions that will normally result in the outflow of cash. Disclosures are provided for unrecognised contractual commitments.

Commitments for which disclosure is necessary to achieve a fair presentation are disclosed in a note to the financial statements, if both the following criteria are met:

- Contracts are non-cancellable or only cancellable at significant cost; and
- Contracts relate to something other than the routine, steady, state business of the entity – therefore salary commitments relating to employment contracts or social security benefit commitments are excluded.

1.16 Revenue from exchange transactions

Revenue is the gross inflow of economic benefits or service potential during the reporting period when those inflows result in an increase in net assets, other than increases relating to contributions from owners.

An exchange transaction is one in which the economic entity receives assets or services, or has liabilities extinguished, and directly gives approximately equal value (primarily in the form of goods, services or use of assets) to the other party in exchange.

Fair value is the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm's length transaction.

Measurement

Revenue is measured at the fair value of the consideration received or receivable, net of trade discounts and volume rebates.

Sale of goods

Revenue from the sale of goods is recognised when all the following conditions have been satisfied:

- the economic entity has transferred to the purchaser the significant risks and rewards of ownership of the goods;
- the economic entity retains neither continuing managerial involvement to the degree usually associated with ownership nor effective control over the goods sold;
- the amount of revenue can be measured reliably;
- it is probable that the economic benefits or service potential associated with the transaction will flow to the economic entity; and
- the costs incurred or to be incurred in respect of the transaction can be measured reliably.

Rendering of services

When the outcome of a transaction involving the rendering of services can be estimated reliably, revenue associated with the transaction is recognised by reference to the stage of completion of the transaction at the reporting date. The outcome of a transaction can be estimated reliably when all the following conditions are satisfied:

- the amount of revenue can be measured reliably;
- it is probable that the economic benefits or service potential associated with the transaction will flow to the economic entity;
- the stage of completion of the transaction at the reporting date can be measured reliably; and
- the costs incurred for the transaction and the costs to complete the transaction can be measured reliably.

When services are performed by an indeterminate number of acts over a specified time frame, revenue is recognised on a straight line basis over the specified time frame unless there is evidence that some other method better represents the stage of completion. When a specific act is much more significant than any other acts, the recognition of revenue is postponed until the significant act is executed.

When the outcome of the transaction involving the rendering of services cannot be estimated reliably, revenue is recognised only to the extent of the expenses recognised that are recoverable.

Service revenue is recognised by reference to the stage of completion of the transaction at the reporting date. Stage of completion is determined by services performed to date as a percentage of total services to be performed.

Interest and royalties

Revenue arising from the use by others of entity assets yielding interest is recognised when:

- It is probable that the economic benefits or service potential associated with the transaction will flow to the entity, and
- The amount of the revenue can be measured reliably.

Interest is recognised, in surplus or deficit, using the effective interest rate method.

Royalties are recognised as they are earned in accordance with the substance of the relevant agreements.

1.17 Revenue from non-exchange transactions

Revenue comprises gross inflows of economic benefits or service potential received and receivable by an entity, which represents an increase in net assets, other than increases relating to contributions from owners.

Conditions on transferred assets are stipulations that specify that the future economic benefits or service potential embodied in the asset is required to be consumed by the recipient as specified or future economic benefits or service potential must be returned to the transferor.

Control of an asset arise when the entity can use or otherwise benefit from the asset in pursuit of its objectives and can exclude or otherwise regulate the access of others to that benefit.

Exchange transactions are transactions in which one entity receives assets or services, or has liabilities extinguished, and directly gives approximately equal value (primarily in the form of cash, goods, services, or use of assets) to another entity in exchange.

Non-exchange transactions are transactions that are not exchange transactions. In a non-exchange transaction, an entity either receives value from another entity without directly giving approximately equal value in exchange, or gives value to another entity without directly receiving approximately equal value in exchange.

Restrictions on transferred assets are stipulations that limit or direct the purposes for which a transferred asset may be used, but do not specify that future economic benefits or service potential is required to be returned to the transferor if not deployed as specified.

Stipulations on transferred assets are terms in laws or regulation, or a binding arrangement, imposed upon the use of a transferred asset by entities external to the reporting entity.

Transfers are inflows of future economic benefits or service potential from non-exchange transactions, other than taxes.

Recognition

An inflow of resources from a non-exchange transaction recognised as an asset is recognised as revenue, except to the extent that a liability is also recognised in respect of the same inflow.

As the entity satisfies a present obligation recognised as a liability in respect of an inflow of resources from a non-exchange transaction recognised as an asset, it reduces the carrying amount of the liability recognised and recognises an amount of revenue equal to that reduction.

Measurement

Revenue from a non-exchange transaction is measured at the amount of the increase in net assets recognised by the entity.

When, as a result of a non-exchange transaction, the entity recognises an asset, it also recognises revenue equivalent to the amount of the asset measured at its fair value as at the date of acquisition, unless it is also required to recognise a liability. Where a liability is required to be recognised it will be measured as the best estimate of the amount required to settle the obligation at the reporting date, and the amount of the increase in net assets, if any, recognised as revenue. When a liability is subsequently reduced, because the taxable event occurs or a condition is satisfied, the amount of the reduction in the liability is recognised as revenue.

Transfers

Apart from Services in kind, which are not recognised, the entity recognises an asset in respect of transfers when the transferred resources meet the definition of an asset and satisfy the criteria for recognition as an asset.

The entity recognises an asset in respect of transfers when the transferred resources meet the definition of an asset and satisfy the criteria for recognition as an asset.

Transferred assets are measured at their fair value as at the date of acquisition.

1.18 Turnover

Turnover comprises of sales to customers and service rendered to customers. Turnover is stated at the invoice amount and is exclusive of value added taxation.

1.19 Cost of sales

When inventories are sold, the carrying amount of those inventories is recognised as an expense in the period in which the related revenue is recognised. The amount of any write-down of inventories to net realisable value and all write offs of inventories are recognised as an expense in the period the write-down or loss occurs. The amount of any reversal of any write- down of inventories, arising from an increase in net realisable value, is recognised as a reduction in the amount of inventories recognised as an expense in the period in which the reversal occurs.

The related cost of providing services recognised as revenue in the current period is included in cost of sales.

1.20 Investment income

Investment income is recognised on a time-proportion basis using the effective interest method.

1.21 Borrowing costs

Borrowing costs are interest and other expenses incurred by an entity in connection with the borrowing of funds. Borrowing costs are recognised as an expense in the period in which they are incurred.

1.22 Translation of foreign currencies

Foreign currency transactions

A foreign currency transaction is recorded, on initial recognition in Rands, by applying to the foreign currency amount the spot exchange rate between the functional currency and the foreign currency at the date of the transaction.

At each reporting date:

- foreign currency monetary items are translated using the closing rate;
- non-monetary items that are measured in terms of historical cost in a foreign currency are translated using the exchange rate at the date of the transaction; and
- non-monetary items that are measured at fair value in a foreign currency are translated using the exchange rates at the date when the fair value was determined.

Exchange differences arising on the settlement of monetary items or on translating monetary items at rates different from those at which they were translated on initial recognition during the period or in previous unaudited group annual financial statements are recognised in surplus or deficit in the period in which they arise.

Cash flows arising from transactions in a foreign currency are recorded in Rands by applying to the foreign currency amount the exchange rate between the Rand and the foreign currency at the date of the cash flow.

1.23 Comparative figures

Where necessary, comparative figures have been reclassified to conform to changes in presentation in the current year.

1.24 Fruitless and wasteful expenditure

Fruitless expenditure means expenditure which was made in vain and would have been avoided had reasonable care been exercised.

All expenditure relating to fruitless and wasteful expenditure is recognised as an expense in the statement of financial performance in the year that the expenditure was incurred. The expenditure is classified in accordance with the nature of the expense, and where recovered, it is subsequently accounted for as revenue in the statement of financial performance.

1.25 Irregular expenditure

Irregular expenditure as defined in section 1 of the PFMA is expenditure other than unauthorised expenditure, incurred in contravention of or that is not in accordance with a requirement of any applicable legislation, including -

a. this Act; or
b. the State Tender Board Act, 1968 (Act No. 86 of 1968), or any regulations made in terms of the Act; or
c. any provincial legislation providing for procurement procedures in that provincial government.

National Treasury practice note no. 4 of 2008/2009 which was issued in terms of sections 76(1) to 76(4) of the PFMA requires the following (effective from 1 April 2008):

Irregular expenditure that was incurred and identified during the current financial and which was condoned before year end and/or before finalisation of the financial statements must also be recorded appropriately in the irregular expenditure register. In such an instance, no further action is also required with the exception of updating the note to the financial statements.

Irregular expenditure that was incurred and identified during the current financial year and for which condonement is being awaited at year end must be recorded in the irregular expenditure register. No further action is required with the exception of updating the note to the financial statements.

Where irregular expenditure was incurred in the previous financial year and is only condoned in the following financial year, the register and the disclosure note to the financial statements must be updated with the amount condoned.

Irregular expenditure that was incurred and identified during the current financial year and which was not condoned by the National Treasury or the relevant authority must be recorded appropriately in the irregular expenditure register. If liability for the irregular expenditure can be attributed to a person, a debt account must be created if such a person is liable in law. Immediate steps must thereafter be taken to recover the amount from the person concerned. If recovery is not possible, the accounting officer or Accounting Authority may write off the amount as debt impairment and disclose such in the relevant note to the financial statements. The irregular expenditure register must also be updated accordingly. If the irregular expenditure has not been condoned and no person is liable in law, the expenditure related thereto must remain against the relevant programme/expenditure item, be disclosed as such in the note to the financial statements and updated accordingly in the irregular expenditure register.

1.26 Segment information

A segment is an activity of an entity:

- that generates economic benefits or service potential (including economic benefits or service potential relating to transactions between activities of the same entity);
- whose results are regularly reviewed by management to make decisions about resources to be allocated to that activity and in assessing its performance; and
- for which separate financial information is available.

Reportable segments are the actual segments which are reported on in the segment report. They are the segments identified above or alternatively an aggregation of two or more of those segments where the aggregation criteria are met.

Measurement

The amount of each segment item reported is the measure reported to management for the purposes of making decisions about allocating resources to the segment and assessing its performance. Adjustments and eliminations made in preparing the entity's financial statements and allocations of revenues and expenses are included in determining reported segment surplus or deficit only if they are included in the measure of the segment's surplus or deficit that is used by management. Similarly, only those assets and liabilities that are included in the measures of the segment's assets and segment's liabilities that are used by management are reported for that segment. If amounts are allocated to reported segment surplus or deficit, assets or liabilities, those amounts are allocated on a reasonable basis.

If management uses only one measure of a segment's surplus or deficit, the segment's assets or the segment's liabilities in assessing segment performance and deciding how to allocate resources, segment surplus or deficit, assets and liabilities are reported in terms of that measure. If management uses more than one measure of a segment's surplus or deficit, the segment's assets or the segment's liabilities, the reported measures are those that management believes are determined in accordance with the measurement principles most consistent with those used in measuring the corresponding amounts in the entity's financial statements.

1.27 Research and development expenditure

Expenditure on research is recognised as an expense when it is incurred. An asset arising from development is recognised when:

- it is technically feasible to complete the asset so that it will be available for use or sale.
- there is an intention to complete and use or sell it.
- there is an ability to use or sell it.
- it will generate probable future economic benefits or service potential.
- there are available technical, financial and other resources to complete the development and to use or sell the asset.
- the expenditure attributable to the asset during its development can be measured reliably.

1.28 Budget information

Economic Entity is typically subject to budgetary limits in the form of appropriations or budget authorisations (or equivalent), which is given effect through authorising legislation, appropriation or similar.

General purpose financial reporting by economic entity provides information on whether resources were obtained and used in accordance with the legally adopted budget.

The approved budget is prepared on a accrual basis and presented by functional classification. The approved budget covers the fiscal period from 01/04/2019 to 31/03/2020.

The budget for the economic entity includes all the entities approved budgets under its control.

The unaudited group annual financial statements and the budget are on the same basis of accounting therefore a comparison with the budgeted amounts for the reporting period have been included in the Statement of comparison of budget and actual amounts.

1.29 Related parties

A related party is a person or an entity with the ability to control or jointly control the other party, or exercise significant influence over the other party, or vice versa, or an entity that is subject to common control, or joint control.

Control is the power to govern the financial and operating policies of an entity so as to obtain benefits from its activities.

Joint control is the agreed sharing of control over an activity by a binding arrangement, and exists only when the strategic financial and operating decisions relating to the activity require the unanimous consent of the parties sharing control (the venturers).

Related party transaction is a transfer of resources, services or obligations between the reporting entity and a related party, regardless of whether a price is charged.

Significant influence is the power to participate in the financial and operating policy decisions of an entity, but is not control over those policies.

Management are those persons responsible for planning, directing and controlling the activities of the economic entity, including those charged with the governance of the economic entity in accordance with legislation, in instances where they are required to perform such functions.

Close members of the family of a person are considered to be those family members who may be expected to influence, or be influenced by, that management in their dealings with the economic entity.

The economic entity is exempt from disclosure requirements in relation to related party transactions if that transaction occurs within normal supplier and/or client/recipient relationships on terms and conditions no more or less favourable than those which it is reasonable to expect the economic entity to have adopted if dealing with that individual entity or person in the same circumstances and terms and conditions are within the normal operating parameters established by that reporting entity's legal mandate.

Where the economic entity is exempt from the disclosures in accordance with the above, the economic entity discloses narrative information about the nature of the transactions and the related outstanding balances, to enable users of the entity's financial statements to understand the effect of related party transactions on its unaudited group annual financial statements.

1.30 Subsequent events

Subsequent events are those events, both favourable and unfavourable, that occur between the reporting date and the date when the financial statements are authorised for issue. Two types of events can be identified:

- those that provide evidence of conditions that existed at the reporting date (adjusting events after the reporting date); and
- those that are indicative of conditions that arose after the reporting date (non-adjusting events after the reporting date).

The economic entity adjusts the amount recognised in the financial statements to reflect adjusting events after the reporting date once the event occurred.

The economic entity discloses the nature of the event and an estimate of its financial effect or a statement that such estimate cannot be made in respect of all material non-adjusting events, where non-disclosure could influence the economic decisions of users taken on the basis of the financial statements.

1.31 Sundry income

Teaching income

Teaching Income is recognised on the accrual basis. This policy decision is attributable to the uncertainty associated with the flow of economic benefits arising from teaching-related transactions to the entity. The management decision taken complies with the requirements of the statement on revenue recognition.

Miscellaneous income

Miscellaneous sales are generated when the NHLS recovers funds for rental lease agreements, hosts conferences and other charges which need to be recovered from the use of its own facilities such as those used by Contract Laboratory Services.

Public Contributions and Donations

Public Contributions and Donations are monies received by the NHLS from external parties. These are recognised when they are received.

Notes to the Group Annual Financial Statements Financial Officer's report.

2. New standards and interpretations

2.1 Standards and interpretations effective and adopted in the current year

In the current year, the economic entity has adopted the following standards and interpretations that are effective for the current financial year and that are relevant to its operations:

Standard/ Interpretation:	Effective date: Years beginning on or after	Expected impact:
• GRAP 6 (as revised 2010): Consolidated and Separate Financial Statements	01 April 2019	The impact of the standard is not material.
• GRAP 18 (as amended 2016): Segment Reporting	01 April 2019	The impact of the is not material.
• GRAP 20: Related parties	01 April 2019	The impact of the is not material.

2.2 Standards and interpretations issued, but not yet effective

The economic entity has not applied the following standards and interpretations, which have been published and are mandatory for the economic entity's accounting periods beginning on or after 01 April 2020 or later periods:

Standard/ Interpretation:	Effective date: Years beginning on or after	Expected impact:
• GRAP 1 (amended): Presentation of Financial Statements	01 April 2020	Unlikely there will be a material impact
• GRAP 34: Separate Financial Statements	01 April 2020	Unlikely there will be a material impact
• GRAP 35: Consolidated Financial Statements	01 April 2020	Unlikely there will be a material impact
• GRAP 110 (as amended 2016): Living and Non-living Resources	01 April 2020	Unlikely there will be a material impact

3. Inventories

	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Raw materials, components	154	206	-	-
Work in progress	4,946	8,182	-	-
Finished goods	735	516	14	14
Consumable stores	167,742	156,356	167,743	156,357
	173,577	**165,260**	**167,757**	**156,371**

4. Receivables from exchange transactions**

Trade debtors	4,709,180	5,245,361	4,707,184	5,242,935
Prepayments [1]	21,959	5,254	21,959	5,254
Interest receivable	4,509	2,567	4,509	2,567
Other receivables	3,924	3,979	3,868	3,931
Teaching Services	127,281	112,783	127,281	112,783
Less: Allowance for impairment on trade receivables	(3,773,320)	(3,531,479)	(3,773,230)	(3,531,479)
	1,093,533	**1,838,465**	**1,091,571**	**1,835,991**

Included in the balance for payables is an amount of R21.9m paid over as a deposit for Covid-19 purchases.

Outstanding debt from KwaZulu-Natal Department of Health

Included in the receivables above is an amount of R2.720bn (2019: R2.891bn) owed by the Kwazulu-Natal Department of Health (KZN (DOH)) of which R2.585bn (2019: R2.637bn) has been impaired. For the receivables the Accountant General performed an audit relating to pathology services rendered to the KZN (DOH) which were queried for the period 01 March 2010 to 31 March 2014. It was confirmed that R1.8bn is payable to the NHLS.

Outstanding debt from Gauteng Department of Health

The balance in the receivables includes an amount owed by Gauteng Department of Health amounting to R1.062bn (2019: R1.463bn) of which R401m (2019: R547m) has been impaired.

Outstanding Debt from Eastern Cape Department of Health

Included in the receivables balance above is also an amount owed by Eastern Cape Department of Health amount to R477m (R418m) of which R222m has been impaired.

Outstanding Debt from Northern Cape Department of Health

The balance in the receivables above also includes an amount owed by Northern Cape Department of Health amounting to R98m (2019:R77m) of which R73m has been impaired.

Trade and other receivables past due but not impaired

Trade and other receivables which are less than 3 months past due are not considered to be impaired. At 31 March 2020 R969,014 (2019: R1,226,378) were past due but not impaired.

The ageing of amounts past due but not impaired is as follows:

	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
1 month past due	847,089	707,747	845,738	706,760
2 months past due	84,416	314,467	85,884	313,605
3 months past due	37,509	204,164	37,491	203,734
	969,014	**1,226,378**	**969,113**	**1,224,099**

Trade and other receivables impaired

As of 31 March 2020, trade and other receivables of R3.760bn (2019: R3.531bn) were impaired and provided for.

The ageing of these loans is as follows:				
Over 3 months	3,773,230	3,531,479	3,773,230	3,531,479
Reconciliation of provision for impairment of trade and other receivables				
Opening balance	3,531,479	3,355,380	3,531,479	3,355,380
Provision for impairment	243,965	188,306	243,965	188,306
Amounts written off as uncollectible	(2,214)	(12,207)	(2,214)	(12,207)
	3,773,230	**3,531,479**	**3,773,230**	**3,531,479**

5. Debt impairment

Contributions to debt impairment provision	**241,871**	176,089	239,543	174,924

	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000

6. Receivables from non-exchange transactions

Other receivables from non-exchange revenue	414,094	431,468	414,094	431,468

7. Cash and cash equivalents

Cash and cash equivalents consist of:				
Cash on hand	228	308	215	296
Bank balances	364,032	30,184	363,529	29,632
Short-term deposits	3,741,500	2,177,601	3,730,889	2,171,809
	4,105,760	**2,208,093**	**4,094,633**	**2,201,737**
Cash and cash equivalents held by the entity that are not available for use by the economic entity	550,960	446,328	550,960	446,328

The interest earned on cash at bank and short term deposits ranged from 6.4% to 7.75% (2019: 8.49% to 8.53%) and these deposits had an average maturity of 30 days.

8. Property, plant and equipment

Economic entity	2020			2019		
	Cost / Valuation	Accumulated depreciation	accumulated impairment & Carrying value	Cost / Valuation	Accumulated depreciation	accumulated impairment & Carrying value
Buildings	680,473	(44,062)	636,411	677,321	(22,701)	654,620
Buildings - air systems	51	(51)	-	437	(45)	392
Computer equipment	214,795	(141,210)	73,585	348,732	(264,113)	84,619
Furniture and fixtures	8,929	(5,073)	3,856	9,955	(6,455)	3,500
Laboratory equipment	461,426	(282,569)	178,857	755,868	(582,333)	173,535
Land	95,552	-	95,552	95,552	-	95,552
Leasehold property	31,330	(30,402)	928	101,351	(100,040)	1,311
Mobile units	24,784	(16,661)	8,123	35,971	(27,410)	8,561
Motor vehicles	95,206	(59,507)	35,699	95,802	(46,075)	49,727
Office Equipment	29,993	(16,730)	13,263	40,749	(25,962)	14,787
Other property, plant and equipment	217	-	217	535	-	535
Plant and machinery	3,475	(1,799)	1,676	7,916	(6,283)	1,633
Sheep and horses	35	-	35	58	-	58
Total	**1,646,266**	**(598,064)**	**1,048,202**	**2,170,247**	**(1,081,417)**	**1,088,830**

Controlling entity	2020			2019		
	Cost / Valuation	Accumulated depreciation	accumulated impairment & Carrying value	Cost / Valuation	Accumulated depreciation	accumulated impairment & Carrying value
Buildings	680,473	(44,062)	636,411	677,321	(22,701)	654,620
Buildings - air systems	51	(51)	-	437	(45)	392
Computer equipment	214,550	(141,019)	73,531	348,487	(263,953)	84,534
Furniture and fixtures	8,814	(5,009)	3,805	9,840	(6,358)	3,482
Laboratory equipment	457,034	(279,780)	177,254	751,758	(579,766)	171,992
Land	95,552	-	95,552	95,552	-	95,552
Motor vehicles	95,206	(59,507)	35,699	95,802	(46,075)	49,727
Leasehold property	31,330	(30,402)	928	101,351	(100,040)	1,311
Mobile units	24,784	(16,661)	8,123	35,971	(27,410)	8,561
Office equipment	29,931	(16,671)	13,260	40,687	(25,903)	14,784
Other property, plant and equipment	217	-	217	535	-	535
Plant and machinery	3,475	(1,799)	1,676	7,916	(6,283)	1,633
Total	**1,641,417**	**(594,961)**	**1,046,456**	**2,165,657**	**(1,078,534)**	**1,087,123**

Reconciliation of property, plant and equipment - Economic entity - 2020	Opening balance	Additions	Disposals	Transfers	Depreciation	Total	
Buildings	654,620	3,587	-	(592)	592	(21,796)	636,411
Buildings - air systems	392	2,320	-	-	(2,240)	(472)	-
Computer equipment	84,619	33,118	-	(1,363)	32	(42,821)	73,585
Furniture and fixtures	3,500	673	-	(8)	17	(326)	3,856
Laboratory equipment	173,535	60,367	-	(1,267)	2,179	(55,957)	178,857
Land	95,552	-	-	-	-	-	95,552
Leasehold property	1,311	335	-	(497)	-	(221)	928
Mobile units	8,561	1,862	-	(144)	-	(2,156)	8,123
Motor vehicles	49,727	3,181	-	(640)	-	(16,569)	35,699
Office equipment	14,787	3,325	-	(190)	(579)	(4,080)	13,263
Other property, plant and equipment	535	55	-	-	(373)	-	217
Plant and machinery	1,633	504	-	-	-	(461)	1,676
Sheep and horses	58	-	(23)	-	-	-	35
	1,088,830	**109,327**	**(23)**	**(4,701)**	**(372)**	**(144,859)**	**1,048,202**

Reconciliation of property, plant and equipment - Economic entity - 2019	Opening balance	Additions	Recognition of grant assets	Disposals	Reclassification	Depreciation	Total
Buildings	675,659	-	-	-	-	(21,039)	654,620
Buildings - air systems	863	-	386	(228)	(511)	(118)	392
Computer equipment	109,392	18,288	440	(268)	(46)	(43,187)	84,619
Furniture and fixtures	3,375	579	36	(105)	(125)	(260)	3,500
Laboratory equipment	156,552	73,770	21,600	(2,879)	(1,093)	(74,415)	173,535
Land	95,552	-	-	-	-	-	95,552
Leasehold property	55,769	-	-	(300)	511	(54,669)	1,311
Mobile units	11,953	269	-	(355)	-	(3,306)	8,561
Motor vehicles	66,136	960	-	(342)	(295)	(16,732)	49,727
Office equipment	11,381	5,877	202	(149)	1,159	(3,683)	14,787
Other property, plant and equipment	173	362	-	-	-	-	535
Plant and machinery	1,497	1,383	-	(244)	(535)	(468)	1,633
Sheep and horses	22	-	36	-	-	-	58
	1,188,324	**101,488**	**22,700**	**(4,870)**	**(935)**	**(217,877)**	**1,088,830**

Reconciliation of property, plant and equipment - Economic entity - 2020	Opening balance	Additions	Disposals	Reclassification	Depreciation	Total
Buildings	654,620	3,587	(592)	592	(21,796)	636,411
Buildings - air systems	392	2,320	-	(2,240)	(472)	-
Computer equipment	84,534	33,119	(1,363)	31	(42,790)	73,531
Furniture and fixtures	3,482	672	(8)	17	(358)	3,805
Laboratory equipment	171,992	60,108	(1,267)	2,179	(55,758)	177,254
Land	95,552	-	-	-	-	95,552
Leasehold property	1,311	335	(497)	-	(221)	928
Mobile units	8,561	1,862	(144)	-	(2,156)	8,123
Motor vehicles	49,727	3,181	(640)	-	(16,569)	35,699
Office equipment	14,784	3,325	(190)	(579)	(4,080)	13,260
Other property, plant and equipment	535	55	-	(373)	-	217
Plant and machinery	1,633	504	-	-	(461)	1,676
	1,087,123	**109,068**	**(4,701)**	**(373)**	**(144,661)**	**1,046,456**

Reconciliation of property, plant and equipment - Controlling entity - 2019	Opening balance	Additions	Recognition of grant assets	Disposals	Reclassification	Depreciation	Total
Buildings	675,659	-	-	-	-	(21,039)	654,620
Buildings - air systems	863	-	386	(228)	(511)	(118)	392
Computer equipment	109,294	18,250	440	(268)	(46)	(43,136)	84,534
Furniture and fixtures	3,368	579	36	(105)	(125)	(271)	3,482
Laboratory equipment	154,897	73,524	21,600	(2,852)	(1,101)	(74,076)	171,992
Land	95,552	-	-	-	-	-	95,552
Leasehold property	55,769	-	-	(300)	511	(54,669)	1,311
Mobile units	11,953	269	-	(355)	-	(3,306)	8,561
Motor vehicles	66,136	960	-	(342)	(295)	(16,732)	49,727
Office equipment	11,357	5,877	202	(149)	1,159	(3,662)	14,784
Other property, plant and equipment	173	362	-	-	-	-	535
Plant and machinery	1,497	1,383	-	(244)	(535)	(468)	1,633
	1,186,518	**101,204**	**22,664**	**(4,843)**	**(943)**	**(217,477)**	**1,087,123**

	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Carrying value of assets pledged as security:	154	206	-	-
Assets subject to finance lease (Net carrying amount)	8,359	8,182	-	-
Motor vehicles	**31,273**	**47,844**	**31,273**	**47,844**

Revaluations

The effective date of the revaluations was Saturday, 31 March 2018. Revaluations were performed by independent valuers, T. Mokhulwa (Professional Associated Valuer) abd R.A Rakau (Professional Valuer), of Black Dot Property Consultants (Pty) Ltd. Mokhuwa and Rakau are not connected to the economic entity .

Land and buildings are re-valued independently every five years.

The valuation was performed using the Depreciated Replacement Method, and the following assumptions were used:

- **Effective Age:** Effective age is the age indicated by the condition and utility of a building and was based on a valuer's judgement and interpretation of market perceptions. Actual age is the number of years that have elapsed since building construction was completed. Actual age is the inital element analysed in the estimation of effective age.
- **Remaining Economic Life:** This is the estimated period over which existing improvements / buildings are expected to continue to contribute to property value. The remaining economic life extends from the date of the opinion of value to the end of the improvement's economic life.
- **Depreciation Percentages:** The improvements were assumed to be depreciated by an amount regarded as applicable to that improvement, based on current condition and expected remaining lifespan. Where buildings / improvements are well maintained, the buildings were basically regarded to have a 50 year lifespan.

These assumptions were based on current market conditions.

Had land and buildings been carried at their historical cost, the carrying amounts would have been:

Category	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Land	3,208	3,208	3,208	3,208
Buildings	118,609	122,409	118,609	122,409
	121,817	**125,617**	**121,817**	**125,617**

Other information

Property, plant and equipment fully depreciated and still in use (Gross carrying amount)

Buildings - air systems	51	7,717	51	7,717
Computer equipment	176,724	165,583	176,574	165,556
Computer software	141,661	141,577	141,661	141,577
Furniture and fixtures	4,133	4,792	4,133	4,707
Laboratory equipment	419,854	447,798	418,282	446,511
Leasehold improvements	84,782	88,579	84,782	88,579
Mobile units	5,738	12,080	5,738	12,080
Motor vehicles	11,512	11,925	11,512	11,925
Office equipment	17,453	17,328	17,453	17,266
Plant and machinery	5,813	5,823	5,813	5,823
	867,721	**903,202**	**865,999**	**901,741**

At the end of the year, the economic entity had 18,005 assets with a total cost of R867,721 (2019: 18,772 with a total cost of R903,202) which had been fully depreciated and are recorded at a carrying amount of Rnil. The NHLS has a policy to replace assets at specified intervals. However due to budget cuts, the NHLS was not able to replace these assets.

Expenditure incurred to repair and maintain property, plant and equipment	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Expenditure incurred to repair and maintain property, plant and equipment included in				
Statement of Financial Performance				
Office Equipment	5,121	4,081	5,121	4,081
Buildings	49,992	43,726	49,978	43,652
Motor vehicles	621	547	621	547
Laboratory equipment	49,306	45,286	48,325	44,190
	105,040	**93,640**	**104,045**	**92,470**

Sheep and horses

As at 31 March 2020, the economic entity owns 51 sheep (2019: 51) and 59 horses (2019: 61). The sheep blood are used for the testing of anti-venom. The horses are used for the production of anti-venom. The sheep and horses meet the definition of an asset and they have been classified as property, plant and equipment in terms of GRAP 17.

9. Intangible assets

Economic entity	2020			2019		
	Cost/ Valuation	Accumulated amortisation and accumulated impairment	Carrying value	Cost/ Valuation	Accumulated amortisation and accumulated impairment	Carrying value
Computer software	148,017	(143,242)	4,775	143,547	(142,610)	937
Patents	60	(36)	24	60	(33)	27
Total	**148,077**	**(143,278)**	**4,799**	**143,607**	**(142,643)**	**964**

Controlling entity	2020			2019		
	Cost/ Valuation	Accumulated amortisation and accumulated impairment	Carrying value	Cost/ Valuation	Accumulated amortisation and accumulated impairment	Carrying value
Computer software	148,017	(143,242)	4,775	143,547	(142,610)	937
Patents	60	(36)	24	60	(33)	27
Total	**148,077**	**(143,278)**	**4,799**	**143,607**	**(142,643)**	**964**

Reconciliation of intangible assets - Economic entity - 2020	Opening balance	Additions	Transfers	Amortisation	Total
Computer software	937	4,479	-	(641)	4,775
Patents	27	-	-	(3)	24
	964	**4,479**	**-**	**(644)**	**4,799**

Reconciliation of intangible assets - Economic entity - 2019	Opening balance	Additions	Disposals	Reclassification*	Amortisation	Total
Computer software	34,552	45	-	650	(34,310)	937
Patents	30	-	-	-	(3)	27
	34,582	**45**	**-**	**650**	**(34,313)**	**964**

Reconciliation of intangible assets - Controlling entity - 2020	Opening balance	Additions	Transfers	Amortisation	Total
Computer software	937	4,479	-	(641)	4,775
Patents	27	-	-	(3)	24
	964	**4,479**	**-**	**(644)**	**4,799**

Reconciliation of intangible assets - Controlling entity - 2019	Opening balance	Additions	Disposals	Reclassification*	Amortisation	Total
Computer software	34,552	45	-	650	(34,310)	937
Patents	30	-	-	-	(3)	27
	34,582	**45**	**-**	**650**	**(34,313)**	**964**

**Reclassification represent corrections made in current year of intangible assets incorrectly classifiied as property, plant and equipment.*

10. Investment in controlled entity

Name of company	Held by	% holding 2020	% holding 2019	Carrying amount 2020	Carrying amount 2019
South African Vaccine Producers (Pty) Limited		100.00 %	100.00 %	-	-
Impairment of investment in controlled entities		100.00 %	100.00 %	-	-
				-	**-**

The carrying amounts of controlled entities are shown net of impairment losses.

11. Loans to economic entity

Controlled entities	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Expenditure incurred to repair and maintain property, plant and equipment included in Statement of Financial Performance				
South African Vaccine Producers (Pty) Ltd Terms and conditions	-	-	32,999	35,207
	-	-	32,999	35,207
Impairment of loans to controlled entity	-	-	(32,999)	(35,207)
	-	-	-	-

The Controlling entity has subordinated it's rights to claim payments of debts of R32,989m (2019: R35,197m) owing to it South African Vaccine Producers (Pty) Limited until the assets of the subsidiary, fairly valued, exceed its liabilities. The report of the Accounting Authority contains further details of the subsidiary..

Loan to SAVP impaired

As of 31 March 2020, loans (including share capital) to the controlled entity of R32,999m (2019: R35,207m) were impaired and provided for.

12. Other financial liabilities

At amortised cost	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Onerous contract [2] Terms and conditions	9,880	13,940	9,880	13,940
Non-current liabilities At amortised cost	5,056	9,712	5,056	9,712
Current liabilities At amortised cost	4,824	4,228	4,824	4,228

13. Finance lease obligation

Minimum lease payments due				
- within one year	21,193	21,942	21,193	21,942
- in second to fifth year inclusive	20,090	42,634	20,090	42,634
	41,283	64,576	41,283	64,576
less: future finance charges	(4,153)	(9,452)	(4,153)	(9,452)
Present value of minimum lease payments	**37,130**	**55,124**	**37,130**	**55,124**
Present value of minimum lease payments due				
- within one year	18,148	16,933	18,148	16,933
- in second to fifth year inclusive	18,982	38,191	18,982	38,191
	37,130	**55,124**	**37,130**	**55,124**
Non-current liabilities	18,982	38,191	18,982	38,191
Current liabilities	18,148	16,933	18,148	16,933
	37,130	**55,124**	**37,130**	**55,124**

It is economic entity's policy to lease certain motor vehicles and equipment under finance leases. The average lease term was 5 years and the average effective borrowing rate was 11% (2019: 11%).

Interest rates are fixed at the contract date. All leases have fixed repayments and no arrangements have been entered into for contingent rent.

The depreciation on leased assets amounts to R47.9 million (2019: R32.7 million).

The economic entity's obligations under finance leases are secured by the lessor's charge over the leased assets. Refer note 8.

14. Payables from exchange transactions

	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Trade payables *	208,802	162,448	208,402	162,238
Payments received in advanced - contract in process	2,004	-	-	-
Accrued expenses	175,192	229,441	173,491	227,561
Other payables **	169,239	157,434	169,239	157,434
	555,237	**549,323**	**551,132**	**547,233**

** Trade payables are non-interest bearing and are normally settled on 30-day payment terms.*
*** Other payables are made up of employee cost related liabilities and other sundry payables.*

15. Post retirement medical benefit plan

Post retirement medical aid plan

NHLS provides post-employment healthcare benefits. Members who joined NHLS before 1 January 2003, and KZN members who joined NHLS before 1 October 2006 are eligible for a subsidy of medical scheme contributions in retirement.

The amounts recognised in the statement of financial position are as follows:

Carrying value Present value of the defined benefit obligation-wholly unfunded	(953,397)	(988,415)	(953,397)	(988,415)
Non-current liabilities	(918,492)	(957,536)	(918,492)	(957,536)
Current liabilities	(34,905)	(30,879)	(34,905)	(30,879)
	(953,397)	**(988,415)**	**(953,397)**	**(988,415)**
Changes in the present value of the defined benefit obligation are as follows:				
Opening balance	988,415	1,000,034	988,415	1,000,034
Benefits paid	(32,438)	(27,761)	(32,438)	(27,761)
Net expense recognised in the statement of financial performance	(2,580)	16,142	(2,580)	16,142
	953,397	**988,415**	**953,397**	**988,415**
Net expense recognised in the statement of financial performance				
Current service cost	22,335	25,019	22,335	25,019
Interest cost	106,889	103,504	106,889	103,504
Actuarial (gains) losses	(131,804)	(112,381)	(131,804)	(112,381)
	(2,580)	**16,142**	**(2,580)**	**16,142**
Calculation of actuarial gains and losses				
Change in real discount rate	113,382	112,397	113,382	112,397
(Higher)/Lower than expected healthcare cost inflation	153	1,080	153	1,080
including changes in members benefit options Unexpected changes in memberships	18,269	(1,096)	18,269	(1,096)
	131,804	**112,381**	**131,804**	**112,381**

Key assumptions used

For practical reasons, the economic assumptions are determined before the valuation date. The economic assumptions used in this valuation are based on market information as at end January 2020. The economic assumptions have been set based on the duration of the liability as at 31 March 2019. At that date, the duration of the liablity was 17.2 years; and therefore a duration of 17 years was used to set the economic assumptions. Assumptions used at the reporting date:

Discount rates used	11.40 %	11.00 %	11.40 %	11.00 %
CPI inflation rate	6.60 %	7.10 %	6.60 %	7.10 %
Salary inflation	8.10 %	8.60 %	8.10 %	8.60 %
Expected increase in healthcare costs Discount rate	8.60 %	9.10 %	8.60 %	9.10 %

Consumer Price Index Inflation:

While not used in the valuation, the actuaries have assumed the underlying future rate of consumer price index inflation (CPI inflation) to be 6.6% (2019: 7.1%) per annum. This assumption has been based on the relationship between the nominal bond curve and the real bond yield.

Income at Retirement:

Income at retirement is relevant to the extent that the contribution tables are based on income. The actuaries have assumed at that an individual member's income would increase by 8.1% (2019:8.6%) per annum, based on the underlying assumption that individual remuneration increase including merit and promotional increases would exceed CPI inflation by an average of 1.5% per annum over the long term. The actuarial assumption is that income at retirement would be 65% of final salary.

Healthcare cost inflation:

The current contribution tables of the medical schemes would continue to apply in the future, with allowances of inflationary increases of 9.8% per annum. In consultation with NHLS, assumptions made by the actuaries state that healthcare cost inflation exceed CPI inflation by an average of 2.00% per annum over the long term.

Sensitivity analysis

Assumed healthcare cost trends rates have a significant effect on the amounts recognised in surplus or deficit. A one percentage point change in assumed healthcare cost trends rates would have the following effects:

	One percentage point increase	One percentage point decrease	One percentage point increase	One percentage point decrease
Effect on the aggregate of the service cost and interest cost	20,997	(17,040)	23,435	(18,764)
Effect on defined benefit obligation	147,081	(109,044)	166,037	(142,961)

Amounts for the current and previous four years are as follows:

Defined contribution plan

It is the policy of the economic entity to provide retirement benefits to all its employees. A number of defined contribution provident funds, all of which are subject to the Pensions Funds Act exist for this purpose.

The economic entity is under no obligation to cover any unfunded benefits.

16. Unspent conditional grants and receipts

	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Unspent conditional grants and receipts comprises of:				
Unspent conditional grants and receipts				
Research grants	35,581	28,669	35,581	28,669
Movement during the year				
Balance at the beginning of the year	28,669	20,316	28,669	20,316
Additions during the year	21,832	26,947	21,832	26,947
Income recognition during the year	(14,920)	(18,594)	(14,920)	(18,594)
	35,581	28,669	35,581	28,669

17. Provisions

Reconciliation of provisions - Economic entity - 2020	Opening Balance	Additions	Utilised during the year	Reversed during the year	Total
Bonus provision [1]	529	2,085	(2,067)	-	547
DoH utility charges provision [2]	375,336	43,062	-	-	418,398
Leave pay provision [3]	232,099	55,715	(17,955)	(11,343)	258,516
Salaries provision [4]	163,671	-	-	-	163,671
Student bursary provision [5]	780	260	(780)	-	260
	772,415	**101,122**	**(20,802)**	**(11,343)**	**841,392**

Reconciliation of provisions - Economic entity - 2019	Opening Balance	Additions	Utilised during the year	Total
Bonus provision [1]	492	1,761	(1,724)	529
DoH utility charges provision [2]	228,002	147,334	-	375,336
Leave pay provision [3]	202,485	46,346	(16,732)	232,099
Salaries provision [4]	139,087	24,584	-	163,671
Student bursary provision [5]	6,500	780	(6,500)	780
	576,566	**220,805**	**(24,956)**	**772,415**

Reconciliation of provisions - Controlling entity - 2020	Opening Balance	Additions	Utilised during the year	Reversed during the year	Total
Bonus provision [1]	529	2,085	(2,067)	-	547
DoH utility charges provision [2]	375,336	43,062	-	-	418,398
Leave pay provision [3]	232,099	55,715	(17,955)	(11,343)	258,516
Salaries provision [4]	163,671	-	-	-	163,671
Student bursary provision [5]	780	260	(780)	-	260
	772,415	**101,122**	**(20,802)**	**(11,343)**	**841,392**

Reconciliation of provisions - Controlling entity - 2019	Opening Balance	Additions	Utilised during the year	Total
Bonus provision [1]	492	1,761	(1,724)	529)
DoH utility charges provision [2]	228,002	147,334	-	375,336
Leave pay provision [3]	202,485	46,346	(16,732)	232,099
Salaries provision [4]	139,087	24,584	-	163,671
Student bursary provision [5]	6,500	780	(6,500)	780
	576,566	**220,805**	**(24,956)**	**772,415**

[1] The bonus provision is made up of the following:

- Certain employees in bands D and above who are on the cost to company package and elect to structure part of their package as a 13th cheque. The provision is utilised when employees become entitled to and are paid for their services to the entity. The bonus payable is determined by applying a specific formula based on the employees' total cost to company; and
- A 13th cheque for employees in bands A to C which is payable in December each year.

[2] The DoH utility charges provision relates to utilities and maintenance fees owing to the DoH for various provincial hospital facilities around the country. Significant adjustments to the provision pertain to changes in the rate charged per square meter as well as the reversal of the utilities provision relating to Eastern Cape Province.

[3] The leave pay provision relates to vesting leave pay to which employees may become entitled upon leaving the employment of the economic entity. The provision arises as employees render a service that increases their entitlement to future compensated leave and is calculated based on an employee's total cost of employment. The provision is utilised when employees become entitled to and are paid for the accumulated leave pay or utilise compensated leave due to them.

[4] The economic entity has an agreement with Walter Sisulu University wherein the NHLS is required to pay part of the salaries for pathological academic staff. The amount has been estimated in the absence of actual figures and invoices.

[5] Student bursary provisions relate to contractual commitments made by the economic entity by year end to fund student education for which the amount cannot yet be determined. The economic entity makes a provision based of the number of students awarded bursaries and amounts estimated using historical experiences.

18. Deferred tax

	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Deferred tax liability				
Deferred tax asset				
Property, plant and equipment	**(242)**	**5**	**-**	**-**

The deferred tax assets and the deferred tax liability relate to income tax in the same jurisdiction, and the law allows net settlement. Therefore, they have been offset in the statement of financial position as follows:

Reconciliation of deferred tax liability				
At beginning of year	5	15	-	-
Taxable temporary difference movement on tangible fixed assets	(247)	(10)	-	-
	(242)	**5**	**-**	**-**

19. Share capital / contributed capital

	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Issued				
Initial capital contribution	332	332	332	332

20. Revaluation reserve

Opening balance	654,919	654,919	654,919	654,919
Revaluation surplus relating to property, plant and equipment				
Revaluation surplus beginning of period	654,919	654,919	654,919	654,919

21. Revenue

Sale of goods	29,117	26,755	-	-
Rendering of services	8,428,133	7,679,047	8,428,133	7,679,047
Miscellaneous other revenue *	7,909	6,447	7,909	6,447
Government grants & subsidies	785,506	790,226	785,506	790,226
	9,250,665	**8,502,475**	**9,221,548**	**8,475,720**
The amount included in revenue arising from exchanges of goods or services are as follows:				
Sale of goods	29,117	26,755	-	-
Rendering of services	-	-	-	-
Government grants & subsidies	8,428,133	7,679,047	8,428,133	7,679,047
Miscellaneous other revenue *	7,909	6,447	7,909	6,447
	8,465,159	**7,712,249**	**8,436,042**	**7,685,494**

** Miscellaneous other revenue constitutes other income from other activities of the NHLS.*

22. Cost of sales

Direct employee costs	3,644,605	3,359,636	3,629,188	3,344,691
Direct depreciation and impairments	142,917	222,063	142,741	221,749
Direct material expenses	3,569,926	3,164,391	3,560,165	3,160,909
	7,357,448	**6,746,090**	**7,332,094**	**6,727,349**

23. Other income

	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Discount received	608	1,363	607	1,360
Fees earned	970	1,414	970	1,414
Grant income recognised	102,880	226,885	102,880	226,885
Internal recoveries	7	2	7	2
Public contributions and Donations	4,604	-	4,604	-
Royalties received	4,407	804	4,407	804
Sundry income	3,627	138	3,444	138
Teaching income	63,761	45,905	63,761	45,905
	180,864	**276,511**	**180,680**	**276,508**

The Public Contributions and Donations is in relation to a bequest made NHLS from a deceased estate.

The amount included in other revenue arising from exchanges of goods or services are as follows:

Discount received	608	1,363	607	1,360
Fees earned	970	1,414	970	1,414
Internal recoveries	7	2	7	2
Royalties received	4,407	804	4,407	-
Sundry income	3,627	138	3,444	138
Teaching income	63,761	45,905	63,761	45,905
	73,380	**49,626**	**73,196**	**48,819**
Transfers				
Grant income recognised	102,880	226,885	102,880	226,885
Public contributions and Donations	4,604	-	4,604	-
	107,484	**226,885**	**107,484**	**226,885**

24. Operating surplus

Operating surplus for the year is stated after accounting for the following:

Operating lease charges
Premises

Straight-lined Motor vehicles	4,082	3,655	4,082	3,655
Straight-lined Equipment	3,832	2,110	3,832	2,110
Straight-lined	37,245	44,780	37,078	44,597
	45,159	**50,545**	**44,992**	**50,362**
Loss on sale of property, plant and equipment	3,815	4,814	3,815	4,831
Amortisation on intangible assets	543	1,395	543	1,395
Depreciation on property, plant and equipment	144,348	250,775	144,119	250,395
Employee costs	3,930,643	3,648,018	3,914,816	3,632,917

25. Interest income

Interest revenue				
Bank	288,596	159,756	287,967	159,295
Interest received - debtors	27,245	23,756	27,245	23,756
	315,841	**183,512**	**315,212**	**183,051**

26. Interest expense

	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Finance costs [1]	-	2,047	-	2,047
Finance leases	6,142	8,329	6,142	8,329
Late payment of tax	125	377	-	3
Other interest paid	11	-	11	-
	6,278	**10,753**	**6,153**	**10,379**

[1] Finance costs relate to liability raised for Microsoft.

27. Taxation

Major components of the tax expense

Current				
Local income tax - current period	1,109	1,876	-	-
Local income tax - recognised in current tax for prior periods	**(539)**	**204**	**-**	**-**
	570	**2,080**	**-**	**-**
Deferred				
Originating and reversing temporary differences	246	10	-	-
	816	**2,090**	**-**	**-**
Reconciliation of the tax expense				
Reconciliation between applicable tax rate and average effective tax rate.				
Applicable tax rate	28.00 %	28.00 %	- %	- %
Prior year	- %	3.20 %	- %	- %
Non-deductable expenses	4.36 %	1.65 %	- %	- %
	32.36 %	**32.85 %**	**- %**	**- %**

28. Employee related costs

Basic	2,898,761	2,679,011	2,887,152	2,667,993
Bonus	156,949	140,427	156,116	139,686
Defined contribution plans	242,117	238,795	241,011	237,758
External bursaries	4,689	(31)	4,689	(46)
Leave pay provision charge	44,352	45,956	44,300	45,736
Long-term benefits - incentive scheme	3,213	2,860	3,203	2,838
Medical aid - company contributions	217,290	200,384	216,187	199,383
Other allowances	193,825	176,384	193,825	176,384
Other short term costs	123,924	117,195	123,217	116,506
SDL	25,029	22,533	24,891	22,401
Training	148	126	11	28
UIF	12,761	12,692	12,694	12,624
WCA	7,585	11,686	7,520	11,626
	3,930,643	**3,648,018**	**3,914,816**	**3,632,917**

Employee costs are split into cost of sales and general expenses as follows:

Cost of sales - employee costs	3,644,605	3,359,636	3,629,188	3,344,691
General expenses - employee costs	286,038	288,382	285,628	288,226
	3,930,643	**3,648,018**	**3,914,816**	**3,632,917**

29. Operating expenses (by function)

	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Advertising	308	1,526	308	1,526
Archiving and Storage	6,498	7,030	6,498	7,030
Auditors remuneration	11,393	12,632	11,059	12,329
Bad debts written off	2,056	12,207	2,056	12,207
Bank charges	12,594	7,654	12,544	7,615
Cleaning	4,793	8,231	4,783	8,187
Computer expenses	1,049	5,093	1,049	5,093
Conferences and seminars	608	835	588	795
Consulting and professional fees	39,582	68,837	39,467	68,794
Consumables	16,646	17,199	16,638	17,162
Contributions to debt impairment provision	241,871	176,089	239,543	174,924
Debt collection	1,013	1,275	1,013	1,275
Delivery expenses	1,040	1,060	1,037	1,058
Depreciation, amortisation and impairments	1,974	30,107	1,921	30,041
Discount allowed	20,642	15,366	20,642	15,366
Employee costs	286,038	288,382	285,628	288,226
Entertainment	21	119	21	119
Exchange losses	3,880	3,976	3,870	3,976
Fines and penalties	2	-	2	-
Insurance	6,956	4,857	6,956	4,857
Lease rentals on operating lease	38,733	43,555	38,633	43,397
Legal expenses	17,343	10,727	17,322	10,701
Loss on disposal of assets and liabilities	3,815	4,814	3,815	4,831
Medical expenses	563	1,721	563	1,721
Minor assets	5,871	208	5,879	167
Motor vehicle expenses	563	1,090	563	1,090
Software development expenses	1,172	2,351	1,017	2,351
Other expenses	9,329	8,484	9,289	8,342
Packaging	7,297	6,105	7,297	6,105
Petrol and oil	133	18	133	18
Postage and courier	41,300	40,169	41,088	40,083
Printing and stationery	101	677	101	677
Project Management expenses	411	289	411	289
Promotions	37	40	37	40
Promotions and sponsorships	55,733	48,355	55,719	48,281
Repairs and maintenance	26	22	26	22
Research Trust	3,329	794	3,329	794
Royalties and license fees	1,202	997	1,202	997
Security	6,373	10,076	6,373	10,076
Software development expenses	132,039	105,408	132,039	105,411
Staff welfare	9,827	9,472	9,700	9,337
Subscriptions and membership fees	579	4,920	540	4,920
Telephone and fax	88,054	85,635	87,949	85,413
Training	43,787	21,102	43,787	21,102
Travel - local	36,918	48,544	36,917	48,543
Travel - overseas	578	307	578	307
Utilities	136,323	112,100	136,323	112,100
	1,300,400	**1,230,455**	**1,296,253**	**1,227,695**

30. Auditors' remuneration

	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Audit Fees - current year	8,755	7,705	8,405	7,355
Adjustment for previous year	2,096	4,518	2,112	4,565
Fees for other services	542	408	542	408
Expenses	-	1	-	1
	11,393	**12,632**	**11,059**	**12,329**

31. Depreciation and amortisation

Depreciation and amortisation - Cost of sales	142,917	222,063	142,741	221,749
Depreciation and amortisation - General expenses	1,974	30,107	1,921	30,041
	144,891	**252,170**	**144,662**	**251,790**

32. Cash generated from operations

Surplus (deficit) for the year	1,082,222	995,811	1,082,940	992,521
Adjustments for:				
Depreciation and amortisation	145,502	252,170	145,304	251,790
Gain on sale of assets and liabilities	3,815	4,814	3,815	4,831
Fair value adjustments	23	(22,701)	-	(22,665)
Finance costs	6,142	10,376	6,142	10,376
Debt impairment	243,927	188,296	241,599	187,131
Movements in retirement benefit assets and liabilities	(35,018)	(11,619)	(35,018)	(11,619)
Movements in provisions	68,977	195,849	68,977	195,849
Movement in tax receivable and payable	(231)	1,103	-	-
Annual charge for deferred tax	246	10	-	-
Other non-cash items	411	1,033	374	937
Changes in working capital:				
Inventories	(8,317)	(35,594)	(11,386)	(32,945)
Receivables from exchange transactions**	522,900	103,859	524,716	105,509
Other receivables from non-exchange transactions	17,374	(103,842)	17,374	(103,842)
Payables from exchange transactions	(15,981)	(348,695)	(17,996)	(348,830)
VAT	(121)	98	-	-
Unspent conditional grants and receipts	6,912	8,353	6,912	8,353
	2,038,783	**1,239,321**	**2,033,753**	**1,237,396**

33. Tax paid

Balance at beginning of the year	(1,924)	(821)	-	-
Current tax for the year recognised in surplus or deficit	(570)	(2,080)	-	-
Balance at end of 31 March 2020	1,693	1,924	-	-
	(801)	**(977)**	**-**	**-**

34. Financial instruments disclosure

Categories of financial instruments

Economic entity - 2020	At amortised cost	Total
Financial assets		
Trade and other receivables from exchange transactions	1,065,185	1,065,185
Other receivables from non-exchange transactions	414,094	414,094
Cash and cash equivalents	4,105,760	4,105,760
	5,585,039	**5,585,039**
Financial liabilities		
Other financial liabilities	9,880	9,880
Trade and other payables from exchange transactions	514,210	514,210
Finance lease liability	37,130	37,130
	561,220	**561,220**

Economic entity - 2019	At amortised cost	Total
Financial assets		
Trade and other receivables from exchange transactions	1,827,299	1,827,299
Other receivables from non-exchange transactions	431,468	431,468
Cash and cash equivalents	2,208,093	2,208,093
	4,466,860	**4,466,860**
Financial liabilities		
Other financial liabilities	13,940	13,940
Trade and other payables from exchange transactions	532,201	532,201
Finance lease liability	55,324	55,324
	601,465	**601,465**

Controlling entity - 2020	At amortised cost	Total
Financial assets		
Trade and other receivables from exchange transactions	1,063,193	1,063,193
Other receivables from non-exchange transactions	414,094	414,094
Cash and cash equivalents	4,094,633	4,094,633
	5,571,920	**5,571,920**
Financial liabilities		
Other financial liabilities	13,940	13,940
Trade and other payables from exchange transactions	510,411	510,411
Finance lease liability	37,130	37,130
	561,481	**561,481**

Controlling entity - 2019	At amortised cost	Total
Financial assets		
Trade and other receivables from exchange transactions	1,824,825	1,824,825
Other receivables from non-exchange transactions	431,468	431,468
Cash and cash equivalents	2,201,737	2,201,737
	4,458,030	**4,458,030**
Financial liabilities		
Other financial liabilities	13,940	13,940
Trade and other payables from exchange transactions	529,897	529,897
Finance lease liability	55,324	55,324
	599,161	**599,161**

Financial instruments in Statement of financial performance

Economic entity - 2020	At amortised cost	Total
Interest income	315,841	315,841
Interest expense	(6,278)	(6,278)
	309,563	**309,563**

Economic entity - 2019	At amortised cost	Total
Interest income	183,512	183,512
Interest expense	(10,753)	(10,753)
	172,759	**172,759**

Controlling entity - 2020	At amortised cost	Total
Interest income	315,212	315,212
Interest expense	(6,153)	(6,153)
	309,059	**309,059**

Controlling entity - 2019	At amortised cost	Total
Interest income	183,051	183,051
Interest expense	(10,379)	(10,379)
	172,672	**172,672**

35. Commitments

	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Authorised capital expenditure				
Already contracted for but not provided for				
• Property, plant and equipment	77,728	21,964	77,728	21,964
Not yet contracted for and authorised by members				
• Property, plant and equipment	12,235	-	12,235	-
Total capital commitments				
Already contracted for but not provided for	77,728	21,964	77,728	21,964
Not yet contracted for and authorised by members	12,235	-	12,235	-
	89,963	**21,964**	**89,963**	**21,964**
Authorised operational expenditure				
Already contracted for but not provided for				
• Current expenditure	2,066,266	483,660	2,066,266	483,660
Not yet contracted for and authorised by members				
• Current expenditure	46,893	-	46,893	-
Total operational commitments				
Already contracted for but not provided for	2,066,266	483,660	2,066,266	483,660
Not yet contracted for and authorised by members	46,893	-	46,893	-
	2,113,159	**483,660**	**2,113,159**	**483,660**

This committed expenditure will be financed by retained surpluses, existing cash resources and funds internally generated. The increase in commitments is due to orders made in preparation for COVID-19.

35. Commitments (continued)

	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Operating leases - as lessee (expense)				
Minimum lease payments due				
- within one year	17,282	19,110	17,282	19,110
- in second to fifth year inclusive	14,555	28,943	14,555	28,943
	31,837	**48,053**	**31,837**	**48,053**

Operating lease payments represent rentals payable by the economic entity for certain of its office equipment. Leases are negotiated for an average term of five years and rentals are fixed for an average of three years. No contingent rent is payable.

36. Contingencies

Claims lodged for damages:				
WSU salaries dispute	15,309	15,309	15,309	15,309
605 Consulting matter	17,383	17,383	17,383	17,383
Drive Control Corporation matter	37,505	37,505	37,505	37,505
Ms B. Mnguni	4,800	4,800	4,800	4,800
Mr W.P. Msimanga	3,000	3,000	3,000	3,000
Ms S. Fortuin	328	328	328	328
Diana Mabaso Incorporated	235	235	235	235
South African Medical Association on behalf of Dr Z.	178	178	178	178
Moorad and Dr A. Jali Ms L. Gqwetha	-	50	-	50
	78,738	**78,788**	**78,738**	**78,788**

The WSU has claimed that the salaries of HODs, Medical Scientists and Technologists are owed by the NHLS for the period 2007 - 2013. The amount is disputed by the NHLS as the staff for which the claim is being made are not the employees of the NHLS

There is a matter between 605 Consulting and NHLS, where the NHLS is being sued for an amount of R17.4 million.

There is another matter between Drive Control and the NHLS, where the NHLS is being sued for an amount of R37.5 million.

There is also another matter between Ms B Mnguni and the NHLS, where the NHLS is being sued for personal injury against the NHLS which amount to R4.8 million.

There is also another labour matter between Mr W P Msimanga and the NHLS, where the NHLS is being sued for an amount of R3.0 million

There is also another matter between Mr S Fortuin and the NHLS, where the NHLS is being sued for personal injury against the NHLS which amounts to R0.328 million.

There is also another matter between Diana Mabaso Inc and the NHLS, where the NHLS is being sued for damages for legal fees by the law firm which amounts to R0.235 million.

There is also a dispute before the Labour court on the deduction of monies that were allegedly overpaid to the Dr Z Moorad and Dr A Jali which amounts to R0.178 milllion.

The intention of the NHLS is to defend all other cases and the legal opinion is of the view that the NHLS is in a favourable legal position to succeed.

Contingent assets

An employee and a vendor are alleged to have committed fraud and/or theft against the NHLS for a period of about 13 years from 2002 until June 2013. The NHLS conducted a disciplinary process and the employee was dismissed. The matter was reported to the Commercial Crimes Unit and a civil process has been instituted against the employee and the vendor.

Amount claimed	-	18,290	-	18,290

NHLS is in the process of registering all its foreign donor funded projects for VAT in order to be able to claim VAT input, which is not recoverable from donors. Once registrations have been finalised and the VAT input is determined this will result in the assets being recognised by NHLS.

37. Related parties

Relationships	
Board Members	Prof Eric Buch
	Ms Nelisiwe Theodora Mkhize
	Dr Monde Tom
	Dr Zwelibanzi Abie Mavuso
	Dr Gerhard Rossouw Goosen
	Dr Balekile Edward Mzangwa
	Prof Chikwelu Lawrence Obi
	Dr Timothy Johan Paul Tucker
	Mr Michael Madala Shingange
	Mr Ben Durham
	Ms Nicolene van der Westhuizen
	Ms S'phiwe Dorris Mayinga
Controlling Entity	National Department of Health
Controlled Entity	South African Vaccine Producers (Pty) Ltd
Provincial Departments	Eastern Cape Department of Health
	Gauteng Department of Health
	Limpopo Department of Health
	North West Department of Health
	Kwazulu-Natal Department of Health
	Western Cape Department of Health
	Northern Cape Department of Health
	Mpumalanga Department of Health
	Free State Department of Health

Universities	**University of Cape Town**
	University of Stellenbosch
	University of Western Cape
	University of Free State
	University of Witwatersrand
	University of Pretoria
	Sefako Makgatho Health Sciences University
	University of Limpopo
	University of Kwazulu-Natal
	Walter Sisulu University
Members of key management	Dr K. Chetty (Chief Executive Officer)
	J. Mogale (Past Chief Executive Officer)
	M. Sass (Chief Financial Officer)
	S.S. Zulu (Past Chief Financial Officer)
	Adv M.M. Mphelo (Company Secretary)
	S.T. Hlongwane (Chief Information Officer)
	M. Nkosi (Acting Chief Information Officer up to 31 December 2019)
	Dr S.M. Kgalamono (Acting Executive: NIOH)
	Prof K.P. Mlisana (AARQA Executive)
	Prof L. Morris (Interim NICD Director)
	Dr M. Mosia (Executive: Human Resources)
	M. Saffer (SAVP Director)
	Prof W. Stevens (NPP Director)

	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Related party balances				
Amounts included in Trade receivable regarding related parties by Region				
Eastern Cape	479,406	420,141	479,406	420,141
Free State	79,066	93,520	79,066	93,520
Gauteng	1,048,244	1,455,529	1,048,244	1,455,529
Kwazulu-Natal	2,341,029	2,804,805	2,341,029	2,804,805
Limpopo	44,465	118,346	44,465	118,346
Mpumalanga	23,753	84,340	23,753	84,340
National	-	770	-	770
North West	179,384	160,748	179,384	160,748
Northern Cape	100,880	79,246	100,880	79,246
Western Cape	35,318	31,602	35,318	31,602
	4,331,545	**5,249,047**	**4,331,545**	**5,249,047**
Provision for doubtful debts related to outstanding balances with related parties by Region				
Gauteng	401,552	547,549	401,552	547,549
Kwazulu-Natal	2,585,016	2,637,049	2,585,016	2,637,049
	2,986,568	**3,184,598**	**2,986,568**	**3,184,598**

	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Amounts in Trade receivables regarding related parties by Segment				
Anti-retoviral programmes	325,060	470,829	325,060	470,829
Correctional Services	7,389	7,603	7,389	7,603
Defense	4,308	4,950	4,308	4,950
Health Clinics	1,078,069	1,381,471	1,078,069	1,381,471
Hospitals	2,912,286	3,378,821	2,912,286	3,378,821
Municipalities	3,961	8,517	3,961	8,517
Other Public Entities	(8,568)	(3,144)	(8,568)	(3,144)
Universities	9,040	-	9,040	-
	4,331,545	**5,249,047**	**4,331,545**	**5,249,047**
Amounts included in Trade Payables regarding related parties by Region				
Free State	33	-	33	-
Gauteng	7,193	8,277	7,193	8,277
Kwazulu-Natal	53	2	53	2
Limpopo	102	48	102	48
North West	462	461	462	461
Western Cape	1,450	393	1,450	393
	9,293	**9,181**	**9,293**	**9,181**
Amounts included in Trade Payables regarding related parties By Segment				
Contract Laboratory Services	15	75	15	75
Municipalities	7,307	7,296	7,307	7,296
National Public Entities	508	1,485	508	1,485
Provincial Public Entities	12	1	12	1
Universities	1,451	324	1,451	324
	9,293	**9,181**	**9,293**	**9,181**
Amounts included in Trade Payables regarding related parties by Segment				
Contract Laboratory Services	15	75	15	75
Municipalities	7,307	7,296	7,307	7,296
National Public Entities	508	1,485	508	1,485
Provincial Public Entities	12	1	12	1
Universities	1,451	324	1,451	324
	9,293	**9,181**	**9,293**	**9,181**

	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Related party transactions				
Services billed to related parties by Region				
Eastern Cape	921,587	815,215	921,587	815,215
Free State	396,380	368,199	396,380	368,199
Gauteng	2,223,146	2,004,181	2,223,146	2,004,181
Kwazulu-Natal	2,222,328	2,014,428	2,222,328	2,014,428
Limpopo	527,115	509,202	527,115	509,202
Mpumalanga	534,730	469,200	534,730	469,200
National	35	13,038	35	13,038
North West	473,103	412,419	473,103	412,419
Northern Cape	159,448	149,087	159,448	149,087
Western Cape	880,647	794,791	880,647	794,791
	8,338,519	**7,549,760**	**8,338,519**	**7,549,760**
Services billed to related parties by Segment				
Anti-retroviral	3,245,122	2,886,122	3,245,122	2,886,122
Correctional Services	26,889	24,940	26,889	24,940
Defense	34,066	34,128	34,066	34,128
Health Clinics	976,316	842,534	976,316	842,534
Hospitals	3,975,858	3,687,900	3,975,858	3,687,900
Municipalities	17,485	16,059	17,485	16,059
Other Public entities	14,221	26,261	14,221	26,261
Universities	48,562	31,816	48,562	31,816
	8,338,519	**7,549,760**	**8,338,519**	**7,549,760**
Purchases from related parties by Region				
Eastern Cape	2,892	3,451	2,892	3,451
Free State	10,438	3,695	10,438	3,695
Gauteng	75,075	76,823	75,075	76,823
Kwazulu-Natal	898	1,299	898	1,299
Limpopo	540	277	540	277
North West	520	128	520	128
Western Cape	31,351	27,766	31,351	27,766
	121,714	**113,439**	**121,714**	**113,439**
Purchases from related parties by Segment				
Contract Laboratory Services	17,364	36,198	17,364	36,198
Municipalities	46,394	31,478	46,394	31,478
National Public Entities	17,099	14,648	17,099	14,648
Provincial Public Entities	166	152	166	152
Universities	40,691	30,963	40,691	30,963
	121,714	**113,439**	**121,714**	**113,439**

38. Prescribed Officers and Board members' emoluments - R'000s

Emoluments were paid to the board members or any individuals holding a prescribed office during the year.

Prescribed Officers

2020	Salaries	Retirement contribution	Medical contribution	Expense allowance	Other **	Bonus	Leave paid out	Total
Dr K. Chetty (Chief Executive Officer)	2,155	189	-	38	20	-	-	2,402
J. Mogale (Past Chief Executive Officer)	225	18	-	-	7	-	454	704
M. Sass (Chief Financial Officer)	1,783	61	18	-	19	-	-	1,881
S.S. Zulu (Past Chief Financial Officer)	182	-	-	-	5	-	317	504
M. M. Mphelo	1,849	162	-	6	20	-	-	2,037
S.T. Hlongwane (Chief Information Officer)	425	40	27	-	4	-	-	496
M. Nkosi	925	72	41	6	11	-	-	1,055
Dr S.M. Kgalamono (Acting Executive: NIOH)	1,788	186	129	91	21	-	-	2,215
Prof K.P. Mlisana	2,054	191	133	30	23	-	-	2,431
Prof L. Morris (Interim NICD Director)	1,744	201	37	2	19	13	-	2,016
Dr M. Mosia (Executive: Human Resources)	1,718	162	71	60	55	-	-	2,066
M. Saffer (SAVP Director)	832	73	-	4	10	-	-	919
	15,680	**1,355**	**456**	**237**	**214**	**13**	**771**	**18,726**

2019	Salaries	Retirement contribution	Medical contribution	Expense Allowance	Other**	Bonus	Leave paid out	Total
J. Mogale (Past Chief Executive Officer)	2,457	215	-	-	-	-	-	2,672
Dr K. Chetty (Acting Chief Executive Officer)	861	76	-	5	4	-	-	946
S.S. Zulu (Past Chief Financial Officer)	1,985	-	-	11	-	-	-	1,996
M. Sass (Acting Financial Officer)	1,385	-	-	-	-	-	-	1,385
T. Dokie (Acting Chief Financial Officer up to 31 May 2018)	134	20	-	8	31	-	-	193
M.M. Mphelo	1,824	161	-	11	4	-	-	2,000
M.S. Mosia	1,705	161	61	60	1	-	-	1,988
K.P. Mlisana	1,920	180	117	21	14	-	-	2,252
M. Nkosi	898	84	47	11	2	-	-	1,042
L. Tlako	1,114	98	-	11	-	-	-	1,223
L. Morris	1,677	200	34	-	2	13	-	1,926
S.K. Kisting	1,392	-	-	9	2	-	-	1,403
M. Saffer (SAVP Director)	781	69	10	-	4	-	-	864
S. Grimett (Acting Chief Information Officer up 31 May 2018)	154	23	-	10	31	-	-	218
W. Stevens	1,863	185	120	127	108	-	-	2,403
Dr M. Zungu	333	34	12	-	3	-	-	382
Dr E. Mayne	249	24	10	-	31	-	-	314
	20,732	**1,530**	**411**	**284**	**237**	**13**	**-**	**23,207**

** Other payments include company contributions for skills development, UIF, expense recoveries and long service awards.

Service contracts

Prescribed Officers are subject to written employment agreements. The employment agreements regulate duties, remuneration, allowances, restraints, leave and notice periods of these executives. None of these service contracts exceed 5 years.

38. Prescribed Officers and Board members' emoluments - R'000s (continued)

Non-executive board members

2020	Members' fees	Other fees (Consultancy fees to subsidiary)	Total
B.E. Mzangwa	10	18	28
Eric Buch	311	-	311
G. Goosen	-	12	12
M. Ross	149	4	153
M. Shingange	55	3	58
N. Mkhize	-	27	27
C.L. Obi	209	21	230
S. Mayinga	142	4	146
T. Tucker	88	-	88
Z.A. Mavuso	93	4	97
	1,057	**93**	**1,150**

2019	Members' fees	Other fees (Consultancy fees to subsidiary)	Total
B. Schoub	7	-	7
T. Stander	-	63	63
Eric Buch	336	-	336
G. Goosen	-	14	14
M. Ross	164	4	168
M. Shingange	71	16	87
G. Hussey	-	24	24
C.L. Obi	176	11	187
S. Mayinga	130	1	131
S. Zungu	42	-	42
T. Tucker	118	5	123
Z.A. Mavuso	233	5	238
	1,277	**143**	**1,420**

*Other fees relate to travel re-imbursement, out-of-pocket expenses and other company contributions.

39. Risk management

Financial risk management

The economic entity's activities expose it to a variety of financial risks: market risk (including currency risk, fair value interest rate risk, cash flow interest rate risk and price risk), credit risk and liquidity risk.

The economic entity's overall risk management programme focuses on the unpredictability of financial markets and seeks to minimise potential adverse effects on the economic entity's financial performance. Risk management is carried out by a central treasury department under policies approved by the accounting authority. Economic Entity treasury identifies and evaluates financial risks in close co-operation with the economic entity's operating units. The accounting authority provides written principles for overall risk management, as well as written policies covering specific areas, such as interest rate risk, credit risk, and investment of excess liquidity.

Liquidity risk

Prudent liquidity risk management implies maintaining sufficient cash and the availability of funding through an adequate amount of committed credit facilities and the ability to close out market positions. Due to the dynamic nature of the underlying businesses, economic entity treasury maintains flexibility in funding by maintaining availability of funds under short-term investments. At year end the investment in short-term deposits amounted to R2.177bn (2018: R1.087bn).

The economic entity's risk to liquidity is a result of the funds available to cover future commitments. The economic entity manages liquidity risk through an ongoing review of future commitments and credit facilities.

The table below analyses the economic entity's financial liabilities into relevant maturity groupings based on the remaining period at the statement of financial position to the contractual maturity date. The amounts disclosed in the table are the contractual undiscounted cash flows. Balances due within 12 months equal their carrying balances as the impact of discounting is not significant.

Economic entity

At 31 March 2020	Less than 1 year	Between 1 and 2 years
Payables from exchange transactions	533,536	-
Other financial liabilities	4,824	5,056
Finance lease liabilities	18,148	18,982

At 31 March 2019	Less than 1 year	Between 1 and 2 years
Payables from exchange transactions	549,537	-
Other financial liabilities	4,228	9,712
Finance lease liabilities	16,933	38,191

Controlling entity

At 31 March 2020	Less than 1 year	Between 1 and 2 years
Payables from exchange transactions	529,237	-
Other financial liabilities	4,824	5,056
Finance lease liabilities	18,148	18,982

At 31 March 2019	Less than 1 year	Between 1 and 2 years
Trade and other payables	547,233	-
Other financial liabilities	4,228	9,712
Financial lease liabilities	16,933	38,191

Credit risk

Credit risk consists mainly of cash deposits, cash equivalents, and trade debtors. The entity only deposits cash with major banks with high quality credit standing and limits exposure to any one counter-party.

Concentrations of credit risk with respect to trade receivables are limited due to the majority of receivables being owned by government departments. However, due to the current payment disputes with the KZN Provincial Department of Health and Gauteng Department of Health, a total doubtful debt allowance of R2.987bn (2019: R3.184bn) has been raised for these Departments. Trade receivables are interest bearing and are generally on 30 day payment terms. All interest on overdue debt has been provided for in full due to various communications received from the relevant government departments indicating they will not be in a position to honour the the additional interest owed to NHLS.

Market risk

Interest rate risk

As the economic entity has no significant interest-bearing assets, the economic entity's income and operating cash flows are substantially independent of changes in market interest rates.

Foreign exchange risk

The economic entity does not hedge foreign exchange fluctuations.

The economic entity has certain liabilities denominated in foreign currencies, whose carrying amounts are exposed to foreign currency translation risk.

40. Irregular expenditure

	Economic entity		Controlling entity	
	2020	2019	2020	2019
	R'000	R'000	R'000	R'000
Opening balance as previously reported	5,132,144	4,445,560	5,132,144	4,445,560
Correction of prior period error	**(21,965)**	**(85,616)**	**(21,965)**	**(85,616)**
Opening balance as restated	**5,110,179**	**4,359,944**	**5,110,179**	**4,359,944**
Add: Irregular Expenditure - current	776,388	3,082,438	776,388	3,082,438
Less: Amount condoned	(3,681,185)	(2,310,238)	(3,681,185)	(2,310,238)
Closing balance	**2,205,382**	**5,132,144**	**2,205,382**	**5,132,144**
Analysis of awaiting condonatin per age classification				
Current year	776,388	1,748,980	776,388	1,748,980
Prior years	1,428,994	3,383,164	1,428,994	3,383,164
	2,205,382	**5,132,144**	**2,205,382**	**5,132,144**

Incidents/cases identified in the current year include those listed below:

	Disciplinary steps taken/criminal proceedings	Economic entity		Controlling entity	
		2020	2019	2020	2019
		R'000	R'000	R'000	R'000
Expired contracts	Discliplinary action was taken which led to dismissal. Counselling and training provided for remaining staff.	598,757	1,559,965	598,757	1,559,965
Contracts that exceeded Delegation of Authority	Discliplinary action was taken which led to dismissal. Counselling and training provided for remaining staff.	-	104,770	-	104,770
No tender procedures followed	Discliplinary action was taken which led to dismissal. Counselling and training provided for remaining staff.	168,399	844,987	168,399	844,987
Contract overspend	Discliplinary action was taken which led to dismissal. Counselling and training provided for remaining staff.	-	365,948	-	365,948
Contract not signed	Discliplinary action was taken which led to dismissal. Counselling and training provided for remaining staff.	8,984	-	8,984	-
Expenditure before contract	Discliplinary action was taken which led to dismissal. Counselling and training provided for remaining staff.				
Other non compliance	Discliplinary action was taken which led to dismissal. Counselling and training provided for remaining staff.				
Fraudulent transaction	Discliplinary action was taken which led to dismissal. Counselling and training provided for remaining staff.	248	-	248	-
		776,388	**3,082,438**	**776,388**	**3,082,438**

Amounts condoned

The following amounts have been condoned:

	Condoned by (Condoning authority)	Economic entity		Controlling entity	
		2020	2019	2020	2019
		R'000	R'000	R'000	R'000
	National Treasury	3,681,185	2,310,258	3,681,185	2,310,258
Expired contracts	National Treasury	264,041	2,310,258	264,041	2,310,258
Contracts that exceeded Delegation of Authority	National Treasury	86,191	-	86,191	-
No tender procedures followed	National Treasury	1,744,381	-	1,744,381	-
Contract overspend	National Treasury	962,127	-	962,127	-
Contract not signed	National Treasury	140,009	-	140,009	-
Expenditure before contract	National Treasury	484,436	-	484,436	-
		3,681,185	**2,310,258**	**3,681,185**	**2,310,258**

Amounts condoned

Condoned by (Condoning Authority)

External and internal investigations are being conducted with regards with Procurement and contract management. These investigations may result in additional irregular expenditure, but the nature and extent has not been established to date.

41. Prior-year adjustments

Presented below are those items contained in the statement of financial position and statement of financial performance that have been affected by prior-year adjustments, change in accounting policy and reclassifications:

Statement of financial position

Controlling Entity 2019	Note	As previously reported	Correction of error	Reclassification	Restated
Inventories [1] & [2]	3	151,101	5,270	-	156,371
Receivables from exchange transations [3] & [4]	4	2,001,139	(10,515)	(154,633)	1,835,991
Property, plant and equipment [5] & [6]	8	1,124,033	(36,910)	-	1,087,123
Payables from exchange transactions [2] & [4]	14	(539,608)	7,285	(14,910)	(547,233)
Revaluation Reserve [5]	20	(941,958)	-	169,543	(772,415)
Accumulated surplus		(688,072)	33,153	-	(654,919)
		(1,661,195)	**1,109**	**-**	**(1,660,086)**
		(554,560)	**(608)**	**-**	**(555,168)**

Economic entity - 2019	Note	Correction of error	Reclassification	Reclassification	Restated
Inventories [1] & [2]	3	159,990	5,270	-	165,260
Receivables from exchange transations [3] & [4]	4	2,003,613	(10,515)	(154,633)	1,838,465
Property, plant and equipment [5] & [6]	8	1,125,355	(36,561)	-	1,088,794
Payables from exchange transactions [2] & [4]	14	(541,634)	7,007	(14,910)	(549,537)
Provisions	17	(941,958)	-	169,543	(772,415)
Revaluation Reserve [5]	20	(688,072)	33,153	-	(654,919)
Accumulated surplus		(1,673,008)	1,081	-	(1,671,927)
		(555,714)	**(565)**	**-**	**(556,279)**

[1] During the year it was noted that there was a journal entry processed in the 2016/17 financial year which should have been reversed in the following year but this was not done. This has been corrected. This had an impact on on Accumulated surplus as well.

[2] During the year there was a detailed analysis performed in order to determine if there were any corrections required on accruals. The adjustment to accrued expenses which are included in Payables from exchange transactions resulted in adjustments to inventory, property plant and equipment, cost of sales and operating expenses as per details contained in the statement of financial performance below.

[3.1] During the year it was noted that the amount included in relation to interest receivable was overstated. The impact of the adjustment was a reduction in investment income on the statement of financial performance as per below and an equivalent decrease in the interest receivable which is included in the receivables from exchange transactions.

[3.2] During the year it was noted that there was an amount that was under invoiced to NDOH by NIOH. The impact of the adjustment was an increase to other income on the statement of financial performance as per below and an equivalent increase in receivables from exchange transactions.

[4] During the year there was also a change in classification from Payables from exchange to Receivables from exchange. The impact of the reclassification resulted in a decrease in Receivables from exchange transactions and Payables from exchange transactions.

[5] During the year it was also noted that there was an adjustment required on the revaluation of buidlings.

[6] During the year it was noted there there was an adjustment required on the depreciation of buildings. This adjustment had an impact on the depreciation and the accumulated surplus.

Statement of financial performance

Controlling entity - 2019	Note	As previously reported	Correction of error	Reclassification	Restated
Revenue	21	8,475,253	467	-	8,475,720
Cost of sales	22	(6,727,641)	292	-	(6,727,349)
Other income	23	288,860	170	(12,522)	276,508
Operating expenses	24	(1,249,885)	9,668	12,522	(1,227,695)
Investment income	25	194,256	(11,205)	-	183,051
Surplus (deficit) for the year		**980,843**	**(608)**	**-**	**980,235**

The correction of error above resulted in the surplus for the year being restated from R993 129 to R995 847.

Economic entity - 2019	Note	As previously reported	Correction of error	Reclassification	Restated
Revenue	21	8,502,008	467	-	8,502,475
Cost of sales	22	(6,746,379)	325	-	(6,746,054)
Other income	23	288,863	170	(12,522)	276,511
Operating expenses	24	(1,252,619)	9,678	12,522	(1,230,419)
Investment income	25	194,717	(11,205)	-	183,512
Surplus (deficit) for the year		**986,590**	**(565)**	**-**	**986,025**

The correction of error above resulted in the surplus for the year being restated from R996 412 to R992 521.

Cash flow statement

Economic entity - 2019	Note	As previously reported	Correction of error	Reclassification	Reclassification	Restated
Cash flow from operating activities						
Sale of goods and services	32	8,229,686	48,405	-	(95,490)	8,182,601
Grants	32	694,270	466	-	95,490	790,226
Employee costs	32	(3,623,644)	(6,936)	-	-	(3,630,580)
Suppliers	32	(4,245,251)	(42,898)	-	-	(4,288,149)
		1,055,061	**(963)**	**-**	**-**	**1,054,098**
Cash flow from investing activities						
Purchase of property, plant and equipment		8	(102,450)		963	(101,487)

Controlling entity - 2019	Note	As previously reported	Correction of error	Reclassification	Reclassification	Restated
Cash flow from operating activities						
Sale of goods and services	32	8,203,268	48,533	-	(95,490)	8,156,311
Grants	32	694,270	466	-	95,490	790,226
Employee costs	32	(3,608,543)	(6,936)	-	-	(3,615,479)
Suppliers	32	(4,236,749)	(43,026)	-	-	(4,279,775)
		1,052,246	**(963)**	**-**	**-**	**1,051,283**
Cash flow from investing activities						
Purchase of property, plant and equipment			8	(102,166)	963	(101,203)

42. Segment information

General information

Identification of segments

The economic entity is organised and reports to management on the basis of nine major provinces withing the country. The s egments were organised around the the target market. Management uses these same segments for determining strategic objectives. Segments were aggregated for reporting purposes.

Information reported about these segments is used by management as a basis for evaluating the segments' performances and for making decisions about the allocation of resources. The disclosure of information about these segments is also considered appropriate for external reporting purposes.

Types services by segment

All the segments within the economic entity offer similar services namely laboratory testing, teaching and research services.

Segment surplus or deficit, assets and liabilities

Controlling entity - 2020	Gauteng	Frees State North West	Limpopo Mpumalanga	Western Cape Northern Cape	Eastern Cape	KwaZulu Natal	NIOH & NICD	Grants	Corporate	Total
Revenue										
Revenue from non exchange transactions	183,809	19,398	-	73,268	2,745	33,755	472,531	-	-	785,506
Revenue from exchange	2,493,811	790,348	922,915	1,088,720	887,916	2,204,938	39,944	-	7,449	8,436,041
transactions Other income	31,871	2,039	1,961	17,375	499	10,062	2,820	150,863	(36,810)	180,680
Interest received	-	-	-	-	-	-	38,338	217	276,656	315,211
Total segment revenue	**2,709,491**	**811,785**	**924,876**	**1,179,363**	**891,160**	**2,248,755**	**553,633**	**151,080**	**247,295**	**9,717,438**
Entity's revenue										**9,717,438**
Expenditure										
Cost of sales	1,932,636	622,601	609,971	1,016,312	710,364	1,570,661	458,074	67,793	200,940	7,189,352
Operating expenses	112,491	14,915	2,885	41,665	27,509	73,151	69,928	29,814	921,974	1,294,332
Depreciation and amortisation	27,626	6,271	7,605	10,888	11,503	17,431	32,313	(75)	31,102	144,664
Total segment expenditure	**2,072,753**	**643,787**	**620,461**	**1,068,865**	**749,376**	**1,661,243**	**560,315**	**97,532**	**1,154,016**	**8,628,348**
Total segmental surplus										**1,089,090**
Interest expense										(6,153)
Unallocated assets										6,797,415
Total assets as per Statement of financial Position										**6,797,415**
Unallocated liabilities										2,406,617
Total liabilities as per Statement of financial Position										

Controlling entity - 2019	Gauteng	Frees State North West	Limpopo Mpumalanga	Western Cape Northern Cape	Eastern Cape	KwaZulu Natal	NIOH & NICD	Grants	Corporate	Total
Revenue										
Revenue from non exchange transactions	-	-	-	-	-	-	528,433	-	-	528,433
Revenue from exchange	2,440,436	723,662	853,076	1,087,468	791,268	2,044,756	-	-	6,154	7,946,820
transactions Other income	25,512	2,000	1,923	8,899	490	7,082	43	216,193	-	262,142
Interest received	-	-	-	-	-	-	33,973	227	160,056	194,256
Total segment revenue	**2,465,948**	**725,662**	**854,999**	**1,096,367**	**791,758**	**2,051,838**	**562,449**	**216,420**	**166,210**	**8,931,651**
Entity's revenue										**8,931,651**
Expenditure										
Cost of sales	1,742,919	581,992	556,809	933,448	653,355	1,432,051	426,686	120,897	58,890	6,507,047
Operating expenses	115,112	19,492	1,969	32,117	28,986	70,769	80,681	104,067	766,506	1,219,699
Depreciation and amortisation	45,069	9,619	12,084	21,780	11,671	23,699	30,000	56	96,508	250,486
Total segment expenditure	**1,903,100**	**611,103**	**570,862**	**987,345**	**694,012**	**1,526,519**	**537,367**	**225,020**	**921,904**	**7,977,232**
Total segmental surplus										**954,419**
Interest expense										(10,379)
Unallocated assets										4,624,861
Total assets as per Statement of financial Position										**4,624,861**
Unallocated liabilities										2,389,328
Total liabilities as per Statement of financial Position										**2,389,328**

Measurement of segment surplus or deficit, assets and liabilities

Basis of accounting for transactions between reportable segments

The accounting policies of the segments are the same as those described in the summary of significant accounting policies.

The nature of differences between the measurements of the reportable segments' surplus or deficit and the entity's surplus or deficit and discontinued operations

Inter-segment transfers: segment revenue and segment expense include revenue and expense arising from transfers between segments. Such transfers are usually accounted for at cost and are eliminated on consolidation.

43. Budget differences

Material differences between budget and actual amounts

The budget was prepared on an accruals basis covering the financial year ended 31 March 2020. The variances between budget and actual which are numerically 10% and R100m above or below budget are explained below:

43.1 Grant income

No amounts were budgeted for grants income.

43.2 Interest received

The variance was caused by higher interest rates realised on cash balances as well as more cash received from customers whch was invested temporarily before being utilised.

43.3 Debt Impairment

The variance was caused by the reduction in impairment for Gauteng following settlement agreements.

44. Events after the reporting date - COVID 19

The COVID-19 pandemic has spread to various parts of the world, including South Africa. The impact of COVID-19 has and continues to be a major risk to each and every individual around the globe.

On 15 March 2020, President Cyril Ramaphosa declared a national state of disaster in terms of the Disaster Management Act to enable the government and the country to manage the spreading of the COVID-19 virus. The national government has put the country into a lock down over the last few months at different lock down levels.

NHLS continues to provide pathology services with regards to COVID-19 testing. The global pandemic has put extreme pressures on both the availability and pricing of all items with regards to performing the COVID-19 testing.

NHLS is currently in the process of sourcing goods and suppliers to deal with the COVID-19 pandemic in South Africa. The demand for testing has been steadily increasing on a daily basis and thus the presssure on laboratory services has put extreme strain on the laboratory services system. This situation is not unique to South Africa as similar situations have prevalent in multiple countries where the COVID-19 virus has infected its citizens.

By the end of September 2020, the NHLS has procured goods and services to the value of R3,38 billion for COVID-19-related services and tests which include items such as equipment, reagent testing kits, protective gear, consumables, etc.

The NHLS started billing provincial departments as at the 07 June 2020. The NHLS have not been charging government customers prior to 07 June 2020 for COVID-19 tests being performed however NHLS have received a grant from the Solidarity Fund to the value of R250m which has subsidised a large amount of tests performed at no charge. NHLS will continue to bill for COVID-19 testing based on its current billing model.

At this time it is difficult to determine the impact and time frame of the COVID-19 pandemic however NHLS has positioned itself to respond to the pandemic in the foreseeable future.

45. Fruitless and wasteful expenditure

Interest charged by a supplier	9	-	-	-

46. Covid-19 Virus Donations

NHLS received the following donations in relation to the COVID-19 pandemic:.

Donor Name				
Jack Ma foundation	-	-	-	-
Gift of the givers	-	-	42	-
Right to care	-	-	374	-
Orlando Pirates/Kaizer Chiefs and Multichoice	-	-	19,742	-
	-	-	**20,158**	-

Detailed income statement	Note(s)	Economic entity		Controlling entity	
		2020	2019 Restated*	2020	2019 Restated*
		R'000	R'000	R'000	R'000
Revenue					
Sale of goods		29,117	26,755	-	-
Rendering of services		8,428,133	7,679,047	8,428,133	7,679,047
Miscellaneous other revenue		7,909	6,447	7,909	6,447
Government grants & subsidies		785,506	790,226	785,506	790,226
		9,250,665	**8,502,475**	**9,221,548**	**8,475,720**
Cost of sales	22	**(7,357,448)**	**(6,746,090)**	**(7,332,094)**	**(6,727,349)**
Gross surplus		**1,893,217**	**1,756,385**	**1,889,454**	**1,748,371**
Other income					
Fees earned		970	1,414	970	1,414
Royalties received		4,407	804	4,407	804
Discount received		608	1,363	607	1,360
Recoveries		7	2	7	2
Teaching Income		63,761	45,905	63,761	45,905
Sundry Income		3,444	138	3,444	138
Grant income recognised		102,880	226,885	102,880	226,885
Interest received	25	315,841	183,512	315,212	183,051
Public contributions and donations		4,604	-	4,604	-
Grant assets fair value adjustments		-	22,701	-	22,665
		496,522	**482,724**	**495,892**	**482,224**
Expenses (Refer to page 94)		**(1,300,400)**	**(1,230,455)**	**(1,296,253)**	**(1,2227,695)**
Operating surplus	24	1,089,339	1,008,654	1,089,093	1,002,900
Interest expense	26	(6,278)	(10,753)	(6,153)	(10,379)
Fair value adjustments		**(23)**	**-**	**-**	**-**
		(6,301)	**(10,753)**	**(6,153)**	**(10,379)**
Surplus before taxation		1,083,031	997,902	1,082,947	992,522
Taxation	27	816	2,090	-	-
Surplus for the year		**1,082,222**	**995,811**	**1,082,940**	**992,521**

	Note(s)	Economic entity		Controlling entity	
		2020	2019 Restated*	2020	2019 Restated*
		R'000	R'000	R'000	R'000
Operating expenses (by function)					
Advertising		308	1,526	308	1,526
Archiving and Storage		6,498	7,030	6,498	7,030
Auditors remuneration	30	11,393	12,632	11,059	12,329
Bad debts written off		2,056	12,207	2,056	12,207
Bank charges		12,594	7,654	12,544	7,615
Cleaning		4,793	8,231	4,783	8,187
Computer expenses		1,049	5,093	1,049	5,093
Conferences and seminars		608	835	588	795
Consulting and professional fees		39,582	68,837	39,467	68,794
Consumables		16,646	17,199	16,638	17,162
Debt Impairment		241,871	176,089	239,543	174,924
Debt collection		1,013	1,275	1,013	1,275
Delivery expenses		1,040	1,060	1,037	1,058
Depreciation, amortisation and impairments		1,974	30,107	1,921	30,041
Discount allowed		20,642	15,366	20,642	15,366
Employee costs		286,038	288,382	285,628	288,226
Entertainment		21	119	21	119
Fines and penalties		2	-	2	-
Insurance		6,956	4,857	6,956	4,857
Lease rentals on operating lease		38,733	43,555	38,633	43,397
Legal expenses		17,343	10,727	17,322	10,701
Loss on disposal of assets		3,815	4,814	3,815	4,831
Loss on exchange differences		3,880	3,976	3,870	3,976
Minor assets		5,871	208	5,879	167
Motor vehicle expenses		563	1,090	563	1,090
Other contract expenses		563	1,721	563	1,721
Other expenses		1,172	2,351	1,017	2,351
Packaging		9,329	8,484	9,289	8,342
Petrol and oil		7,297	6,105	7,297	6,105
Printing and stationery		41,300	40,169	41,088	40,083
Postage and courier		133	18	133	18
Project Management expenses		101	677	101	677
Promotions		411	289	411	289
Promotions and sponsorships		37	40	37	40
Repairs and maintenance		55,733	48,355	55,719	48,281
Research Trust		26	22	26	22
Royalties and license fees		3,329	794	3,329	794
Security		1,202	997	1,202	997
Software development expenses		6,373	10,076	6,373	10,076
Software expenses		132,039	105,408	132,039	105,411
Staff welfare		9,827	9,472	9,700	9,337
Subscriptions		579	4,920	540	4,920
Telephone and fax		88,054	85,635	87,949	85,413
Training		43,787	21,102	43,787	21,102
Travel - local		36,918	48,544	36,917	48,543
Travel - overseas		578	307	578	307
Utilities		136,323	112,100	136,323	112,100
		1,300,400	**1,230,455**	**1,296,253**	**1,227,695**

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