NATIONAL HEALTH LABORATORY SERVICE

GeneXpert MTB/RIF

Progress Report

April 2014

NATIONAL HEALTH LABORATORY SERVICE

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Disclaimer: This is a dynamic specimen dataset requiring regular update and it should be noted that figures may change as linkages to individuals tested are updated.

1. Background to Project

This project was initiated at the request of the Honorable Minister of Health, Dr Aaron Motsoaledi, in early 2011, following the World Health Organization's strong recommendation published in December 2010 which stated that "the new automated DNA test for TB be used as the initial diagnostic test in individuals suspected of MDR-TB or HIV/TB". In essence this comprises the majority of TB suspects in South Africa. A pilot study was proposed by the TB Cluster within the National Department of Health (NDoH) while a project feasibility study was being performed with due diligence.

The pilot study was initiated in microscopy centres. The NDoH requested that at least 1 instrument be placed in each province, preferably in high burden districts. Selections were made by the TB cluster, with twenty-five microscopy centres being selected and a total of 30 instruments placed.

The NDoH funded 9 GX16 and 14 GX4 instruments for the project. FIND (The Foundation for Innovative New Diagnostics) donated 6 GX4 analysers and the Infinity or GX48 was supported by PEPFAR Right to Care funds. All instruments were placed by World TB day March 24 2011. This placement represented about 10% of national coverage. The basis for the calculations was an assumption that 2 smears at diagnosis would be replaced by 1 Xpert® MTB/RIF assay. All instruments were interfaced to the NHLS Laboratory Information System (LIS) allowing for troubleshooting and data collection.

Since then, 287 GeneXpert instruments of varying sizes (GX4: 95; GX16:186; GX48: 1; GX80:5) have been placed in 207 sites – both urban and rural settings, by the National Priority Programmes of the NHLS and the NDoH, the progress of which is described in point 6 below.

The programme is being further expanded to directly support the annual screening for TB and HIV of a quarter of a million people in special risk populations in correctional centres and in peri-mining communities. There are 6 districts with high proportion of mines in South Africa that have been identified for focused attention.

2. Assays performed to date

In summary, a total of 3,300,544 specimens have been processed to date (30 April 2014). In April 165,561 specimens were processed. The total % of *Mycobacterium tuberculosis* complex (MTBC) detected in this cohort was 10.29% (17,042). As a reflection of Xpert MTB/RIF's superior sensitivity over microscopy, the average national TB positivity rate among suspects was found to be 8% using microscopy but up to 16-18% in the first year and 13-14% in the second and third year, after introduction of Xpert® MTB/RIF assay. To date Kwa-Zulu Natal (KZN) has performed the greatest number of tests which is probably as a result of the number of instruments placed (refer to tables 1 & 2). Average Rifampicin resistance detection rates have remained around 7% since project inception (Refer to tables 3 & 4).

Table 1: GeneXpert MTB Results by province (cumulative)

Province	Year	Month	MTB Detected	MTB Not Detected	Test Unsuccessful	Total	% MTB Detected
Eastern Cape	2011	3	1	116		**120**	**0.83**
Eastern Cape	2011	4	130	709	24	**867**	**14.99**
Eastern Cape	2011	5	222	1 030	101	**1 358**	**16.35**
Eastern Cape	2011	6	259	1 252	27	**1 544**	**16.77**
Eastern Cape	2011	7	281	1 315	20	**1 623**	**17.31**
Eastern Cape	2011	8	391	1 848	61	**2 308**	**16.94**
Eastern Cape	2011	9	374	1 950	60	**2 393**	**15.63**
Eastern Cape	2011	10	573	2 740	89	**3 412**	**16.79**
Eastern Cape	2011	11	512	2 351	93	**2 967**	**17.26**
Eastern Cape	2011	12	542	2 030	76	**2 660**	**20.38**
Eastern Cape	2012	1	962	4 130	145	**5 238**	**18.37**
Eastern Cape	2012	2	912	4 356	119	**5 389**	**16.92**
Eastern Cape	2012	3	803	4 773	190	**5 769**	**13.92**
Eastern Cape	2012	4	858	4 352	256	**5 470**	**15.69**
Eastern Cape	2012	5	1 251	6 789	348	**8 393**	**14.91**
Eastern Cape	2012	6	953	6 053	294	**7 306**	**13.04**
Eastern Cape	2012	7	998	5 678	227	**6 910**	**14.44**
Eastern Cape	2012	8	1 271	7 384	231	**8 894**	**14.29**
Eastern Cape	2012	9	1 182	6 503	208	**7 902**	**14.96**
Eastern Cape	2012	10	2 067	10 873	352	**13 302**	**15.54**
Eastern Cape	2012	11	2 822	15 947	336	**19 116**	**14.76**
Eastern Cape	2012	12	1 961	8 750	186	**10 909**	**17.98**

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Eastern Cape	2013	1	3 016	13 302	454	**16 773**	**17.98**
Eastern Cape	2013	2	2 682	14 851	378	**17 913**	**14.97**
Eastern Cape	2013	3	2 777	17 920	493	**21 193**	**13.10**
Eastern Cape	2013	4	3 317	22 234	830	**26 385**	**12.57**
Eastern Cape	2013	5	3 982	31 554	1 257	**36 798**	**10.82**
Eastern Cape	2013	6	3 087	23 403	1 081	**27 577**	**11.19**
Eastern Cape	2013	7	4 253	31 212	1 020	**36 492**	**11.65**
Eastern Cape	2013	8	4 334	35 276	1 135	**40 753**	**10.63**
Eastern Cape	2013	9	4 223	32 014	779	**37 025**	**11.41**
Eastern Cape	2013	10	4 493	32 871	928	**38 302**	**11.73**
Eastern Cape	2013	11	4 092	30 005	751	**34 859**	**11.74**
Eastern Cape	2013	12	2 945	15 997	381	**19 335**	**15.23**
Eastern Cape	2014	1	4 669	24 816	562	**30 048**	**15.54**
Eastern Cape	2014	2	3 168	23 973	546	**27 689**	**11.44**
Eastern Cape	2014	3	3 704	32 048	774	**36 529**	**10.14**
Eastern Cape	2014	4	2 048	16 297	378	**18 727**	**10.94**
Free State	2011	4	11	29		**44**	**25.00**
Free State	2011	5	232	1 235	6	**1 478**	**15.70**
Free State	2011	6	249	1 284	1	**1 540**	**16.17**
Free State	2011	7	268	1 498		**1 773**	**15.12**
Free State	2011	8	304	1 654	1	**1 967**	**15.46**
Free State	2011	9	303	1 714	3	**2 029**	**14.93**
Free State	2011	10	377	1 895		**2 282**	**16.52**
Free State	2011	11	537	2 795	17	**3 360**	**15.98**
Free State	2011	12	525	2 462	5	**3 004**	**17.48**
Free State	2012	1	724	3 479	11	**4 215**	**17.18**
Free State	2012	2	700	4 324	21	**5 047**	**13.87**
Free State	2012	3	812	6 012	7	**6 834**	**11.88**
Free State	2012	4	637	4 112	18	**4 771**	**13.35**
Free State	2012	5	865	5 885	41	**6 796**	**12.73**
Free State	2012	6	1 042	6 857	30	**7 935**	**13.13**
Free State	2012	7	1 028	6 648	13	**7 696**	**13.36**
Free State	2012	8	1 064	7 509	8	**8 589**	**12.39**
Free State	2012	9	1 079	7 616	12	**8 716**	**12.38**
Free State	2012	10	1 487	9 845	43	**11 385**	**13.06**
Free State	2012	11	1 296	9 508	51	**10 866**	**11.93**
Free State	2012	12	881	5 217	25	**6 135**	**14.36**
Free State	2013	1	1 249	8 063	38	**9 351**	**13.36**
Free State	2013	2	979	7 875	62	**8 918**	**10.98**

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Free State	2013	3	1 075	9 868	111	**11 057**	**9.72**
Free State	2013	4	1 110	9 953	75	**11 142**	**9.96**
Free State	2013	5	1 289	12 445	111	**13 850**	**9.31**
Free State	2013	6	977	10 543	89	**11 615**	**8.41**
Free State	2013	7	1 500	16 748	188	**18 443**	**8.13**
Free State	2013	8	1 379	15 477	114	**16 978**	**8.12**
Free State	2013	9	1 356	14 221	130	**15 716**	**8.63**
Free State	2013	10	1 446	13 367	138	**14 961**	**9.67**
Free State	2013	11	1 304	11 958	139	**13 412**	**9.72**
Free State	2013	12	925	6 803	76	**7 816**	**11.83**
Free State	2014	1	1 450	11 071	84	**12 606**	**11.50**
Free State	2014	2	906	8 787	90	**9 785**	**9.26**
Free State	2014	3	1 082	11 933	144	**13 162**	**8.22**
Free State	2014	4	1 117	11 297	136	**12 554**	**8.90**
Gauteng	2011	3	42	379	5	**429**	**9.79**
Gauteng	2011	4	73	372	14	**463**	**15.77**
Gauteng	2011	5	315	1 474	46	**1 840**	**17.12**
Gauteng	2011	6	211	1 139	28	**1 384**	**15.25**
Gauteng	2011	7	240	1 552	17	**1 816**	**13.22**
Gauteng	2011	8	339	2 305	55	**2 707**	**12.52**
Gauteng	2011	9	323	2 311	86	**2 729**	**11.84**
Gauteng	2011	10	447	2 866	87	**3 410**	**13.11**
Gauteng	2011	11	550	3 614	51	**4 226**	**13.01**
Gauteng	2011	12	470	2 474	34	**2 990**	**15.72**
Gauteng	2012	1	529	3 139	58	**3 727**	**14.19**
Gauteng	2012	2	442	3 063	61	**3 568**	**12.39**
Gauteng	2012	3	493	3 811	72	**4 379**	**11.26**
Gauteng	2012	4	491	3 925	111	**4 531**	**10.84**
Gauteng	2012	5	794	5 774	92	**6 665**	**11.91**
Gauteng	2012	6	800	5 797	186	**6 789**	**11.78**
Gauteng	2012	7	836	5 965	127	**6 935**	**12.05**
Gauteng	2012	8	1 058	8 011	392	**9 469**	**11.17**
Gauteng	2012	9	1 019	6 343	226	**7 597**	**13.41**
Gauteng	2012	10	1 406	8 785	382	**10 583**	**13.29**
Gauteng	2012	11	1 860	11 190	371	**13 432**	**13.85**
Gauteng	2012	12	1 222	6 514	188	**7 936**	**15.40**
Gauteng	2013	1	1 723	10 413	345	**12 482**	**13.80**
Gauteng	2013	2	1 610	11 015	448	**13 075**	**12.31**
Gauteng	2013	3	1 673	12 005	510	**14 191**	**11.79**

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Gauteng	2013	4	2 018	14 765	664	**17 451**	**11.56**
Gauteng	2013	5	2 244	17 414	866	**20 529**	**10.93**
Gauteng	2013	6	2 049	15 620	831	**18 506**	**11.07**
Gauteng	2013	7	3 062	20 453	932	**24 454**	**12.52**
Gauteng	2013	8	3 211	23 884	799	**27 902**	**11.51**
Gauteng	2013	9	3 277	23 332	637	**27 255**	**12.02**
Gauteng	2013	10	3 594	23 117	608	**27 329**	**13.15**
Gauteng	2013	11	3 585	23 849	591	**28 036**	**12.79**
Gauteng	2013	12	2 586	14 492	329	**17 419**	**14.85**
Gauteng	2014	1	3 430	22 363	620	**26 414**	**12.99**
Gauteng	2014	2	2 532	18 522	568	**21 624**	**11.71**
Gauteng	2014	3	3 096	28 142	832	**32 073**	**9.65**
Gauteng	2014	4	2 757	23 911	705	**27 377**	**10.07**
Kwa-Zulu Natal	2011	3	4	5		**12**	**33.33**
Kwa-Zulu Natal	2011	4	5	3		**12**	**41.67**
Kwa-Zulu Natal	2011	5		2		**7**	**-**
Kwa-Zulu Natal	2011	6		5		**11**	**-**
Kwa-Zulu Natal	2011	7	835	2 888	119	**3 849**	**21.69**
Kwa-Zulu Natal	2011	8	1 362	4 991	175	**6 536**	**20.84**
Kwa-Zulu Natal	2011	9	1 362	5 497	208	**7 076**	**19.25**
Kwa-Zulu Natal	2011	10	1 281	6 096	108	**7 495**	**17.09**
Kwa-Zulu Natal	2011	11	1 399	6 586	146	**8 142**	**17.18**
Kwa-Zulu Natal	2011	12	1 292	4 457	138	**5 899**	**21.90**
Kwa-Zulu Natal	2012	1	1 398	5 486	123	**7 008**	**19.95**
Kwa-Zulu Natal	2012	2	1 536	6 965	191	**8 694**	**17.67**
Kwa-Zulu Natal	2012	3	1 721	8 730	339	**10 793**	**15.95**
Kwa-Zulu Natal	2012	4	1 501	8 444	377	**10 326**	**14.54**
Kwa-Zulu Natal	2012	5	1 911	9 708	474	**12 098**	**15.80**
Kwa-Zulu Natal	2012	6	1 865	11 655	518	**14 044**	**13.28**
Kwa-Zulu Natal	2012	7	1 556	10 424	397	**12 384**	**12.56**
Kwa-Zulu Natal	2012	8	1 953	12 416	476	**14 853**	**13.15**
Kwa-Zulu Natal	2012	9	2 241	15 429	633	**18 312**	**12.24**
Kwa-Zulu Natal	2012	10	3 131	18 202	920	**22 263**	**14.06**
Kwa-Zulu Natal	2012	11	2 706	16 081	794	**19 592**	**13.81**
Kwa-Zulu Natal	2012	12	2 403	12 271	671	**15 357**	**15.65**
Kwa-Zulu Natal	2013	1	3 234	15 860	1 062	**20 157**	**16.04**
Kwa-Zulu Natal	2013	2	2 358	16 158	916	**19 434**	**12.13**
Kwa-Zulu Natal	2013	3	3 040	20 644	1 184	**24 871**	**12.22**
Kwa-Zulu Natal	2013	4	2 386	16 845	872	**20 107**	**11.87**
Kwa-Zulu Natal	2013	5	2 994	23 031	1 538	**27 568**	**10.86**
Kwa-Zulu Natal	2013	6	2 492	17 724	1 181	**21 403**	**11.64**

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Kwa-Zulu Natal	2013	7	3 992	27 106	1 481	**32 586**	**12.25**
Kwa-Zulu Natal	2013	8	4 159	31 229	1 917	**37 313**	**11.15**
Kwa-Zulu Natal	2013	9	4 485	33 718	1 769	**39 981**	**11.22**
Kwa-Zulu Natal	2013	10	5 141	36 616	1 435	**43 202**	**11.90**
Kwa-Zulu Natal	2013	11	4 955	36 051	1 198	**42 215**	**11.74**
Kwa-Zulu Natal	2013	12	3 859	24 456	962	**29 289**	**13.18**
Kwa-Zulu Natal	2014	1	5 340	36 144	1 141	**42 626**	**12.53**
Kwa-Zulu Natal	2014	2	3 895	33 234	1 041	**38 172**	**10.20**
Kwa-Zulu Natal	2014	3	4 491	43 341	1 740	**49 575**	**9.06**
Kwa-Zulu Natal	2014	4	4 331	36 288	1 603	**42 226**	**10.26**
Limpopo	2011	3	6	11		**20**	**30.00**
Limpopo	2011	4	87	884	12	**987**	**8.81**
Limpopo	2011	5	196	1 448	18	**1 667**	**11.76**
Limpopo	2011	6	214	1 722	34	**1 976**	**10.83**
Limpopo	2011	7	208	1 959	9	**2 183**	**9.53**
Limpopo	2011	8	199	2 064	14	**2 285**	**8.71**
Limpopo	2011	9	276	2 643	20	**2 948**	**9.36**
Limpopo	2011	10	308	2 849	31	**3 198**	**9.63**
Limpopo	2011	11	276	2 314	17	**2 618**	**10.54**
Limpopo	2011	12	202	1 342	17	**1 573**	**12.84**
Limpopo	2012	1	240	1 456	28	**1 725**	**13.91**
Limpopo	2012	2	223	1 889	33	**2 147**	**10.39**
Limpopo	2012	3	246	2 411	68	**2 728**	**9.02**
Limpopo	2012	4	170	1 447	32	**1 653**	**10.28**
Limpopo	2012	5	176	1 537	19	**1 737**	**10.13**
Limpopo	2012	6	160	1 661	30	**1 857**	**8.62**
Limpopo	2012	7	220	1 477	32	**1 736**	**12.67**
Limpopo	2012	8	165	1 691	36	**1 900**	**8.68**
Limpopo	2012	9	334	2 585	21	**2 949**	**11.33**
Limpopo	2012	10	490	3 331	72	**3 903**	**12.55**
Limpopo	2012	11	743	5 972	161	**6 887**	**10.79**
Limpopo	2012	12	825	5 248	155	**6 240**	**13.22**
Limpopo	2013	1	1 007	6 250	227	**7 485**	**13.45**
Limpopo	2013	2	897	9 496	501	**10 896**	**8.23**
Limpopo	2013	3	895	11 775	519	**13 192**	**6.78**
Limpopo	2013	4	1 017	11 341	518	**12 880**	**7.90**
Limpopo	2013	5	1 113	15 401	615	**17 134**	**6.50**
Limpopo	2013	6	963	14 288	615	**15 872**	**6.07**
Limpopo	2013	7	1 441	23 460	647	**25 555**	**5.64**
Limpopo	2013	8	1 295	25 143	734	**27 180**	**4.76**
Limpopo	2013	9	1 308	23 146	495	**24 958**	**5.24**

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Limpopo	2013	10	1 421	19 208	464	**21 103**	**6.73**
Limpopo	2013	11	1 288	16 215	454	**17 968**	**7.17**
Limpopo	2013	12	1 100	9 713	307	**11 132**	**9.88**
Limpopo	2014	1	1 295	13 036	404	**14 736**	**8.79**
Limpopo	2014	2	934	12 990	467	**14 393**	**6.49**
Limpopo	2014	3	1 129	18 928	724	**20 784**	**5.43**
Limpopo	2014	4	1 148	17 551	623	**19 326**	**5.94**
Mpumalanga	2011	3	64	286	24	**377**	**16.98**
Mpumalanga	2011	4	213	1 042	93	**1 352**	**15.75**
Mpumalanga	2011	5	272	1 338	249	**1 864**	**14.59**
Mpumalanga	2011	6	265	1 573	183	**2 027**	**13.07**
Mpumalanga	2011	7	353	1 547	45	**1 952**	**18.08**
Mpumalanga	2011	8	300	1 271	84	**1 663**	**18.04**
Mpumalanga	2011	9	273	1 380	187	**1 849**	**14.76**
Mpumalanga	2011	10	352	1 639	102	**2 103**	**16.74**
Mpumalanga	2011	11	314	1 631	93	**2 049**	**15.32**
Mpumalanga	2011	12	214	923	42	**1 191**	**17.97**
Mpumalanga	2012	1	269	1 295	86	**1 651**	**16.29**
Mpumalanga	2012	2	281	1 389	89	**1 761**	**15.96**
Mpumalanga	2012	3	300	1 563	66	**1 932**	**15.53**
Mpumalanga	2012	4	179	1 111	75	**1 369**	**13.08**
Mpumalanga	2012	5	238	1 444	101	**1 788**	**13.31**
Mpumalanga	2012	6	287	1 982	103	**2 378**	**12.07**
Mpumalanga	2012	7	367	2 211	93	**2 678**	**13.70**
Mpumalanga	2012	8	410	2 497	92	**3 007**	**13.63**
Mpumalanga	2012	9	439	2 116	96	**2 660**	**16.50**
Mpumalanga	2012	10	504	2 465	149	**3 128**	**16.11**
Mpumalanga	2012	11	441	2 362	114	**2 928**	**15.06**
Mpumalanga	2012	12	306	1 432	54	**1 804**	**16.96**
Mpumalanga	2013	1	452	2 135	105	**2 693**	**16.78**
Mpumalanga	2013	2	419	2 634	155	**3 210**	**13.05**
Mpumalanga	2013	3	514	3 088	147	**3 752**	**13.70**
Mpumalanga	2013	4	512	3 024	127	**3 667**	**13.96**
Mpumalanga	2013	5	678	3 481	130	**4 294**	**15.79**
Mpumalanga	2013	6	589	3 475	168	**4 238**	**13.90**
Mpumalanga	2013	7	1 021	5 465	210	**6 703**	**15.23**
Mpumalanga	2013	8	1 203	8 084	381	**9 676**	**12.43**
Mpumalanga	2013	9	1 260	8 387	270	**9 926**	**12.69**
Mpumalanga	2013	10	1 283	8 190	242	**9 725**	**13.19**

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Mpumalanga	2013	11	1 179	7 718	202	**9 110**	**12.94**
Mpumalanga	2013	12	969	5 214	192	**6 387**	**15.17**
Mpumalanga	2014	1	1 245	6 873	222	**8 341**	**14.93**
Mpumalanga	2014	2	848	5 902	159	**6 911**	**12.27**
Mpumalanga	2014	3	1 212	9 902	318	**11 435**	**10.60**
Mpumalanga	2014	4	1 111	8 609	363	**10 087**	**11.01**
North West	2011	4	83	469	4	**560**	**14.82**
North West	2011	5	285	1 290	57	**1 637**	**17.41**
North West	2011	6	323	1 446	30	**1 805**	**17.89**
North West	2011	7	356	1 438	33	**1 834**	**19.41**
North West	2011	8	479	1 961	45	**2 493**	**19.21**
North West	2011	9	539	2 228	141	**2 917**	**18.48**
North West	2011	10	485	2 362	155	**3 012**	**16.10**
North West	2011	11	501	1 863	89	**2 464**	**20.33**
North West	2011	12	360	1 485	90	**1 947**	**18.49**
North West	2012	1	413	1 692	54	**2 160**	**19.12**
North West	2012	2	359	1 474	76	**1 911**	**18.79**
North West	2012	3	338	1 986	163	**2 490**	**13.57**
North West	2012	4	263	1 649	135	**2 051**	**12.82**
North West	2012	5	290	1 834	200	**2 329**	**12.45**
North West	2012	6	346	2 177	263	**2 792**	**12.39**
North West	2012	7	365	2 021	117	**2 510**	**14.54**
North West	2012	8	251	1 435	119	**1 813**	**13.84**
North West	2012	9	502	3 077	169	**3 757**	**13.36**
North West	2012	10	725	4 180	199	**5 114**	**14.18**
North West	2012	11	732	4 327	299	**5 369**	**13.63**
North West	2012	12	590	3 152	182	**3 936**	**14.99**
North West	2013	1	876	4 670	268	**5 815**	**15.06**
North West	2013	2	793	5 635	267	**6 697**	**11.84**
North West	2013	3	804	6 229	257	**7 293**	**11.02**
North West	2013	4	853	6 285	322	**7 464**	**11.43**
North West	2013	5	903	7 438	531	**8 877**	**10.17**
North West	2013	6	792	6 327	572	**7 697**	**10.29**
North West	2013	7	1 290	9 978	479	**11 754**	**10.97**
North West	2013	8	1 266	10 741	506	**12 521**	**10.11**
North West	2013	9	1 232	10 332	491	**12 064**	**10.21**
North West	2013	10	1 387	10 920	507	**12 824**	**10.82**
North West	2013	11	1 365	10 670	483	**12 529**	**10.89**
North West	2013	12	1 016	6 602	292	**7 922**	**12.83**

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North West	2014	1	1 525	10 188	625	**12 339**	**12.36**
North West	2014	2	1 123	10 686	461	**12 272**	**9.15**
North West	2014	3	1 523	15 194	721	**17 441**	**8.73**
North West	2014	4	1 229	11 507	627	**13 367**	**9.19**
Northern Cape	2011	3	31	229	7	**270**	**11.48**
Northern Cape	2011	4	123	713	27	**867**	**14.19**
Northern Cape	2011	5	232	1 162	96	**1 495**	**15.52**
Northern Cape	2011	6	273	1 661	155	**2 095**	**13.03**
Northern Cape	2011	7	376	2 426	68	**2 877**	**13.07**
Northern Cape	2011	8	396	2 392	109	**2 905**	**13.63**
Northern Cape	2011	9	390	2 428	89	**2 916**	**13.37**
Northern Cape	2011	10	512	2 785	110	**3 417**	**14.98**
Northern Cape	2011	11	339	1 618	58	**2 026**	**16.73**
Northern Cape	2011	12	179	613	17	**821**	**21.80**
Northern Cape	2012	1	171	559	20	**751**	**22.77**
Northern Cape	2012	2	303	1 619	76	**2 000**	**15.15**
Northern Cape	2012	3	462	2 665	142	**3 272**	**14.12**
Northern Cape	2012	4	279	1 419	86	**1 788**	**15.60**
Northern Cape	2012	5	346	1 939	163	**2 453**	**14.11**
Northern Cape	2012	6	320	2 217	185	**2 728**	**11.73**
Northern Cape	2012	7	332	1 822	113	**2 274**	**14.60**
Northern Cape	2012	8	316	1 756	82	**2 162**	**14.62**
Northern Cape	2012	9	445	2 568	64	**3 086**	**14.42**
Northern Cape	2012	10	508	2 502	94	**3 114**	**16.31**
Northern Cape	2012	11	543	2 759	125	**3 438**	**15.79**
Northern Cape	2012	12	407	1 827	42	**2 288**	**17.79**
Northern Cape	2013	1	748	3 017	213	**3 979**	**18.80**
Northern Cape	2013	2	568	3 470	221	**4 261**	**13.33**
Northern Cape	2013	3	638	4 641	154	**5 436**	**11.74**
Northern Cape	2013	4	610	4 112	209	**4 935**	**12.36**
Northern Cape	2013	5	640	4 452	295	**5 392**	**11.87**
Northern Cape	2013	6	477	3 212	191	**3 886**	**12.27**
Northern Cape	2013	7	704	4 755	233	**5 699**	**12.35**
Northern Cape	2013	8	741	5 451	303	**6 503**	**11.39**
Northern Cape	2013	9	759	5 232	222	**6 222**	**12.20**
Northern Cape	2013	10	753	5 479	237	**6 479**	**11.62**
Northern Cape	2013	11	712	5 027	248	**5 998**	**11.87**
Northern Cape	2013	12	566	3 163	92	**3 833**	**14.77**
Northern Cape	2014	1	789	4 203	249	**5 242**	**15.05**

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Northern Cape	2014	2	544	3 814	238	**4 598**	**11.83**
Northern Cape	2014	3	614	5 000	271	**5 888**	**10.43**
Northern Cape	2014	4	644	4 078	335	**5 061**	**12.72**
Western Cape	2011	3	13	36		**52**	**25.00**
Western Cape	2011	4	8	17	1	**30**	**26.67**
Western Cape	2011	6	3	9		**18**	**16.67**
Western Cape	2011	7	6	22		**35**	**17.14**
Western Cape	2011	8	165	785	7	**965**	**17.10**
Western Cape	2011	9	202	1 096	4	**1 311**	**15.41**
Western Cape	2011	10	402	1 982	3	**2 397**	**16.77**
Western Cape	2011	11	660	3 126	14	**3 811**	**17.32**
Western Cape	2011	12	681	2 711	15	**3 419**	**19.92**
Western Cape	2012	1	973	3 395	15	**4 384**	**22.19**
Western Cape	2012	2	1 007	4 671	29	**5 709**	**17.64**
Western Cape	2012	3	992	5 325	15	**6 335**	**15.66**
Western Cape	2012	4	740	3 815	20	**4 579**	**16.16**
Western Cape	2012	5	870	5 137	26	**6 038**	**14.41**
Western Cape	2012	6	931	5 835	25	**6 797**	**13.70**
Western Cape	2012	7	899	5 684	34	**6 624**	**13.57**
Western Cape	2012	8	923	5 098	36	**6 065**	**15.22**
Western Cape	2012	9	1 220	6 694	62	**7 985**	**15.28**
Western Cape	2012	10	1 609	8 467	127	**10 213**	**15.75**
Western Cape	2012	11	1 675	8 639	149	**10 474**	**15.99**
Western Cape	2012	12	1 212	4 754	108	**6 086**	**19.91**
Western Cape	2013	1	1 990	7 744	161	**9 896**	**20.11**
Western Cape	2013	2	1 906	9 489	249	**11 646**	**16.37**
Western Cape	2013	3	1 938	11 691	196	**13 828**	**14.02**
Western Cape	2013	4	2 319	11 684	312	**14 319**	**16.20**
Western Cape	2013	5	2 496	15 075	357	**17 933**	**13.92**
Western Cape	2013	6	2 341	13 193	249	**15 789**	**14.83**
Western Cape	2013	7	3 047	16 502	272	**19 828**	**15.37**
Western Cape	2013	8	3 061	17 588	372	**21 029**	**14.56**
Western Cape	2013	9	3 130	16 710	227	**20 076**	**15.59**
Western Cape	2013	10	3 398	18 779	176	**22 363**	**15.19**
Western Cape	2013	11	3 092	17 974	174	**21 251**	**14.55**
Western Cape	2013	12	2 412	11 086	145	**13 655**	**17.66**
Western Cape	2014	1	3 451	14 162	197	**17 811**	**19.38**
Western Cape	2014	2	2 960	15 618	150	**18 730**	**15.80**
Western Cape	2014	3	2 640	14 839	172	**17 654**	**14.95**
Western Cape	2014	4	2 657	13 943	268	**16 872**	**15.75**
Total			**406 433**	**2 801 243**	**92 868**	**3 300 544**	**12.31**

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NATIONAL HEALTH LABORATORY SERVICE

Table 2: GeneXpert MTB Results by province (01-30 April 2014)

Province	MTB Detected	MTB Not Detected	Test Unsuccessful	Total	% MTB Detected
Eastern Cape	2 048	16 297	378	**18 723**	**10.94**
Free State	1 117	11 297	136	**12 550**	**8.90**
Gauteng	2 757	23 911	705	**27 373**	**10.07**
Kwa-Zulu Natal	4 331	36 288	1 603	**42 222**	**10.26**
Limpopo	1 148	17 551	623	**19 322**	**5.94**
Mpumalanga	1 111	8 609	363	**10 083**	**11.02**
North West	1 229	11 507	627	**13 363**	**9.20**
Northern Cape	644	4 078	335	**5 057**	**12.73**
Western Cape	2 657	13 943	268	**16 868**	**15.75**
Total	**17 042**	**143 481**	**5 038**	**165 561**	**10.29**

Table 3: Provincial GeneXpert RIF Results in MTB detected cases (01-30 April 2014)

Province	Inconclusive	Resistant	Sensitive	No Results	Grand Total	% Rif Resistant
Eastern Cape	91	154	1 796	7	2 048	7.52
Free State	57	72	988		1 117	6.45
Gauteng	85	179	2 486	7	2 757	6.49
Kwa-Zulu Natal	174	387	3 748	22	4 331	8.94
Limpopo	34	46	1 064	4	1 148	4.01
Mpumalanga	38	99	974		1 111	8.91
North West	68	64	1 096	1	1 229	5.21
Northern Cape	43	29	570	2	644	4.50
Western Cape	41	154	2 462		2 657	5.80
Grand Total	**631**	**1 184**	**15 184**	**43**	**17 042**	**6.95**

Table 4: Provincial GeneXpert RIF Results in MTB detected cases (cumulative)

Province	Year	Month	Inconclusive	Resistant	Sensitive	No RIF Result	Total	% RIF Resistant
EASTERN CAPE	2011	4		12	120		**132**	9.09
EASTERN CAPE	2011	5		16	203	1	**220**	7.27
EASTERN CAPE	2011	6	2	20	235	2	**259**	7.72
EASTERN CAPE	2011	7	1	19	248	10	**278**	6.83
EASTERN CAPE	2011	8	1	30	335	24	**390**	7.69

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EASTERN CAPE	2011	9	5	26	331	5	**367**	7.08
EASTERN CAPE	2011	10	15	37	510	7	**569**	6.50
EASTERN CAPE	2011	11	4	40	459		**503**	7.95
EASTERN CAPE	2011	12	5	48	479	3	**535**	8.97
EASTERN CAPE	2012	1	12	71	865	3	**951**	7.47
EASTERN CAPE	2012	2	12	66	803	15	**896**	7.37
EASTERN CAPE	2012	3	11	65	693	3	**772**	8.42
EASTERN CAPE	2012	4	18	53	765	3	**839**	6.32
EASTERN CAPE	2012	5	23	88	1 088	21	**1 220**	7.21
EASTERN CAPE	2012	6	12	57	853	7	**929**	6.14
EASTERN CAPE	2012	7	10	49	895	6	**960**	5.10
EASTERN CAPE	2012	8	14	68	1 157	4	**1 243**	5.47
EASTERN CAPE	2012	9	12	68	1 053	3	**1 136**	5.99
EASTERN CAPE	2012	10	22	147	1 866	3	**2 038**	7.21
EASTERN CAPE	2012	11	43	174	2 486	29	**2 732**	6.37
EASTERN CAPE	2012	12	19	157	1 735	34	**1 945**	8.07
EASTERN CAPE	2013	1	46	206	2 683	42	**2 977**	6.92
EASTERN CAPE	2013	2	65	187	2 398	31	**2 681**	6.98
EASTERN CAPE	2013	3	52	218	2 494	10	**2 774**	7.86
EASTERN CAPE	2013	4	39	232	3 040	2	**3 313**	7.00
EASTERN CAPE	2013	5	115	255	3 457	11	**3 838**	6.64
EASTERN CAPE	2013	6	99	217	2 806	25	**3 147**	6.90
EASTERN CAPE	2013	7	123	262	3 964	2	**4 351**	6.02
EASTERN CAPE	2013	8	173	285	3 864	6	**4 328**	6.59
EASTERN CAPE	2013	9	179	224	3 549	2	**3 954**	5.67
EASTERN CAPE	2013	10	119	179	2 567	8	**2 873**	6.23
EASTERN CAPE	2013	11	63	223	3 115	7	**3 408**	6.54
EASTERN CAPE	2013	12	41	141	2 632	2	**2 816**	5.01
EASTERN CAPE	2014	1	87	287	4 367	7	**4 748**	6.04
EASTERN CAPE	2014	2	80	176	2 969	1	**3 226**	5.46
EASTERN CAPE	2014	3	122	252	3 408	3	**3 785**	6.66
EASTERN CAPE	2014	4	98	160	1 861	7	**2 126**	7.53
FREE STATE	2011	4			11		**11**	-
FREE STATE	2011	5	2	15	215		**232**	6.47
FREE STATE	2011	6	2	11	233		**246**	4.47
FREE STATE	2011	7	2	16	250		**268**	5.97
FREE STATE	2011	8	5	14	283	1	**303**	4.62
FREE STATE	2011	9	6	17	287	1	**311**	5.47
FREE STATE	2011	10	3	29	346		**378**	7.67

FREE STATE	2011	11	5	26	512		**543**	4.79
FREE STATE	2011	12	3	27	489		**519**	5.20
FREE STATE	2012	1	13	47	651		**711**	6.61
FREE STATE	2012	2	13	40	658		**711**	5.63
FREE STATE	2012	3	12	48	753	5	**818**	5.87
FREE STATE	2012	4	8	45	585		**638**	7.05
FREE STATE	2012	5	12	51	792	19	**874**	5.84
FREE STATE	2012	6	16	60	969		**1 045**	5.74
FREE STATE	2012	7	11	48	948		**1 007**	4.77
FREE STATE	2012	8	6	55	1 000		**1 061**	5.18
FREE STATE	2012	9	8	79	997	2	**1 086**	7.27
FREE STATE	2012	10	25	102	1 360		**1 487**	6.86
FREE STATE	2012	11	29	118	1 110		**1 257**	9.39
FREE STATE	2012	12	7	59	818		**884**	6.67
FREE STATE	2013	1	20	59	1 177		**1 256**	4.70
FREE STATE	2013	2	25	44	907	5	**981**	4.49
FREE STATE	2013	3	26	70	978	1	**1 075**	6.51
FREE STATE	2013	4	27	65	1 011		**1 103**	5.89
FREE STATE	2013	5	34	77	1 127	1	**1 239**	6.21
FREE STATE	2013	6	16	61	892	2	**971**	6.28
FREE STATE	2013	7	27	86	1 289	5	**1 407**	6.11
FREE STATE	2013	8	53	77	1 185	3	**1 318**	5.84
FREE STATE	2013	9	77	71	1 096		**1 244**	5.71
FREE STATE	2013	10	15	33	769	1	**818**	4.03
FREE STATE	2013	11	13	58	994	1	**1 066**	5.44
FREE STATE	2013	12	12	36	799		**847**	4.25
FREE STATE	2014	1	26	89	1 328		**1 443**	6.17
FREE STATE	2014	2	22	52	832		**906**	5.74
FREE STATE	2014	3	43	61	975	2	**1 081**	5.64
FREE STATE	2014	4	58	69	987		**1 114**	6.19
GAUTENG	2011	3		3	39		**42**	7.14
GAUTENG	2011	4	1	5	71		**77**	6.49
GAUTENG	2011	5		32	287		**319**	10.03
GAUTENG	2011	6	2	11	211		**224**	4.91
GAUTENG	2011	7	2	17	227		**246**	6.91
GAUTENG	2011	8	5	15	327		**347**	4.32
GAUTENG	2011	9	2	20	316		**338**	5.92
GAUTENG	2011	10	3	20	435	1	**459**	4.36
GAUTENG	2011	11	3	35	524		**562**	6.23

GAUTENG	2011	12	7	21	451		**479**	4.38
GAUTENG	2012	1	4	38	504		**546**	6.96
GAUTENG	2012	2	7	29	412		**448**	6.47
GAUTENG	2012	3	9	38	472	3	**522**	7.28
GAUTENG	2012	4	5	47	446		**498**	9.44
GAUTENG	2012	5	10	62	726	2	**800**	7.75
GAUTENG	2012	6	9	52	747		**808**	6.44
GAUTENG	2012	7	7	58	782	2	**849**	6.83
GAUTENG	2012	8	13	64	987		**1 064**	6.02
GAUTENG	2012	9	12	74	952		**1 038**	7.13
GAUTENG	2012	10	18	87	1 310		**1 415**	6.15
GAUTENG	2012	11	24	123	1 613	56	**1 816**	6.77
GAUTENG	2012	12	18	91	1 127	13	**1 249**	7.29
GAUTENG	2013	1	27	140	1 609	1	**1 777**	7.88
GAUTENG	2013	2	34	92	1 521	7	**1 654**	5.56
GAUTENG	2013	3	24	103	1 560	3	**1 690**	6.09
GAUTENG	2013	4	30	146	1 817	9	**2 002**	7.29
GAUTENG	2013	5	57	139	1 912	3	**2 111**	6.58
GAUTENG	2013	6	63	141	1 838	4	**2 046**	6.89
GAUTENG	2013	7	75	195	2 638	4	**2 912**	6.70
GAUTENG	2013	8	116	179	2 652	2	**2 949**	6.07
GAUTENG	2013	9	144	199	2 589	10	**2 942**	6.76
GAUTENG	2013	10	110	130	1 914	6	**2 160**	6.02
GAUTENG	2013	11	44	168	2 632	6	**2 850**	5.89
GAUTENG	2013	12	40	147	2 185	11	**2 383**	6.17
GAUTENG	2014	1	67	213	3 098	1	**3 379**	6.30
GAUTENG	2014	2	59	162	2 256	2	**2 479**	6.53
GAUTENG	2014	3	81	229	2 741	4	**3 055**	7.50
GAUTENG	2014	4	78	168	2 311	4	**2 561**	6.56
KWAZULU-NATAL	2011	3		2	2		**4**	50.00
KWAZULU-NATAL	2011	4		1	3	1	**5**	20.00
KWAZULU-NATAL	2011	5			2		**2**	-
KWAZULU-NATAL	2011	7	8	52	776	1	**837**	6.21
KWAZULU-NATAL	2011	8	10	72	1 014		**1 096**	6.57
KWAZULU-NATAL	2011	9	13	113	1 197	4	**1 327**	8.52
KWAZULU-NATAL	2011	10	13	97	1 090		**1 200**	8.08
KWAZULU-NATAL	2011	11	12	114	1 270	3	**1 399**	8.15
KWAZULU-NATAL	2011	12	5	105	1 178	5	**1 293**	8.12
KWAZULU-NATAL	2012	1	27	102	1 265	3	**1 397**	7.30

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KWAZULU-NATAL	2012	2	41	176	1 298	2	**1 517**	11.60
KWAZULU-NATAL	2012	3	39	148	1 483	48	**1 718**	8.61
KWAZULU-NATAL	2012	4	25	107	1 288	81	**1 501**	7.13
KWAZULU-NATAL	2012	5	29	174	1 653	60	**1 916**	9.08
KWAZULU-NATAL	2012	6	51	162	1 655	1	**1 869**	8.67
KWAZULU-NATAL	2012	7	25	166	1 334	6	**1 531**	10.84
KWAZULU-NATAL	2012	8	17	172	1 762	6	**1 957**	8.79
KWAZULU-NATAL	2012	9	39	190	1 949	2	**2 180**	8.72
KWAZULU-NATAL	2012	10	61	288	2 778	5	**3 132**	9.20
KWAZULU-NATAL	2012	11	32	239	1 992	21	**2 284**	10.46
KWAZULU-NATAL	2012	12	19	176	1 925	9	**2 129**	8.27
KWAZULU-NATAL	2013	1	50	286	2 886	6	**3 228**	8.86
KWAZULU-NATAL	2013	2	43	199	2 092	6	**2 340**	8.50
KWAZULU-NATAL	2013	3	67	258	2 700	13	**3 038**	8.49
KWAZULU-NATAL	2013	4	53	200	2 075	48	**2 376**	8.42
KWAZULU-NATAL	2013	5	52	244	2 558	20	**2 874**	8.49
KWAZULU-NATAL	2013	6	72	218	2 121	17	**2 428**	8.98
KWAZULU-NATAL	2013	7	90	344	3 228	9	**3 671**	9.37
KWAZULU-NATAL	2013	8	146	298	2 828	30	**3 302**	9.02
KWAZULU-NATAL	2013	9	135	359	3 386	48	**3 928**	9.14
KWAZULU-NATAL	2013	10	83	262	2 641	44	**3 030**	8.65
KWAZULU-NATAL	2013	11	71	275	3 078	36	**3 460**	7.95
KWAZULU-NATAL	2013	12	69	318	3 155	61	**3 603**	8.83
KWAZULU-NATAL	2014	1	110	484	4 583	46	**5 223**	9.27
KWAZULU-NATAL	2014	2	145	330	3 310	26	**3 811**	8.66
KWAZULU-NATAL	2014	3	158	383	3 697	9	**4 247**	9.02
KWAZULU-NATAL	2014	4	138	309	3 093	22	**3 562**	8.67
LIMPOPO	2011	3		1	3	2	**6**	16.67
LIMPOPO	2011	4		8	79		**87**	9.20
LIMPOPO	2011	5	2	10	171	13	**196**	5.10
LIMPOPO	2011	6	1	25	188		**214**	11.68
LIMPOPO	2011	7	1	21	185	1	**208**	10.10
LIMPOPO	2011	8		4	80		**84**	4.76
LIMPOPO	2011	9	7	9	113	1	**130**	6.92
LIMPOPO	2011	10	3	18	272	3	**296**	6.08
LIMPOPO	2011	11	2	16	256	2	**276**	5.80
LIMPOPO	2011	12	3	14	185		**202**	6.93
LIMPOPO	2012	1	1	14	221	2	**238**	5.88
LIMPOPO	2012	2	3	19	201	1	**224**	8.48

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LIMPOPO	2012	3	7	21	212	1	**241**	8.71
LIMPOPO	2012	4	6	19	145		**170**	11.18
LIMPOPO	2012	5	3	15	158		**176**	8.52
LIMPOPO	2012	6	2	9	150		**161**	5.59
LIMPOPO	2012	7	5	18	185	2	**210**	8.57
LIMPOPO	2012	8	1	14	152		**167**	8.38
LIMPOPO	2012	9	3	28	297	3	**331**	8.46
LIMPOPO	2012	10	5	37	448	2	**492**	7.52
LIMPOPO	2012	11	10	34	640	5	**689**	4.93
LIMPOPO	2012	12	6	33	729	57	**825**	4.00
LIMPOPO	2013	1	15	85	898	6	**1 004**	8.47
LIMPOPO	2013	2	14	58	822	3	**897**	6.47
LIMPOPO	2013	3	21	49	816	9	**895**	5.47
LIMPOPO	2013	4	11	49	946	11	**1 017**	4.82
LIMPOPO	2013	5	18	61	984	8	**1 071**	5.70
LIMPOPO	2013	6	42	46	873	2	**963**	4.78
LIMPOPO	2013	7	42	55	1 243	39	**1 379**	3.99
LIMPOPO	2013	8	49	50	1 047	4	**1 150**	4.35
LIMPOPO	2013	9	28	69	1 070	8	**1 175**	5.87
LIMPOPO	2013	10	11	35	783	6	**835**	4.19
LIMPOPO	2013	11	9	40	870	1	**920**	4.35
LIMPOPO	2013	12	9	57	980	1	**1 047**	5.44
LIMPOPO	2014	1	19	72	1 205		**1 296**	5.56
LIMPOPO	2014	2	19	44	868	3	**934**	4.71
LIMPOPO	2014	3	42	54	986	1	**1 083**	4.99
LIMPOPO	2014	4	28	42	873	3	**946**	4.44
MPUMALANGA	2011	3		6	57	1	**64**	9.38
MPUMALANGA	2011	4	1	19	192	1	**213**	8.92
MPUMALANGA	2011	5	5	21	246		**272**	7.72
MPUMALANGA	2011	6	6	18	241		**265**	6.79
MPUMALANGA	2011	7	1	30	322		**353**	8.50
MPUMALANGA	2011	8	3	24	274		**301**	7.97
MPUMALANGA	2011	9	4	28	241		**273**	10.26
MPUMALANGA	2011	10	5	21	328		**354**	5.93
MPUMALANGA	2011	11	3	18	291	3	**315**	5.71
MPUMALANGA	2011	12	2	22	194	1	**219**	10.05
MPUMALANGA	2012	1	2	20	225	26	**273**	7.33
MPUMALANGA	2012	2	8	25	247		**280**	8.93
MPUMALANGA	2012	3	9	24	265		**298**	8.05

MPUMALANGA	2012	4	2	14	143	23	**182**	7.69
MPUMALANGA	2012	5	8	20	202	12	**242**	8.26
MPUMALANGA	2012	6	2	34	241	11	**288**	11.81
MPUMALANGA	2012	7	5	35	307		**347**	10.09
MPUMALANGA	2012	8	5	47	355	2	**409**	11.49
MPUMALANGA	2012	9	3	46	390		**439**	10.48
MPUMALANGA	2012	10	6	40	458		**504**	7.94
MPUMALANGA	2012	11	4	56	353	2	**415**	13.49
MPUMALANGA	2012	12	2	37	267		**306**	12.09
MPUMALANGA	2013	1	8	60	383	1	**452**	13.27
MPUMALANGA	2013	2	7	47	364	2	**420**	11.19
MPUMALANGA	2013	3	13	67	428	4	**512**	13.09
MPUMALANGA	2013	4	9	60	440	3	**512**	11.72
MPUMALANGA	2013	5	7	79	649	6	**741**	10.66
MPUMALANGA	2013	6	12	66	530		**608**	10.86
MPUMALANGA	2013	7	27	101	844	3	**975**	10.36
MPUMALANGA	2013	8	31	95	969	2	**1 097**	8.66
MPUMALANGA	2013	9	47	93	967		**1 107**	8.40
MPUMALANGA	2013	10	11	69	696		**776**	8.89
MPUMALANGA	2013	11	13	80	743	3	**839**	9.54
MPUMALANGA	2013	12	15	80	838		**933**	8.57
MPUMALANGA	2014	1	24	109	1 171	1	**1 305**	8.35
MPUMALANGA	2014	2	22	92	767		**881**	10.44
MPUMALANGA	2014	3	44	124	1 005	4	**1 177**	10.54
MPUMALANGA	2014	4	24	87	832		**943**	9.23
NORTH WEST	2011	4	1	5	64	3	**73**	6.85
NORTH WEST	2011	5	4	23	182		**209**	11.00
NORTH WEST	2011	6	2	18	194	1	**215**	8.37
NORTH WEST	2011	7	5	22	225		**252**	8.73
NORTH WEST	2011	8	2	22	312		**336**	6.55
NORTH WEST	2011	9	3	36	330		**369**	9.76
NORTH WEST	2011	10	6	18	301		**325**	5.54
NORTH WEST	2011	11	4	26	307		**337**	7.72
NORTH WEST	2011	12		25	242		**267**	9.36
NORTH WEST	2012	1	5	26	266		**297**	8.75
NORTH WEST	2012	2	4	22	267		**293**	7.51
NORTH WEST	2012	3	4	26	355		**385**	6.75
NORTH WEST	2012	4	2	20	265		**287**	6.97
NORTH WEST	2012	5	7	33	273		**313**	10.54

NORTH WEST	2012	6	9	42	330		**381**	11.02
NORTH WEST	2012	7	6	31	334		**371**	8.36
NORTH WEST	2012	8	3	16	261	1	**281**	5.69
NORTH WEST	2012	9	5	44	479		**528**	8.33
NORTH WEST	2012	10	11	48	693	3	**755**	6.36
NORTH WEST	2012	11	14	42	653	1	**710**	5.92
NORTH WEST	2012	12	2	35	548	5	**590**	5.93
NORTH WEST	2013	1	18	55	799	1	**873**	6.30
NORTH WEST	2013	2	15	54	733	2	**804**	6.72
NORTH WEST	2013	3	13	58	765	19	**855**	6.78
NORTH WEST	2013	4	16	44	854		**914**	4.81
NORTH WEST	2013	5	19	54	814		**887**	6.09
NORTH WEST	2013	6	15	36	750	1	**802**	4.49
NORTH WEST	2013	7	39	57	1 173	1	**1 270**	4.49
NORTH WEST	2013	8	42	59	1 090		**1 191**	4.95
NORTH WEST	2013	9	45	59	1 027		**1 131**	5.22
NORTH WEST	2013	10	21	44	772	4	**841**	5.23
NORTH WEST	2013	11	14	48	919	1	**982**	4.89
NORTH WEST	2013	12	11	58	897		**966**	6.00
NORTH WEST	2014	1	28	100	1 386		**1 514**	6.61
NORTH WEST	2014	2	31	61	1 046		**1 138**	5.36
NORTH WEST	2014	3	67	81	1 295	2	**1 445**	5.61
NORTH WEST	2014	4	58	48	919	2	**1 027**	4.67
NORTHERN CAPE	2011	3		5	26		**31**	16.13
NORTHERN CAPE	2011	4		4	114	1	**119**	3.36
NORTHERN CAPE	2011	5	2	11	215		**228**	4.82
NORTHERN CAPE	2011	6	1	28	234		**263**	10.65
NORTHERN CAPE	2011	7	5	46	314		**365**	12.60
NORTHERN CAPE	2011	8	4	25	358		**387**	6.46
NORTHERN CAPE	2011	9	5	19	346		**370**	5.14
NORTHERN CAPE	2011	10	6	31	449		**486**	6.38
NORTHERN CAPE	2011	11	4	13	293		**310**	4.19
NORTHERN CAPE	2011	12	1	4	143	1	**149**	2.68
NORTHERN CAPE	2012	1	2	9	138		**149**	6.04
NORTHERN CAPE	2012	2	2	12	225		**239**	5.02
NORTHERN CAPE	2012	3	3	24	319	1	**347**	6.92
NORTHERN CAPE	2012	4	7	9	215		**231**	3.90
NORTHERN CAPE	2012	5	11	20	269		**300**	6.67
NORTHERN CAPE	2012	6	4	19	233	1	**257**	7.39

NORTHERN CAPE	2012	7	3	13	260		**276**	4.71
NORTHERN CAPE	2012	8	3	18	250		**271**	6.64
NORTHERN CAPE	2012	9	1	24	368		**393**	6.11
NORTHERN CAPE	2012	10	7	23	443		**473**	4.86
NORTHERN CAPE	2012	11	6	43	418	3	**470**	9.15
NORTHERN CAPE	2012	12	1	19	357	3	**380**	5.00
NORTHERN CAPE	2013	1	9	33	637	1	**680**	4.85
NORTHERN CAPE	2013	2	10	26	463	17	**516**	5.04
NORTHERN CAPE	2013	3	12	21	417	132	**582**	3.61
NORTHERN CAPE	2013	4	4	26	420	135	**585**	4.44
NORTHERN CAPE	2013	5	17	39	545		**601**	6.49
NORTHERN CAPE	2013	6	11	26	424		**461**	5.64
NORTHERN CAPE	2013	7	9	41	610		**660**	6.21
NORTHERN CAPE	2013	8	23	33	595		**651**	5.07
NORTHERN CAPE	2013	9	31	41	596	2	**670**	6.12
NORTHERN CAPE	2013	10	12	38	435	2	**487**	7.80
NORTHERN CAPE	2013	11	11	24	467		**502**	4.78
NORTHERN CAPE	2013	12	7	28	492	1	**528**	5.30
NORTHERN CAPE	2014	1	13	43	757	2	**815**	5.28
NORTHERN CAPE	2014	2	10	29	519	1	**559**	5.19
NORTHERN CAPE	2014	3	12	31	567	1	**611**	5.07
NORTHERN CAPE	2014	4	34	25	491	1	**551**	4.54
WESTERN CAPE	2011	3			13		**13**	-
WESTERN CAPE	2011	4			5		**5**	-
WESTERN CAPE	2011	6				1	**1**	-
WESTERN CAPE	2011	7			5		**5**	-
WESTERN CAPE	2011	8	2	10	153		**165**	6.06
WESTERN CAPE	2011	9		10	188		**198**	5.05
WESTERN CAPE	2011	10	3	16	383		**402**	3.98
WESTERN CAPE	2011	11	7	34	618		**659**	5.16
WESTERN CAPE	2011	12	3	35	644		**682**	5.13
WESTERN CAPE	2012	1	7	45	920		**972**	4.63
WESTERN CAPE	2012	2	9	43	955		**1 007**	4.27
WESTERN CAPE	2012	3	19	47	925	1	**992**	4.74
WESTERN CAPE	2012	4	11	42	687		**740**	5.68
WESTERN CAPE	2012	5	12	34	823		**869**	3.91
WESTERN CAPE	2012	6	10	50	847		**907**	5.51
WESTERN CAPE	2012	7	16	37	824		**877**	4.22
WESTERN CAPE	2012	8	5	58	815		**878**	6.61

Disclaimer: This is a dynamic specimen dataset requiring regular update and it should be noted that figures may change as linkages to individuals tested are updated.

WESTERN CAPE	2012	9	3	63	1 109		**1 175**	5.36
WESTERN CAPE	2012	10	25	70	1 436		**1 531**	4.57
WESTERN CAPE	2012	11	17	81	1 517		**1 615**	5.02
WESTERN CAPE	2012	12	11	55	1 115	1	**1 182**	4.65
WESTERN CAPE	2013	1	25	109	1 799		**1 933**	5.64
WESTERN CAPE	2013	2	30	97	1 718		**1 845**	5.26
WESTERN CAPE	2013	3	27	99	1 762		**1 888**	5.24
WESTERN CAPE	2013	4	47	85	2 108		**2 240**	3.79
WESTERN CAPE	2013	5	43	123	2 220		**2 386**	5.16
WESTERN CAPE	2013	6	52	110	2 102		**2 264**	4.86
WESTERN CAPE	2013	7	57	150	2 732	1	**2 940**	5.10
WESTERN CAPE	2013	8	112	138	2 692	1	**2 943**	4.69
WESTERN CAPE	2013	9	135	171	2 681		**2 987**	5.72
WESTERN CAPE	2013	10	73	157	3 012		**3 242**	4.84
WESTERN CAPE	2013	11	45	137	2 792		**2 974**	4.61
WESTERN CAPE	2013	12	22	115	2 210		**2 347**	4.90
WESTERN CAPE	2014	1	52	159	3 120		**3 331**	4.77
WESTERN CAPE	2014	2	52	167	2 644		**2 863**	5.83
WESTERN CAPE	2014	3	76	136	2 308		**2 520**	5.40
WESTERN CAPE	2014	4	38	150	2 376		**2 564**	5.85
Total			**8 330**	**26 065**	**345 149**	**1 919**	**381 463**	**6.83**

3. Rif Condordance

Rifampicin concordance is good for both LPA and culture. The data is skewed by reporting the GeneXpert immediately, but still have to wait for MGIT and LPA results.

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Table 5: Rif Concordance by LPA or DST

Province	Rif Resistant Cases	GeneXpert Confirmation & Rif Concordance									
		Cultures					LPA				
		Confirmed		Rif Concordance		Pre-analytical	Confirmed		Rif Concordance		Indeterminate
		#	%	#	%		#	%	#	%	
Eastern Cape	3 547	98	2.8%	55	56.1%	3	560	16%	517	92.3%	3
Free State	1 371	105	7.7%	59	56.2%	0	414	30%	338	81.6%	106
Gauteng	2 657	124	4.7%	92	74.2%	0	601	23%	536	89.2%	15
Kwazulu-Natal	6 142	1 411	23.0%	1 315	93.2%	0	1 291	21%	1 132	87.7%	33
Limpopo	979	76	7.8%	60	78.9%	0	202	21%	155	76.7%	0
Mpumalanga	1 444	314	21.7%	307	97.8%	0	484	34%	424	87.6%	3
North West	976	40	4.1%	31	77.5%	0	236	24%	198	83.9%	13
Northern Cape	721	120	16.6%	88	73.3%	3	227	31%	178	78.4%	19
Western Cape	2 002	45	2.2%	10	0.0%	0	1 560	78%	1 460	93.6%	2
National	**19 839**	**2 333**	**11.8%**	**2 017**	**86.5%**	**6**	**5 575**	**28%**	**4 938**	**88.6%**	**194**

4. Errors

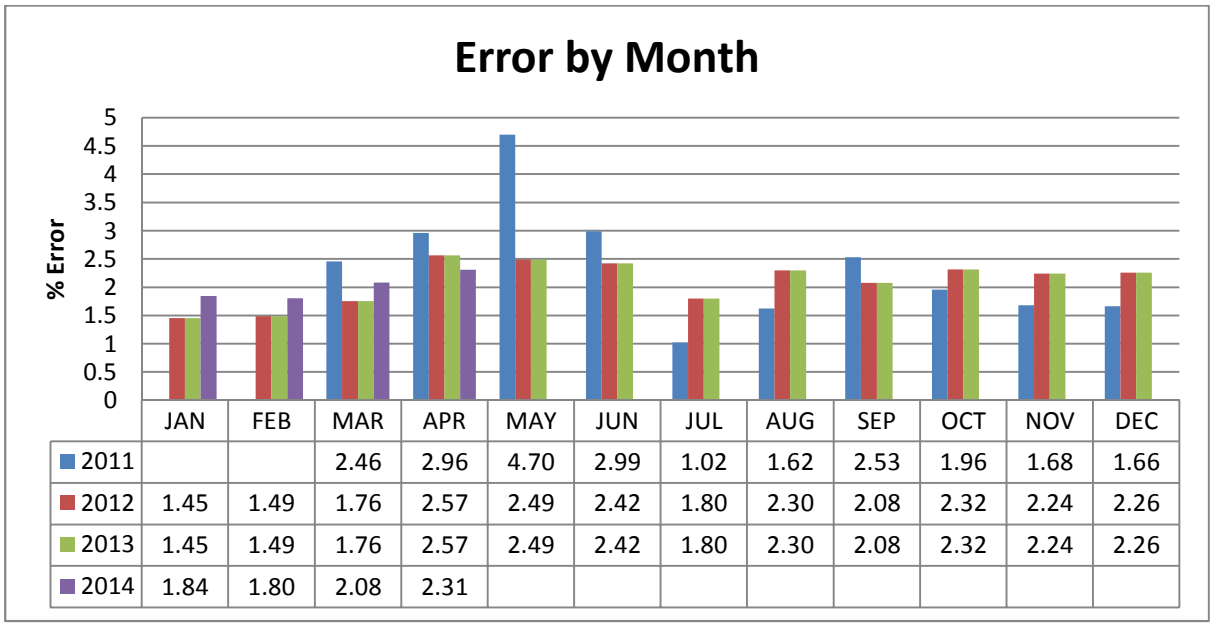
Average error rate has ranged consistently below 3%, however 2/9 provinces reported error rates above 3% in the month of April. Details of the invalid results, which likely represent sample issues remains below 1%. These are being monitored regularly and corrective action implemented where necessary.

Table 6: Number of Unsuccessful Tests and Reasons (1-30 April 2014)

Province	ERR	INV	NORES	NULL	MTB Results	Grand Total	% Error
Eastern Cape	295	64	19		18 400	18 778	1.57
Free State	104	25	5	2	12 455	12 591	0.83
Gauteng	538	121	46		26 883	27 588	1.95
Kwa-Zulu Natal	1 116	364	121	2	40 762	42 365	2.63
Limpopo	531	68	24		18 731	19 354	2.74
Mpumalanga	259	57	47		9 727	10 090	2.57
North West	506	81	40		12 785	13 412	3.77
Northern Cape	194	133	8		4 726	5 061	3.83
Western Cape	165	93	10		16 933	17 201	0.96
Grand Total	**3 708**	**1 006**	**320**	**4**	**161 402**	**166 440**	**2.23**

Disclaimer: This is a dynamic specimen dataset requiring regular update and it should be noted that figures may change as linkages to individuals tested are updated.

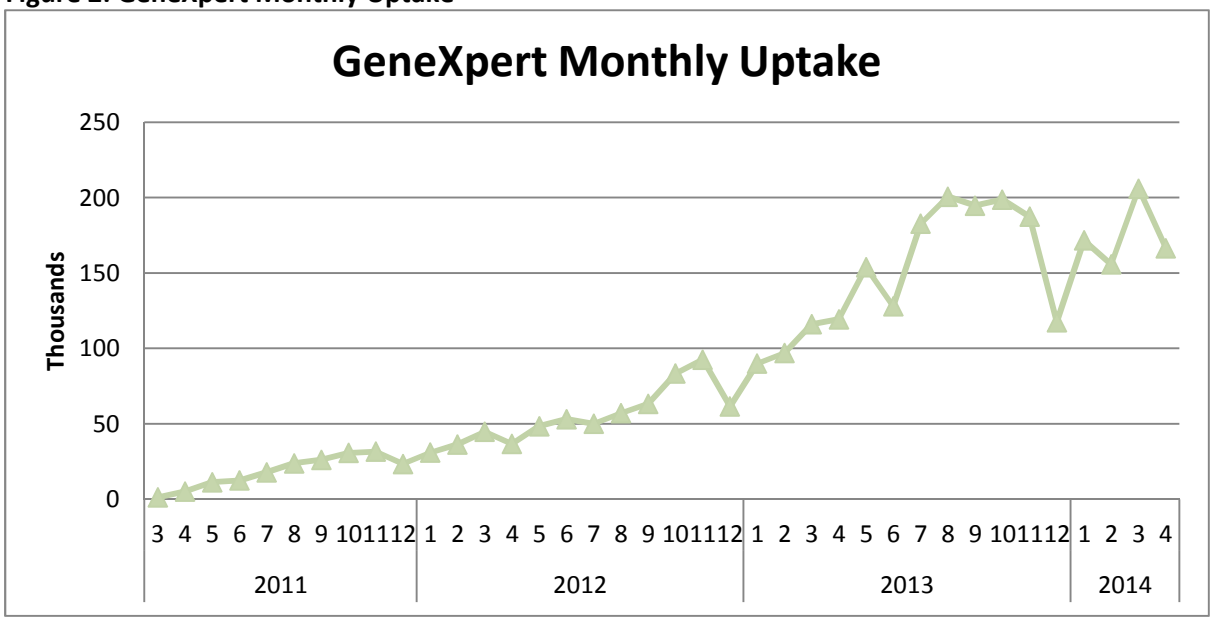
Figure 1: GeneXpert Error by Month



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2011			2.46	2.96	4.70	2.99	1.02	1.62	2.53	1.96	1.68	1.66
2012	1.45	1.49	1.76	2.57	2.49	2.42	1.80	2.30	2.08	2.32	2.24	2.26
2013	1.45	1.49	1.76	2.57	2.49	2.42	1.80	2.30	2.08	2.32	2.24	2.26
2014	1.84	1.80	2.08	2.31								

5. Monthly uptake since implementation started

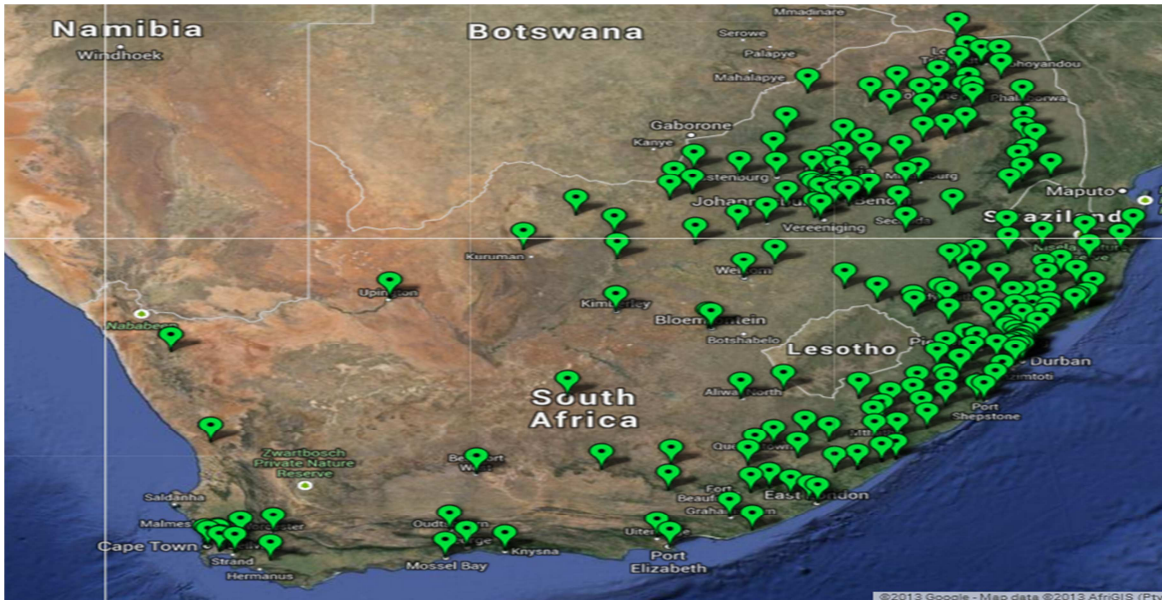
Figure 2: GeneXpert Monthly Uptake



Monthly uptake increased steadily since program inception. The main reason for interruptions is due to the variation in work practices which is expected during the December period.

6. Phased Implementation Progress

Figure 3: Current GeneXpert Placement (207 testing centers, 287 **analysers, Gx4:** 95; Gx16-8: 1**; Gx16:** 185; GX48:1; GX80-80: 5) *20 clinic placements



7. Training: Laboratory and Clinical

A total of 1,101 laboratory staff and 5,979 health care workers have been trained since December 2011. This will be an ongoing process to support NDoH training on clinical algorithm. Laboratory staff received both clinical and technical training.

8. Challenges identified during the course of the project to date

- Rollout of EGK to avoid duplications
- Implementing WHO recommended guidelines for Xpert testing on EPTB and paeditric samples: being addressed
- Hospital staff not complying to the GXP testing algorithm because trainings has not been conducted in most of the hospitals- being addressed
- Staff rotation in hospital wards posing a challenge in the implementation and compliance to the TB algorithms resulting to delay in initiating patients on TB Treatment
- GXP training were put on hold due to financial constraints within provinces and the end of the financial year

9. Literature Update For GeneXpert

There has been an expansion of the literature with respect to the assay performance. The highlights are summarized in the table below:

Table: Recent publications (GeneXpert for pulmonary TB and extrapulmonary TB)

Manuscript	Aim/Sample population and specimen type (n=…)	Results	
		Sensitivity	Specificity
Page-Shipp et al, Int J Tuberc Lung Dis, 2014 Short communication	Communication on Xpert MTB/RIF at the public event for 2012 South African World TB Day where Xpert testing was offered to tuberculosis (TB) symptomatic clients from gold mining and surrounding communities	• Public event Xpert testing was feasible; • Case-finding rate was very low (0.7%). They recommend exploring enhanced symptom screening algorithms to improve pre-test probability, cost-effectiveness analysis, exploring alternate electrical fail-safes and on-site data connectivity and improving management of client expectations.	
Lorent et al, PloS One, 2014	315,874 individuals screened for TB from deprived communites. Sputum sent to tertiary lab for Xpert testing	• n=737 bacteriologically confirmed TB cases. Xpert testing yielded 41% and 48% additional diagnoses among presumptive HIV-associated and multidrug-resistant TB cases, respectively.	
Chisti et al, PlosOne 2014.	Prospectively investigation of severely malnourished young Bangladeshi children (<5 years) with radiological pneumonia admitted over a 15-month period. n=405 eligible children	• TB was confirmed microbiologically in 7% (27/396) of children that provided sputum - 10 by culture, 21 by Xpert MTB/RIF assay, and 4 by both tests. • The sensitivity and specificity of Xpert MTB/RIF assay compared to culture was 67% (95% CI: 24-94) and 92% (95% CI: 87-95) respectively	
Denkinger et al, Eur Res J, 2014. Review	Meta analysis and review of 18 studies involving 4461 samples	Xpert pooled sensitivity versus cultue: Lymph node tissues or aspirates = 83.1% Cerebrospinal fluid = 80.5% Pleural fluid = 46.4% Xpert pooled specificity was consistently >98.7% against composite reference standard across different sample types.	
Muyoyeta et al, PLos One, 2014	Computer Aided Diagnosis (CAD) program for scoring chest x-rays (CXRs) of presumptive tuberculosis (TB) patients compared to Xpert MTB/RIF (Xpert) in n=350 patients	291 (83.1%) had an abnormal CXR score by CAD. The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of CXR compared to Xpert were 100% (95%CI 96.2-100), 23.2% (95%CI 18.2-28.9), 33.0% (95%CI 27.6-38.7) and 100% (95% 93.9-100), respectively.	
Meldau et al, BMC, 2014	Comparison of smear-microscopy, adenosine deaminase (ADA),	Xpert MTB/RIF sensitivity and specificity (was 22.5% and 98% , respectively, and	

	interferon gamma (IFN-γ), and Xpert MTB/RIF [using an unprocessed (1 ml) and centrifuged (~20 ml) sample] in 93 pleural fluids	centrifugation did not improve sensitivity (23.7%). IFN-γ is an excellent rule-in test and, compared to ADA, has significantly better sensitivity and rule-out value

10. Update on GeneXpert Research projects:

11.1. *GeneXpert Verification and EQA program using Dried Culture spots (DCS)*

- Verification material manufacture for Q1 is complete.
- Panel 1 of the 2014 EQA program has been sent to all participating NHLS sites
    i. Submissions have started and the closing date for submissions is 30 April 2014.
- A liquid format of the EQA material is also being investigated in terms of composition, stability (at RT, 4°C and 37°C) and feasibility
    i. Status: stability up to 5 months has been tested
- TBGxMonitor™ (www.tbgxmonitor.com) upgrade specification finalized.
    - Seriun publishing partial updates on the demo system for evaluation.
    - Initial components tested meet specification.
    - Investigation Report form awaiting finalization.

11.2. *Connectivity solutions for the GeneXpert*

- Connectivity: Collaboration with Cepheid ongoing
    i. Remote connectivity – old dashboard still up to collect routine data.
    ii. Testing of new dashboard complete along with user review. Awaiting feedback on data.

11. Update on other projects

Grand Challenges Canada project: Multiple POC HIV/TB integration feasibility project

Patient follow-up on from the GCC randomized controlled trial is continuing.

- A qualitative study is underway in the clinics to investigate routine workflow in clinics before and after implementation of POC testing.
- Abstract submitted to ASLM on "Connectivity at POC – Expectation vs Experience"

Sub-studies within GCC

- **Peadiatric stool protocol**: A study to evaluate the Xpert MTB/RIF assay on peadiatric stool specimens (In collaboration with David Alland and FIND). Ethics has been obtained. Stool specimens collection has begun (specimens are being collected from routine residual specimens sent to Microbiology laboratory.)
- **Longitudinal follow up of Dried blood spots** for viral load monitoring: Longitudinal collection of DBS from n=100 HIV-positive patients over 60 weeks. Sample collection and testing is ongoing.
- **Clinic validation of EPOC Blood gas analysis system (Alere):** A new chemistry POC device will be evaluated against routine laboratory results at Themba Lethu clinic. A nurse is performing Creatinine measurements on the EPOC versus creat on Reflotron and routine laboratory results on venepuncture specimens. n=40 patients have been recruited onto the study so far.
- **Laboratory Comparison of Genotype MTBDRplus v1 and 2 using DCS.** Results were presented at the 4th SA TB conference. Further R&D is underway. EQA test panels have been submitted to 4 routine labs as a pilot evaluation of the DCS format on LPA. Data analysis software and automated reporting for the National LPA EQA program is under development.
- **Laboratory validation of new TB diagnostics:** 1) A pilot laboratory evaluation of the new POC EasyNAT™ Diagnostic kit for TB screening (USTAR Biotechnologies) is complete. The initial validation demonstrated a sensitivity and specificity of 100% in n=18 Dried culture spot specimens. A protocol for a further clinical validation is underway. 2) A validation protocol is underway for evaluation of the updated Abbott NM high through TB assay. Ethics has been approved and awaiting clinic approvals and training.
- **Laboratory validation of new HIV diagnostics:** A pilot to investigate the performance of the new Xpert® HIV-1 Quant assay for VL was performed on a 42 member plasma HIV-1 subtype C panel versus the CAP/CTMv2 (Roche) and RealTi*m*e HIV-1 (Abbott). Data analysis is underway and has been submitted to ASLM 2014.
- **Abstracts submitted to ASLM 2014 (x6)**: Validation of blood collection, storage and transport media; laboratory validation of HIV/Syphilis Duo rapid test; POC EasyNAT™

Diagnostic kit pilot validation; Xpert® HIV-1 Quant assay for VL validation; POC connectivity experience vs expectation.

- **GCC Connectivity**
  - The captured data via **TBGxCompanion** has been cleaned based on the initial feedback from the study coordinator and sent to the HERO group for analysis. Additional data capturing and cleaning has been completed based on missing information. The data is ready for analysis.
  - The **AegisPOC-Conworx** user evaluation and transcription error investigation has been completed on the AegisPOC data showing that manual data transcription has a high error rate. Conworx data to be evaluated.

12. Funding

Table 9: Total and Percentage Contribution to date by Donor

Donor	% Contribution
NDoH	24.04
Bill & Melinda Gates Foundation	7.20
TB Reach	1.42
MSF	0.90
FIND	0.45
USAID	2.45
CDC NHLS 2010/11	14.78
CDC NDoH	0.72
CDC NHLS 2011/12	1.39
Dr. Niebauer	0.20
Gobal Fund NDOH	40.91
Global Fund RTC	2.78
CDC NDoH	2.77
Subtotal	**100**

CDC has contributed 19, 65% towards the program to date.

13. Recent Campaigns

None in the month of April