Disease profile for Vhembe Health District
Limpopo
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Limpopo

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Foreword

The Limpopo Department of Health (LDoH) commissioned the Health System Trust (HST) to conduct a rapid appraisal of the Burden of Disease (BoD) for Vhembe District with the following terms of reference:

1. Analyses of existing data by stakeholders i.e. DoH health facility-based (DHIS), STATS SA, UNIVEN, University of Limpopo, Health System Trust (HST), MRC and others, in order to determine the baseline BoD trends;

2. An Estimated Burden of Disease Report with specific recommendation on how to:
   a. Institutionalise the BoD in Vhembe and recommend possible measures for rolling out the BoD project to other districts in the coming financial years;
   b. Recommendations to institutionalise the Health and Demographic Surveillance System (HDSS) for Vhembe and possible measures for the roll out to other districts in the coming financial years;
   c. Any other relevant recommendations.

Owing to challenges with availability and quality of data on underlying causes of death and non-availability of certain morbidity data (incidence/prevalence/disability), the brief was extended to collating available data into a cross-sectional, descriptive study from a varied range of sources. The project was undertaken to determine baseline morbidity and mortality data which would enhance rational health planning in Vhembe District as one of the NHI Pilots Districts in the country. The preliminary report was presented to a Vhembe multi-stakeholder consultative meeting in March 2015 with the view to elicit verification of content and data/information. The meeting made specific content recommendations and provided an in-principle endorsement of the report.

The report presents specific baseline disease trends, transversal health system deficiencies, proposals for appropriate interventions and broad recommendations as to how to institutionalise the routine measurements of the burden of disease trends in Vhembe District as well as rolling out good practices to other districts in the province. The report provides a snapshot of problems impacting on the health system and broad interventions required to improve the desired health outcomes thus reversing the cycle of the burden of disease. The LDoH will be exploring ways and modalities to give effect to a range of recommendations emanating from this evidence-based report.

Our sincere gratitude goes to HST and its partners for an insightful report which will go a long way in enhancing our service delivery planning approaches and accompanying strategies/interventions.

Dr S Kabane, Head of Health, Limpopo.
Acknowledgements

Producing this report has been a collaborative effort and we are especially indebted to the numerous individuals whose assistance and insights have contributed so much to the outcome.

HST and LDoH wishes to sincerely thank the following:

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Mr Jimmy Ledwaba, Dr Victor Matabane, Mr Eric Maimela, Dr Pebetse Khoabane, Dr Tumiso Malatji and Mr Philip Kruger.

In the Vhembe Health District:

Mr R Sirwali (District Executive Manager), Ms Funani Tshikovhi, Mr Emmanual Mugaga and Mr Mavhungu Ludere.

At the hospitals:

The CEO, medical practitioners and Information Officer of Elim Hospital, the Information Officer of Tshilidzini Hospital and the Information Officer of Donald Fraser Hospital.

We should also like to single out for thanks Unati Mahlati for her probing comments on the first draft of this report, which have helped to make it a much more comprehensive and useful document.

Despite challenges that the researchers faced during project execution, HST and LDoH believe that this BoD Report will go a long way towards improving rational district health planning, choice of appropriate interventions and implementation modalities aimed at improving the desired health outcomes.
### Acronyms

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<td>AIDS</td>
<td>Acquired Immune Deficiency Syndrome</td>
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<td>ANC</td>
<td>Antenatal care</td>
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Executive summary

Given the centrality of health information for planning health services and improving health systems, Health Systems Trust was requested by the Limpopo Department of Health to provide an overview of the burden of disease in the Vhembe District, a National Health Insurance pilot district. The district lies on the northern border of Limpopo Province of South Africa with poor socio-economic indicator and varying population densities.

Given challenges with availability and quality of data on underlying causes of death and non-availability of morbidity data (incidence/prevalence/disability), the brief was extended to collating available data into a cross-sectional, descriptive study from a varied range of sources. A fundamental aim was to evaluate prevention and treatment delivery in the district to give direction to its comprehensive primary health care (PHC) strategy. The study was also intended to inform the development and implementation of the district’s health strategies and policies and the improvement of the availability of burden-of-disease data. The study sought to provide a baseline overview of aspects of health within the Vhembe district to enhance its participation as one of the pilot districts in the development of National Health Insurance (NHI).

The anticipated end-users of the study include a wide range of participants in the health-delivery chain ranging from national, provincial and district management to PHC facility managers.

The study took place over a five-month period and utilised a mix of quantitative and qualitative research methods. The qualitative data collection included a survey of medical practitioners working at a Vhembe hospital by means of a questionnaire focussing on the completion of death notification forms and their role in data and information management, as well as reviewing reports from workshops held in the district to contribute to the findings of the 2013/14 District Health Barometer (DHB). The quantitative methods included the collection of data from primary sources, such as the Vhembe DHIS database, ETR.Net, the DHB database and that of Statistics South Africa. Material from secondary sources included accessing data related to the socio-economic and sociodemographic context of the district from Statistics South Africa Census 2011 and General Household Survey 2013, together with data and studies on HIV and TB, maternal, neonatal, child and women’s health data, disease prevention and control of communicable and non-communicable diseases.

This data was collated and subjected to desktop review, before being analysed in order to produce a report portraying the context and trends of population health and health delivery in the Vhembe district. Recommendations were included where necessary.

The initial draft of the study was discussed with the full district management, representatives of the Limpopo Department of Health and advisers from the University of Vhembe. More detail was included in this document when it was revised in line with feedback from that meeting.

The study’s main findings are summarised below.

Demographic and economic characteristics

The Vhembe district occupies 25,597 km² on the northern border of Limpopo Province and of South Africa itself and had a population of 1,294,723 according to Census 2011. The area is largely rural, with a district population density of 54.5 people per km² across its four local municipalities (health sub-districts) of Musina, Mutale, Thulamela and Makhado.

However, there are pockets of dense urban settlement, particularly around the town of Thohoyandou in the Thulamela local municipality, resulting in a municipal population density of 106 people per km², about double the Vhembe district’s average. Thulamela is South Africa’s fourth most populated municipality. Makhado, dominated by the town of Makhado (formerly Louis Trichardt) is the country’s eighth most populated municipality, with a population density of 62 people per km². By contrast, the Musina municipality has a large area of 7,577 km² and a low population density of just nine people per km². Musina has a high level of 25.2% of informal housing, about double the level of Vhembe’s other three municipalities. Mutale municipality consists mainly of rural communities, with 85% of its population living in tribal areas and has Vhembe’s second-lowest population density at 24 people per km².

Females head more than half the households in most Vhembe municipalities, though not in Musina. Mining, mainly for copper and diamonds, offers greater job opportunities in Musina and boosted the municipality’s economic growth to 5.53% between 2001 and 2011. There is significant d occupation in agriculture, though it contributes only 7% of the area’s GDP.

There are high numbers of agricultural households across the Vhembe district, peaking at 53.7% in Thulamela. Mutale is an exception, with only 11.3% of agricultural households and economic activity dominated by coal
mining. Eco-tourism and heritage sites are increasingly contributing to economic activity, notably in the Musina municipality where the Mapungubwe World Heritage Site is located.

High unemployment at 38.7% and extensive poverty (32%) mean the Vhembe district is one of South Africa’s poorer districts. It falls within Quintile 2 of the socioeconomic deprivation index.

The population mainly consists of Black Africans. More than half of the population (55.1%) is 24 years and younger. There is a substantial population of children under five years old and also a secondary population bulge of older people aged over 65 years, particularly women. In the Musina municipality, however, the proportion of the population aged over 65 years is much lower than elsewhere in the Vhembe district.

Social determinants of health

At 38.7% in 2011, the district unemployment rate was substantially higher than nationally (24.3%). Within this, youth unemployment (14 to 34 years) was particularly high at 50.6% for the Vhembe district, peaking in the Mutale municipality at 48.8% overall and 62.2% for youth unemployment. Rates for the Thulamela municipality, which had the highest absolute numbers of population, were only somewhat lower than in Mutale. Both the lowest overall unemployment rate and the lowest youth unemployment rate were found in the Musina municipality, at 18.7% and 22.5% respectively.

In 2013 in Makhado, Musina and Thulamela, nearly half of all households (varying from 43.1% to 48.1%) had annual incomes clustered in the brackets of R9 601 to R19 600 and R19 601 to R38 200. Musina local municipality had noticeably higher average household incomes, with only about a quarter (27.2%) of households having annual incomes of R9 600 or lower. By contrast, in Mutale local municipality 63.6% of households were clustered in these lowest brackets, including 13.2% with no income. Makhado had 12.4% of households with no income and Thulamela 11.9%. High levels of unemployment and poverty make seeking healthcare more difficult in the Vhembe district, despite of high levels of HIV and AIDS and communicable diseases in children under five years old.

Limpopo Province as a whole had the lowest adult literacy in South Africa at 88%. In the Vhembe district, other educational indicators were lower than nationally, with 17.7% of those aged 20 years and older having no schooling, a rate which was more than double the national level. Indications are that this gap is closing, given 21.9% had passed Matric and 9.9% had higher education in 2011, levels that are relatively near national levels.

However, across Limpopo Province, more than a quarter (29.1%) of school dropouts aged between seven and 18 years cited poor performance as the reason. Despite the prevalence of no-fee schools in such areas, nearly one in five (19.1%) in the province mentioned that no money for school fees was a deterrent. Though this was not mentioned, a further barrier is likely to be that 83.2% of children in the Vhembe district walk all the way to school.

Female learners were more likely to complete both primary and secondary education. However, they constituted six out of 10 of those aged between seven and 18 years old not attending school in Limpopo Province in 2013.

Municipal-services indicators were much lower in the Vhembe district than national and provincial averages in 2011, except for use of electricity for lighting, which was 87.2% in the Vhembe district. However, access to piped water within a dwelling was 13.7% in the Vhembe district, sharply contrasting with 88.9% nationally and 77.5% in Limpopo Province. The proportion of flush toilets connected to sewerage was 13.9% in the Vhembe district, while 77.9% nationally and 77.5% provincially. Weekly refuse removal was provided to 15.4%, against 66% nationally, though the Limpopo Province level is 20.2%. The Vhembe district 2012 Blue Drop score of 74.85% signifies that drinking-water quality was average with room for improvement.

Though Musina is one of the more rural municipalities, municipal-service provision is generally much closer to national levels.

Service-delivery environment

The Vhembe district has 1 regional hospital; 6 district hospitals (though none located in the Mutale sub-district); and 146 primary health care facilities. A large proportion of this health-delivery infrastructure, including the regional hospital, is concentrated in the Thulamela sub-district, which is home to the largest population and the highest population density in the Vhembe district. However, despite much lower population densities in Mutale and Musina, the size of these sub-districts and low levels of health-facility provision means exercising the constitutional right to basic access to health care is difficult for much of the population.
Though the Vhembe district PHC utilisation rate of 2.8 visits per person per year is higher than both the Limpopo Province and national averages, the total PHC headcount (3,789,917 in 2013) has been falling across the district, including at sub-district level except for the Musina sub-district. PHC utilisation by children under five years old was 5.6 visits in 2013 in the district, higher than the national level of 4.3 visits. Discrepancies between the total PHC headcount and data for PHC clients seen by professional nurses, however, suggest the total PHC headcount, has been undercounted.

Against the higher PHC headcount, clinical workloads for PHC professional nurses and doctors were lower than expected, especially given reported staff shortages. There was strong evidence of patchy data quality, making final conclusions more difficult.

The uneven distribution of clinics and community health centres (CHCs), coupled with varying population densities, resulted in the Musina sub-district having the highest population ratio per clinic/CHC and Mutale the lowest. The workload spike in Musina might restrict access to health services and might explain why Musina had the lowest PHC utilisation rate but the highest clinical workload for PHC professional nurses and doctors in the district.

A further complication is that clients often bypass facilities to attend hospitals directly. The rate of outpatients not referred by medical practitioners and PHC facilities was relatively high, reaching 91.3% in Musina in 2012 and 85.5% in Makhado in 2010.

As the Vhembe district borders on Botswana, Zimbabwe and Mozambique (through the Kruger National Park), health facilities in some areas may also face the challenge of treating foreign nationals, who are not included in the headcount, in addition to the local population. The town of Musina, particularly, is close to the Beitbridge border post, the major entry point from countries to the north.

In the absence of accessible health facilities and professional medical attention, clients are more likely to present late for treatment or resort to using traditional health practitioners, even though both options may lead to medical complications. Relatively low levels of education and high levels of school dropouts in turn make it difficult to entrench health-seeking behaviour through health education. This is reflected in different ways, from poor attendance at antenatal care (with a cascade of consequences for mother and child) to poor case-finding for hypertension. Given the high level of school dropouts, the rollout of school-based health teams may face extra challenges.

### Burden of disease

In 2011, in the Vhembe district the leading single causes of premature mortality (as measured in Years of Life Lost (YLLs) which take age at premature death into account) were: TB; diarrhoeal diseases; lower respiratory infections; and HIV/AIDS. Overall, this suggests that HIV-related mortality is by far the leading cause of premature mortality.

The main causes of death in Vhembe in 2009 were non-communicable diseases (41.3%), followed by communicable diseases (excluding HIV and TB), maternal, perinatal or nutrition causes (38.3%). Third were HIV and TB deaths (18.0%) and fourth, injury-related deaths (7.2%). Other factors were also notable in certain age groups, such as protein energy malnutrition among children under five years old; road accidents and drowning among children aged between five and 14 years; and chronic diseases of lifestyle among people over 65 years old, particularly men. Cardiovascular diseases and diabetes caused 41% of deaths among both men and women in this last age group.

The percentage of deaths ill-defined in the Vhembe district was 32.9%, the fourth highest in the country. A further 10.9% of deaths was assigned to so-called “garbage codes”, where the ICD-10 coding was not considered to refer and illuminate underlying causes of death for public health cause-of-death analysis purposes. The fact that this analysis can be applied to only about four out of 10 deaths in the district makes profiling the burden of disease accurately particularly problematic.

Coding issues were investigated in general and specifically using a survey of medical practitioners. It appears that more training of medical staff is needed, focusing on how and why these codes are used. Other areas pinpointed for intervention and improvement were: the quality of injury-mortality statistics (in conjunction with the Department of Home Affairs); and deaths certified by headmen in order to reduce the number of ill-defined causes of death. The new format of the death-notification form has also precluded local collection of death data for local mortality surveillance.
Epidemiological (disease) profile of the Vhembe district

HIV and TB control

The HIV testing coverage (clients 15-49 years) of the district was 26.8%, lower than the national target, although slightly above national and provincial values. HIV prevalence in this age group was 13.9%. Male condom distribution was lower than the national target (but in line with national and provincial values) at 30.4 condoms per male 15 years and older in 2013. The Musina and Mutale sub-districts showed particularly high coverage values of 51.9 and 58.3, however. Stock-outs were considered to be a major factor in widely varying values.

The total number of adults and children remaining on antiretroviral therapy (ART) steadily increased over time to about 35,722 and 2,287 respectively in 2013. These were increases of 160% and 91.6% respectively since 2010. Rises in the number of children under 15 years on ART were noticeably more varied across the sub-districts than among adults, with Thulamela and Musina showing distinctly lower growth than Makhado and Mutale. This is believed to be due to the success of the Prevention of Mother-to-Child Transmission Programme (PMTCT) and may tie in with effective access to antenatal care. Further treatment increases among adults particularly are expected with the 2015 implementation of new guidelines.

Given the suite of healthcare offerings triggered by the first antenatal visit, it is concerning that this coverage slowly decreased from 88.4% in the Vhembe district in 2010 to 76.1% in 2013. This 2013 coverage was well below the national and provincial rates. Coverage was particularly low in the Mutale sub-district, while Musina had more than 100% coverage in certain years due to non-South African women attending antenatal care in the sub-district.

The rate of first antenatal-care visits before 20 weeks in the Vhembe district was 44.7%, considerably below the national target of 60%. This is partly influenced by the cultural practice of not attending antenatal clinics before the pregnancy is showing.

Gaps in antenatal first visit coverage suggest that about one in four women in the Vhembe district deliver their babies without any previous antenatal care during that pregnancy. However, poor data quality is believed to account for some of these gaps.

Similarly, just under a quarter of antenatal first visit clients were not tested for HIV, excluding the 1.8% who already knew their status. This was mainly ascribed to clients refusing to be tested combined with poor counselling by lay counsellors.

The HIV-prevalence rate resulting from these tests among antenatal clients aged between 15 and 49 years old was 8.8%, compared to the Antenatal Sero-prevalence Survey prevalence of 17.7% (the eighth lowest nationally). Only three quarters of HIV-positive pregnant women were put on ART in 2013 in the district.

Despite about a quarter of HIV-positive women not receiving ART, only 2.6% of infants tested HIV positive, just over the national target of 2.5%. Early infant HIV diagnosis coverage was 93%.

In 2013, the Vhembe district incidence of all types of TB was the lowest in South Africa at 270.8 per 100,000, while the incidence of new pulmonary smear-positive TB was the third lowest at 103.1 per 100,000. However, TB case-finding of 2.0% was below the national and provincial levels.

The effectiveness of treatment was also questionable with a district treatment success rate for all TB of 69.7% in 2012, well below the national target. The smear conversion rate of 68.6% in 2012 was also well below the national target, though close to the national rate. The TB cure rate had declined somewhat from 79.4% in 2010 to 77.5% in 2012, below the national and district targets.

The accuracy of TB data was called into question, however, as investigation highlighted multiple problems related to ETR.Net, ranging from export/import problems to a tendency to count incorrectly clients who are late for a booked smear date. These data-quality issues were compounded by other logistical problems such as low levels of DOTS support and lack of vehicles to trace TB treatment defaulters. Even so, the default rate of 4.6% was within the national target. Death rates for new smear-positive PTB patients increased to 9.1% in 2012, however, suggesting defaulting and/or late access to treatment. The rate of clients confirmed with TB resistant to rifampicin (proxy for MDR-TB) was 6.2% in 2013.
Co-infection with HIV appears to be effectively monitored, with 87.3% of TB clients knowing their HIV status in 2013. The number of co-infected clients put on ART increased substantially from 26.8% in 2011 to 63.7% in 2013. This rate is well below the national target of 90% (though slightly lower than national and provincial levels). However, it must be underlined that about a third of co-infected clients were not on ART in the Vhembe district in 2013.

Staff surveyed pointed out that staff shortages created high case loads and in turn made the rendering of comprehensive service less likely. The situation did not facilitate introducing patient-friendly measures to encourage compliance, such as fast queues for TB patients and after-hours service.

Maternal, neonate, child and women’s health (MNCWH) and nutrition

The couple year protection rate (CYPR) increased somewhat over the period to 36.9% in 2013 in the Vhembe district, just above the national target. The ambitious district target was 60% by 2014 and the need to find an improved CYPR level may be underlined by increasing rates of termination of pregnancy (TOP). The 7.2% district TOPs average is about the national rate, despite medical and nursing staff often exercising their right not to participate in TOPs. It should be further investigated how closely the rising TOPs rate is linked to the decline in the 8.4% district rate of deliveries for women aged under 18 years old, which is still higher than the national average. Reinforcing better access to family-planning services for this age group might have a positive impact on both trends.

Across the Vhembe district, nine out of ten deliveries take place in facilities, although this rate is more than halved in the Mutale sub-district which has no district hospital. The Caesarean-section rate for district hospitals was 18.8% in the Vhembe district in 2013. Both this and the overall rate were lower than the provincial and national averages.

The maternal mortality in facility ratio in the Vhembe district was 122 per 100 000 in 2013, also lower than the national and the provincial average (according to both DHIS and NCCEMD reports). However, the Musina sub-district had a much higher rate. These rates might be improved further through wider recruitment of clients to antenatal care, allowing earlier identification of problematic chronic conditions; and through availability of more staff, including more senior staff, to improve skills available to deal with problem deliveries.

The stillbirth rate was 16.5% in 2013 and the inpatient early neonatal mortality rate was 7.9 per 1 000 births. Though both were below the target, there was still a high percentage of low birth-weight babies. Identifying high-risk cases earlier might help prevent these problems.

The rate of death among inpatients under one year old was also lower than the provincial and national levels at 9.6% for the Vhembe district, though markedly higher in the Musina sub-district at 14.5%. This picture was repeated for the inpatient death under five years rate, which was 6.1% for the Vhembe district in 2013 but 11.4% in the Musina sub-district.

Significantly, immunisation coverage was much lower in the Musina sub-district at 56.8%, compared to the Vhembe district average of 81.8%. Despite this, Thulamela sub-district had the highest levels of diarrhoea with dehydration among children under five years old at 16.7 per 1 000, compared to the district average of 14.0 per 1 000. This, in turn, appears related to relatively low rotavirus second dose coverage, which was 85.5% in Thulamela compared to a high of 115.8% in Mutale.

Fatality rates for diarrhoea cases in children under five years old were, however, highest in the Musina sub-district at 5.2%, compared to the Vhembe district average of 4.3%. The district average was just above the target but slightly lower than national and provincial rates.

For pneumonia, both the district incidence (51.8 per 1 000) and case fatality rate (3.1%) were below the target. The incidence rate of 38.7 in the Makhado district was particularly low but the sub-district’s case fatality rate was 4.4%, suggesting an educational campaign might help parents and caretakers seek treatment for their children earlier.

The Vhembe district had a very high incidence of children under two years old who were underweight for age at 71.4 per 1 000 in 2013, though severe malnutrition incidence among children under five years old was 4.6 per 1 000, only just above the provincial and national average. However, Thulamela sub-district had a particularly high level of the first indicator, at 130.1 per 1 000, though severe malnutrition across the broader age group was only slightly higher than the district level at 4.9 per 1 000. The case fatality rate for malnutrition among children under five years has fallen across the district over the past four years to 15.2% in 2013, which was above the national average and the national target. This rate...
was particularly high in the Musina sub-district at 23.2%. The lack of a hospital in Mutale once again prevents provision of a more accurate picture for this sub-district.

**Disease prevention: Non-communicable diseases**

Contrary to global and national trends, the hypertension incidence in the Vhembe district has been decreasing over time and was 10.0 per 1 000 in 2013. The spikes in figures over the past four years in all districts may be caused by sporadic increased case-finding efforts.

Diabetes incidence was slightly lower than provincial and national averages at 1.5 per 1 000, though the figures are particularly low for the Musina and Mutale sub-districts at 0.4 and 0.2 per 1 000 respectively. The same picture was seen with detection rates, which were particularly low at about 20% and 25% of district levels for Musina and Mutale sub-districts for new clients under 18 years and for new clients aged 18 years and older. Despite this, the district diabetes detection rates were similar to national levels in 2013 at 0.5 per 1 000 for new clients under 18 years old and 2.2 per 1 000 for new clients aged 18 years and older.

The mental-health case load increased over the period in the Vhembe district to 1.9%, slightly above the provincial and the national averages. Almost all mental-health cases were 18 years and older in the district, similar to rates in the province and the country. In the Musina sub-district, the mental health case load was highest in the 18 years and older category at 100%, with only 0.4% of cases under the age of 18.

The dental extraction to restoration ratio fell over the period to 16.4 in 2013 in the Vhembe district, higher than the provincial but lower than the national ratio. This was partly due to the fact that no dental service was available in the Musina and Mutale sub-districts.

**Disease prevention and control: Communicable diseases**

Malaria is endemic in the Vhembe district. In the 2013/14 malaria season, there were 3 524 cases of malaria (55.7% among men) and 44 deaths due to malaria in Vhembe. This was much higher than previous years, mainly due to a heavy rainy season. Thulamela usually experiences the highest number of malaria cases, though in 2012 its cases dropped markedly to about one-tenth of their previous level while those in Mutale peaked at 512.

**Data quality**

Availability and reliability of data to facilitate this study were key areas of analysis. Lack of reliable data on causes of death, for example, caused the whole study to move from a burden-of-disease report to an overview of health delivery and key health indicators instead. Observations arising from the challenges of assessing the Vhembe district burden of disease have been noted earlier in this executive summary.

Data-quality issues were also believed to be reasons for the study frequently pinpointing higher or lower incidences or rates than expected, according to both DHB workshops and reports from staff. These aspects are examined in the body of the report, together with examples of problematic data affecting, for instance, matters from primary health care utilisation and aspects of male condom distribution coverage to HIV testing in antenatal care. It was felt that staff did not understand the importance of quality data to guide public-health implementation and policy development and accordingly that recording data elements receives low priority in facilities, despite emphasis on this in the Standard Operating Procedures.

Similarly, specific aspects of problematic cause-of-death data were traced to medical practitioners in public-health facilities being unaware of the importance of their role in using appropriate ICD-10 coding on death-notification forms and the majority of them not using IMCI guidelines when diagnosing conditions and causes of death in children.

A survey among 22 practitioners in a district hospital showed that more than half took no part in routine data collection. Similarly, the majority of respondents had either not recorded the correct cause of death on death-notification forms or had never completed a death-notification form.

Challenges in improving data capture among medical practitioners included: unavailability of ICD-10 codes. In addition, more than half had no access to a computer. Others had used their own notebooks or laptops for computer access. However, more than half of these devices used outdated versions of MS Office programs and nearly half of this group (44.4%) either did not update anti-virus software or did not have it installed.
Recommendations

Key recommendations include the following:

**Service-delivery environment**
- Improve coordination with other departments and structures, possibly using a model such as KwaZulu-Natal’s Operation Sukuma Sakhe, to support: improved unemployment rates; rollout of municipal services; improved attendance at schools, particularly among girl learners.
- Expand the quantity and level of facilities in the Mutale and Musina sub-districts, including expanding mobile clinics to service Musina’s informal dwellings.
- Increase staffing levels at facilities to ease patient workloads.
- Introduce traditional-medicine managers to work with traditional health practitioners on community HIV-alleviation projects.

**Burden of disease**
- Train medical practitioners in medical certification of death.
- Join discussions on improving data gathering, such as adding a field for the manner of death to the death-notification form to improve injury-mortality statistics and modifying the death-notification form to allow access to cause of death for use by a local mortality surveillance system.
- Allocate resources to the implementation of a local mortality-surveillance system.
- Improve the quality of data for deaths certified by headmen.

**Epidemiology**
- Review HIV testing practices to improve uptake.
- Review male condom distribution and investigate reports of stock-outs.
- Close the PMTCT gap by increasing ART uptake among eligible clients.
- Focus on recording data, including test results, especially in maternity booklets and Road to Health cards.
- Ensure compliance with the 2013 guidelines that TB patients are tested for HIV and initiated on ART if positive, as well as all HIV-positive patients being frequently screened for TB.
- Strengthen the DOTS system in the district and institute improved follow-up for TB patients, including providing vehicles to trace defaulters.
- Improve family-planning services to tackle the rate of deliveries to women under 18 years of age.
- Make available more obstetrics-skilled staff to monitor and handle difficult deliveries, preventing as many emergencies as possible.
- Use ward-based outreach teams to provide education and advice on breastfeeding and complementary feeding and to find cases of child malnutrition.
- Eliminate inconsistencies in immunisation coverage.
- Extend health education to grandmothers caring for small children.
- Investigate problematic child-health indicators in the Musina sub-distict and devise improvement strategies.
- Promote improved early case-finding and treatment of hypertension and diabetes mellitus.
- Give enhanced focus to finding mental-health cases among the total population, especially those aged under 18 years.
- Ensure the effectiveness of malaria-control measures and devise a contingency plan for seasons of exceptionally heavy rain.

**Data quality**
- Ensure data is collected for all NIDS elements, including for environmental health services.
- Train all staff, including medical practitioners, on the data needs of the SOP.
- Make ICD-10 coding available to medical practitioners for use in their data inputs.
- Ensure all medical practitioners have access to information technology to carry out data-related tasks.
- Implement district-wide monitoring and evaluation of data at all levels.
1. **Introduction**

1.1 **Background**

As noted by the World Health Organization, health information is a key resource for managing health systems and improved health outcomes. Closing information gaps at local, provincial and national levels is essential for guiding priority policy-making and implementation of interventions. High-quality, readily available data are needed for the formulation of research and policy development, together with implementation, monitoring and evaluation of health interventions aimed at increasing life expectancy and improving the health status of the population.

South Africa is plagued by four clear health problems that have been described as the quadruple burden of disease.\(^1\) These are: HIV, AIDS and TB; maternal, infant and child mortality; non-communicable diseases; and injury and violence. Rates of death and disability remain unacceptably high across the country and especially in more deprived zones, such as Limpopo Province in general and Vhembe District in particular.

The Vhembe Health District operates within South Africa’s District Health Systems (DHS) which is based on the primary health care approach – aimed at keeping people healthy and caring for them when they become unwell. Positive outcomes such as increased life expectancy have been observed, but intervention efforts and significant allocation of resources over the past 20 years through the DHS have not succeeded in strengthening PHC as much as is needed.

Limited successes in some areas, and the impact of various changes in the health-policy landscape across South Africa, underscore the importance of evaluating prevention and treatment approaches, which would give direction to implementing the PHC re-engineering strategy. Managers in Vhembe District identified the need for a document presenting an overview of the causes of mortality, the incidence and prevalence of key diseases in the district, and the risk factors pertaining to all these, as this would enhance measuring of progress towards primary health care goals in Vhembe District.

1.2 **Aims and objectives**

Health Systems Trust (HST) was contracted by the Limpopo Department of Health (LDoH) to conduct a rapid assessment of the estimated burden of disease for Vhembe District, partly as a baseline to guide implementation of National Health Insurance (NHI) since Vhembe has been selected as one of the pilot districts for this project.

Specific objectives were to:

- analyse existing data from stakeholders such as the National Department of Health’s District Health Information System, Statistics South Africa, the Medical Research Council of South Africa, Health Systems Trust and local educational institutions in order to compile an overview of the causes of mortality, of the incidence and prevalence of the most important diseases, and of their risk factors in Vhembe District.
- compile an estimated burden of disease (BoD) report with specific recommendations on:
  - institutionalising the collection of data to support the production of an annual BoD report and possible measures for rolling out the BoD project to other districts in the coming financial years;
  - institutionalising the Health and Demographic Surveillance System (HDSS) for Vhembe District and possible measures for its roll-out to other districts in the coming financial years.
- collect and analyse qualitative data from sentinel sites to obtain a deeper understanding of the situation regarding BoD data in Vhembe District.

These aims and objectives were agreed with the district.

Research and development of the project was conducted over a five-month period through close interaction between key Vhembe managers and the project staff.
1.3 Methods

1.3.1 Study design

Using a mix of quantitative and qualitative research methods over an initial five-month project, a cross-sectional, descriptive study was produced. Quantitative data-collection techniques included the collection and analysis of secondary data related to socio-economic and sociodemographic data, HIV and TB data, maternal, neonatal, child and women’s health, disease prevention and control and non-communicable disease.

The focus was to determine which indicators were available at district level as well as the reliability and quality of the information, with a view to presenting the most current data. Conducting interviews with selected key informants working in the local hospitals allowed for qualitative research techniques to discern why death data and International Statistical Classification of Diseases and Related Health Problems (ICD) coding were deficient. More specifically, the qualitative study explored adherence of the medical practitioners to the District Health Management Information System Standard Operating Procedures (DHMIS SOP), as well as the extent to which medical practitioners experienced problems with the completion of death-notification forms and the use of ICD-10 coding.

1.3.2 Data sources and collection

Most of these data sources are directly accessible via HST’s extensive databases and publications; therefore no field work was required. Internet searches and literature reviews on Google and PubMed were also conducted to identify any other relevant data sources. To determine and understand the baseline BoD trends in Vhembe District, the following data sources were used:

Socio-economic and sociodemographic data sources included the District Health Barometer (DHB), Statistics SA publications such as 2011 Census as well as the Local Government Handbook. The project also contacted the relevant departments at the University of Venda and Limpopo University to source their research studies that might add value. Statistics SA annually produces information on causes of death from the civil registration system in South Africa. The most recent report presents statistics on the underlying causes of death in 2011, offering information at district level.2 The District Health Barometer (DHB) 2013/14 includes information on neonatal, stillbirth, and maternal mortality in facilities at district level. Burden of disease data were retrieved from the Medical Research Council’s Burden of Disease Unit.

HIV and TB data sources were: ETR.Net, the DHB, the National HIV Sero-Prevalence surveys, District Health Information Software (DHIS) and the National Health Laboratory Service (NHLS).

Maternal, neonatal, child and women’s health (MNCWH) data sources were retrieved from the DHIS, District Clinical Specialist Team (DCST) situation analysis, National Committee on Confidential Enquiries into Maternal Deaths (NCCEMD) and the DHB. Detailed qualitative information on MNCWH was also obtained by interviewing the Vhembe DCST and the provincial MNCWH committee headed by Dr Anne Robinson.

Disease prevention and control data were obtained from the National Institute for Communicable Diseases (NICD), which provided laboratory-diagnosed notifiable medical conditions (such as measles and cholera). The National Department of Health malaria-surveillance programme in Tzaneen provided information on malaria cases and deaths.

Non-communicable disease data were retrieved from the DHIS and HST’s Annual Health Statistics publication. Reference was also made to the South African National Health and Nutrition Examination Survey (SANHANES-1) report, which includes information on self-reported non-communicable diseases (NCDs) and measured hypertension and blood sugar (diabetes).3

1.3.3 Data management

This project was conducted over a five-month period. The following summarises of the key project activities.

- Phase 1: Inception
  - Meeting with LPDoH
  - Finalisation of work plan
- Sourcing of relevant data sets and information
- Approval for use of datasets obtained
- Ethics approval obtained
- Team engagements and meetings

- Phase 2: Identify data needs
  - Desktop review
  - Selection and confirmation of indicators to be reported on
  - Designing and development of project database of indicators
  - Team meeting

- Phase 3: Data collection
  - Capture and entry of data onto project database
  - Identification of sentinel sites
  - Development of tools for qualitative data collection
  - Planning for and collection of qualitative data collection
  - Data analysis

- Phase 4: Analysis, reporting and dissemination
  - Preparation of draft report
  - Consultation meeting with LPDoH
  - Preparation of the final BoD report

1.3.4 Structure of report

This report opens with discussion of demographic and economic characteristics, social determinants of health and the service-delivery environment.

The burden of disease in Vhembe District, which draws on analysis of death-registration data by the Medical Research Council’s specialised unit, is presented next. This is examined in terms of trends in leading causes of premature mortality and in causes of death.

The district’s disease profile is discussed in a substantial epidemiological section covering disease occurrence, prevention and treatment in the following areas, primarily through the use of routinely collected data: HIV and TB; maternal, children’s and women’s health and nutrition; non-communicable diseases; and finally, communicable diseases. The data are presented according to the format of the nationally developed Annual Performance Plan in order to create continuity in the understanding of the data by staff working in the district.

Data quality and its impact on the study’s findings are then discussed. This is followed by an overview and interpretation of the report’s main findings. The report ends with a set of recommendations.

1.3.5 Terminology

As this is a health-oriented publication, the term sub-district (SD) has been used where health data and policy implementation are discussed, in keeping with general usage in health data and publications within South Africa. The terms "municipality" and "local municipality" are used with data and discussion referring to socio-economic units and municipal service delivery. The terms are interchangeable according to purpose in Vhembe District as the borders of the sub-districts of Makhado, Musina, Mutale and Thulamela are identical with the local municipalities, making these entities co-terminous. Accordingly, sub-district is used in the health context and local municipality is used with regard to socio-economic factors.
2. Demography

2.1 Overview of Vhembe District

2.1.1 Orientation

Vhembe District (DC34) is a Category C municipality (see also 2.1.2) located in the northern part of Limpopo Province. It shares borders with Zimbabwe and Botswana in the north-west and Mozambique in the south-east through the Kruger National Park. The district’s land area is 25.597 km², making it geographically the nineteenth-largest district in South Africa.

However, the district is among the poorest of South Africa’s 52 districts, with significantly high levels of unemployment and mainly rural living conditions. Population densities range from 106 people per km² in Thulamela to nine people per km² in Musina. More than half of the population is aged 24 years or younger across the district’s four local municipalities.
Map 1: Topography of Vhembe District Municipality

Legend

Vhembe Subdistricts

Subdistrict name & Code

- Makhado, LIM344
- Musina, LIM341
- Mutale, LIM342
- Thulameia, LIM343

South Africa

Source: Municipal Demarcation Board
2.1.2 Municipal breakdown and population distribution

Vhembe District consists of four local municipalities (sub-districts) (Map 1):
- Musina (LIM341)
- Mutale (LIM342)
- Thulamela (LIM343)
- Makhado (LIM344).

Administratively, all four of these local municipalities are Category B municipalities, categorising each as a local municipality, as opposed to a district municipality (Category C) or a metro municipality, for example.

The 2011 Census population for Vhembe District was 1,294,723 (Figure 1). This was adjusted by the District Health Information Software (DHIS) for 2013 to 1,393,722.

In 2011, Thulamela (population of 618,463) and Makhado (population 516,031) were each about 10 times larger than the population of Musina (population 68,359). The population of the Mutale municipality was 34% higher than Musina, but still less than a fifth that of Makhado and Thulamela.

Figure 1: Vhembe population distribution across sub-districts, 2011

Source: Statistics SA

This yields a population density of 54.4 persons per km² for Vhembe District in 2011. As shown in Map 1, Vhembe is predominantly rural. As shown in Map 2, the majority of the settlements are clustered east of the N1, predominantly in Makhado and Thulamela, with only about eight settlements found west of the N1.
2.1.3 Local economy

Limpopo Province as a whole contributes 2.4% to South Africa’s gross domestic product (GDP). Vhembe District’s main economic activities include agriculture, mining and tourism. Growing economic sub-sectors are game farming and eco-tourism.

Mining activities are the highest contributor to the provincial GDP. Agriculture includes both commercial and subsistence farming, and as a whole, contributes only 3% to the provincial GDP, although 22% of the district’s labour force are currently employed in that sector.

2.1.4 Socio-economic factors and health coverage

Vhembe District is one of South Africa’s poorer districts, largely due to its high rates of unemployment and levels of poverty. In 2011, the district unemployment rate stood at 38.7% and the poverty level at 32%.

In terms of the South African socio-economic deprivation index, Vhembe District falls within Quintile 2. This index ranks all the country’s 52 districts into quintiles according to socio-economic indicators. The 20% of districts falling into Quintile 1 are considered to be the most deprived, while those within Quintile 5 are the 20% of districts that are least deprived.

Vhembe has an estimated medical scheme coverage of only 7.2%, meaning that the remaining 92.8% of the population uses public-health services. Anticipating that Vhembe would benefit from the roll-out of National Health Insurance (NHI), it was selected as one of the 11 NHI pilot districts.
2.2 Characteristics of Vhembe sub-districts

While significant areas of Vhembe District are sparsely inhabited, the bulk of the population live in the local municipalities of Thulamela (48%) and Makhado (40%) (Table 1). The northern local municipalities of Mutale (7%) and Musina (5%) are least populated.

Table 1: Demographic characteristics of Vhembe District, 2011

<table>
<thead>
<tr>
<th>Sub-district</th>
<th>Area (km²)</th>
<th>Population</th>
<th>Households</th>
<th>Agricultural households</th>
<th>Female headed households</th>
<th>Formal dwellings</th>
<th>Informal dwellings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makhado</td>
<td>8 300</td>
<td>516 031</td>
<td>134 889</td>
<td>37.5%</td>
<td>52.1%</td>
<td>91.9%</td>
<td>8.1%</td>
</tr>
<tr>
<td>Musina</td>
<td>7 577</td>
<td>68 359</td>
<td>20 042</td>
<td>45.9%</td>
<td>39.6%</td>
<td>74.8%</td>
<td>25.2%</td>
</tr>
<tr>
<td>Mutale</td>
<td>3 886</td>
<td>91 870</td>
<td>23 751</td>
<td>11.3%</td>
<td>54.8%</td>
<td>87.3%</td>
<td>12.7%</td>
</tr>
<tr>
<td>Thulamela</td>
<td>5 834</td>
<td>618 462</td>
<td>156 594</td>
<td>53.7%</td>
<td>54.4%</td>
<td>85.7%</td>
<td>14.3%</td>
</tr>
</tbody>
</table>

Despite the wide difference in area between Vhembe’s local municipalities, their population density also mirrors their absolute population numbers. Accordingly, in 2011, Thulamela had the highest population density of 106 people per km² and Makhado 62 people per km². By contrast, Mutale had 24 people per km² and Musina just nine people per km². These factors are further examined within the following descriptions of each municipality.

2.2.1 Musina (LIM541)

The Musina Local Municipality covers an area of 7 577 km². After Makhado, its area is the second-largest of Vhembe District’s local municipalities but in 2011, it had the smallest population with just 68 359 inhabitants. This size and low population led to a very low population density of nine people per km², by far the lowest in Vhembe District.

The district is named for the town of Musina, the largest town in the area and the most northern town in the country. The town of Musina is located close to the Beitbridge border post between South Africa and Zimbabwe. This is a main entry point for foreigners arriving or returning as residents from areas to the north of South Africa.

The Musina Local Municipality had a significant growth rate of 5.53% per annum between 2001 and 2011. The job opportunities available within this buoyant economic environment could contribute to the significantly high proportion of informal dwellings (25.2% in 2011), by a long way the highest across the district, as well as a proportionally lower proportion of female-headed households. In 2011, females headed 39.6% of Musina households, in comparison with over 50% for other Vhembe municipalities.

Mining is the most substantial contributor to Musina municipality’s local economy, as it is to both Vhembe District and the provincial GDP.

Agriculture contributes 7% to the local municipality’s GDP. The municipality’s agricultural products include tomatoes, citrus and dates. Of the 20 042 total households in the Musina municipality in 2011, agricultural households represented 45.9%.

It is anticipated that eco-tourism and heritage sites will continue to add value to the local economy given that the key archaeological site of Mapungubwe was declared a World Heritage Site in 2003.

2.2.2 Mutale (LIM542)

Mutale Local Municipality lies on the far north-eastern side of Limpopo Province. In the north, it borders Zimbabwe and in the east, through the Kruger National Park, it borders Mozambique. Its area of 3 886 km² makes it less than half the geographic size of the Musina Local Municipality and by far the smallest local municipality in Vhembe District.
The Mutale Local Municipality serves almost entirely rural communities, with 85% of the population living in tribal areas. In 2011, agricultural households formed 11.3% of the total number of 23,751 households.

Mutale’s 91,870 inhabitants gave it both the second-lowest population of the Vhembe local municipalities and, at 24 people per km², the second-lowest population density. Of the 23,751 total households in Mutale, 11.3% were agricultural in 2011. Within the municipality, 12.7% of dwellings were informal. However, 54.8% of households were female-headed, the highest proportion in Vhembe District.

In 2011, Mutale’s population lived mainly in formal dwellings (87.3%), with 12.7% living in informal dwellings – about half the proportion of informal dwellings compared, for example, to Musina. The local municipality’s growth rate from 2001 to 2011 was 1.03%. Mining is the main economic activity within Mutale Local Municipality, particularly the Tshikondeni Coal Mine. The municipality is rich in other commodities, from diamonds and gold to nickel and magnesium. Mutale municipality also has abundant tourism resources.

2.2.3 Thulamela (LIM343)

Thulamela is Vhembe’s most eastern sub-district or municipality and borders the Kruger National Park on the east. Thohoyandou is the main town of this sub-district and local municipality.

With an area of 5,834 km², Thulamela is Vhembe’s second-smallest municipality geographically. However, its population of 618,642 people in 2011 made it Limpopo Province’s most populated municipality, also ranking Thulamela as the fourth most-populated of all South Africa’s municipalities.

Across the municipality, there was a population density of 106 persons per km², the highest in Vhembe District. However, more than 85% of the inhabitants live in tribal areas. Within the municipality, 85.7% of the dwellings were formal structures and 14.3% informal.

Thulamela Municipality had an economic growth rate of 0.62% between 2001 and 2011, the second-lowest in Vhembe District. Agriculture is the district’s main economic activity. Agricultural households accounted for 45.9% of the area’s total 156,594 households in 2011. Females headed more than half (54.4%) of all households. The proportion of informal dwellings was 14.3%.

2.2.4 Makhado (LIM344)

The local municipality of Makhado is formed around the main town of Makhado, with the national road (N1) running through the town. Geographically, Makhado is Vhembe’s largest municipality, covering 8,300 km². It borders Musina in the north, Thulamela in the east, Molemole in the west (Capricorn District) and Giyani in the south (Mopani District).

Makhado Local Municipality is divided into four regions: Makhado (previously Louis Trichardt), Vuwani, Dzanani and Waterval. With 516,031 inhabitants, in 2011 it was the eighth most-populated municipality in South Africa. However, its extensive area means that it had a population density of 62 people per km², substantially lower than the population density of Thulamela. Of the total 134,889 households in Makhado Local Municipality, 37.5% were agricultural households. Females headed 52.1% of all households. The proportion of informal dwellings was the lowest across Vhembe District at 8.1%.

Makhado Local Municipality is a fertile region, producing litchis, mangoes, bananas and nuts, and is also one of Limpopo’s premier business and tourist destinations. However, its economic growth rate of just 0.43% between 2001 and 2011 was noticeably the lowest in Vhembe District.

2.3 Population overview of Vhembe District

2.3.1 Age distribution

In 2011 across all Vhembe local municipalities, the population was generally dominated (58.8%) by people of working age, between 15 and 64 years (Figure 2). The next largest group was young children aged from 0 to 14 years (34.9%). Across the four local municipalities, Musina had the highest proportion of inhabitants of working age (69.2%) and the lowest proportion of both elderly people (2.6%) and young children (28.2%). In Vhembe’s other three municipalities, the proportion of elderly people was about three times higher than in Musina; 6% in Thulamela, 6.2% in Mutale and 7.1% in Makhado. The proportion of young children was highest in Mutale at 38.2%.
In 2011, more than half of Vhembe District’s population (55.1%) was 24 years old and younger, with a relatively even distribution of males and females in all age categories from 0 to 4 years through to 40 to 44 years, despite a slightly increasing imbalance towards females from the 20 to 24 year age category onwards (Figure 3). This gender imbalance was more noticeable in the 40 to 44 year age group.

From the point of view of primary health care (PHC) service delivery and healthcare planning, it should be noted that the gender difference continued to increase through the older age categories. From the age categories of 50 to 54 years upwards, there was nearly double the proportion of females compared to males. Within the 65+ age category, the gender difference is nearly threefold. The increase in the proportion of females aged 65+ to 3.6%, as opposed to 1.3% in the 60 to 64 year age group, was also marked (Figure 3).

These gender differences should have an impact on case-finding and treatment of non-communicable diseases and on PHC utilisation generally.

In 2011, the proportion of Black Africans ranged from 94% in Musina to 99.3% in Mutale and Thulamela (Figure 4). Other races formed less than 1% of the population in both Mutale and Thulamela. There were slightly higher proportions of Whites in Makhado (2%) and Musina (4.8%).

2.3.2 Race distribution

In 2011, the proportion of Black Africans ranged from 94% in Musina to 99.3% in Mutale and Thulamela (Figure 4). Other races formed less than 1% of the population in both Mutale and Thulamela. There were slightly higher proportions of Whites in Makhado (2%) and Musina (4.8%).
2.4 Summary

The nineteenth-largest district in South Africa, Vhembe is a predominantly rural area in northern Limpopo Province. It borders on Botswana, Zimbabwe and Mozambique and is divided into four local municipalities: Makhado, Musina, Mutale and Thulamela.

Most of the district is relatively sparsely settled, with Thulamela having the largest population density (106 people per km², about twice the district average), ranking it rank among South Africa’s most populated municipalities. However, most Vhembe municipalities have very high rural populations (85% in Mutale and Thulamela particularly). The proportion of formal dwellings mainly ranged from 85.7% in Thulamela, to 87.3% in Mutale and peaking at 91.9% in Makhado. Musina, however, has only 74.8% of formal dwellings.

Vhembe’s population of 1,294,722 in 2011 was predominantly Black African and also relatively young, with more than half (55.1%) aged 24 years or younger. As will be seen, this translated into particularly high youth unemployment rates in the district. The gender balance was fairly equal through the age groups, though it starts to lean particularly towards females from the age of 40 years onwards, with a strong incline towards females by the age of 65 years. A significant proportion of households were female-headed, ranging from 39.6% in Musina to 54.8% in Mutale.

Across the district, the poverty level was 32%. While agriculture and eco-tourism contribute to the district’s economy and sustainability, it is mining that generates significant growth and creates some pockets of prosperity. Musina, for example, is the second-largest of Vhembe’s municipalities geographically and had by far the lowest population density (just nine people per km²). Yet, due to diamond and copper mining, in 2011 its unemployment rates were noticeably below the national average, at 18.7%, against a national rate of 24.3% at the time.

2.5 Conclusions

The high levels of poverty and unemployment, coupled with the generally scattered population and rural nature of the district, present significant challenges for individual health maintenance and access to health services. These challenges are exacerbated by the high proportion of youth in the population, as well as a bulge of elderly people. The proportion of female-headed households is also high.
3. Social determinants of health

Data presented in this section are taken from the Census 2011, published by Statistics South Africa, and aim to portray the social context of two key factors of this report: health risks, morbidity and mortality; and access to and uptake of health services.

3.1 Unemployment rates

Vhembe District’s overall unemployment rate (defined as the percentage of unemployed persons within the labour force) was 38.7% in 2011 (Figure 5). This rate tallied closely to the provincial unemployment rate of 39.5% but was noticeably higher than the national rate of 24.3%.

In 2011, the unemployment rate for youth (15 to 34 years) was particularly high in Vhembe District at 50.6%, compared to a general unemployment rate of 38.7% in the district. In 2013, by comparison, youth unemployment was 29.5% in Limpopo Province and 36.2% nationally.

![Figure 5: Unemployment rates across Vhembe sub-districts, 2011](image)

Source: Statistics SA

3.1.1 Household income and unemployment, Mutale LM

Across Vhembe’s four local municipalities, in 2013 Mutale had both the highest overall unemployment rate of 48.8% and the highest youth unemployment rate of 62.2% (Figure 5).

This is reflected in a high proportion of 13.2% of households with no income (Figure 6). A further 8.9% had an average income of only R1 to R4 800 a year. Most households in the local municipality had average incomes falling into one of three low and middle-income categories: 17.5% between R4 801 and R9 600; 24% between R9 601 and R19 600 and 19.1% between R19 601 and R38 200. The remaining 17.5% of upper-income households were clustered in the lower brackets of this range, with 7.4% receiving between R38 201 and R76 400 and 4.9% receiving between R76 401 and R153 800.
3.1.2 Household income and unemployment, Musina LM

By contrast with Mutale, Musina’s household income and unemployment rates were strikingly better, due to the impact of mining, for example, on the local economy. Overall, unemployment was running at 18.7%, with youth unemployment at 22.5% in 2013. This translated into noticeably better average annual household incomes in Musina (Figure 7).

At 27.8%, the sub-district had the highest proportion of households in the R9 601 to R19 600 income bracket. Another 20.3% of households had an income of R19 601 to R38 200. The proportion of households with incomes above this level was 24.8%, outstripping Mutale’s 17.5%. Nearly half of these households clustered into the R38 201 to R76 401 bracket of household income.

3.1.3 Household incomes and unemployment, Thulamela LM

Unemployment in Thulamela and Makhado was closer to the Mutale rates and so were average annual household incomes (Figure 8). In 2013, Thulamela’s overall unemployment was close to Mutale at 43.8%, with youth unemployment rates of 58.3%.

Despite this, Thulamela Local Municipality had the lowest rate of households with no income in the district at 11.9%, although this should be seen in the context of 8.9% of households with an income between R1 and R4 800. Nearly half of all the sub-district’s households were clustered in the income brackets of R4 801 to R9 600 and R9 601 to R19 600. While 19.8% had an income of between R19 601 and R38 200, the top seven income brackets contain only 19.0% of households.
3.1.3 Household income and unemployment, Makhado LM

Makhado was only slightly better off than Thulamela in 2013, with unemployment rates close to the district figures: an overall unemployment rate of 36.7% and a youth unemployment rate of 49.6%.

Thus 12.4% of households in the local municipality were without income (Figure 9), while 47.2% of households were clustered in the two bands of R9 601 to R19 600 and R19 601 to R38 200.

3.2 Education

Education levels among SA citizens aged 20 years and older in Vhembe District are lower, often significantly, than nationally. In 2011 in Vhembe, 17.7% had no schooling, 21.6% had passed Matric and 9.9% had higher education. By comparison, in this age group nationally, 8.6% had no schooling, 28.9% had Matric and 11.8% had higher education. These poor education levels have been compounded by the standard of schooling available, with Vhembe defined as having the highest learning-deprivation index in Limpopo. Vhembe District headed rankings of the 200 most deprived schools across the Limpopo Province.7

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Figure 8: Average annual household income, Thulamela LM, 2013

Figure 9: Average annual household income, Makhado LM, 2013

Source: Statistics SA
3.2.1 Comparative schooling levels across Vhembe

Compared to Vhembe’s other three local municipalities, Musina had a much smaller proportion of people aged 20 years and older who have no schooling at 11.3% (Figure 10). In addition, Musina has shown more than fivefold growth compared to the other three municipalities due to the fact that it offered more work opportunities through its strong mining sector and the economic multiplier effect.

This in turn led to a higher proportion of the population without schooling in Makhado, Mutale and Thulamela. The proportion of Mutale’s population who had passed matric among the group aged 20 years and older (18.8%) was slightly lower than in Makhado and Thulamela. However, Thulamela had the highest proportion of people with higher education (11.2%). (Note that proportions do not add up to 100% as only the extremes in education level are presented.)

Figure 10: Schooling profile across Vhembe sub-districts, 2011

<table>
<thead>
<tr>
<th></th>
<th>Makhado</th>
<th>Musina</th>
<th>Mutale</th>
<th>Thulamela</th>
<th>Vhembe</th>
</tr>
</thead>
<tbody>
<tr>
<td>No schooling aged 20+</td>
<td>18.9</td>
<td>11.3</td>
<td>18.8</td>
<td>17.4</td>
<td>17.7</td>
</tr>
<tr>
<td>Higher education aged 20+</td>
<td>9.1</td>
<td>6.8</td>
<td>7.8</td>
<td>11.2</td>
<td>9.9</td>
</tr>
<tr>
<td>Matric aged 20+</td>
<td>21.8</td>
<td>21.6</td>
<td>18.8</td>
<td>21.9</td>
<td>21.6</td>
</tr>
</tbody>
</table>

Source: Statistics SA

Low educational levels meant that Limpopo had an adult literacy rate of 88%, the lowest in the country and lower than KwaZulu-Natal and the Eastern Cape which had similarly high levels of rural population. Producing educated and skilled learners who can join the workforce with ease remains a challenge for Vhembe schools, with only about one in 10 (10.9%) primary schools in the area having access to internet.7

3.2.2 Reasons for school dropouts in Vhembe

More broadly, primary causes given by individuals aged between seven and 18 years for not attending Limpopo educational institutions included poor performance, cited by 29.1% of respondents in 20138 (Figure 11). This level of nearly one in three respondents not attending was fairly stable from 2011 to 2013, having soared from a previous stable level of about 18% not attending in 2009 and 2010.

The proportion of those citing disability or illness fluctuated over recent years, with a low of 14.7% in 2011. However, these reached the highest levels of 28.2% and 27.1% in 2012 and 2013 respectively.

The proportion citing family commitments also fluctuated, reaching a high of 18.9% in 2010. However, the low of 7.3% in 2013 suggests progress in family support of education.

Those mentioning “no money for fees” as a reason for non-attendance dropped somewhat from 24.8% in 2009 but remained a substantial 19.1% in 2013.6 This points to problems within the application of the no-fees schools system introduced in 2006 and of the waiver of school fees for children from single-parent families and orphans. Provincial education budgeting and funding could also be examined as problems have been experienced in various areas across South Africa with designated no-fee schools needing to enforce supplementary fees to ease cashflow or pay for necessities.9

Getting to school was mentioned as a reason for not attending school only in 2011 and then only by 2.6%, or about one in 50 learners. However, it must be noted that a particularly high proportion of 83.2% of learners in Vhembe District have to reach school on foot.10 This is one factor that makes many schools not child- or girl-friendly, according to UNESCO.11 Walking long distances to school exposes such learners to personal dangers, including rape.12 The necessity of walking to school is an obvious reason for dropping out and levels of dropouts are particularly high both in the Limpopo Province and in Vhembe District.
Other
Getting to school
Completed school
Working at home
Education is useless
Poor performance
Disability and Illness
Family commitment
No money for fees

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>14.7</td>
<td>12.5</td>
<td>6.6</td>
<td>2.2</td>
<td>17.4</td>
</tr>
<tr>
<td>Getting to school</td>
<td>0</td>
<td>0</td>
<td>2.6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Completed school</td>
<td>0</td>
<td>2.1</td>
<td>1.0</td>
<td>3.0</td>
<td>0</td>
</tr>
<tr>
<td>Working at home</td>
<td>2.2</td>
<td>6.4</td>
<td>10.1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Education is useless</td>
<td>7.7</td>
<td>0.9</td>
<td>1.5</td>
<td>2.6</td>
<td>0</td>
</tr>
<tr>
<td>Poor performance</td>
<td>18.2</td>
<td>18.4</td>
<td>30.4</td>
<td>30.9</td>
<td>29.1</td>
</tr>
<tr>
<td>Disability and Illness</td>
<td>19.1</td>
<td>23.6</td>
<td>14.7</td>
<td>28.2</td>
<td>27.1</td>
</tr>
<tr>
<td>Family commitment</td>
<td>13.3</td>
<td>18.9</td>
<td>12.7</td>
<td>16.1</td>
<td>7.3</td>
</tr>
<tr>
<td>No money for fees</td>
<td>24.8</td>
<td>17.1</td>
<td>20.5</td>
<td>17.1</td>
<td>19.1</td>
</tr>
</tbody>
</table>

Source: Statistics SA

3.2.3 Challenges to education of girls

Limpopo females were found to be more likely than South African females in general to complete their primary school education, and school completion rates for females in the province are higher than in males. Gender differences are apparent at primary-school level as well, with female learners more likely than males to finish primary school by the age of 15. However, in Limpopo six out of 10 individuals aged between 7 and 18 years of age not attending school in 2013 were female (Figure 12).8

Enrolling girl learners in school and preventing them from dropping out is a major challenge throughout Africa. It has been pointed out that less value is placed on their educational achievements as they are often socialised to accept the roles of caring for the home and bearing children.11 Nearly twice as many females as males cited “no money for fees” as a reason for not attending school (23.3% compared to 12.7%). No males cited family commitments, while 12.0% of females gave this reason. There has also been a risk of sexual abuse and rape at schools, which are not always seen as safe places by girl learners.13

Teenage pregnancies are also still stigmatised. This often makes it difficult for young mothers to exercise their constitutional right to education and pursue their studies.11

Source: General Household Survey 2013

Figure 11: Reasons for not attending education institutions for persons aged 7-18 years, Limpopo, 2009-2013

Figure 12: Reasons why individuals aged 7-18 years were not attending school by gender, Limpopo, 2013
3.2.4 School dropouts and health-policy implementation

School health is one of the pillars of PHC re-engineering and Vhembe is one of the NHI pilot districts, with 19 school health service teams established under their mobile clinic teams. However, until school dropout levels can be countered, the effectiveness of this programme may be limited.

3.3 Municipal services

Across Vhembe District, in 2011 only 13.9% of households had a flush toilet connected to sewerage and only 15.4% of households had piped water inside dwellings. While Musina was one of the most rural of the sub-districts, it also achieved the best municipal service delivery levels in Vhembe. A prosperous local economy should provide further support for these initiatives. However, the sub-districts of Thulamela and Makhado were challenged by the need to deliver services to much higher population numbers.

3.3.1 Municipal service provision across Vhembe sub-districts

Musina provided weekly refuse removal to 61.5% of households in 2011, while this service reached only 13.9% across Vhembe District, ranging between 5.2% and 12.5% of households in the other three local municipalities (Figure 13). Musina’s proportion of informal dwellings (25.2%) was much higher than the other three local municipalities but 63.2% of households had a flush toilet connected to sewerage. This municipality also had the highest proportion of homes (26.4%) with piped water inside. Homes with a flush toilet in the other rural municipality, Mutale, accounted for just 3.8% of the total, with 5.8% having piped water inside. While 87.2% of Vhembe District households used electricity for lighting, this proportion was lowest in Musina at 76.4%.

Except for using electricity for lighting, which was 85.4% nationally compared to 87.2% in Vhembe District, the values for all these municipal services indicators were generally lower, sometimes much lower, in Vhembe than the South African average. Nationally, access to piped water was 89.9% and in Limpopo Province 77.5%. Access to improved sanitation was 77.9% nationally and 77.5% provincially. Provision of municipal refuse removal was 66% nationally but 20.2% in Limpopo.

Figure 13: Municipal services across Vhembe sub-districts, 2011

![Figure 13: Municipal services across Vhembe sub-districts, 2011](chart)

Source: Statistics SA

3.3.2 Water quality

According to the 2012 Blue Drop Report published by the Department of Water Affairs, Vhembe District fell somewhat below the Limpopo Province standard for drinking-water quality measured by the Blue Drop score, in terms of the World Health Organization risk-management principles. Vhembe District’s Blue Drop score was 74.85%, signifying average with ample room for improvement. This compares to a provincial score of 79.4%.

The district could not provide data on drinking-water quality compliance with SANS 241 because data were not collected on the domestic-water sample compliance rate, although these are routine environmental health data elements from the National Indicator Data Set (NIDS). However, the provincial average compliance with bacteriological, chemical and physical and organoleptical testing varied between 96% and 98%.
3.4 Summary

Vhembe is among the poorest (Quintile 2) districts in South Africa and this is borne out by a range of social indicators. The unemployment rate of the district is markedly higher than nationally. Availability or lack of work opportunities characterises the contrasting situations of Musina and Mutale local municipalities. Mutale municipality has Vhembe District’s highest youth unemployment rate as well as overall unemployment rate; while in Musina, these are by far the lowest and less than half of Vhembe District rates.

Across the district, the proportion of the district’s SA citizens aged 20 years and older who have passed Matric or have higher education is lower than nationally. The district has the highest number of the most deprived schools in Limpopo Province. Major factors for not attending school included poor performance; disability or illness; and family commitments. Though walking to school was rarely mentioned as a problem, it should be noted that 83.2% of Vhembe learners walk all the way to school, compounding the problems faced by girl learners in obtaining an education.

Municipal services (flush toilets, piped water in dwelling, weekly refuse removal) are much less common in Vhembe than nationally, except for the use of electricity for lighting.

3.5 Recommendations

The strikingly high unemployment rates throughout much of the district coupled with poor levels of municipal services make achieving health and wellbeing a major challenge, both for individual citizens and for the health services. The levels of non-attendance and dropout from school are challenges to the roll-out of school-based health teams. The challenges faced by girl learners in receiving an education in turn make health education for mothers more problematic.

It is recommended that the LPDoH consider enhancing liaison with other departments and structures which are key to service provision, possibly using a model such as KwaZulu-Natal’s government–community initiative, Operation Sukuma Sakhe. This should include the following initiatives:

- Support business initiatives to improve unemployment rates.
- Support roll-out of improved levels of municipal services that will in turn improve health and wellbeing for the district population.
- Help tackle levels of non-attendance and dropout from school, particularly investigating where this may be due to illness among learners or family commitments.
- Looking for strategies to help support girl learners in receiving an education, thereby improving their future understanding of health and, where appropriate, childcare issues.
4. Service delivery environment

4.1 Distribution of primary health care facilities

Vhembe District has a total of 146 primary health care (PHC) facilities (Table 2). These are made up of: 114 clinics; eight community health centres (CHC) and 24 mobile clinics.

Overall there are six district hospitals: three in Makhado Sub-district; two in Thulamela; and one in Musina. There is, however, no hospital in Mutale Sub-district. Vhembe District’s only regional hospital is located in Thulamela Sub-district, which has significantly the highest population density.

<table>
<thead>
<tr>
<th>Sub-district</th>
<th>Clinic</th>
<th>CHC</th>
<th>Correctional Centre</th>
<th>District Hospital</th>
<th>EMS Station</th>
<th>Mobile Service</th>
<th>Non-medical Site</th>
<th>Regional Hospital</th>
<th>Specialised Psychiatric Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makhado</td>
<td>45</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Musina</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mutale</td>
<td>16</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Thulamela</td>
<td>49</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>10</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>114</td>
<td>8</td>
<td>5</td>
<td>6</td>
<td>10</td>
<td>24</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

Distribution of healthcare facilities is uneven across Vhembe District as Musina Sub-district has no CHCs and Mutale has no district hospital. This makes some of the indicators irrelevant for Mutale Sub-district since patients for Caesarean sections, for example, are referred to another sub-district.

Map 3 provides a graphical illustration of the location of health facilities across the sub-districts in relation to population distribution. Due to co-ordinates for Thulamela Sub-district’s Mavambe Clinic having been loaded incorrectly in DHIS, it is represented as lying outside the Vhembe border. Efforts to correct this from other sources proved unsuccessful.
4.2 PHC headcount

The 2011 Census population figure of 1 294 722 people in Vhembe District resulted in a PHC utilisation rate of 3.2, signifying the average number of PHC visits per person per year. However, the total PHC headcount in Vhembe District of 3 783 917 at the end of 2013 suggests that this indicator has generally been falling in the district to 2.8 (Table 3). This trend was mirrored in the sub-districts with the exception of Musina. There are clear discrepancies, though, between the PHC clients seen by professional nurses and the total PHC headcount. This suggests the total PHC headcount is undercounted.

Though the headcount in Musina Sub-district was significantly smaller than the other sub-districts, it has risen steadily since 2010. Even so, the overall number of PHC visits in Musina remained the lowest in Vhembe District at 149 502.

Table 3: PHC total headcount across Vhembe sub-districts, 2010-2013

<table>
<thead>
<tr>
<th>Sub-district</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makhado</td>
<td>1 535 528</td>
<td>1 678 828</td>
<td>1 574 131</td>
<td>1 478 551</td>
</tr>
<tr>
<td>Musina</td>
<td>129 537</td>
<td>129 896</td>
<td>135 796</td>
<td>149 802</td>
</tr>
<tr>
<td>Mutale</td>
<td>411 366</td>
<td>420 247</td>
<td>383 067</td>
<td>398 977</td>
</tr>
<tr>
<td>Thulamela</td>
<td>1 896 571</td>
<td>1 914 865</td>
<td>1 833 607</td>
<td>1 756 887</td>
</tr>
<tr>
<td>Vhembe District</td>
<td>3 973 002</td>
<td>4 143 836</td>
<td>3 926 601</td>
<td>3 783 917</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file
4.3 PHC utilisation rates

4.3.1 Annualised PHC utilisation rates

The average number of PHC visits per person per year is represented as the PHC utilisation rate and this has been fairly stable over time both across Vhembe District and generally within the individual sub-districts (Figure 14). In 2013, this rate for Vhembe District was 2.8 visits, just above the national figure of 2.4 visits and the provincial average of 2.6 visits. Makhado, Musina and Thulamela Sub-districts all had rates in this range.

Figure 14: PHC utilisation rate (annualised) across Vhembe sub-districts, 2010-2013

Comparing the figures for PHC clients seen by professional nurses with the total headcount, particularly in Makhado and Thulamela Sub-districts, suggests the PHC headcount is undercounted. Examples of these discrepancies are highlighted in Table 4.

Table 4: Examples of PHC seen by professional nurse exceeding PHC total headcount, 2012-2013

<table>
<thead>
<tr>
<th>Facility</th>
<th>Data Element Name</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bungeni Mobile 1</td>
<td>PHC client seen by professional nurse</td>
<td>17 669</td>
<td>16 178</td>
</tr>
<tr>
<td></td>
<td>PHC headcount total</td>
<td>17 669</td>
<td>16 111</td>
</tr>
<tr>
<td>Damani Clinic</td>
<td>PHC client seen by professional nurse</td>
<td>17 058</td>
<td>15 194</td>
</tr>
<tr>
<td></td>
<td>PHC headcount total</td>
<td>16 958</td>
<td>15 229</td>
</tr>
<tr>
<td>De Hoop Clinic</td>
<td>PHC client seen by professional nurse</td>
<td>16 138</td>
<td>14 964</td>
</tr>
<tr>
<td></td>
<td>PHC headcount total</td>
<td>16 138</td>
<td>14 796</td>
</tr>
<tr>
<td>Gondeni Clinic</td>
<td>PHC client seen by professional nurse</td>
<td>18 856</td>
<td>18 125</td>
</tr>
<tr>
<td></td>
<td>PHC headcount total</td>
<td>19 953</td>
<td>17 749</td>
</tr>
<tr>
<td>Guyuni Clinic</td>
<td>PHC client seen by professional nurse</td>
<td>11 403</td>
<td>11 643</td>
</tr>
<tr>
<td></td>
<td>PHC headcount total</td>
<td>11 350</td>
<td>11 643</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

4.3.2 OPD client not referred rate

Mutale, which has no district hospital, appears to stand out from the other Vhembe sub-districts with a consistently higher PHC utilisation rate – 4.3 in 2013, for example. However, within Vhembe District, the rate of outpatients who had not been referred to hospitals by medical practitioners and PHC facilities (the OPD client not referred rate) was 58.7% in 2013, an increase from 51.4% in 2012 (Figure 15).
This means that a relatively high proportion of patients in Makhado, Musina and Thulamela Sub-districts bypass PHC facilities and access hospitals directly. In turn, this affects the PHC utilisation rate in these sub-districts, while the Mutale Sub-district is not included in these figures as it does not have a hospital.

From Table 5, it is noticeable that referrals operate most efficiently in Thulamela Sub-district, which has two district hospitals, a regional hospital and a specialist psychiatric hospital. By contrast, the 2013 OPD not referred rates in Makhado and Musina were 61.9% and 84.5% respectively.

### Table 5: OPD client not referred rate across Vhembe sub-districts, 2010-2013

<table>
<thead>
<tr>
<th>Indicator Name</th>
<th>Period</th>
<th>Makhado</th>
<th>Musina</th>
<th>Thulamela</th>
<th>Vhembe</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPD new client not referred rate</td>
<td>2010</td>
<td>65.5</td>
<td>88.5</td>
<td>39.9</td>
<td>51.4</td>
</tr>
<tr>
<td></td>
<td>2011</td>
<td>67.6</td>
<td>88.5</td>
<td>41.4</td>
<td>51.8</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>70.9</td>
<td>91.3</td>
<td>41.9</td>
<td>55.4</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>61.9</td>
<td>84.5</td>
<td>54.2</td>
<td>58.7</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

4.3.3 PHC utilisation children under 5 years

The PHC utilisation rate for children under 5 years has been fairly stable over the past years (Figure 16). It averaged 5.6 visits in 2013, just above the provincial average of 5.2 visits. Both of the district and provincial rates are markedly higher than the national figure of 4.3 visits and have increased in recent years. No comparison can be made with the OPD client not referred rate as it does not divide off this age group.

As with the overall PHC utilisation rate, Mutale Sub-district stood out once again with a significantly higher PHC utilisation rate for this age group of 9.0 visits. PHC facilities in the area appear to need to cover as much as possible for the lack of a district hospital.

By contrast, it should also be noted that the rate of 4.4 visits for 2013 in Musina Sub-district was lower than district, provincial and national rates.
4.4. Clinical workloads

Available figures are analysed below, although problems with data recording seem to cast doubt on some of the data quality. This could in theory be further illuminated by cross-checking with PERSAL staffing data, but this is currently considered unreliable.

4.4.1 PHC professional nurses’ workloads

The clinical workload for PHC professional nurses – representing the average number of clients seen per professional nurse in a clinical work day – has been fairly stable in Vhembe in recent years (Figure 17). In 2013, it covered 22.1 clients, which is lower than both the national average of 29.7 and the provincial average of 24.1 clients. It should be noted that the numbers of clients seen by community health workers are not included in these figures.

The sub-district breakdown, however, shows that in Musina, the clinical workload for PHC professional nurses continuously increased from 2010 by about 50% to 33.3 clients in 2013. As the PHC utilisation rate stayed steady, there appears to be a shortage of nurses in the sub-district. The workload in Mutale rose again to 15.4, a return to the higher 2010 work-load level after drops in 2011 and 2012.

Mutale appeared to record the lowest professional nurse workload across the sub-districts. However, workload records need to be queried as these figures may be influenced by poor data quality.

As Table 4 showed, in some instances the level of PHC clients seen by professional nurses exceeded the PHC total headcount. For example, for February 2012, Tshikundamalema Clinic in Mutale Sub-district had a figure of 11 215 PHC professional nurse clinical workdays (Table 6), an outlier figure compared to the values for January and March of 78 and 139 respectively.
Table 6: Example of data quality issue with PHC professional nurse clinical workdays, Tshikundamalema Clinic

<table>
<thead>
<tr>
<th>Facility</th>
<th>Data Element Name</th>
<th>Period</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tshikundamalema Clinic</td>
<td>PHC professional nurse clinical work days</td>
<td>2012</td>
<td>78</td>
<td>11215</td>
<td>139</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2013</td>
<td>102</td>
<td>120</td>
<td>111</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

Similarly, from one year to the next, in some clinics professional nurse workdays halved or more. In about half the facilities in Mutale (77 out of 144), recorded professional nurse workdays dropped sharply between 2012 and 2013. At Mutale’s Guyuni Clinic, for instance, this indicator fell from 3 358.2 in 2012 to 915 in 2013, while in Musina’s Madimbo Clinic, it fell from 1 368 to 722 (Table 7). Examples are shown in Table 7.

Table 7: Examples of major drops in professional nurse work days, Madimbo and Guyuni Clinics, 2012-2013

<table>
<thead>
<tr>
<th>Sub-district</th>
<th>Facility</th>
<th>Data Element Name</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Musina</td>
<td>Madimbo Clinic</td>
<td>PHC professional nurse clinical work days</td>
<td>1 368</td>
<td>722</td>
</tr>
<tr>
<td>Mutale</td>
<td>Guyuni Clinic</td>
<td>PHC professional nurse clinical work days</td>
<td>3 358.2</td>
<td>915</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

4.4.2 PHC doctor workloads

The PHC doctor clinical workload represents the average number of clients seen per doctor per clinical work day (including doctors employed both in the public and private sectors). In 2013, this was 23.5 clients in Vhembe District, slightly lower than both the national average of 24.9 and the provincial average of 24.4 clients (Figure 18). Though the PHC doctor clinical workload had previously decreased between 2010 and 2012, there was an obvious general increase in 2013.

There was a particular discrepancy once again in Musina Sub-district, with the workload jumping nearly fivefold between 2012 and 2013 from 9.5 to 47.6. Since the PHC utilisation rate stayed the same, this indicates that fewer doctors were available, mirrored by a considerable number of vacant posts in the period.16,17

Figure 18: PHC doctor clinical work load across Vhembe sub-districts, 2010-2015

![PHC doctor clinical work load across Vhembe sub-districts, 2010-2015](image_url)

Source: Vhembe DHIS data file
It should be noted that Vhembe District has been struggling with shortages of nursing and medical staff for a few years. The ideal of all clinics being visited by a doctor at least once a week was not met in most districts, especially those in rural settings. In 2013, Limpopo as a whole had the highest public-sector vacancy rate in the country at 86%.16 In 2014 the Health Ministry funded a new medical school at the University of Limpopo which is striving to increase the intake of medical students in order to increase staff levels in public-health facilities.17

Problems with reflecting the doctor workload data seem to be compounded by data-quality problems (Table 8). Drops were seen in data elements such as PHC client seen by doctor and total PHC doctor clinical work days across all the Vhembe sub-districts between 2012 and 2013. However, in Mutale Sub-district between 2012 and 2013, the total PHC doctor clinical work days fell from 519.94 to 240. In Musina Sub-district, these annual figures seem to be outliers, falling from 58.5 to 7.5. There appears to be a generally poor understanding of how to record data for these indicators.

Table 8: Quality problems with doctor workload data across Vhembe sub-districts, 2012-2013

<table>
<thead>
<tr>
<th>Sub-district</th>
<th>Data Element Name</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makhado</td>
<td>PHC client seen by doctor</td>
<td>13 658.25</td>
<td>12 615.25</td>
</tr>
<tr>
<td></td>
<td>PHC doctor clinical work days – total</td>
<td>735</td>
<td>534.39</td>
</tr>
<tr>
<td></td>
<td>PHC headcount total</td>
<td>1 574 131</td>
<td>1 478 551</td>
</tr>
<tr>
<td>Musina</td>
<td>PHC client seen by doctor</td>
<td>553</td>
<td>357</td>
</tr>
<tr>
<td></td>
<td>PHC doctor clinical work days – total</td>
<td>58.5</td>
<td>7.5</td>
</tr>
<tr>
<td></td>
<td>PHC headcount total</td>
<td>135 796</td>
<td>149 502</td>
</tr>
<tr>
<td>Mutale</td>
<td>PHC client seen by doctor</td>
<td>4 827</td>
<td>5 307</td>
</tr>
<tr>
<td></td>
<td>PHC doctor clinical work days – total</td>
<td>519.94</td>
<td>240</td>
</tr>
<tr>
<td></td>
<td>PHC headcount total</td>
<td>383 067</td>
<td>398 977</td>
</tr>
<tr>
<td>Thulamela</td>
<td>PHC client seen by doctor</td>
<td>31 581.5</td>
<td>32 070.5</td>
</tr>
<tr>
<td></td>
<td>PHC doctor clinical work days – total</td>
<td>1 870.9</td>
<td>1 362</td>
</tr>
<tr>
<td></td>
<td>PHC headcount total</td>
<td>1 833 607</td>
<td>1 756 887</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

4.5 Population ratio per PHC facility

Another key factor in healthcare delivery is the distribution of clinics and community health centres (CHCs). Map 3 and Table 3 both show these as unevenly distributed across Vhembe’s sub-districts. Mutale has the lowest population ratio per clinic/CHC (5 404) and Musina the highest at 17 089. Contributing to Musina’s high ratio is the fact that it has only four clinics, no CHC and one mobile service, together with one EMS station and one non-medical site. By contrast, Thulamela has 49 clinics and three CHCs, Makhado 45 clinics and four CHCs, and Mutale 16 clinics and one CHC.

As a PHC facility can accommodate only a limited number of clients per day, the ratios of population numbers to clinic or community health centre in Musina might in turn restrict clients’ access to health services. This could explain why Musina has both the lowest PHC utilisation rate (2.0) and yet the highest clinical workload for PHC professional nurses (33.3) and doctors (47.6) in Vhembe District.

In Musina Sub-district, both the need to travel further to make use of PHC facilities and the reality of little or no transport availability in rural areas could also contribute to the low PHC utilisation rate. Accessing PHC services is made more challenging for the area’s scattered clients as the sub-district’s single mobile unit and four clinics in the area are clustered around the district hospital.

The influx of clients from Zimbabwe via the Beitbridge border post might also have an impact on PHC service delivery in Musina Sub-district. As non-South African citizens, these patients are not included in South African population statistics even though they make use of the facilities. Mutale, on the other hand, combines the lowest population ratio per clinic/CHC (5 404), the highest utilisation rate (4.3 visits) but the lowest clinical workload for PHC professional nurses (15.4) and doctors (22.1). This partly indicates an uneven allocation of professional nurses and doctors between the two sub-districts of Mutale and Musina. However, this must once again be read in the context of Mutale having no district hospital.
Table 9: Population ratio per clinic/CHC across Vhembe sub-districts, 2013

<table>
<thead>
<tr>
<th>Sub-district</th>
<th>Population</th>
<th>Clinics</th>
<th>Community Health Centre</th>
<th>Population ratio per Clinic/CHC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makhado</td>
<td>516 031</td>
<td>45</td>
<td>4</td>
<td>10 531</td>
</tr>
<tr>
<td>Musina</td>
<td>68 359</td>
<td>4</td>
<td>0</td>
<td>17 089</td>
</tr>
<tr>
<td>Mutale</td>
<td>91 870</td>
<td>16</td>
<td>1</td>
<td>5 404</td>
</tr>
<tr>
<td>Thulamela</td>
<td>618 463</td>
<td>49</td>
<td>3</td>
<td>11 983</td>
</tr>
<tr>
<td>Total</td>
<td>1 294 723</td>
<td>114</td>
<td>8</td>
<td>45 007</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file and Statistics SA

4.6 Summary

In general, data shows that Vhembe District has a higher average PHC utilisation rate than both the Limpopo Province and national averages, but with lower clinical workloads for PHC professional nurses and doctors. However, this should not be allowed to mask the fact that clinics and community health centres appear unevenly distributed across the sub-districts, possibly creating workload, particularly in Musina which has the highest population ratio per clinic/CHC yet the lowest PHC utilisation rate despite the highest clinical workload for PHC professional nurses and doctors in the district.

Similarly, the lack of a district hospital in Mutale distorts the picture there and probably elsewhere as Mutale clients seek hospital care in other sub-districts. Overall, this suggests that potential clients’ access to health services is restricted in both Mutale and Musina Sub-districts.

As will be seen in the Epidemiological Profile, Section 6, DHB workshops in the district underlined a marked use of traditional medicines and cultural practices in the area. Challenges of distance and availability of healthcare facilities may contribute to a higher use of traditional medicine and traditional health practitioners by the population. Nationally, approximately 80% of South Africans use traditional medicine to meet their PHC needs, compounded by the fact that traditional health practitioners share similar cultural values to their patients. Anecdotal evidence within South Africa suggests that a number of ART patients also turn to using traditional medicine after experiencing ART side-effects.

4.7 Conclusions

Accessibility of health services in Vhembe District is generally limited by three key factors. The first is the rural nature of much of the district, which sets up barriers of distance or time in reaching health facilities and professional health care.

Secondly, staffing levels and distribution of facilities can mean that workloads are particularly high in some areas. Steps are being taken to remedy this but results of some of the initiatives may take some years to come to fruition. It is recommended that the quantity and level of facilities be expanded in Mutale and Musina to cope with demand. In the spirit of South African government’s recognition of the Traditional Health Practitioners Act (2007), it is also proposed that the LFDoH involve traditional health practitioners in the strategic planning of health issues. It is noted that some provincial and local Departments of Health, such as in KwaZulu-Natal, Free State and North West Provinces, have designated traditional medicine managers working with traditional health practitioners on community HIV alleviation projects, among others.

Finally, variable data quality hampers efforts to assess the situation and the most pressing needs. Accurate planning and assessment can be possible only once data quality is improved upon.
5. Burden of disease

The analysis in this section is based on Statistics SA cause-of-death data for Vhembe District from 2008 until 2013. Given the limited demographic information for the district, it is not possible to assess the completeness of registration of deaths precisely. However, a comparison of the number of registered deaths with the number expected if the district were to experience the same mortality rates as the whole province suggests that about 85% of the deaths are registered.\textsuperscript{21,22}

The analysis was conducted in line with the National Burden of Disease Study\textsuperscript{23} conducted by the Medical Research Council (MRC) Burden of Disease Research Unit, but without adjustment for under-registration or identification of misclassified AIDS deaths. In line with the rapid approach used for all districts in the Burden of Disease (BoD) chapter of the District Health Barometer,\textsuperscript{24} the underlying causes of death were coded to a revised South African National Burden of Disease (NBD) list based on International Statistical Classification of Diseases and Related Health Problems (ICD-10) classifications.

There was redistribution across specified causes of death according to algorithms developed for the NBD of “ill-defined” codes, referring to symptoms, signs and abnormal findings not classified elsewhere (ICD-10 codes R00-R99), and of “garbage codes”, referring to deaths assigned to codes that should not be considered underlying causes of death as they are not useful for public-health analysis of cause-of-death data.

The leading causes of death (overall and by age group) and of premature mortality, as measured by Years of Life Lost (YLLs), were estimated. As this indicator is based on the age at death and measures premature mortality, it provides information on the primary causes of death that should be targeted for prevention.\textsuperscript{25}

Burden of disease is defined as the impact of a health problem as measured by the Disability Adjusted Life Year (DALY). The DALY is the sum of the numbers of years lost due to disease from mortality (Years of Life Lost, or YLL) and disability from morbidity (Years Lived with Disability, or YLD). This can be represented as: DALY = YLL + YLD.

Though use of DALY is becoming prevalent in public health internationally, due to unavailability of disability data in South Africa, the term burden of disease typically refers to YLLs only and does not include YLDs as it should according to the definition. Hence, in this section only death data and YLLs are presented.

5.1 Categorisation of burden of disease

To assess the burden of disease in South Africa, the NBD list of causes of death was originally divided into three broad groups: communicable diseases; perinatal, maternal and nutritional conditions, and non-communicable diseases and injuries. Given the large healthcare burden within the communicable-disease group created by HIV-related deaths, these deaths were separated into a fourth group. Finally, since many HIV deaths are misclassified as tuberculosis (TB) by those completing the death certificates, TB deaths are reported with HIV deaths. This classification is represented in Table 10.

<table>
<thead>
<tr>
<th>Broad cause group</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communicable diseases (excluding HIV and TB)</td>
<td>Diarrhoeal diseases</td>
</tr>
<tr>
<td>Maternal, perinatal and nutritional disorders (Comm/Mat/Peri/Nut)</td>
<td>Meningitis and encephalitis</td>
</tr>
<tr>
<td></td>
<td>Maternal conditions</td>
</tr>
<tr>
<td></td>
<td>Perinatal conditions</td>
</tr>
<tr>
<td></td>
<td>Nutritional disorders</td>
</tr>
<tr>
<td>HIV related and TB (HIV and TB)</td>
<td>HIV related</td>
</tr>
<tr>
<td></td>
<td>Tuberculosis</td>
</tr>
<tr>
<td>Non-communicable diseases (NCDs)</td>
<td>Cerebrovascular disease</td>
</tr>
<tr>
<td></td>
<td>Diabetes mellitus</td>
</tr>
<tr>
<td></td>
<td>Ischaemic heart disease</td>
</tr>
<tr>
<td></td>
<td>Cancer</td>
</tr>
<tr>
<td>Injuries</td>
<td>Transport injuries</td>
</tr>
<tr>
<td></td>
<td>Interpersonal violence</td>
</tr>
</tbody>
</table>

Source: BoD chapter, DHB 2013/14

According to the 2013/14 DHB, the main causes of death in Vhembe District in 2009 were: non-communicable diseases (41.3%); communicable diseases (excluding HIV and TB), maternal, perinatal or nutrition causes (38.3%); HIV and TB (18.0%); and injury-related causes (7.2%).
In order to reduce the problem of misclassification of causes, trends in cause-specific mortality were assessed for five groupings of major causes of death among those aged older than five years. These are presented below:

1. Major infectious diseases (AIDS, TB, diarrhoea and pneumonia combined)
2. Cardiovascular and metabolic diseases (including stroke and diabetes)
3. Cancers
4. Chronic respiratory diseases (asthma, COPD, other respiratory)
5. Injuries

Mortality reporting for children aged under five years old is adapted for age and includes neonatal causes.

5.2 Age distribution of deaths

The age distribution of deaths in Vhembe District is typical of a population experiencing an HIV/AIDS epidemic, with high numbers of deaths in children under five years and a peak in adults between 30 and 45 years of age (Figure 19). It is heartening to see a decline in child mortality and in the adult peak between 2008 and 2013, suggesting that ART and PMTCT are having the desired effect. Data for 2009 and 2011 were excluded from this figure as the data appeared to be incomplete for those years.

5.3 Cause-of-death profile (broad cause groups)

Like the rest of South Africa and Limpopo, a quadruple burden of disease is observed in Vhembe District. This quadruple burden consists of: communicable diseases together with maternal, perinatal and nutritional conditions; HIV and TB; non-communicable diseases; and injuries. What is notable, however, is that the percentage contribution made by HIV and AIDS and communicable diseases (and maternal, perinatal and nutritional conditions) declined between 2008 and 2011 from 60% to 54%. The impact of non-communicable diseases and injuries, however, is increasing.

As shown in Figure 20, analysis of premature deaths showed that in Vhembe District in 2011, the highest proportions of Years of Life Lost (YLLs) were due to:

1. Communicable diseases (excluding HIV and TB), maternal, perinatal or nutrition causes (34.8%)
2. HIV and TB (22.9%)
3. Non-communicable diseases (32.4%)
4. Injuries (9.9%).
5.4 Leading causes of premature mortality

In Vhembe District, the leading 10 single causes of premature mortality, as measured in YLLs, in 2011 were:\textsuperscript{24}

1. Tuberculosis (13.6%)
2. Diarrhoeal diseases (12.0%)
3. Lower respiratory infections (11.2%)
4. HIV/AIDS (9.3%)
5. Cerebrovascular diseases (5.2%)
6. Diabetes mellitus (4.5%)
7. Road injuries (3.5%)
8. Accidental threats to breathing (3.1%)
9. Septicaemia (2.3%)
10. Nephritis/nephrosis (2.3%)

It should be noted that the category of accidental threats to breathing, covering ICD-10 W75 to W84, excludes drowning but includes suffocation, accidental hanging and strangulation, mining accidents, choking and unspecified threats to breathing.

Given that some of the mortality due to tuberculosis, diarrhoea and lower respiratory infections was probably related to HIV, these findings suggest that HIV-related mortality was by far the leading cause of Years of Life Lost (YLLs).

5.5 Trends in leading causes of premature mortality

Figure 21 presents trends from 2008 to 2011 in the causes of premature mortality, as measured by Years of Life Lost (YLLs). Overall, TB remained the leading cause of death, though these figures show its impact has lessened over the past four years from 17.5% in 2008 to 13.6% YLLs. Diarrhoeal disease remained the second leading cause, followed by lower respiratory tract infections and HIV/AIDS. Cerebrovascular diseases, diabetes mellitus, and road injuries remain ranked fifth, sixth and seventh respectively. As a proportion of Years of Life Lost (YLLs), though, the percentage of these causes has increased between 2008 and 2011.
5.6 Causes of death by age group and gender

5.6.1 Causes of death: under 5 years

The leading causes of death for children under 5 years old in Vhembe District are shown in Figure 22. Notably, diarrhoea, protein energy malnutrition (PEM) and lower respiratory tract infections remained major causes of death in this age group. These are typically closely associated with HIV and AIDS, which also contributes directly to the cause of death. Preterm conditions were among the causes, but seem to be declining. In the under one-year-old age group, birth asphyxia and congenital conditions are among causes of death.
Figure 23 compares the number of deaths between the age group of children under one year old and children aged between one and four years old. Overall, the number of deaths in these age groups has declined since 2008. There was an increase in the one to four year age group between 2008 and 2010 but this has slowly declined since.

Figure 23: Comparison of number of deaths between <1 year and 1 to 4 years, Vhembe District, 2008-2013

Source: Statistics SA

5.6.2 Causes of death: 5-14 years

There were 1 102 deaths among children between the ages of five and 14 years between 2008 and 2013. In absolute numbers, the leading causes of these deaths were: major infectious diseases (AIDS, TB, diarrhoea and pneumonia: 479, or 43%); injuries (244, or 22%); ‘other’ conditions (283, or 26%), mainly infectious causes, among which should be noted meningitis (55), septicaemia (29) and malaria (15); epilepsy (29); other neurological causes (25); and renal disease (22).

Figure 24: Leading causes of death 5-14 years, Vhembe District, 2008-2013 (N=1 102)

Source: Statistics SA

By gender, it can be seen that leading causes of death for males in this age group (Figure 25) are: diarrhoeal diseases (75); tuberculosis (58); and lower respiratory tract infections (57). Meningitis caused 44 deaths. Road injuries were responsible for 51 deaths and drowning for 42 deaths. Fewer deaths were caused by epilepsy (20); accidental threats to breathing (17); and fires, heat and hot substances (15).
For females in this age group, tuberculosis (79 deaths) and diarrhoeal diseases (69 deaths) were the leading causes of death (Figure 26). Other major causes of death were: HIV/AIDS (51 deaths) and lower respiratory infections (38 deaths), though the 12 deaths due to endocrine nutritional, blood and immune disorders may also be AIDS cases reported as immune-compromised (coded D84). There were also 17 deaths due to septicaemia.

Road injuries caused 44 deaths. Drowning (16 deaths) was much lower among females in this age group than among males, though the numbers of deaths from fires, heat and hot substances (15) and accidental threats to breathing (12) were similar.

It is must be noted overall that for both genders, HIV and AIDS still contribute significantly to deaths in this age group, as do road injuries.
5.6.3 Causes of death: 15-24 years

Major infectious diseases and injuries are the leading causes of death among the age group from 15 to 24 years (Figure 27). Of the 342 deaths in this age group in 2013, the major causes of death were: major infectious diseases (37%); ‘other’ conditions, mostly with other infectious causes (22%); and injuries (34%).

Figure 27: Leading causes of death, 15-24 years, Vhembe District, 2013 (N=342)

Source: Statistics SA

Trends between 2008 and 2013 show an increase in the major infectious diseases and ‘other’ categories (Figure 26). Notably, injuries are declining.

Figure 28: Trends in leading causes of death, 15-24 years, Vhembe District, 2008-2013

Source: Statistics SA

Among men in Vhembe District aged between 15 and 24 years old, leading causes of death from 2008 to 2013 were: road injuries (231 deaths); accidental threats to breathing (224); tuberculosis (96); and interpersonal violence (54) (Figure 29). Meningitis and encephalitis caused 40 deaths; lower respiratory infections caused 39; HIV/AIDS 37; and diarrhoeal diseases 30. Drowning caused 39 deaths in males of this age group, while epilepsy caused 37.
For women in Vhembe District aged 15 to 24 years old, leading causes of death over this five-year period were: tuberculosis (210 deaths); HIV and AIDS (146); diarrhoeal diseases (113); and lower respiratory tract infections (99) (Figure 30). Among other leading causes of death were meningitis and encephalitis (33 deaths) and endocrine nutritional, blood and immune disorders (26 deaths). Epilepsy caused 20 deaths. Road injuries caused 86 deaths and accidental threats to breathing 66 deaths, with interpersonal violence making a smaller contribution (23 deaths).

In both men and women, it should be noted that tuberculosis, diarrhoeal disease and lower respiratory tract infections are typically conditions that occur in HIV-infected patients who are more susceptible due to their immunocompromised states.

**5.6.4 Causes of death: 25-64 years**

The absolute number of deaths in Vhembe District in 2013 in the 25 to 64 years age group was 4 392. Major infectious diseases caused half of all these deaths (Figure 31). Cardiovascular disease and diabetes also contributed a substantial percentage of the total number of deaths.
Despite being the leading cause of death, trends show that the numbers of deaths due to major infectious diseases have declined over the past five years. Deaths due to cardiovascular diseases and diabetes, however, are increasing (Figure 32).

Leading causes of male deaths in this age group during 2013 (Figure 33) illustrate that tuberculosis (450 deaths), HIV and AIDS (425 deaths), as well as diarrhoeal diseases (170 deaths) and lower respiratory tract infections (154 deaths) were leading causes. As mentioned previously, HIV and AIDS is in itself a risk factor for these infectious diseases.

Chronic diseases of lifestyle – conditions considered to be preventable – were among the top 10 causes of death in men, causing 335 deaths (renal disease 102; diabetes 100; cerebrovascular disease 80; hypertensive heart disease 53). Road injuries caused 123 deaths and accidental threats to breathing 101 deaths.
For women in Vhembe District in the 24 to 65 years age group, the leading causes of death during 2013 were: HIV and AIDS (329 deaths); tuberculosis (273 deaths); diarrhoeal diseases (204 deaths); and lower respiratory tract infections (195 deaths) (Figure 34). These causes were closely followed by chronic diseases of lifestyle (non-communicable conditions) which caused 430 deaths in this survey, including: diabetes (140 deaths); cerebrovascular disease (110 deaths); and renal disease (107 deaths). Despite a cervical screening programme having been offered in the public sector for many years, 73 women in Vhembe District died of cervical cancer in 2013.

5.6.5 Causes of death: 65+ years

There was a total of 3,480 deaths among people aged over 65 years in Vhembe in 2013 (Figure 35). Cardiovascular diseases and diabetes, together with major infectious diseases, were the leading causes of death in this age group, accounting for 41% and 19% of deaths respectively. The proportion of deaths from cancers was 11%.
Figure 35: Leading causes of death, 65+ years, Vhembe District, 2013 (N=3,480)

Source: Statistics SA

Trends since 2008 show that the numbers of deaths due to cardiovascular conditions and diabetes have not declined, though deaths from major infectious diseases were declining (Figure 36). Cancers, which are related to chronic diseases of lifestyle, increased slightly over 2013.

Figure 36: Trends in leading cause of death, 65+ years, Vhembe District, 2008-2013

Source: Statistics SA

In 2013, for both males (Figure 37) and females (Figure 38) in this age group, non-communicable diseases were the leading causes of death in Vhembe District. The four leading causes of death in males were all due to non-communicable diseases: cerebrovascular disease (152 deaths); diabetes (128 deaths); renal disease (122 deaths); and hypertensive heart disease (111 deaths).

It is important to note, however, that infectious diseases also rank among the leading causes of death for both males and females. This includes diarrhoeal diseases, which caused the deaths of 66 males and 131 females in 2013. Similarly, lower respiratory infections caused 100 deaths in males and 178 deaths in females in 2013.

HIV and AIDS caused 50 deaths in males in this age group but none in females. However, endocrine nutritional, blood and immune disorders caused 58 deaths in females.
5.7 Data-quality challenges

Understanding how the district burden of disease translates into mortality figures is complicated by a number of key factors. Firstly, based on death notifications, Statistics SA currently compiles national and provincial cause of death statistics but reports only limited information at district level. Furthermore, completeness of death registration at district level is unknown. Secondly, problems with data quality have been identified including: a high proportion of ill-defined causes; misclassification of HIV/AIDS deaths; and poorly specified external causes of injury deaths.\textsuperscript{24}

Analysis of the Vhembe data showed that the percentage of ill-defined deaths was 32.9\%, the fourth highest rate across South Africa’s 52 health districts. So-called “garbage codes” accounted for 10.9\% of deaths. International recommendations state that ill-defined and garbage codes should account for less than 10\% of all deaths\textsuperscript{26} suggesting that the data for Vhembe is of poor quality.

In Vhembe, the very high proportion of ill-defined and garbage codes makes it crucial that doctors are adequately trained to certify causes of death accurately and alerted to the need to do so. In addition, it is likely that a significant proportion of deaths is certified by headmen. This needs to be investigated as it will need a different solution (such as verbal autopsy). Addressing the problem of poorly specified injury deaths will require engagement with forensic mortuaries in order to access information on specific external causes.

\textbf{Figure 37: Male deaths, 65+ years, Vhembe District, 2013}

\textbf{Figure 38: Female deaths, 65+ years, Vhembe District, 2013}

\textbf{Source: Statistics SA}
5.8 **Summary**

In Vhembe, the main causes of death in 2009 were: non-communicable diseases (41.3%); communicable diseases (excluding HIV and TB), maternal, perinatal or nutrition causes (38.3%); HIV and TB deaths (18.0%); and injury-related deaths (7.2%).

However, as indicated in YLLs analyses (Section 5.3), which take the age at death into account, the major causes of premature death in 2011 were: communicable diseases, excluding HIV and TB (34.8%); HIV and AIDS (22.9%), non-communicable diseases (32.4%); and injuries (9.9%). From among these, the leading single causes of premature death were TB, diarrhoeal diseases, lower respiratory infections and HIV/AIDS.

From this pattern, HIV-related mortality emerges as by far the leading cause of YLLs. This was borne out by a survey of medical practitioners’ perceptions of causes of deaths among patients they treated. The result helped illuminate both the significant percentage (10.0%) of deaths categorised with unanalysable, so-called “garbage codes” and the high percentage of ill-defined deaths in the district – at 32.0%, this was the fourth highest across South Africa’s 52 health districts.

5.9 **Recommendations**

It is clear that there is a need for the district to develop a mechanism for routine access to cause-of-death information, with different options being considered. However, it is imperative to improve the quality of cause of death information regardless of the mechanism developed.

1. **Improving the quality of cause of death data**
   
   a. **Training in medical certification of cause of death**

   The source of cause-of-death data is the medical doctor who certifies the cause of death on the death-notification form. This form follows WHO international recommendations, requiring that the cause-of-death sequence is reported in a specific way so that a single underlying cause of death can be selected for analysis. Unfortunately, medical doctors receive very little training in medical certification of the cause of death, impacting on the quality of cause-of-death data.

   The first step in improving the quality of mortality data would be to ensure that medical certifiers are trained how to do this. Training materials and trainers are available in South Africa (for example, through Statistics SA and the MRC). It may be useful to require all doctors working in the public sector to attend such training.

   b. **Improving the quality of injury mortality statistics**

   Engaging with forensic pathology services is needed to determine accurate injury death statistics. The manner of death and external cause is often not reported on death notifications completed by forensic pathologists for legal reasons. The consequence is to make it impossible to use death notifications to code accurately the causes of injury deaths from death notifications.

   Two steps are needed in this regard. Firstly, the Department of Home Affairs (DHA) should be requested to include a field for manner of death on the death notification form to enhance the collection of such information. Secondly, the forensic pathology service should consider ways in which data can be collected routinely in each facility. The Western Cape Forensic Pathology Services have a case-management information system which can be used to provide annual reports on the case load as well as an injury report.

   c. **Improving cause of death data for deaths certified by headmen**

   It is not clear what proportion of the deaths are certified by headmen, but the analysis of data from Statistics SA (Statistics SA) suggests that as many as 30% of death-notification forms could be completed by a headman. The quality of the cause-of-death information could be improved by conducting verbal autopsies for deaths with ill-defined causes particularly those which were reported by a headman (or a sample). Ward-based community health workers could be trained to conduct the interview and collect the data. The information for each case would need to be assessed by a doctor and the underlying cause of death identified. Alternatively, computer software called InterVA, is available to select a probable underlying cause for each case. Feasibility would need to be investigated through discussion with headmen, local DHA offices and the Primary Health Care Ward-Based Outreach Teams programme. A process to alert the community health worker of a death in the community would need to be identified.
2. Implementing a local mortality-surveillance system

The district must have the means to provide local-level statistics and be able to use the data for public-health actions. Experience in the Western Cape has demonstrated how a local mortality surveillance system can improve the quality of cause-of-death statistics, providing essential information for public health action, programme monitoring and evaluation, and health policy and planning.26 A local mortality surveillance system has enabled reporting sub-district cause-of-death data. By linking information from the forensic mortuaries, and undertaking training of doctors, data quality has been improved. The City of Cape Town (CoCT) has been responsible for significant IT development, moving from a system based on stand-alone computers to a web-based system. Cause-of-death coding has moved from manual coding using a shortlist to automated ICD-10 coding using IRIS automated coding software.27 The system involved provincial Department of Health officials being given copies of the death-notification forms (DNF) at the regional DHA offices and then capturing the data onto the web-based system housed by the CoCT.

In February 2014, the DHA amended the Birth and Death Registration Act28 and introduced the new format of the DNF, making the fourth page (Medical Certificate of Cause of Death) self-sealing. While this is important for confidentiality, it includes the instruction that it may be opened only by a Statistics SA official. The Western Cape local-level mortality surveillance system can now no longer obtain cause-of-death information,29 as the sealed forms preclude Department of Health staff from having access to the cause-of-death data. Despite numerous requests to Statistics South Africa, DHA and NDoH for assistance in regaining access to this data this is still being denied. However, this process is ongoing and legal opinions are being sought.

Local collection of death data would be recommended because this enables monitoring and improvement of the quality of death certification by the provincial Department of Health at source, reporting of sub-district mortality information, and the possibility of linking data with forensic mortuary data in order to provide accurate injury-mortality information. None of the above is currently possible with vital registration data. This would also allow for the integration of additional information obtained by verbal autopsy. Given the current constraints regarding local DoH collection of death data, this clearly has implications for any developments in Vhembe District.

The options appear to be:

- Call for Department of Home Affairs to amend the Death Notification Form and to include a duplicate of the page with the cause-of-death information so that one page can be sent to Statistics SA and one page to Health. The infrastructure for a local mortality system has resource requirements in terms of data capturers and IT, as well as expertise in ICD-10 mortality coding, data management, data analysis and reporting of cause of death data. Technical expertise, such as public-health specialist inputs from local higher educational institutions, will be useful for interpretation and detailed analysis of the data.
- Request anonymised sub-district data from Statistics SA that could be analysed by the district. However, the quality of geocoding to sub-districts may be problematic as local knowledge of the area is lacking, and injury data will be of very poor quality. In addition, there is no mechanism for monitoring and improving the quality of death certification by the Department of Health in this option.

Given the national importance of cause-of-death data for public health, it is essential that NDoH be encouraged to engage DHA and Statistics SA to obtain access to identifiable cause-of-death data, both for improving the quality of mortality data and for ensuring that this data is fully utilised to improve public health in South Africa.
6. Epidemiological (disease) profile of Vhembe District

6.2 Background

Diseases are presented by programme to mirror the Annual Performance Plan of the Limpopo Province Department of Health and the Vhembe District Health Plan, since activities in the district are aligned to these. Indicators discussed here were agreed on for study with the district.

Data are presented from a range of sources: directly from the Vhembe District Health Information System (DHIS); from the data gathered for the District Health Barometer 2013/14; antenatal clinic HIV-prevalence survey; ETR.net; and the Limpopo Province Malaria Database.

It should be noted that over recent years, some indicators and treatment guidelines have changed, particularly where HIV and AIDS and TB are concerned. These amendments are noted in the specific section.

More generally, the National Indicator Data Set (NIDS) is revised every second year, for example, and the last revision was implemented in April 2013. Most indicators remained the same as in the 2010 version, except that HIV-testing coverage for the 15- to 49-year age group was added.

6.2 HIV and TB control

6.2.1 HIV testing and prevalence: Clients 15-49 years

This section covers indicators related to HIV prevention and treatment, as well as indicators related to TB and TB/HIV co-infection.

The HIV testing coverage indicator measures the proportion of people aged between 15 and 49 years tested for HIV as a proportion of the population in this age group but excludes antenatal-care clients. Clients either initiated testing or accepted provider-initiated counselling and testing services, which were carried out both in public-health facilities and non-medical sites that report data to the DHIS. As a result, Vhembe District recorded a total of 259,541 clients in this age group who were tested for HIV, yielding HIV testing coverage of 26.8% in 2013 (Table 11). This cannot be compared to earlier data as the data elements for this indicator were not introduced into NIDS until 2013.

The district coverage of 26.8% was lower than the national target for this indicator (36.0%), but slightly higher than the provincial average of 23.9% and the national average of 22.8%. Mutale had the highest coverage at 36.5%, which was also just above the national target, followed by Musina (29.5%), then Thulamela (25.9%), with the lowest coverage occurring in Makhado (25.7%).

Of the 259,541 clients aged between 15 and 49 years (excluding antenatal clients) who were tested for HIV, 14,562 clients tested positive, resulting in an HIV prevalence among this age group of 5.6% in Vhembe District in 2013. Across the sub-districts, the highest 2013 prevalence was in Musina (10.9%), followed by Makhado (6.3%), then Thulamela (4.9%). The lowest was in Mutale at 3.0%.

The noticeably higher prevalence in Musina may be associated with migrant workers who are attracted to the sub-district’s mines and satellite industries.

<table>
<thead>
<tr>
<th>Sub-district</th>
<th>Numbers</th>
<th>Total Population</th>
<th>HIV testing coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makhado</td>
<td>97,729</td>
<td>516,031</td>
<td>25.7%</td>
</tr>
<tr>
<td>Musina</td>
<td>17,969</td>
<td>68,359</td>
<td>29.5%</td>
</tr>
<tr>
<td>Mutale</td>
<td>23,563</td>
<td>91,870</td>
<td>36.5%</td>
</tr>
<tr>
<td>Thulamela</td>
<td>120,280</td>
<td>618,462</td>
<td>25.9%</td>
</tr>
<tr>
<td>Vhembe District</td>
<td>259,541</td>
<td>1,294,722</td>
<td>26.8%</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

The district prevalence of 5.6% was lower than both the provincial prevalence of 7.4% and the national prevalence of 12.6%. It must be noted that the prevalence in Limpopo according to the 2012 HSRC survey30 was 13.9%, suggesting the DHIS data is an underestimation. The reason for this might be data-quality problems, with tests sometimes not counted in the data. While a high number of patients already knew their status, it also emerged from DHB workshops that coverage was adversely affected
by professional nurses not offering the service to clients, partly as a result of professional nursing workloads. Conversely, there was also concern that data could be distorted by possible incidents of double-counting, caused by retesting to confirm positive results.

6.2.2 Male condom distribution

There were wide variations between the Vhembe sub-districts over the past four years in male condom distribution coverage, measuring the number of male condoms distributed per male aged 15 years and older to clients via PHC and CHC facilities, as well as through factories, offices, restaurants, NGOs and other outlets. The district coverage of 30.4 condoms per male aged 15 years and older was slightly higher than the national rate of 27.9 and that of Limpopo Province at 27.7 (Table 12). However, this was well below the national target of 50 condoms per male aged 15 years and older. The coverage was particularly low in Makhado at 20.4 and in Thulamela just above the district coverage at 31.8 per male aged 15 years and older. Both Mutale and Musina had distribution coverage above the national target, at 58.3 and 51.9 respectively.

It is noticeable from Table 12 that Musina had both a higher HIV prevalence and noticeably higher condom distribution coverage. In the Musina Sub-district, the distribution coverage of 51.9 per male 15 years and older in Musina was more than double that in Makhado at 20.4, for example. The Musina figures may both be due to the higher percentage of migrant workers attracted particularly to the mines who are, in turn, able to take advantage of pro-active corporate health services.

Generally, male condom distribution coverage is normally used as a proxy for protection both against HIV infection and against reinfection that would increase viral load. In this context, it is important to note that the proportion of antenatal-care clients testing HIV positive is noticeably higher than in the general population. Neither the lower male condom distribution coverage in Makhado and Thulamela, nor coverage of male condom distribution in Musina and Mutale at almost double the district level seems to have any direct impact on HIV-positive rates, either among antenatal-care clients or in the general population aged between 15 and 49 years. In the Musina Sub-district, both categories had HIV-positive rates about double those for the district. As well as bearing out studies showing that younger women are bearing the brunt of the HIV epidemic, these figures suggest that male condom distribution rates are not having the required impact.

Table 12: HIV-test positive rates, male condom distribution coverage and total clients, 15-49 years, across Vhembe sub-districts, 2013

<table>
<thead>
<tr>
<th>Sub-district</th>
<th>Numbers</th>
<th>Proportion HIV test positive 15 – 49 years</th>
<th>Male condom distribution coverage</th>
<th>HIV+ rate in ANC clients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makhado</td>
<td>6 149</td>
<td>6.3%</td>
<td>20.4</td>
<td>9.4%</td>
</tr>
<tr>
<td>Musina</td>
<td>1 995</td>
<td>10.9%</td>
<td>51.9</td>
<td>16.2%</td>
</tr>
<tr>
<td>Mutale</td>
<td>672</td>
<td>3.0%</td>
<td>58.3</td>
<td>6.2%</td>
</tr>
<tr>
<td>Thulamela</td>
<td>5 746</td>
<td>4.9%</td>
<td>31.8</td>
<td>7.7%</td>
</tr>
<tr>
<td>Vhembe District</td>
<td>14 562</td>
<td>5.6%</td>
<td>30.4</td>
<td>8.8%</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS datafile

If the coverage rates are approximately correct, it is clear that new strategies may need to be implemented to boost condom distribution to reach the targets. However, at DHB workshops it was suggested that these wide variations could be due to the facilities not counting condoms distributed correctly. It was also noted that some facilities often experienced male condom stockouts.

6.2.3 Adults and children on ART

The total number of adults and children remaining on antiretroviral therapy (ART) has been steadily increasing over time. The number of adults remaining on ART has nearly tripled in three years, from 13 745 in 2010 to about 35 722 in 2013 (Figure 39), while the number of children remaining on ART has doubled from 1 188 in 2010 to 2 287 in 2013 (Figure 40). The lower increase of ART among children can be attributed to implementation of PMTCT.

The sub-districts of Makhado and Thulamela had many more clients on ART than Musina and Mutale. A high starting figure of 7 015 in 2010 in Thulamela, which houses the regional hospital, nearly doubled by 2013 to 13 762. Numbers for Musina and Mutale approximately doubled as well but from a low base,
reaching 4,148 and 2,704 respectively in 2013. In Makhado, however, numbers nearly quadrupled from 4,013 to 15,108 between 2010 and 2013.

Figure 39: Adults remaining on ART across Vhembe sub-districts, 2010-2013

![Figure 39: Adults remaining on ART across Vhembe sub-districts, 2010-2013](image)

Source: Vhembe DHIS data file

Rises in the numbers of children under 15 on ART were not as steep as among adults. Though Makhado Sub-district almost tripled to 984 and Mutale almost doubled to 191 between 2011 and 2013, both the Thulamela and Musina Sub-districts increased by less than half to 947 and 165 respectively (Figure 40). These results appear to underline the success of PMTCT implementation.

Figure 40: Children under 15 years remaining on ART across Vhembe sub-districts, 2010-2013

![Figure 40: Children under 15 years remaining on ART across Vhembe sub-districts, 2010-2013](image)

Source: Vhembe DHIS data file

The district aims to have a total of 61,665 adults and children on ART at the end of the 2014/15 financial year. To achieve this, health facilities need to initiate more than 30,000 clients on ART during that time. The change in ART treatment guidelines from 2015, making all HIV-positive clients eligible for treatment up to a CD4 threshold of 500, will increase this workload.32

6.2.4 Summary

HIV testing coverage of people aged between 15 and 49 years in Vhembe District was 26.8% in 2013. Though the Mutale Sub-district had clearly the highest coverage at 35.5%, Musina Sub-district was also above the district coverage at 29.5%. Both Makhado and Thulamela were below the district coverage.

This had contrasting outcomes in terms of HIV prevalence, with Mutale having the lowest in the district at 3.0% and Musina the highest at 10.9%. Vhembe District prevalence was 5.6%.

Underlining Mutale’s efforts at HIV prevention through HIV testing were its male condom distribution coverage, again the highest in the district at 58.3. Musina was again quite similar at 51.9, while coverage in Makhado and Thulamela were about half these levels.
Numbers of adults on ART have risen fast over the past four years, particularly in Makhado, to a district figure of 35,722. Rises in the numbers of children on ART were less steep, though they almost tripled in Makhado and were 2,287 for the district.

### 6.25 Recommendations

- HIV-testing practices should be reviewed in the Makhado and Thulamela Sub-districts to improve uptake, as should male condom distribution, especially if stockouts have led to lower figures in these areas.
- Rising numbers of adults and children on ART show the outcomes of broader eligibility for treatment but the recent extension to include all HIV-positive clients up to a CD4 threshold of 500 means that for successful implementation, staffing and service-delivery issues will need to be closely monitored.

### 6.3 Antenatal HIV care and treatment

This section collates data collected since 2010 on the coverage of HIV testing in antenatal care (including among infants) and results of retesting pregnant women; HIV prevalence among pregnant women; and initiation of ART in pregnant women; early infant diagnosis of HIV and the rate of infants under two months of age found to be HIV positive (Table 13).

#### Table 13: ANC/HIV service data element totals, Vhembe District, 2013

<table>
<thead>
<tr>
<th>Data Element Name</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenatal 1st visit total</td>
<td>40,376</td>
</tr>
<tr>
<td>Antenatal client eligible for ART initiation</td>
<td>3,068</td>
</tr>
<tr>
<td>Antenatal client HIV 1st test</td>
<td>31,435</td>
</tr>
<tr>
<td>Antenatal client HIV 1st test negative</td>
<td>28,660</td>
</tr>
<tr>
<td>Antenatal client HIV 1st test positive</td>
<td>2,775</td>
</tr>
<tr>
<td>Antenatal client HIV retest</td>
<td>18,584</td>
</tr>
<tr>
<td>Antenatal client HIV retest positive</td>
<td>324</td>
</tr>
<tr>
<td>Antenatal client INITIATED on ART</td>
<td>2,363</td>
</tr>
<tr>
<td>Antenatal client known HIV positive but NOT on ART at 1st visit</td>
<td>709</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

#### 6.3.1 Antenatal 1st visit coverage

In 2013, a total of 40,376 pregnant women made a first antenatal-care (ANC) visit to a health facility in Vhembe District. This translates into annualised **ANC 1st visit coverage** of 76.1% for Vhembe District (Figure 41). This coverage appears to be declining.

The indicator aims to measure the proportion of potential antenatal clients from within the South African population attending for at least one antenatal visit (booking). The indicator is calculated by multiplying the population aged under one year old by a factor of 1.15. This Vhembe rate was lower in 2013 than the national and provincial rates of 87.5% and 81.9% respectively, according to the 2013/14 DHB.

Actual coverage topped 100% in the Musina Sub-district in earlier years. This is thought not to be a data-quality issue but due to inclusion of non-South African pregnant women attending ANC in the sub-district.
The district rate decreased from 88.4% in 2010 to 76.1% in 2013. However, the rate was much higher in Mutale Sub-district (98.2%), while Thulamela (71.3%) had the lowest rate, closely followed by Makhado (75.8%). This suggests that just under 30% of women in Thulamela and about 25% of women in Makhado deliver their babies without having received any previous antenatal care during that pregnancy.

The falling trend in Vhembe’s annual antenatal first visit coverage compounds the fact that this is below national and provincial levels in the district. This creates concern as registration for ANC services is the initial step in the PMTCT service cascade. It is a critical step for pregnant women to access HIV testing and subsequent services and so ensure good maternal and child health outcomes.

Poor data quality might be one of the reasons for the low rate. The patchy data in Table 14 supports this interpretation, as did discussion at DHB workshops, for example, where it was suggested that hospitals render ANC services but do not record it. As Table 14 shows, there were no records of any ANC visits at some clinics in certain years.

Table 14: Clinic discrepancy examples of antenatal 1st visit totals, Vhembe District, 2010-2013

<table>
<thead>
<tr>
<th>Sub-district</th>
<th>Facility</th>
<th>Data Element Name</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makhado</td>
<td>Elim Hospital</td>
<td>Antenatal 1st visit total</td>
<td>687</td>
<td>238</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Louis Trichardt Hospital</td>
<td>Antenatal 1st visit total</td>
<td></td>
<td>31</td>
<td>147</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Waterval Nthabalala Mobile 1</td>
<td>Antenatal 1st visit total</td>
<td></td>
<td>38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Musina</td>
<td>Nancefield 2 Clinic</td>
<td>Antenatal 1st visit total</td>
<td>62</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Thulamela</td>
<td>Donald Fraser Hospital</td>
<td>Antenatal 1st visit total</td>
<td>61</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Malamulele Hospital</td>
<td>Antenatal 1st visit total</td>
<td>24</td>
<td>32</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Malamulele Mobile 1</td>
<td>Antenatal 1st visit total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

6.3.2 Antenatal 1st visit before 20 weeks

The antenatal 1st visit before 20 weeks rate measures the proportion of women who have a first visit (booking visit) before they are 20 weeks into their pregnancy as a proportion of all first antenatal-care visits. In Vhembe District, this rate was 44.7% in 2013 and below the national target of 60% (Figure 42). It is also just below the national average of 50%, but higher than the Limpopo average of 45.8%. Differences between the sub-districts were small. It is essential to reach as many as possible pregnant women in the first 20 weeks of pregnancy as part of basic antenatal care (ANC) to test for HIV and to identify high-risk cases.
Discussion at DHB workshops suggested a broad range of other factors that can affect service delivery.

**Booking-related** factors included: after pregnancy was confirmed, pregnant women were sent away by clinics, having been requested to visit the facility later in pregnancy; pregnant women were informed not to make a first clinic visit until the fifth month of pregnancy; women using over-the-counter pregnancy tests often did not make a first antenatal-care visit until after 20 weeks of pregnancy.

**Patient-related** factors included: cultural issues, meaning that women must be visibly pregnant before they go to clinics; girl learners, particularly, did not visit clinics until their pregnancies are visible; use of poor-quality pregnancy tests or unavailability of pregnancy test kits.

**Logistical** problems included: long waiting times at PHC facilities; limited clinic hours; ANC services rendered only on certain days, leading to missed opportunities; clinics limiting the number of new antenatal cases to five a day; and pregnant women not being informed about the Mom-Connect project.

**Service-delivery** quality issues include: the negative attitude of staff at clinics; below standard antenatal care from professional nurses; outreach teams not functioning properly; and the lack of good health education given at clinics.

### 6.3.3 Antenatal client HIV 1st test positive

The indicator of *antenatal client HIV 1st test positive* measures HIV prevalence among antenatal women of all ages, giving the proportion within all antenatal clients tested for HIV whose results were positive for HIV.

Of the 40,376 antenatal 1st visit cases in 2013 in Vhembe District, 31,435 clients were tested for HIV (77.8%) (Figure 43). Across the district, at their first ANC visit 709 clients reported that they already knew their HIV-positive status, but were not on ART (1.8%).

From the 31,435 clients tested for HIV on their first antenatal-care visit in Vhembe District, DHIS data shows 2,775 were HIV positive, yielding a prevalence of only 8.8% for this indicator. This district rate was lower than both the provincial rate of 12.4% and the national rate of 16.9%.

Across the Vhembe sub-districts, the rate of antenatal clients with a positive first HIV test was noticeably the highest in Musina at 16.2%. This echoes the finding that this sub-district had one of the highest rates of HIV-positive testing in the 15 to 49 age group, excluding ANC clients (see Section 6.2.1).
However, the Antenatal Sero-prevalence Survey is considered to provide a better estimate for HIV prevalence among pregnant women than the DHIS. The 2012 Antenatal Sero-prevalence Survey showed that the HIV prevalence among antenatal clients aged 15-49 years tested in Vhembe District was 17.7% in 2012 (Figure 44), having varied between 13.9% and 17.0% during the previous seven years. The survey prevalence was below the national (29.5%) and provincial (22.3%) averages and the eighth lowest nationally. This appears to be one of Vhembe District’s success stories and maintaining low HIV-positive rates among ANC clients is vital for family and social cohesion and to prevent growing numbers of orphans.

The DHIS values for HIV prevalence are consistently lower than that of the Antenatal Sero-prevalence Survey and one of the reasons for this is that the DHIS data includes only women who tested for HIV for the first time during their pregnancy, excluding women who already know their status. The Antenatal Survey anonymously tests all women regardless of whether their HIV status is known.

Changes in HIV treatment and care guidelines during 2013 required that all pregnant women who are HIV positive should be immediately started on antiretroviral therapy (ART). In the light of these policy changes, it is imperative that maximum effort continues to be put into ensuring that all pregnant women are aware of their HIV status.

6.3.4 Antenatal HIV retest rate

NDoH policy guidelines require that those women who tested negative for their first HIV test should be retested during their pregnancy. In Vhembe District, the antenatal client HIV retest rate, which measures the proportion of ANC clients who were retested within the group of pregnant women who had tested negative for HIV on their first antenatal-care visit, more than doubled between 2010 and 2013 (Figure 45). The Vhembe rate of 63.8% in 2013 (based on 18 584 clients retested out of 28 660 who
tested negative on first visit) was higher than both the 53.6% rate across Limpopo Province and the national rate of 54.4%, according to the DHIS.

Figure 45: Antenatal client HIV retest rate across Vhembe sub-districts, 2010-2013

<table>
<thead>
<tr>
<th></th>
<th>Mutale SD</th>
<th>Thulamela SD</th>
<th>Musina SD</th>
<th>Vhembe</th>
<th>Mkhado SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>29.0</td>
<td>48.8</td>
<td>60.7</td>
<td>63.8</td>
<td>26.7</td>
</tr>
<tr>
<td>2011</td>
<td>57.5</td>
<td>62.5</td>
<td>48.7</td>
<td>64.7</td>
<td>30.3</td>
</tr>
<tr>
<td>2012</td>
<td>63.3</td>
<td>57.5</td>
<td>62.5</td>
<td>60.7</td>
<td>41.0</td>
</tr>
<tr>
<td>2013</td>
<td>63.3</td>
<td>63.8</td>
<td>48.4</td>
<td>63.3</td>
<td>66.2</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

While Vhembe District’s rate of retesting grew, over the same time period the proportion of ANC clients who retested positive as a proportion of all clients retested for HIV decreased dramatically (Figure 46). The antenatal client HIV positive retest rate fell from 11.9% in 2010 to 1.7% in 2013. This 2013 rate was almost half that of the 2013 provincial rate of 2.4% and even lower compared to the national rate of 3.3%. Fluctuations were seen in Musina Sub-district for both indicators.

Figure 46: Antenatal client HIV retest positive rate across Vhembe sub-districts, 2010-2013

Source: Vhembe DHIS data file

6.3.5 Antenatal clients initiated on ART

In 2013, 3 068 pregnant women were assessed as being eligible for ART. This figure is supposed to include: 2 775 ANC clients who were found to be HIV positive on their first antenatal visit; 324 ANC clients who were found to be positive after retesting later; and a further 293 who already knew their HIV status at their first ANC visit but had become eligible for ART because of their pregnancy. Based on all these figures, 3 808 clients were supposed to be eligible for ART.

However, of these 3 808 clients, only 3 068 pregnant women were in fact assessed as eligible for ART, while 2 363 were actually initiated on ART (Figure 47). This means that across Vhembe District, the antenatal client initiated on ART rate, representing the percentage of ANC clients initiated on ART out of all eligible ANC clients, is given as 77.0% in 2013. In fact, the rate appears over-represented and should be 62.0% based on the full total of 3 808 ANC clients who were supposed to be eligible for ART.
The DHIS rate of initiating ART for ANC clients who had tested positive was 77.0% in Vhembe District, a little higher than the national average of 76.3% and slightly lower than provincial average of 78.6%, though noticeably lower if adjusted to 62.0% as discussed. Across the sub-districts, the rate ranged from highest in Musina Sub-district (92.6%), followed by Thulamela (82.5%) and Mutale (78.2%). Makhado had the lowest rate (68.4%).

Figure 47: ANC initiate ART rate across Vhembe sub-districts, 2010-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Makhado SD</th>
<th>Musina SD</th>
<th>Mutale SD</th>
<th>Thulamela SD</th>
<th>Vhembe</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>38.6</td>
<td>90.6</td>
<td>1.4</td>
<td>45.6</td>
<td>46.7</td>
</tr>
<tr>
<td>2011</td>
<td>70.9</td>
<td>104.7</td>
<td>93.0</td>
<td>85.1</td>
<td>82.0</td>
</tr>
<tr>
<td>2012</td>
<td>77.2</td>
<td>56.2</td>
<td>63.4</td>
<td>71.5</td>
<td>70.2</td>
</tr>
<tr>
<td>2013</td>
<td>68.4</td>
<td>92.6</td>
<td>78.2</td>
<td>82.5</td>
<td>77.0</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

This may pinpoint a data-quality issue in Makhado, however, as illustrated in Table 15. Similarly, the sharp fluctuations in figures from year to year suggest problems with interpreting policy correctly or that policy documents were received late and were not implemented correctly.

Overall for Vhembe District, these figures mean that almost one out of every four HIV-positive antenatal-care clients in Vhembe District was not put on ART to prevent mother-to-child transmission (PMTCT). This gap is a matter of concern as the 2013 PMTCT guidelines recommend a standardised triple-drug regimen to treat HIV-infected pregnant women during pregnancy and breastfeeding, regardless of CD4 count, and that ART should be continued after breastfeeding for women with CD4 counts less than 350 (named option B by the World Health Organization). This should mean that all ANC clients who test HIV positive at first test or retest due to negative status in the first test and known cases not on ART should more or less equal the number of those who go on to start ART.

Based on the new ART initiation guidelines for pregnant women, Vhembe District aims to initiate 100% of HIV-positive pregnant women on ART in 2014/15. However, the variable differences across the sub-districts point to a range of challenges in reaching this target.

Some of the discrepancies appear to be due to poor record-keeping affecting data quality, as shown in Table 15. The total of ANC clients first tested for HIV should be the same as the total of ANC first visits, but is often higher, for example. Similarly, the number of ANC clients eligible for initiation on ART should be more or less equal to the number actually initiated on ART.
<table>
<thead>
<tr>
<th>Sub-district</th>
<th>Data Element Name</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makhado</td>
<td>Antenatal 1st visit total</td>
<td>14 389</td>
<td>13 099</td>
<td>11 230</td>
<td>15 943</td>
</tr>
<tr>
<td></td>
<td>Antenatal client HIV 1st test</td>
<td>14 082</td>
<td>13 268</td>
<td>13 227</td>
<td>12 735</td>
</tr>
<tr>
<td></td>
<td>Antenatal client eligible for ART initiation</td>
<td>251</td>
<td>444</td>
<td>412</td>
<td>1 378</td>
</tr>
<tr>
<td></td>
<td>Antenatal client INITIATED on ART</td>
<td>97</td>
<td>315</td>
<td>318</td>
<td>943</td>
</tr>
<tr>
<td></td>
<td>Antenatal client HIV 1st test negative</td>
<td>12 077</td>
<td>11 465</td>
<td>11 795</td>
<td>11 542</td>
</tr>
<tr>
<td></td>
<td>Antenatal client HIV retest</td>
<td>2 397</td>
<td>6 398</td>
<td>6 440</td>
<td>7 688</td>
</tr>
<tr>
<td></td>
<td>Antenatal client HIV 1st test positive</td>
<td>2 005</td>
<td>1 803</td>
<td>1 432</td>
<td>1 193</td>
</tr>
<tr>
<td></td>
<td>Antenatal client known HIV positive but NOT on ART at 1st visit</td>
<td>371</td>
<td>608</td>
<td>389</td>
<td>284</td>
</tr>
<tr>
<td>Musina</td>
<td>Antenatal 1st visit total</td>
<td>2 741</td>
<td>2 724</td>
<td>2 310</td>
<td>3 047</td>
</tr>
<tr>
<td></td>
<td>Antenatal client HIV 1st test</td>
<td>3 606</td>
<td>2 555</td>
<td>2 378</td>
<td>2 068</td>
</tr>
<tr>
<td></td>
<td>Antenatal client eligible for ART initiation</td>
<td>127</td>
<td>129</td>
<td>194</td>
<td>363</td>
</tr>
<tr>
<td></td>
<td>Antenatal client INITIATED on ART</td>
<td>115</td>
<td>135</td>
<td>109</td>
<td>336</td>
</tr>
<tr>
<td></td>
<td>Antenatal client HIV 1st test negative</td>
<td>2 576</td>
<td>1 960</td>
<td>1 884</td>
<td>1 734</td>
</tr>
<tr>
<td></td>
<td>Antenatal client HIV retest</td>
<td>681</td>
<td>668</td>
<td>1 147</td>
<td>817</td>
</tr>
<tr>
<td></td>
<td>Antenatal client HIV 1st test positive</td>
<td>1 030</td>
<td>595</td>
<td>494</td>
<td>334</td>
</tr>
<tr>
<td></td>
<td>Antenatal client known HIV positive but NOT on ART at 1st visit</td>
<td>42</td>
<td>148</td>
<td>121</td>
<td>108</td>
</tr>
<tr>
<td>Mutale</td>
<td>Antenatal 1st visit total</td>
<td>2 752</td>
<td>2 622</td>
<td>2 272</td>
<td>3 836</td>
</tr>
<tr>
<td></td>
<td>Antenatal client HIV 1st test</td>
<td>2 589</td>
<td>2 594</td>
<td>3 126</td>
<td>2 753</td>
</tr>
<tr>
<td></td>
<td>Antenatal client eligible for ART initiation</td>
<td>70</td>
<td>71</td>
<td>93</td>
<td>238</td>
</tr>
<tr>
<td></td>
<td>Antenatal client INITIATED on ART</td>
<td>1</td>
<td>66</td>
<td>59</td>
<td>186</td>
</tr>
<tr>
<td></td>
<td>Antenatal client HIV 1st test negative</td>
<td>2 275</td>
<td>2 344</td>
<td>2 903</td>
<td>2 588</td>
</tr>
<tr>
<td></td>
<td>Antenatal client HIV retest</td>
<td>971</td>
<td>1 491</td>
<td>1 678</td>
<td>1 897</td>
</tr>
<tr>
<td></td>
<td>Antenatal client HIV 1st test positive</td>
<td>314</td>
<td>250</td>
<td>223</td>
<td>185</td>
</tr>
<tr>
<td></td>
<td>Antenatal client known HIV positive but NOT on ART at 1st visit</td>
<td>83</td>
<td>94</td>
<td>98</td>
<td>96</td>
</tr>
<tr>
<td>Thulamela</td>
<td>Antenatal 1st visit total</td>
<td>16 142</td>
<td>15 336</td>
<td>12 240</td>
<td>17 550</td>
</tr>
<tr>
<td></td>
<td>Antenatal client HIV 1st test</td>
<td>18 797</td>
<td>15 686</td>
<td>13 968</td>
<td>13 879</td>
</tr>
<tr>
<td></td>
<td>Antenatal client eligible for ART initiation</td>
<td>349</td>
<td>395</td>
<td>375</td>
<td>1 089</td>
</tr>
<tr>
<td></td>
<td>Antenatal client INITIATED on ART</td>
<td>159</td>
<td>336</td>
<td>268</td>
<td>898</td>
</tr>
<tr>
<td></td>
<td>Antenatal client HIV 1st test negative</td>
<td>16 626</td>
<td>14 027</td>
<td>12 726</td>
<td>12 816</td>
</tr>
<tr>
<td></td>
<td>Antenatal client HIV retest</td>
<td>4 772</td>
<td>7 501</td>
<td>7 172</td>
<td>8 182</td>
</tr>
<tr>
<td></td>
<td>Antenatal client HIV 1st test positive</td>
<td>2 171</td>
<td>1 659</td>
<td>1 242</td>
<td>1 063</td>
</tr>
<tr>
<td></td>
<td>Antenatal client known HIV positive but NOT on ART at 1st visit</td>
<td>306</td>
<td>568</td>
<td>406</td>
<td>221</td>
</tr>
</tbody>
</table>

Other key reasons for a lower ART initiation rate were mentioned at DHB workshops. HIV counselling has been mostly done by lay counsellors and has often been ineffective with a high number of clients refusing to be tested, often for reasons of stigmatisation and fear of the unknown. Cultural and language barriers have made these challenges more difficult to understand. Poor infrastructure and staff who are not committed to the job have compounded these problems.

6.3.6 Early infant HIV diagnosis

Early infant diagnosis (EID) coverage measures the percentage of HIV-exposed infants below two months of age who receive an HIV test. This indicator calculates the number of polymerase chain
reaction (PCR) tests performed on infants under two months old as a proportion of the number of HIV-exposed infants.

Data from the National Health Laboratory Services (NHLS) is recorded by financial year rather than calendar year. This showed that in Vhembe District, early infant HIV diagnosis coverage increased annually between 2009/10 and 2013/14 (Figure 48). It also nearly doubled from 49.3% in 2009/10 to 93.0% in 2013/14. This was higher than the provincial average of 82.0% as well as the national average of 88.3%, though it did not quite reach the district target of 95%.

Figure 48: Comparison EID (NHLS) and Infant PCR 6 weeks uptake rate (DHIS) across Vhembe sub-districts, 2010-2013

The data derived from the DHIS showed an Infant 1st PCR test around 6 weeks uptake rate of 91.1% in 2013. This represents the proportion of infants who are first PCR tested at around six weeks after birth as a proportion of live births to HIV-positive women and was in line with the NHLS indicator value (93.0%). By contrast, the figure for the years 2010 to 2012 fluctuated and ranged between the much lower levels, from 59.7% in 2012 to 64.9% in 2011.

These substantial changes might have been due to poor data quality in the DHIS. Comparing the number of live births to HIV-positive women to first PCR tests of infants at around six weeks old in Table 16 reveals substantial discrepancies which suggest underreporting of this indicator across Vhembe District, particularly in 2012.

Table 16: Examples of discrepancies infant 1st PCR test numbers against live births to HIV-positive women across Vhembe sub-districts, 2010-2013

<table>
<thead>
<tr>
<th>Sub-district</th>
<th>Data Element Name</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makhado</td>
<td>Infant 1st PCR test around 6 weeks</td>
<td>1 091</td>
<td>1 412</td>
<td>1 267</td>
<td>1 620</td>
</tr>
<tr>
<td></td>
<td>Live birth to HIV positive woman</td>
<td>1 610</td>
<td>1 938</td>
<td>1 917</td>
<td>1 710</td>
</tr>
<tr>
<td>Musina</td>
<td>Infant 1st PCR test around 6 weeks</td>
<td>184</td>
<td>296</td>
<td>344</td>
<td>485</td>
</tr>
<tr>
<td></td>
<td>Live birth to HIV positive woman</td>
<td>538</td>
<td>564</td>
<td>546</td>
<td>548</td>
</tr>
<tr>
<td>Mutale</td>
<td>Infant 1st PCR test around 6 weeks</td>
<td>234</td>
<td>280</td>
<td>259</td>
<td>294</td>
</tr>
<tr>
<td></td>
<td>Live birth to HIV positive woman</td>
<td>86</td>
<td>80</td>
<td>122</td>
<td>119</td>
</tr>
<tr>
<td>Thulamela</td>
<td>Infant 1st PCR test around 6 weeks</td>
<td>919</td>
<td>1 049</td>
<td>901</td>
<td>1 469</td>
</tr>
<tr>
<td></td>
<td>Live birth to HIV positive woman</td>
<td>1 804</td>
<td>2 094</td>
<td>2 036</td>
<td>1 869</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

In some cases, a large proportion of births in a sub-district or district are to women who have been referred from other sub-districts or districts. This can result in apparent omissions because PCR testing is done in the referral sub-district and defaulting may also be a greater factor. In Mutale, for example, because there is no hospital in this sub-district a substantial number of pregnant women go to a hospital in the Thulamela Sub-district to deliver. Communication gaps between the hospitals and Mutale PHC facilities may result in poor follow-up if the hospitals do not inform clinics when HIV-positive mothers have given birth.
Additional reasons given for such discrepancies at DHB workshops from a staff point of view include: nursing staff who are not trained to perform the PCR tests; and staff failing to check the Road To Health Card or maternity booklet for the mother’s HIV status, or failing to record it there. Negative staff attitudes were also mentioned. From a patient point of view, issues included cultural beliefs, migration, lack of resources to attend the health facility and lack of information, as well as giving incorrect addresses for follow-up. Logistically, it was noted that poor-quality specimens are often rejected by the NHLS.

The percentage of PCR tests HIV positive for infants under two months of age according to NHLS data has been slowly decreasing over time and was 2.6% in 2013/14 (Figure 49). This indicator measures the percentage of positive results for early infant PCR tests and is used as a proxy for early vertical HIV transmission, whether in utero or intrapartum.

The NHLS rate of 2.6% for this indicator in Vhembe was higher than the national (2.2%) average but lower than the provincial average (3.0%), almost reaching the national target of less than 2.5%. Also at 2.6% for Vhembe District in 2013 was the DHIS indicator infant 1st PCR test positive around 6 weeks, which measures the infants who tested PCR positive for the first time around six weeks after birth as a proportion of all infants PCR tested at that stage.

Figure 49: Comparison of baby PCR positivity rate (NHLS) and infant 1st PCR test positive rate (DHIS), Vhembe district, 2010-2013

The DHIS rate appears to have been much higher in previous years, dropping from 11.7% in 2010, through 4.8% for 2011 and 3.1% for 2012.

6.3.7 Summary

In Vhembe District, the rate of first antenatal visits has been falling for the past four years. In 2013, the annualised rate was 76.1%, noticeably lower than the national and provincial rates. Rates were highest in Mutale but lowest in the Makhado and Thulamela Sub-districts, where more than one in four women appear not to have received antenatal care.

The rates for a first antenatal visit before 20 weeks were 44.7% for the district, with similar figures for the sub-districts. While most of these rates were lower than the national and provincial averages, Musina and Mutale were somewhat higher.

The district prevalence of positive first HIV tests for ANC clients was 8.8%, though the Musina Sub-district was nearly double this level. The Antenatal Sero-prevalence Survey showed rates that were about 70% higher for Vhembe District.

The rate of HIV retesting of ANC clients has grown steeply, more than doubling in Vhembe District. However, HIV-positive results on retesting have fallen steeply to 1.7% in 2013, much lower than the provincial and national rates.

Nearly one in four HIV-positive pregnant women were not initiated on ART in 2013, despite being eligible for treatment.

Infant first PCR tests at six weeks of age and early infant diagnosis have risen markedly over time, with that result that about one in two babies were not being tested in 2010, while about one in 10 was not tested in 2013.
6.5.8 Recommendations

- ANC first visits data should be quality checked to ensure that statistics are not distorted and if clinics do not record rendering this service, they should be urged to do so.
- If ANC visits are dropping in Vhembe District, community programmes should be instituted to emphasise the value of this service, particularly to identify high-risk cases and especially in this largely rural district.
- If clinic procedures are a problem, efforts must be made to make them more efficient and patient-friendly.
- The quality of programme counselling should be improved to reduce the number of clients refusing to be tested and community HIV education campaigns should be pursued to address stigma issues.
- The shortfall of women who should have been initiated on ART in 2013 is a serious gap in PMTCT of HIV. Efforts must be made to scale up this service and make it more efficient to cope with the influx of ART initiates at the new CD4 500 guidelines.
- Greater attention must be given to recording test results in particular in the important maternity booklets and Road To Health cards.

6.4 Tuberculosis

Since tuberculosis (TB) data uses outcome indicators, the most recent data for the period reviewed was for treatment outcomes from 2012 (not 2013 as elsewhere in this report).

6.4.1 TB incidence

The incidence of all types of TB in Vhembe District was the lowest in South Africa. Incidence of TB (all types) measures all types of TB cases diagnosed per 100 000 people in the catchment population. The incidence in Vhembe District was above 300 per 100 000 between 2007 and 2012, dropping to 270.8 per 100 000 in 2013 (Figure 50). These figures are less than the average for the Limpopo Province of 354 per 100 000 and less than half the national average of 621 per 100 000.

Figure 50: Incidence of all types of TB (per 100 000), Vhembe District, 2010-2013

The 2013 TB incidence new pulmonary smear-positive in Vhembe was 103.1 per 100 000. This indicator measures the new TB cases diagnosed by positive pulmonary smear tests per 100 000 people in the catchment population.

The 2013 Vhembe District incidence of new smear-positive pulmonary TB (PTB) was its lowest level since 2009 and also the third lowest nationally. By comparison, the average across Limpopo Province was somewhat higher at 120.5 per 100 000, while the South African average was 208.4 per 100 000, about double Vhembe District rate (Figure 51).
6.4.2 TB case finding

Finding smear-positive TB patients, followed by successful treatment, is the key to TB control, since such patients are responsible for ongoing transmission of TB, with each smear-positive case who has not been cured possibly infecting between 10 and 20 people. This makes effective case-finding a major priority together with successful treatment.

The number of suspected cases for all types of TB increased from 45 771 cases in 2009 to 79 999 in 2011 and then decreased to 65 213 cases in 2012.

The number of suspected cases for new smear positive pulmonary TB, referring to the number of clients aged five years or older who were found during TB screening to have been coughing for more than two weeks, increased from 2 865 in 2009 to 4 920 in 2011, falling to 1 820 in 2012 (Table 17).

Table 17: TB case finding new smear positive pulmonary TB, Vhembe District, 2009-2012

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suspected TB case</td>
<td>45 771</td>
<td>48 258</td>
<td>79 999</td>
<td>65 213</td>
</tr>
<tr>
<td>Suspected TB smear positive</td>
<td>2 865</td>
<td>2 665</td>
<td>4 920</td>
<td>1 820</td>
</tr>
<tr>
<td>Suspect TB smear positive &amp; started with treatment</td>
<td>2 812</td>
<td>2 347</td>
<td>6 640</td>
<td>1 700</td>
</tr>
</tbody>
</table>

The TB (pulmonary) case finding index measures the proportion of clients identified as TB suspects within the PHC headcount who are aged five years and older and for whom a sputum sample was sent for laboratory examination. This rate indicates whether enough people are being screened for TB. The Vhembe case-finding index increased between 2010 and 2013 from 1.6% to 2.0% (Table 18).

However, it reached a high of 2.5% in 2011, with the decrease to 2.0% in 2013 suggesting health facilities were screening fewer people for PTB. The 2013 case-finding index in Vhembe District is below the national level of 2.4% and the provincial rate of 2.4% for 2013.

Table 18: TB (pulmonary) case finding index (%) and new PTB incidence (per 100 000), Vhembe District, 2010-2013

<table>
<thead>
<tr>
<th>Indicator Name</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB (pulmonary) case finding index</td>
<td>1.6</td>
<td>2.5</td>
<td>2.1</td>
<td>2.0</td>
</tr>
<tr>
<td>TB incidence – new PTB</td>
<td>160.2</td>
<td>138.8</td>
<td>115.8</td>
<td>103.1</td>
</tr>
</tbody>
</table>

The quality of this data should be investigated, however. Table 17 shows suspected cases for new smear positive pulmonary TB cases initiated on TB treatment increasing from 2 812 in 2009 to 6 640 in 2011, then dropping to 1 700 in 2012. This appears to mirror the drop in the TB incidence for new PTB in 2012 and 2013 and it should be checked whether new PTB is indeed dropping in Vhembe or not being sufficiently investigated or recorded at facilities.
6.4.3 TB success, smear conversion, cure and defaulter rates

6.4.3.1 TB success rate

The TB treatment success rate (all TB) measures the proportion of TB clients (with all types of TB) who are cured plus those who completed treatment out of all patients who were diagnosed and put on TB treatment. This indicator was reported to be 69.7% in 2012 in Vhembe, well below the national target of 85% (Figure 52).

![Figure 52: TB treatment success rate (all TB) (%), Vhembe District, 2009-2012](image)

Source: ETR.Net

6.4.3.2 Smear conversion rate (new pulmonary smear-positive TB)

An important indicator for new pulmonary smear-positive TB treatment is sputum smear conversion at 2 months rate (new pulmonary smear-positive), which measures the proportion of new smear-positive cases that converted at two months against all smear-positive cases due for testing. In Vhembe District, this rate was 68.6% in 2012 (Table 19). This remained well below the national target of 85%, though the national rate itself of 66.7% was also below its target.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Vhembe 2012</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB treatment success rate</td>
<td>69.7%</td>
<td>85.0%</td>
</tr>
<tr>
<td>Smear conversion rate</td>
<td>68.6%</td>
<td>85.0%</td>
</tr>
<tr>
<td>TB cure rate</td>
<td>77.5%</td>
<td>80%</td>
</tr>
<tr>
<td>Defaulter rate (new smear positive)</td>
<td>4.6%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Source: 2013/14 DHB data file

The smear conversion rate at two months of 68.6% in 2012 was lower than the TB cure rate (new smear positive), recorded as 77.5% in the same year. This casts suspicion on the smear conversion rate because a patient is cured when the smear converts to negative. The reason for this is a system error in ETR.Net which rejects any smear conversion data for smears taken after the date identified on the system but still registers cure dates. This mismatch creates inaccuracies in smear conversion rates, while reflecting the TB treatment cured and success rates more accurately.

6.4.3.3 TB cure and defaulter rates (new pulmonary smear-positive)

Successful treatment of pulmonary TB (PTB) influences overall TB incidence. This section covers the cure and defaulter rates for new pulmonary smear-positive TB cases, which are summarised in Figure 53.

TB cure rate new pulmonary smear-positive measures the proportion of new smear-positive PTB patients who completed treatment and were proven to be cured by having two negative smears on separate occasions at least 30 days apart. In Vhembe District, this indicator declined slightly from 79.4% in 2010 to 77.5% in 2012, slightly below the national target of 80%. The district target of 85% has, however, not been reached.
In 2012, the TB defaulter rate (new pulmonary smear-positive), measuring the proportion of new smear-positive PTB patients who defaulted on treatment, reached its lowest level in Vhembe District since 2009. At 4.6%, this reached the national target of less than 5%. Both the cure and defaulter rates decreased between 2011 and 2012. However, according to the 2013/14 DHB data file, the deaths from all TB cases, including death rates for new smear-positive PTB patients, increased from 8.0% in 2011 to 9.1% in 2012.

![Figure 53: Trends in TB treatment outcome rates across Vhembe sub-districts, 2009-2012](image)

Reasons for this encouraging but sustained level of default fell mainly into the key categories of both patient-related factors and point-of-care diagnostics and infrastructure, according to DHB workshops.

**Patient-related** factors included: poor adherence to treatment by patients was due to: a shifting population, particularly migrant workers; stigmatisation; lack of information; and employers who do not release patients to visit clinics during working hours.

At the health facilities, the range of challenges included: data issues, from incorrect patient addresses and lack of defaulter-tracing systems to generally poor data quality, with registers incomplete, incorrect capturing of data in ETR.Net and the functioning of the ETR.Net system, including export/import problems.

There were **service-delivery** problems, from staff shortages, creating high case loads and making it difficult for staff to give comprehensive service, to the lack of fast-track queues for TB patients and/or after-hours service for TB patients; performance issues, including staff attitudes and lack of knowledge regarding TB management, such as the importance of consistent sputum collection; and the ineffectiveness of DOTS, the Directly Observed Treatment System, because of a lack of DOTS supporters within the community, limited clinic-based DOTS and poor information supplied to patients on the system. There is no follow-up system for TB patients and no vehicles are available for use to trace defaulters. Alcoholism is also an issue with patients.

**6.4.4 Multi-drug resistant TB**

Multi-drug resistant tuberculosis (MDR-TB) is defined as TB resistant to isoniazid and rifampicin. Rifampicin resistance is therefore used as a proxy for MDR-TB. In Vhembe District, the TB rifampicin resistance confirmed client rate, measuring the proportion of rifampicin-resistant clients, more than halved from 13.3% in 2011 to 6.2% in 2013 (Figure 54).

There were no changes in treatment protocols over the period and the decrease is believed to be largely due to a change in data-gathering practices. Initially only those cases that were expected to be drug-resistant were tested, while currently a larger population is tested.

The national average was 6.6% and the average in Limpopo 4.9%. According to data from the LPDoH (February 2015) and based on Vhembe TB patients referred to Limpopo’s only specialised TB hospital in the Waterberg district, the number of laboratory-diagnosed cases of MDR-TB in 2013 was 100.
6.4.5 TB/HIV co-infection rates

Co-infection of TB and HIV requires initiation of ART to reduce related mortality. Accordingly, it is important that as many clients as possible are tested for HIV and made aware of their status, especially newly diagnosed TB clients. Quality data on the proportion of TB clients with known HIV status is therefore vital for TB/HIV healthcare planning and provision.

In Vhembe District, this rate increased sharply from 49.8% in 2010 to 85.7% in 2011, after which the percentage stabilised (Figure 55). The proportion was 87.3% in 2013 and close to the national target of 90%.

6.4.6 ART initiation in co-infected patients

For TB patients diagnosed as co-infected with HIV, ART initiation is part of the continuum of care model and is an extremely important component in strengthening integration of TB and HIV services to reduce TB- and HIV-related mortality. In 2013, a total of 2,011 clients of all ages in Vhembe District were co-infected with HIV and TB (Table 20).

The highest numbers were in Makhado and Thulamela Sub-districts, 1,022 and 776 respectively, mirroring the higher HIV-positive rates seen there in testing (see Section 6.2.1, HIV testing and prevalence).
The TB/HIV on ART rate, measuring TB cases on ART, was 63.7% in Vhembe District in 2013, according to ETR.Net data. This was a large increase from 26.8% in 2011. It was slightly lower compared to the provincial (66.3%) and national (66.2%) rates (Figure 56).

However, the national target is 90% and the Vhembe target even 100% for 2014/15. Furthermore, the 2013 ART guidelines stipulate that all TB patients diagnosed with HIV should be put on treatment, regardless of their CD4 count. Given that the burden of disease in Vhembe is fuelled by TB and HIV, specific focus should be placed on ensuring that all TB patients are tested for HIV and initiated on ART if positive. In turn, all HIV-infected patients should be frequently screened for TB.

The NIDS indicator TB/HIV co-infected client initiated on ART rate measures TB/HIV co-infected clients initiated on ART as a proportion of all HIV-positive TB cases. According to DHIS data, in Vhembe District in 2012 this rate was 37.0% (Figure 57).

This DHIS rate was almost 50 percentage points lower than the ETR.Net data, indicating that the DHIS data quality is suspicious. DHIS data showed the rate of ART treatment initiation for co-infected patients was highest in Musina (62.0%), followed by Mutale, Makhado and lastly Thulamela with a rate of 31.4%.

### Table 20: Total TB/HIV co-infected clients across Vhembe sub-districts, 2013

<table>
<thead>
<tr>
<th>Data Element Name</th>
<th>Sub-district</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB/HIV co-infected client – total</td>
<td>Makhado</td>
<td>1,022</td>
</tr>
<tr>
<td></td>
<td>Musina</td>
<td>137</td>
</tr>
<tr>
<td></td>
<td>Mutale</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>Thulamela</td>
<td>776</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

Source: ETR.Net and 2013/14 DHB data file

Figure 56: TB/HIV on ART rate (ETR.Net), Vhembe District, 2011-2013

Figure 57: TB/HIV co-infected client initiated on ART rate (%) across Vhembe sub-districts, 2013

Source: Vhembe DHIS data file
Similar issues are reflected in Table 21, where absolute numbers for TB/HIV co-infected clients compared to TB/HIV co-infected clients initiated on ART appear to show large gaps. The largest gaps between co-infection diagnosis and initiation on ART were seen in the Makhado and Thulamela Sub-districts. In 2013, Makhado had 1,022 clients diagnosed with co-infection but initiated ART with only 380. Thulamela had 776 clients diagnosed with co-infection but initiated ART with only 244. As only data for 2013 is available, it is difficult to determine whether the low rates are due to poor data quality or a correct reflection of the HIV service provided in these sub-districts.

Table 21: Absolute numbers of TB/HIV co-infected clients, including those on ART, across Vhembe sub-districts, 2013

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Year</th>
<th>Facility</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB/HIV co-infected client – total</td>
<td>2013</td>
<td>Makhado Sub-district</td>
<td>1,022</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Musina Sub-district</td>
<td>137</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mutale Sub-district</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thulamela Sub-district</td>
<td>776</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vhembe</td>
<td>2,011</td>
</tr>
<tr>
<td>TB/HIV co-infected client initiated on ART</td>
<td>2013</td>
<td>Makhado Sub-district</td>
<td>380</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Musina Sub-district</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mutale Sub-district</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thulamela Sub-district</td>
<td>244</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vhembe</td>
<td>744</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

Comparison between DHIS and ETR.Net data for the rate of ART treatment initiation for co-infected patients shows wide variances, with the ETR.Net figure being almost double the DHIS figure. Clarification of such discrepancies is important to determine data quality and provide a clearer reflection of the HIV service provided in Vhembe District (Table 22).

Table 22: Comparison of TB/HIV initiate ART rates (%), Vhembe District, DHIS & ETR.Net, 2013

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB/HIV initiate ART rate (DHIS)</td>
<td>37.0</td>
</tr>
<tr>
<td>TB/HIV on ART (ETR.Net)</td>
<td>63.7</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file & ETR.Net

6.4.7 Summary

Vhembe District appears to have the lowest incidence of all TB types nationally at 270.8 per 100,000. However, it is not clear how accurate this picture is given noticeable discrepancies between the DHIS and ETR.Net data, with ETR.Net often giving a much higher figure.

Incidence of new pulmonary smear-positive TB dropped to a new low of 103.1 per 100,000 in the district in 2013, with indicators for suspected cases of TB also falling. The PTB case-finding index has fluctuated over the past four years but at 2.0% is below the national and provincial levels. Similarly, cases initiated on treatment appear to have dropped, especially as both the treatment success rate of 69.7% and the smear conversion rate were well below the national target in 2012.

Though TB treatment defaulter rates were within the national target, death rates for new smear-positive PTB patients increased to 9.1% in 2012.

6.4.8 Recommendations

- Vhembe District should create strategies to engage successfully with the two key priorities of South Africa’s National TB Control Programme, effective case finding and successful treatment.
- Given the BoD in Vhembe District, this particularly includes focusing on implementing the 2013 guidelines that all TB patients are tested for HIV and initiated on ART if positive; and that all HIV-positive patients are frequently screened for TB.
A follow-up system should be instituted for TB patients and vehicles provided to trace defaulters.

The DOTS system should be strengthened in the district, recruiting DOTS supporters and improving clinic support.

Health education initiatives with the community, patients on treatment and employers should be pursued to improve treatment adherence and prevent further spread of TB. This should include help with alcohol problems for patients.

6.5 Maternal, child and women’s health & nutrition (MCWH)

Maternal, child and women’s health is a national healthcare priority given that rates of maternal mortality and mortality for children under five years, infants and neonates have been unacceptably high in South Africa in the past. Significant reductions have been required to reach the Millennium Development Goal targets.

This section covers health indicators related to:

- Reproductive health (couple year protection rate);
- Delivery (delivery rate in facility, Caesarean section rate, stillbirth rate, maternal mortality, termination of pregnancy);
- Child health and nutrition (neonatal, infant and child mortality, incidence and case fatality rate of diarrhoea, pneumonia, malnutrition).

6.5.1 Couple year protection rate

Couple year protection rate (CYPR) measures the percentage of women aged between 15 and 49 years old who were protected against unplanned pregnancies for a year using modern contraceptive methods, including sterilisation. CYPR spans a very wide age group of almost 35 years because there is no age breakdown for this indicator within NIDS. This makes it a rather crude proxy for protection against unplanned pregnancies and is currently the best available measure where regular, disaggregated survey data is not available.

The CYPR in Vhembe District increased slightly over the past four years, from 30.4% in 2010 to 36.9% in 2013 (Figure 58). Across the sub-districts, the rate varied markedly, being highest in Mutale (51.5%), despite the fact that the Musina Sub-district had markedly the highest male condom distribution coverage, for example (see Section 6.2.2, Male condom distribution). The lowest sub-district CYPR in 2013 was in Makhado (33.3%).

The 2013 district rate of 36.9% was just above the national target of 36% and in line with provincial (36.3%) and national (37.3%) levels. The district CYPR target of 60% by 2014 appears unrealistic given the variation between sub-district levels.

Figure 58: Couple year protection rate across Vhembe sub-districts, 2010-2013

![Couple year protection rate graph](image)

Source: Vhembe DHIS data file
The CYPR could be higher as there are definite data quality problems, especially in respect of oral contraceptive cycles where data show a considerable number of gaps and very large outliers for many facilities, particularly in Mutale, Makhado and Thulamela Sub-districts, as seen in Table 23.

Table 23: Examples of data-quality problems for CYPR from Vhembe health facilities, 2013

<table>
<thead>
<tr>
<th>Oral pill cycle</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thulamela Sub-district</strong></td>
<td></td>
</tr>
<tr>
<td>Malamulele Mobile 1</td>
<td>99 96 99 72 72 141 33 135 162 78 30</td>
</tr>
<tr>
<td>Malamulele Mobile 2</td>
<td>276 114 228 63 66 255 159 174 231 297 24</td>
</tr>
<tr>
<td>Malamulele Mobile 3</td>
<td>283 126 153 78 51 114 87 114 207 123 72</td>
</tr>
<tr>
<td>Malamulele Mobile 4</td>
<td>126 45 87 192 18 54 0 123 138 168 42</td>
</tr>
<tr>
<td>Malamulele Mobile 5</td>
<td>78 30 58 9 30 87 63 39 60 75 48</td>
</tr>
<tr>
<td>Matsheka Clinic</td>
<td>53 51 46 99 0 1 0 24 48 49 120 45</td>
</tr>
<tr>
<td>Pfanani Clinic</td>
<td>116 168 171 198 0 9 150 138 81 48 84 123</td>
</tr>
<tr>
<td><strong>Mutale Sub-district</strong></td>
<td></td>
</tr>
<tr>
<td>Thengwe Clinic</td>
<td>144 93 180 54 24 6 126 68 35 195 126 88</td>
</tr>
<tr>
<td><strong>Makhado Sub-district</strong></td>
<td></td>
</tr>
<tr>
<td>Waterval Nthabalala Mobile 1</td>
<td>6 36 45 51 24 36 21 27 39 42 50</td>
</tr>
<tr>
<td>Tshino Clinic</td>
<td>207 118 177 109 171 12 7 88 163 98 126 119</td>
</tr>
<tr>
<td>Tshimbupfe Clinic</td>
<td>64 150 86 66 40 39 33 208 174 46 6 93</td>
</tr>
<tr>
<td>Tshakhuma Clinic</td>
<td>135 51 54 117 204 6 174 231 324 102 24 94</td>
</tr>
<tr>
<td>Tiyani CHC</td>
<td>15 84 53 114 30 0 30 54 72 16 54 75</td>
</tr>
<tr>
<td>Phadzima Mobile 1</td>
<td>33 57 21 18 21 3 12 36 117 135 19</td>
</tr>
<tr>
<td>Makhado Mobile 1</td>
<td>135 61 48 57 9 34 90 36 57 27 27</td>
</tr>
<tr>
<td>Kutama Clinic</td>
<td>170 158 237 225 237 230 150 9 108 117 93 113</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

### 6.5.2 Delivery-related indicators

#### 6.5.2.1 Delivery rate in facility

The **delivery rate in facility** measures the percentage of all deliveries in the area taking place in a health facility compared to all expected deliveries in that population within a year. This is calculated using the population of children aged under one year old multiplied by a factor of 1.07. In Vhembe District, this rate has increased slightly over the past four years from 86.0% in 2010 to 90.2% in 2013 (Figure 59).

There were large differences between Vhembe’s sub-districts. Mutale’s 2013 rate of 38.4% of deliveries in facility is much lower than the other three sub-districts, though it has grown from 29.6% in 2010. The particularly low rate is mainly because there is no hospital in the sub-district. Only a limited number of deliveries take place in Mutale PHC facilities compared to the delivery rates normally expected, with the remainder occurring in neighbouring sub-districts. Meanwhile the 2013 rate in Thulamela was 103.3%, probably a combination of an influx from the Mutale Sub-district as well as clients from beyond South Africa. This indicator has been slowly rising above 100% in the Thulamela Sub-district since 2011. However, the rate in Musina dropped from 103.5% in 2010 to 84.2% in 2013.

The rate of deliveries in facilities in Vhembe was higher than the national average of 81.4% as well as the provincial average (86.3%). It was below the district target 2014/15 of 95%. Both the fluctuating, high rates of deliveries in the Musina and Thulamela Sub-districts and the higher than average district rate seem to be due to women from other African countries delivering babies in Vhembe District.
The breakdowns in Table 24 below show high numbers of deliveries in the Makhado and Thulamela district and regional hospitals. In 2013, for example, 23,635 women delivered in these hospitals compared to 9,188 in clinics and CHCs.

Table 24: Absolute numbers of deliveries in CHCs and clinics in Vhembe District, 2010-2013

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Sub-district</th>
<th>Data Element Name</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinic</td>
<td>Makhado</td>
<td>Delivery in facility total</td>
<td>2,485</td>
<td>2,643</td>
<td>3,012</td>
<td>2,842</td>
</tr>
<tr>
<td></td>
<td>Musina</td>
<td>Delivery in facility total</td>
<td>576</td>
<td>389</td>
<td>445</td>
<td>480</td>
</tr>
<tr>
<td></td>
<td>Mutale</td>
<td>Delivery in facility total</td>
<td>668</td>
<td>738</td>
<td>891</td>
<td>870</td>
</tr>
<tr>
<td></td>
<td>Thulamela</td>
<td>Delivery in facility total</td>
<td>2,110</td>
<td>2,626</td>
<td>2,962</td>
<td>3,140</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>5,839</td>
<td>6,396</td>
<td>7,310</td>
<td>7,332</td>
</tr>
<tr>
<td>Community Health Centre</td>
<td>Makhado</td>
<td>Delivery in facility total</td>
<td>976</td>
<td>1,057</td>
<td>1,078</td>
<td>1,026</td>
</tr>
<tr>
<td></td>
<td>Mutale</td>
<td>Delivery in facility total</td>
<td>78</td>
<td>90</td>
<td>114</td>
<td>111</td>
</tr>
<tr>
<td></td>
<td>Thulamela</td>
<td>Delivery in facility total</td>
<td>575</td>
<td>615</td>
<td>719</td>
<td>719</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>1,629</td>
<td>1,762</td>
<td>1,911</td>
<td>1,856</td>
</tr>
<tr>
<td>District Hospital</td>
<td>Makhado</td>
<td>Delivery in facility total</td>
<td>8,341</td>
<td>8,303</td>
<td>8,386</td>
<td>8,489</td>
</tr>
<tr>
<td></td>
<td>Musina</td>
<td>Delivery in facility total</td>
<td>1,705</td>
<td>1,757</td>
<td>1,596</td>
<td>1,433</td>
</tr>
<tr>
<td></td>
<td>Thulamela</td>
<td>Delivery in facility total</td>
<td>8,228</td>
<td>8,304</td>
<td>8,731</td>
<td>8,498</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>18,274</td>
<td>18,364</td>
<td>18,713</td>
<td>18,420</td>
</tr>
<tr>
<td>Regional Hospital</td>
<td>Thulamela</td>
<td>Delivery in facility total</td>
<td>5,029</td>
<td>5,528</td>
<td>4,864</td>
<td>5,215</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

The high proportion of Mutale women who deliver outside the sub-district is underlined by comparing the 981 deliveries in facility in 2013 to the population under one year old of 2,387, showing that the remainder delivered outside the sub-district in 2013 because it has no hospital (Table 25). By contrast, in the Thulamela Sub-district, there were 1,675 more deliveries than the population of children aged under a year. This points to the number of women from beyond the sub-district and even from beyond South Africa who deliver their babies in Thulamela.
Table 25: Deliveries in facility compared to population under one year old across Vhembe sub-districts, 2013

<table>
<thead>
<tr>
<th>Sub-district</th>
<th>Data Element Name</th>
<th>Total</th>
<th>&lt;1 population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makhado</td>
<td>Delivery in facility total</td>
<td>12 357</td>
<td>13 608</td>
</tr>
<tr>
<td>Musina</td>
<td>Delivery in facility total</td>
<td>1 913</td>
<td>2 123</td>
</tr>
<tr>
<td>Mutale</td>
<td>Delivery in facility total</td>
<td>981</td>
<td>2 387</td>
</tr>
<tr>
<td>Thulamela</td>
<td>Delivery in facility total</td>
<td>17 572</td>
<td>15 897</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

6.5.2.2 Delivery rate in facility under 18 years

The delivery rate in facility under 18 years measures deliveries to women aged under 18 years as a proportion of total deliveries in health facilities. Though this indicator has been declining in Vhembe District for the past four years, from 9.3% in 2010 to 8.4% in 2013, it remains above the national target of 6.9%. It was also higher than the national (7.8%) and the provincial (7.9%) averages (Figure 60).

This outcome indicator is used typically as a proxy to track success in the prevention of teenage pregnancies. However, given that termination of pregnancy (TOP) services are offered in the district, too, successful prevention of teenage pregnancies should be viewed also in the light of TOP services to women under 18 years old. Unfortunately, this data is not disaggregated into categories for under- and over-18 year age groups in Limpopo Province.

![Figure 60: Delivery rate in facility under 18 years across Vhembe sub-districts, 2010-2013](image)

Source: Vhembe DHIS data file

At DHB workshops, one major reason mentioned for the higher Vhembe rate of deliveries under 18 years in facilities was poverty, in terms of gaining access to social grants. Other synergistic factors included: youth not wanting to use contraception; poor availability of family-planning services and particularly lack of youth-friendly services; and school health-service staff not being allowed to provide family-planning services at Limpopo schools. These factors are compounded by high rates of illiteracy, school dropouts and learners walking all the way to school.

6.5.2.3 Delivery by Caesarean section

The delivery by Caesarean section rate, measuring the percentage of deliveries in hospital by Caesarean section (C-section) remains an important indicator of access to essential obstetric care and is a key maternal-health indicator. This is a facility-based rather than a population-based indicator.

It is important to note, however, that no specific target was set for the C-section rate in the 2013 NIDS, which came into effect in April 2013. In June 2010, the World Health Organization officially withdrew its previous recommendation of a 15% C-section rate, stating that: “There was no empirical evidence for an optimum percentage. What matters most was that all women who need Caesarean sections receive them.”

Hospitals in Vhembe District are perceived to be performing more C-sections currently because midwife obstetric units (MOUs) are referring obstetric emergencies, according to DHB workshops.
The C-section rate for district hospitals in Vhembe has fluctuated a little over the period from 2010 to 2013. It was 18.8% in 2013, lower than the national average of 21.8% as well as the provincial average of 19.4% (Figure 61).

Figure 61: Caesarean section rate, Vhembe – district hospitals, 2010-2013

Source: 2013/14 DHB

According to the 2013/14 DHB, the overall C-section rate for South Africa, based on all public sector facilities and a small number of private hospitals, was 24.4% in 2013/14 and the provincial rate 16.2%. In Vhembe District, it has been stable over time and was 14.8% in 2013 (Figure 62). Differences between Makhado, Musina and Thulamela, the three sub-districts with facilities to perform C-sections, were relatively small.

Figure 62: Caesarean section rate all hospitals across Vhembe sub-districts, 2010-2013

Source: Vhembe DHIS data file

Note: There is no district hospital in Mutale SD

In the Thulamela Sub-district, there was a somewhat higher overall rate of C-sections at 16.3% of all deliveries (Table 26). This is due to the high rate of C-sections at Tshilidzini Regional Hospital, which serves as a district referral hospital for complicated deliveries.
Table 26: Numbers of Caesarean sections per hospital type across Vhembe sub-districts, 2010-2013

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Sub-district</th>
<th>Data Element Name</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>District Hospital</td>
<td>Makhado</td>
<td>Delivery by Caesarean section</td>
<td>1 803</td>
<td>1 859</td>
<td>1 761</td>
<td>1 788</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delivery in facility total</td>
<td>8 341</td>
<td>8 303</td>
<td>8 386</td>
<td>8 489</td>
</tr>
<tr>
<td></td>
<td>Musina</td>
<td>Delivery by Caesarean section</td>
<td>327</td>
<td>338</td>
<td>219</td>
<td>201</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delivery in facility total</td>
<td>1 705</td>
<td>1 757</td>
<td>1 596</td>
<td>1 433</td>
</tr>
<tr>
<td></td>
<td>Thulamela</td>
<td>Delivery by Caesarean section</td>
<td>1 358</td>
<td>1 391</td>
<td>1 321</td>
<td>1 402</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delivery in facility total</td>
<td>8 228</td>
<td>8 304</td>
<td>8 731</td>
<td>8 498</td>
</tr>
<tr>
<td>Regional Hospital</td>
<td>Thulamela</td>
<td>Delivery by Caesarean section</td>
<td>1 151</td>
<td>1 158</td>
<td>1 233</td>
<td>1 459</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delivery in facility total</td>
<td>5 029</td>
<td>5 528</td>
<td>4 864</td>
<td>5 215</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

Figures from the DHIS show the rate at Tshilidzini Regional Hospital has grown slowly, despite a dip in 2011, from 22.9% in 2010 and 25.3% in 2012 to 28.0% in 2013. By contrast, the amalgamated rate of C-sections at the two Thulamela district hospitals is 16.5%. Once again, it should be noted that as Mutale has no district hospital, no C-sections were performed in the sub-district and patients were referred to other parts of Vhembe District.

Table 27: Caesarean-section rate per facility (%) across Vhembe sub-districts, 2010-2013

<table>
<thead>
<tr>
<th>Sub-district</th>
<th>Facility</th>
<th>Indicator Name</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makhado</td>
<td>Elim Hospital</td>
<td>Delivery by Caesarean section rate</td>
<td>21.2</td>
<td>21.5</td>
<td>20.5</td>
<td>20.8</td>
</tr>
<tr>
<td></td>
<td>Louis Trichardt Hospital</td>
<td>Delivery by Caesarean section rate</td>
<td>26.2</td>
<td>26.6</td>
<td>25.2</td>
<td>21.7</td>
</tr>
<tr>
<td></td>
<td>Siloam Hospital</td>
<td>Delivery by Caesarean section rate</td>
<td>19.9</td>
<td>21.2</td>
<td>19.5</td>
<td>21.0</td>
</tr>
<tr>
<td>Musina</td>
<td>Messina Hospital</td>
<td>Delivery by Caesarean section rate</td>
<td>19.2</td>
<td>19.2</td>
<td>13.7</td>
<td>14.0</td>
</tr>
<tr>
<td>Thulamela</td>
<td>Donald Fraser Hospital</td>
<td>Delivery by Caesarean section rate</td>
<td>17.2</td>
<td>18.3</td>
<td>17.6</td>
<td>16.7</td>
</tr>
<tr>
<td></td>
<td>Malamulele Hospital</td>
<td>Delivery by Caesarean section rate</td>
<td>15.8</td>
<td>15.1</td>
<td>12.4</td>
<td>16.3</td>
</tr>
<tr>
<td></td>
<td>Tshilidzini Hospital (regional hospital)</td>
<td>Delivery by Caesarean section rate</td>
<td>22.9</td>
<td>20.9</td>
<td>25.3</td>
<td>28.0</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

Late first antenatal-care bookings also tended to lead to more C-sections as high-risk cases were not identified early, according to DHB workshops. Other factors influencing the overall C-section rate included: assisted deliveries discontinued; poor observation of women in labour and an inability to interpret CTG tracing or a partogram; doctors delaying attending to obstetric emergencies.

It was observed at the DHB workshops that the C-section rate for mothers under-18 was generally higher as they are often unable to give birth naturally because they are physically underdeveloped. However, as Table 28 shows, there was no relation between the rate of delivery by C-section and the rate of delivery in facility by clients under 18 years old.

Table 28: No relation between rates of delivery by Caesarean section and delivery in facility under 18 years in Vhembe (%), 2010-2013

<table>
<thead>
<tr>
<th>Indicator Name</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delivery by Caesarean section rate</td>
<td>15.1</td>
<td>14.8</td>
<td>13.8</td>
<td>14.8</td>
</tr>
<tr>
<td>Delivery in facility under 18 years rate</td>
<td>9.3</td>
<td>9.1</td>
<td>8.3</td>
<td>8.1</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file
6.5.3 Maternal mortality

A maternal death in facility is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy. The death can be from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. The maternal mortality in facility ratio measures the total number of maternal deaths in facility per 100,000 live births in the facility. It is important to note that only deaths occurring within health facilities are recorded for this indicator. Maternal death data can be obtained from two sources, namely the District Health Information Software (DHIS) and the National Committee on Confidential Enquiries into Maternal Deaths (NCCEMD).24

Between 2011 and 2013, there was a fluctuation in the ratio of maternal mortality in facility in Vhembe District, according to DHIS data. The ratio rose from 130.3 per 100,000 live births in 2011 to 149.9 per 100,000 in 2012, before falling to 122.0 per 100,000 in 2013 (Figure 63). This pattern was mirrored in the sub-districts of Makhado and Thulamela. However, Musina Sub-district showed a marked and steady fall from 277.0 per 100,000 in 2011 to 246.8 per 100,000 in 2012 and 153.3 per 100,000 in 2013.

Vhembe District ratio of maternal mortality in facility in 2013 was lower than both the national average of 133.3 per 100,000 and the provincial average of 152.0 per 100,000. It was also lower than the Vhembe target for 2014/15 of 136.5 per 100,000. However, it is still much higher than the Millennium Development Goal indicator target of 38 per 100,000 live births for 2015.39

![Figure 63: Maternal mortality in facility ratio per 100,000 (DHIS) across Vhembe sub-districts, 2011-2013](source: Vhembe DHIS data file)

Note: There is no district hospital in Mutale SD

At sub-district level, the ratio in Musina of 155.3 per 100,000 was much higher than provincial and national averages (Figure 64). It was higher, too, than the ratios in the sub-districts of Makhado and Thulamela. However, it should be noted that in terms of absolute numbers, in 2013 only three women died in Musina, compared to 13 in Makhado. In Thulamela, 24 women died, 11 of these maternal deaths occurring at the Tshilidzini Regional Hospital. As a referral hospital, this is expected as it deals with more complicated deliveries. At the Mulamela and Donald Fraser District Hospitals, the numbers of maternal deaths were eight and five respectively.
A range of factors relating to patients, staff and infrastructure have an impact on maternal mortality in health facilities, according to DHB workshops. Patient-related factors included the increase of HIV/AIDS maternity cases, many patients with unrecognised chronic conditions and late or no bookings. Pregnant women in the district may use traditional medicine. When this is used to induce labour, maternal and foetal fatigue can occur after it wears off. Alcohol abuse by pregnant women and lack of openness among patients who lose their maternity record cards are other factors.

From a staff point of view, the shortage of doctors means that staff cannot attend all problem maternity cases. This was compounded by receiving hospitals often having only junior doctors. The unit head should be seeing all patients but may not be doing so and is not aware of which patients are in labour. Rotation through various specialities may mean that expert nursing staff are not available. Insufficient staff allocations include wards supplemented by nursing students who are inexperienced yet left to...
manage women on their own. There may be poor compliance to protocols and inadequate leadership and supervision. As a result of these factors, staff often fail to recognise delivery complications.

**Infrastructure** concerns included: late or no booking; blood supplies were often low or unavailable; Emergency Medical Services were not readily available, there was a shortage of ambulances general and in particular no standby obstetric ambulance.

### 6.5.4 Termination of pregnancy

Information from informal discussion with staff notes resistance to termination of pregnancy in certain parts of Vhembe District on cultural and religious grounds. Despite this, the number of pregnancies terminated in Vhembe health facilities has been slowly increasing over recent years from 2,016 in 2010 to 2,818 in 2013 (Figure 66). Disaggregated data showing the trimester of termination and age groups of the clients are not available.

**Figure 66:** Absolute number of termination of pregnancy performed totals, Vhembe District, 2010-2013

The **termination of pregnancy rate**, measures the proportion of pregnancies terminated in health facilities as proportion of all expected pregnancies in the population. This is calculated by multiplying estimated population under 1 year by 1.15 to compensate for still births and infant mortality. The rate has been slowly increasing in Vhembe District from 5.2% in 2010 to 7.2% in 2013 (Figure 67). The district average of 7.2% was higher than the provincial rate of 5.5%, though just lower than the national rate of 7.5%. The highest rate of 10.3% was found in Makhado and the lowest rate in Thulamela at 6.6%. Strong religious and cultural beliefs in both the community and among doctors and professional nurses mean that medical staff often exercise their right not to terminate pregnancies. As a result, patients from Mutale (which has no district hospital) and from Musina are referred to the other two sub-districts.

**Figure 67:** Termination of pregnancy rate (%) across Vhembe sub-districts, 2010-2013
6.5.5 Summary

Though CYPR in Vhembe District increased from 30.4% to 36.9% in the past four years, this is still only just over half of the district target. At the same time, pregnancy terminations have steadily increased in the district and the delivery rate for women under 18 years (8.4%), though declining, is above both the national target and the national average.

Meanwhile deliveries in facility have slowly increased across the district from a rate of 86% in 2010 to 90.2% in 2013. As expected, the Mutale Sub-district has a particularly low rate as there is no district hospital. The rate in the Thulamela Sub-district has steadily increased from 95.4% to 103.3% in 2013, influenced by the number of women from outside the sub-district and even outside the country who deliver babies in these facilities. District hospital rates of Caesarean sections – 18.8% in 2013 – were slightly below the national average. Once again, the Thulamela Sub-district had a higher rate, especially as its regional hospital receives referrals for complicated deliveries.

The maternal mortality ratio in facilities decreased between 2011 and 2013 to a low for the period of 122 per 100,000, lower than the district target and the national average. The ratio was much higher in the sub-district of Musina, however, which has relatively few health facilities and a high percentage (25.2%) of informal dwellings, possibly making health-seeking behaviour more challenging. That said, the NCCEMD data was much lower than the DHIS data for this indicator.

Patients for termination of pregnancy are often referred from Musina and Mutale to other sub-districts, as Mutale has no hospital and medical and nursing staff in the district often exercise their right not to participate in TOPs. The district average has now climbed to 7.2%, almost identical to the national rate.

6.5.6 Recommendations

- The low CYPR rate may impact on deliveries to women under 18 years of age as well as TOPs. Given that CYPR in Vhembe District is nearly half of the target, an interim programme should be put in place to improve access to protection. This could include family-planning services in schools, currently not yet permitted in Limpopo Province. Community health education efforts should be extended to reach the high rate of school dropouts in the district.

- Delivery rates in facility show that the Thulamela Sub-district is probably overburdened, having reached more than 100% of deliveries in facility as long ago as 2011. Support for staff in such facilities is essential to deliver the appropriate quality of service. Similarly, the fact that Mutale still has no district hospital can lead to a higher rate of complicated deliveries, C-sections and even maternal and infant deaths. Since these indicators are recorded in other sub-districts, it is not possible here to disaggregate any referred cases, though it would be appropriate to plan to distribute health facilities in the district within easier access of potential patients.

- Once again, community health education could help support the vital importance of antenatal care, preparing the patient and medical staff for any unpredictable delivery complications. This should include: emphasising the advantages of the maternal record card; the dangers of chronic conditions or overuse of alcohol; and the possible side-effects of using traditional medicines. A partnership with traditional health practitioners along similar lines to those which tackle HIV/AIDS would be advantageous.

- Greater availability of skilled staff should also be considered so that difficult deliveries are monitored and handled before they become emergencies.
6.6 Child health and nutrition-related indicators

Most key child-health mortality rate indicators in Vhembe District increased between 2010 and 2013 (Table 29). As discussed in Section 5, Burden of Disease, the age distribution of deaths in Vhembe District is typical of a population experiencing an HIV/AIDS epidemic, with high numbers of deaths among children under five years old.

Table 29: Overview of trends in fatality and mortality rates under 5 years old, Vhembe District, 2010-2013

<table>
<thead>
<tr>
<th>Indicator Name</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child under 5 years diarrhoea case fatality rate</td>
<td>8.9</td>
<td>7.7</td>
<td>6.1</td>
<td>4.3</td>
</tr>
<tr>
<td>Child under 5 years pneumonia case fatality rate</td>
<td>7.1</td>
<td>4.6</td>
<td>4.9</td>
<td>3.1</td>
</tr>
<tr>
<td>Child under 5 years severe acute malnutrition case fatality rate</td>
<td>25.6</td>
<td>16.5</td>
<td>16.5</td>
<td>13.2</td>
</tr>
<tr>
<td>Inpatient death under 1 year rate</td>
<td>7</td>
<td>8.5</td>
<td>10.9</td>
<td>9.6</td>
</tr>
<tr>
<td>Inpatient death under 5 year rate</td>
<td>6.2</td>
<td>5.6</td>
<td>6.4</td>
<td>6.1</td>
</tr>
<tr>
<td>Inpatient early neonatal death rate</td>
<td>9.9</td>
<td>7.8</td>
<td>9.6</td>
<td>7.9</td>
</tr>
<tr>
<td>Inpatient neonatal death rate</td>
<td>10.5</td>
<td>8.5</td>
<td>10</td>
<td>8.8</td>
</tr>
<tr>
<td>Neonatal mortality in facility rate</td>
<td>9.2</td>
<td>7.9</td>
<td>9.3</td>
<td>8.2</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

Despite the challenges faced in service delivery in Vhembe District, particularly in its extensive rural areas and in the Mutale Sub-district where there is no hospital, some rates are generally on a par with or better than provincial and national rates (Table 30). As will be shown, though, in some cases the Vhembe data appears unreliable. The overview, however, is encouraging.

Table 30: Deaths rates by age group for children under 5 in Limpopo and South Africa, 2013

<table>
<thead>
<tr>
<th>Indicator Name</th>
<th>Indicator Type</th>
<th>Period</th>
<th>Limpopo</th>
<th>National</th>
<th>Vhembe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient death under 1 year rate</td>
<td>%</td>
<td>2013</td>
<td>12.5</td>
<td>6.7</td>
<td>9.6</td>
</tr>
<tr>
<td>Inpatient death under 5 year rate</td>
<td>%</td>
<td>2013</td>
<td>8.3</td>
<td>5.2</td>
<td>6.1</td>
</tr>
<tr>
<td>Inpatient early neonatal death rate</td>
<td>per 1K</td>
<td>2013</td>
<td>11.2</td>
<td>10.0</td>
<td>7.9</td>
</tr>
<tr>
<td>Inpatient neonatal death rate</td>
<td>per 1K</td>
<td>2013</td>
<td>13.0</td>
<td>12.1</td>
<td>8.8</td>
</tr>
<tr>
<td>Neonatal mortality in facility rate</td>
<td>per 1K</td>
<td>2013</td>
<td>11.6</td>
<td>10.2</td>
<td>8.2</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

6.6.1 Stillbirth, neonatal and inpatient mortality rates to five years old

6.6.1.1 Stillbirth

As the stillbirth rate measures the proportion of stillborn infants within the total of infants born in health facilities, it is a good indicator of care during the third trimester and intrapartum period. Stillbirths should be counted only when the foetus is of 26 or more weeks’ gestational age and weighs 500g or more. Only stillbirths occurring in health facilities are reported for this indicator, with any stillbirths outside hospitals, such as in the community, not being taken into account.

On a year-to-year basis, the stillbirth rate remained relatively stable over the past four years (Figure 68). In 2013, the rate was 16.5% in Vhembe District (551 stillbirths). The rate was fairly similar across the sub-districts except for Mutale which has a much lower rate of 5.0%, possibly because more complicated pregnancies/deliveries are sent through to a hospital in another sub-district. The rate in Vhembe District was below both the provincial (21.1%) and national averages (21.5%), as well as below the national target of less than 19.7%.
Numbers of stillbirths in 2013 were highest in the Thulamela Sub-district at 308 (Table 31). This is because Vhembe’s only regional hospital, to which all complicated deliveries are referred, is located here. By contrast, stillbirths in Makhado were about a third lower than in Thulamela. Very low figures in Musina and Mutale of 30 and 5 respectively are due to the referral of complicated cases to other sub-districts.

Table 31: Absolute number of stillbirths across Vhembe sub-districts, 2013

<table>
<thead>
<tr>
<th>Sub-district</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makhado</td>
<td>208</td>
</tr>
<tr>
<td>Musina</td>
<td>30</td>
</tr>
<tr>
<td>Mutale</td>
<td>5</td>
</tr>
<tr>
<td>Thulamela</td>
<td>308</td>
</tr>
</tbody>
</table>

Factors that need attention to bring down the stillbirth rate further, according to DHB workshops, are largely related to health education, including issues such as patients not being alert to reduced foetal movement. Rather than seek medical help, patients often use traditional or over-the-counter medication and cultural practices such as massages. Low birth weight can be due to alcohol abuse by pregnant women. Attempts at late termination of pregnancy in illegal abortion clinics may cause problems, resulting in the patient being referred to hospital where the baby is stillborn. There is a high percentage of late bookings, with women typically not booking until their pregnancy is showing, or presenting as completely unbooked cases. This lack of antenatal care and a general delay in seeking medical help, especially where the patient has a pre-existing medical condition, worsens the situation.

6.5.1.2 Inpatient early neonatal death and mortality rates

The inpatient early neonatal death rate, measuring the number of inpatient deaths within the first seven completed days of life per 1 000 births, provides another indicator of the quality of antenatal, intrapartum and postnatal care. Inpatient early neonatal deaths also contribute to the under-five mortality rate. In Vhembe District, this fluctuated over the previous four years. In 2013, it was 7.9 per 1 000 live births but there was a high of 9.9 per 1 000 in 2010 (Table 32).

These district figures were below the national target of less than 10.9 per 1 000 and also below the provincial and national rates of 11.7 per 1 000 and 10.1 per 1 000 respectively.
Table 32: Trends in inpatient neonatal death and neonatal mortality in facility rates (per 1 000), Vhembe District, 2010-2013

<table>
<thead>
<tr>
<th>Indicator Name</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient early neonatal death rate</td>
<td>9.9</td>
<td>7.8</td>
<td>9.6</td>
<td>7.9</td>
</tr>
<tr>
<td>Inpatient neonatal death rate</td>
<td>10.5</td>
<td>8.5</td>
<td>10.0</td>
<td>8.8</td>
</tr>
<tr>
<td>Neonatal mortality in facility rate (annualised)</td>
<td>9.2</td>
<td>7.9</td>
<td>9.3</td>
<td>8.2</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

Only neonatal deaths when the foetus was of 26 or more weeks’ gestational age or weighed 500g or more are included in this indicator. Deaths reported here occurred predominantly in public health facilities. Deaths occurring at home are by definition not included.

The indicator remained quite similar across the sub-districts, ranging between 7.5 and 8.8 per 1 000 (Figure 69). The exception was Mutale, where no early neonatal deaths were recorded as the sub-district has no hospital.

Figure 69: Inpatient early neonatal death rate (per 1 000) across Vhembe sub-districts, 2010-2013

Source: Vhembe DHIS data file

Inpatient early neonatal death rates are influenced by a range of community and healthcare factors, according to DHB workshops.

Community factors include some babies who died after having survived intended illegal abortions. There is also a higher percentage of low birth-weight babies, particularly as patients present late to healthcare facilities so that high-risk cases are not identified in time. Though figures are not disaggregated for the under-18 age group of mothers, their babies are particularly often born prematurely and weighing less than 500g. In rural areas, women often deliver at home and do not take sick babies to hospital for some days. Cultural practices mean herbal enemas may be given to small babies. Health education is an important factor, particularly with grandmothers left to care for babies but without the medical knowledge to identify problems in time.

Within the healthcare system, issues to be addressed include the higher percentage of HIV-exposed babies where mothers had not been put on ART and babies may already be HIV positive. Hospitals may lack facilities to care for premature babies, including lack of basic equipment such as incubators. All too often, sick babies do not receive specialised care because they are admitted to district hospitals instead of the regional hospital.

6.6.1.3 Inpatient neonatal death and neonatal mortality in facility rates

The inpatient neonatal death rate measures the proportion of children who die before 28 days of age as a proportion of all live births at health facilities within a year. By comparison, the neonatal mortality rate in facility measures the number of inpatient neonatal deaths occurring within the first 28 days after birth per 1 000 live births in health facilities. This figure is reached by multiplying the estimated population under one year old by a factor of 1.03 to allow for mortality. The inpatient neonatal mortality
rate includes both early neonatal deaths, as discussed above, and late neonatal deaths (live born babies who died between 7 and 28 days of birth). It must be noted that late neonatal deaths tend to be underreported in the DHIS when compared to other studies.

Vhembe District inpatient neonatal death rate was 7.9 per 1,000 in 2013, having fluctuated over the previous years. In 2013, both the provincial and national rates were higher than the district rate at 13.0 and 12.1 per 1,000 respectively (Figure 70).

Across the sub-districts; the inpatient neonatal death rate was highest in Musina at 10.9 per 1,000 in 2013, followed by Thulamela at 9.4 per 1,000 and Makhado at 8.3 per 1,000. No data was recorded for Mutale Sub-district as it has no hospital. As with cases resulting in stillbirths, more complicated pregnancies and/or deliveries were referred to a hospital in a neighbouring sub-district.

Figure 70: Inpatient neonatal death rate (per 1,000) across Vhembe sub-districts, 2010-2013

![Inpatient neonatal death rate graph](image)

Source: Vhembe DHIS data file

The inpatient neonatal death and neonatal mortality in facility rates followed similar trends for the past four years. In 2013 Vhembe District neonatal mortality in facility rate was 82 per 1,000 live births. This district rate was lower than the provincial (11.6 per 1,000) and the national (10.2 per 1,000) rates in 2013.

It is a matter of concern that in 2013, both the inpatient neonatal death and neonatal mortality in facility rates in Musina and Thulamela Sub-districts were markedly higher than the averages for Vhembe District.

### 6.6.1.4 Inpatient deaths and mortality under one year old

The inpatient death under 1 year rate measures the proportion of inpatients under one year old who died during their stay in health facilities and is reached by dividing the total number of inpatient deaths under one year by the total number of separations (the sum of inpatient deaths, inpatient discharges and inpatient transfers out) for inpatients under one year old. This rate was 9.6% in 2013 in Vhembe District and has been slightly increasing over time although a decrease was seen in 2013 (Figure 71). The rate in the sub-districts was similar except for Musina, where it was much higher (14.5%). While the district rate was markedly lower than the provincial rate of 12.5%, it was 43% higher than the national rate of 6.7%.
By comparison to the inpatient death under 1 year rate, the child under 1 year mortality in facility rate measures the admitted children under one year of age who died per estimated 1 000 live births. (Live births within a population are estimated by multiplying estimated population under one year by a factor of 1.03 to compensate for infant mortality.) Mortality for children under one year old in Vhembe District in 2013 was 12.7 per 1 000 live births (Figure 72). This rate has increased noticeably since 2010.

Within the sub-districts, the rate was highest for Musina at 16.9 per 1 000 live births, followed by Thulamela (15.9) and Makhado (10.6).

Source: Vhembe DHIS data file

6.6.1.5 Inpatient deaths under five years

The inpatient death under 5 years rate measures the proportion of inpatients under five years old who died during their stay in healthcare facilities. It is calculated by dividing the total number of deaths of inpatients under five years old by the total number of separations of inpatients under five years old. The rate for Vhembe District has been fairly stable over time in Vhembe District. In 2013, it was 6.1% (Figure 73).

Once again the rate of 11.4% in the Musina Sub-district was much higher than in the other Vhembe sub-districts, which may be due to the high level of informal dwellings (25.2%).
The numerator data for this indicator seems very unreliable for many facilities, as shown in Table 33. It is often lower than the numerator for the under one year indicator. As data elements for children under five years are defined to include both children aged between one and five years with children under one year, it appears the numerator has been distorted by the under one year category often not being included.

### Table 33: Examples of discrepancies where <1 deaths should equal or be less than <5 deaths, Vhembe District, 2010-2013

<table>
<thead>
<tr>
<th>Sub-district</th>
<th>Facility</th>
<th>Data Element Name</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thulamela</td>
<td>Tshilidzini Hospital</td>
<td>Inpatient death under 1 year total</td>
<td>33</td>
<td>41</td>
<td>91</td>
<td>87</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inpatient death under 5 years total</td>
<td>51</td>
<td>60</td>
<td>69</td>
<td>121</td>
</tr>
<tr>
<td>William Eddie</td>
<td>CHC</td>
<td>Inpatient death under 1 year total</td>
<td>4</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inpatient death under 5 years total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

6.6.2 Immunisation coverage under 1 year

Immunisation coverage under one year measures the proportion of children under one year old who have completed their primary course of immunisation. A child is regarded as being fully immunised when there is both documented proof on the Road To Health Card/Booklet of all required vaccines (BCG, OPV1, DTaP-IPV/Hib 1, 2, 3, HepB 1, 2, 3, PCV 1,2,3, RV 1,2 and Measles 1) and the child is under one year old. Death can result when children who are not fully immunised are also exposed to childhood illnesses, for example during a measles outbreak, children may also suffer from diarrhoea and pneumonia.

In Vhembe District, immunisation coverage under one year was 81.8% in 2013, higher than the provincial average of 70.3%, just below the national coverage of 84.4% and below the required target of 90% (Figure 74). There were large variations in this indicator among the sub-districts, however, pointing to inconsistencies in immunisation coverage.

For all the years surveyed, the highest immunisation coverage was in Mutale, ranging between a low of 90.4% in 2011 and a peak of 104.6% in 2013. Across the Vhembe sub-districts, Mutale also had the highest PHC utilisation rate for children under five years old, indicating that child-health services are a priority.

Makhado and Thulamela Sub-districts had coverage just below the district level, at 80.5% and 82.8% respectively. Coverage was always lowest in Musina, which showed considerably lower levels than the other sub-districts and where the peak of 60.6% was reached in 2011 and the low of 56.8% in 2013. Remediing the low rate of immunisation in Musina would give marked assistance to Vhembe District reaching the immunisation target.
Low immunisation coverage may be a result of poor quality of child-health services. Between 2011 and 2013, the PHC utilisation rate for children under five years old in Musina was the lowest of the four Vhembe sub-districts, while the rate of mortality in facility for children under one year old was the highest among the sub-districts. Child-health services should therefore be prioritised in the Musina Sub-district.

Figure 74: Immunisation coverage under 1 year across Vhembe sub-districts, 2010-2013

6.6.3 Children under five years: Diarrhoea with dehydration

Section 5 indicates that the leading causes of death in Vhembe District for children aged under five years are diarrhoea, protein energy malnutrition and lower respiratory tract infections. The success of efforts to prevent childhood diseases is monitored by measuring their incidence. Meanwhile, the case-fatality rate for these diseases indicates the extent to which children developing these diseases are correctly identified and treated. Decline in the case-fatality rates reflects better outcomes for children suffering from these diseases. This may reflect better case management of children with diarrhoea, and/or earlier presentation to health facilities.

The child under 5 years diarrhoea with dehydration incidence measures the number of new episodes of diarrhoea with dehydration in children under five years old per 1 000 children aged under five years in the population. For Vhembe District in 2013, this rate was 14.0 per 1 000 in 2013 (Figure 75). It has been fairly stable in recent years and the peak in 2011 might be due to poor data quality.

Trends in the different sub-districts differ. In 2013, the incidence was highest in Thulamela (16.7), followed by Musina (13.5) and Makhado (12.1). The lowest rate was recorded in Mutale (7.0).

Figure 75: Diarrhoea with dehydration incidence under 5 years (per 1 000) across Vhembe sub-districts, 2010-2013

Source: Vhembe DHIS data file
The range of 2013 rates across the sub-districts could be related to the rotavirus 2nd dose coverage. This was relatively low in Thulamela (85.5% in 2013) and highest in Mutale (115.8% in 2013).

The diarrhoea incidence in Vhembe District was similar to the national average of 14.1 per 1 000 and the provincial average of 14.2 per 1 000, but higher than the target of 10.1 per 1 000. Poor water quality might be the reason. As noted earlier, Vhembe District has not reached the water-quality target, with a 2012 blue drop score for the district of 74.85%. This means the ability of the responsible authority to manage drinking-water quality according to risk-management principles endorsed by the World Health Organization is average with ample room for improvement.

Data on the incidence of diarrhoea as reported through the DHIS should also be interpreted with care, as poor access or utilisation of primary healthcare facilities, poor recognition of children with dehydration by health workers, or weaknesses in the recording and reporting system may underestimate the incidence. At times, it is also possible that the incidence is overcounted. At DHB workshops, problems with overcounting were pointed out, with hospitals counting cases referred by PHC facilities, where the case has already been recorded as a new case.

### 6.6.4 Children under five years: Diarrhoea case fatality rate

The child under 5 years with diarrhoea case fatality rate, measures the proportion of children under five years admitted with diarrhoea who died of this illness. The rate has been decreasing in Vhembe District over recent years, more than halving from 8.9% in 2010 to 4.3% in 2013 (Figure 76).

The rate was highest in Musina at 5.2%. The 4.3% rate in the district was below the average for Limpopo (5.2%) as well as the national average (3.9%) but just above the target of less than 3.8%. The Mutale Sub-district had no data for diarrhoea deaths among children under five years old because it has no hospital. This may mask an underlying serious problem here since speed is often essential in treating such cases to prevent fatalities.

**Figure 76:** Child under 5 years diarrhoea case fatality rate (%) across Vhembe sub-districts, 2010-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Makhado SD</th>
<th>Musina SD</th>
<th>Mutale SD</th>
<th>Thulamela SD</th>
<th>Vhembe</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>13.5</td>
<td>14.6</td>
<td>0.0</td>
<td>4.9</td>
<td>8.9</td>
</tr>
<tr>
<td>2011</td>
<td>12.3</td>
<td>7.1</td>
<td>0.0</td>
<td>5.4</td>
<td>7.7</td>
</tr>
<tr>
<td>2012</td>
<td>8.1</td>
<td>4.7</td>
<td>0.0</td>
<td>5.9</td>
<td>6.1</td>
</tr>
<tr>
<td>2013</td>
<td>3.7</td>
<td>5.2</td>
<td>0.0</td>
<td>4.3</td>
<td>4.3</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

### 6.6.5 Children under five years old: Pneumonia incidence

The World Health Organization defines pneumonia in children as a child presenting with a cough, fever and fast breathing. In Vhembe District, the child under 5 years pneumonia incidence, which measures the number of new cases in that age group per 1 000 children under five years old in the population, decreased markedly from 66.0 per 1 000 in 2011 to 52.3 in 2012, stabilising around that level in 2013 with an incidence of 51.8 per 1 000 (Figure 77). The 2013 incidence in Vhembe District was just below the national average (53.2 per 1 000) and also below the national target of less than 56.3 per 1 000. However, it was higher than the Limpopo Province average of 34.2 per 1 000.

The discrepancy between Vhembe District incidence and the provincial figure can be traced to the particularly high incidence in Mutale (68.3 per 1 000) and Thulamela (64.1 per 1 000) compared to the much lower incidence of 38.7 per 1 000 in Makhado and 15.6 per 1 000 in the Musina Sub-district. Overall, the decline could be attributed to reduced HIV-infection prevalence in young children, thanks
to the success of the PMTCT programme, reinforced by the introduction of pneumococcal vaccine to
the routine immunisation schedule from 2009.

Across the district, the pneumococcal vaccine third dose coverage increased from 65.4% in 2010 to
98.4% in 2013. However, coverage in the Musina Sub-district was the lowest in Vhembe District, varying
from 61.0% to 72.8% against a district average of 81.9% in the same period. The low incidence in
Musina of pneumonia in children aged under five years might, therefore, be an underestimation due to
undercounting of new pneumonia cases.

Figure 77: Pneumonia incidence under 5 years (per 1 000) across Vhembe sub-districts, 2010-2013

![Pneumonia incidence under 5 years (per 1 000) across Vhembe sub-districts, 2010-2013](image)

Source: Vhembe DHIS data file

HIV infections predispose a higher proportion of children under five years old to pneumonia, which
can be compounded by doctors not following IMCI guidelines, as was suggested at DHB workshops.
Input from the workshops also pointed to issues of poor data collection generally, as well as staff not
following the data element definition with the result that cases have been double counted, particularly
in hospitals.

There appears to be an overcount of new cases in the data, similar to diarrhoea data for this age
group. Once again, the DHB workshops confirmed that all pneumonia cases for this age group were
counted at hospitals, including those referred by PHC facilities, where the cases would already have
been counted.

6.6.6 Children under five: Pneumonia case fatality rate

The child under 5 years pneumonia case fatality rate measures the proportion of children aged under
five years old who died after being admitted with pneumonia. This decreased across Vhembe District
from 7.1% in 2010 to 3.1% in 2013 (Figure 78). In 2013, Vhembe District rate was lower than all the other
case-fatality measures. The Vhembe level for this indicator was also lower than the Limpopo Province
average of 4.7%, as well as being lower than both the South African average of 3.5% and the national
target of less than 3.4%.

This indicator was generally highest in the Makhado Sub-district, though it almost halved from 8.4% in
2010 to 4.4% in 2013. This is followed by the Thulamela Sub-district, which brought down its incidence
steeply from 6.5% to 2.7%. The rate in the Musina Sub-district jumped from 7.0% in 2010 to 9.1% in
2011 but then dropped sharply to 2.9% in 2012 and again to 1.2% in 2013. Since Mutale does not have
a hospital, it was not possible to measure this rate and no data is recorded in this sub-district for
pneumonia deaths in children under five years old measured in facility.
Late presentation for treatment of children who are already very sick is an important factor which could be tackled through health education for parents and other caretakers. However, DHB workshops also suggested aspects of data gathering should be improved as the data is not completely reliable. This was ascribed to poor data collection, hospitals not following the data definition and some hospitals not submitting data at all.

6.6.7 Incidence of children underweight for age and severe acute malnutrition

Malnutrition is known to contribute substantially to child mortality and morbidity, but despite this, population-based data on severe acute malnutrition are limited. Accordingly, DHIS data were used to monitor trends in child under 5 years severe acute malnutrition incidence, measuring children under five years old newly diagnosed with severe acute malnutrition per 1 000 children aged under five years in the population; and the child under 2 years underweight for age incidence, measuring the number of children under two years old newly diagnosed as underweight (defined as weighing between -2 and -3 Standard Deviations) per 1 000 children aged under two years in the population.

6.6.8 Children under two years: Underweight for age

In 2013 in Vhembe District, the child under 2 years underweight for age incidence was 71.4 per 1 000 in 2013, with no data available for earlier years (Figure 79). Much of this district figure is due to a substantially higher incidence in Thulamela sub-district (130.1), whereas the rate in Musina was 31.8 per 1 000, with Mukhado and Mutale being even lower at 18.0 per 1 000 and 15.4 per 1 000.

The national average in 2013 was 18.7 per 1 000 and the provincial average 30.8 per 1 000. The South African National Health and Nutrition Examination Survey (SANHANES-13) found that 91 per 1 000 children were underweight in Limpopo Province. However, drawing firm conclusions from these comparisons is not possible given that the Vhembe and provincial values are taken from different sources.
Figure 79: Child under 2 years underweight for age incidence (annualised) (per 1 000), Vhembe District, 2013

<table>
<thead>
<tr>
<th>Sub-district</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makhado SD</td>
<td>18.0</td>
</tr>
<tr>
<td>Musina SD</td>
<td>31.8</td>
</tr>
<tr>
<td>Mutale SD</td>
<td>15.4</td>
</tr>
<tr>
<td>Thulamela SD</td>
<td>130.1</td>
</tr>
<tr>
<td>Vhembe</td>
<td>71.4</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

There is a link between the incidence of children under two years old who are underweight for age and the incidence of children under five years old with severe malnutrition. Thulamela Sub-district, for example, shows the highest rates for both indicators, while Mutale shows the lowest rates for both.

6.6.9 Children under five years: Severe acute malnutrition

In 2013 in Vhembe District, the child under 5 years severe acute malnutrition incidence, which measures the proportion of children newly diagnosed with severe acute malnutrition per 1 000 children of that age group in the population, has been fairly stable over recent years. It was 4.6 per 1 000 in 2013 (Figure 80). The incidence in Vhembe District was just above the provincial rate of 4.2 per 1 000 and the national average of 4.5 per 1 000. As with diarrhoea and pneumonia data, however, it appears there may again be an overcount. Once more, this is due to a degree of double-counting, where both referring PHC facilities and hospitals count the same referred cases.

The district rate was generally reflected across its sub-districts, with Thulamela having an incidence of 4.9 per 1 000, Musina 4.8 per 1 000 and Makhado 4.7 per 1 000. The incidence in Mutale, however, was less than half of the rate in the district and in neighbouring sub-districts at 2.1 per 1 000.

Figure 80: Child under 5 years severe acute malnutrition incidence (per 1 000) across Vhembe sub-districts, 2010-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Makhado SD</th>
<th>Musina SD</th>
<th>Mutale SD</th>
<th>Thulamela SD</th>
<th>Vhembe</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>4.9</td>
<td>7.6</td>
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<td>2012</td>
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<td>5.2</td>
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<tr>
<td>2013</td>
<td>4.7</td>
<td>4.8</td>
<td>2.1</td>
<td>4.5</td>
<td>4.6</td>
</tr>
</tbody>
</table>

Source: Vhembe DHIS data file

Community factors contributing to severe acute malnutrition in Vhembe were pinpointed by DHB workshops. These include non-existent community IMCI; inaccessibility of health services; lack of food security; informal settlements in the rural part of the district; low education levels and poverty, reflected in the high unemployment rate (see also Section 3, Social determinants of health); poor use of family-planning services and misuse of child grants. Childcare factors included poor health education for mothers and grandmothers, who often head families; poor breastfeeding practices; and incorrect mixing of infant formula.
6.6.10 Children under five years: Severe acute malnutrition fatalities

The child under 5 years severe acute malnutrition case fatality rate measures the proportion of children under five years old who died after being admitted with severe acute malnutrition. In Vhembe District, this rate almost halved between 2010 and 2013, falling from 25.6% to 13.2%. The Vhembe rate was below the Limpopo provincial average of 15.3%, though above both the national average of 11.3% and the national target of less than 11.4%.

The rate was lowest in Thulamela across all years studied, just below the district rate and mirroring its fall. Rates were much more uneven in Makhado and Musina, however: While the rate for 2013 was 12.4% in Makhado, the sub-district experienced peaks in 2010 and 2012 of 23.7% and 29.1% respectively. Musina had highly variable rates, ranging from a peak of 46.0% in 2010 falling to lows of 13.2% in 2011 and 6.8% in 2012. However, in 2013 the Musina rate increased again to 23.3%.

Although in the Musina Sub-district, the incidence of severe acute malnutrition among children under five years old is in line with Vhembe District average, this high fatality rate for severe acute malnutrition indicates that children are not diagnosed with this condition in time, reaching hospitals at a very late stage and then dying. This underlines once again that child-health services in the Musina district need to be improved. Mutale does not have a hospital so could not provide data for severe acute malnutrition deaths among children under five years of age.

Figure 81: Child under 5 years severe acute malnutrition case fatality rate (%), Vhembe District, 2010-2013

DHB workshops highlighted issues of poor data quality and late presentation of cases where children are already very sick. However, it was noted that a straightforward counter to part of the impact of poverty levels would be remedying the situation where clinics do not put children on feeding schemes.

6.6.11 Summary

The indicators for fatality and mortality for children under five years old in Vhembe District were high, though consistent with a population experiencing and HIV/AIDS epidemic. However, it was encouraging to see that these had almost all been decreasing between 2010 and 2013. This in turn points to successes with the PMTCT programme.

Rates of stillbirths and inpatient early neonatal deaths were below the national targets at 16.5% and 7.9 per 1 000 respectively in 2013. The inpatient neonatal death rate of 7.9 per 1 000 in Vhembe District was almost half the Limpopo Province rate in 2013. However, this rate was noticeably higher in the Musina Sub-district and Thulamela in 2013 at 10.9 per 1 000 and 9.4 per 1 000 respectively. Of further concern was the inpatient death under one year rate of 9.6%. Though markedly lower than the provincial rate, this was nearly half as high as the national rate. By comparison, the district inpatient deaths under five years rate was 6.1% in 2013.

Immunisation coverage in Vhembe District was better than the provincial average but below the national target. This impacted in turn on rates of diarrhoea with dehydration at 14.0 per 1 000 in 2013. The fatality rate has decreased steadily across the district, however, to 4.3% in 2013. It is also noted that the district’s blue drop score shows that drinking-water quality needs improvement.
With pneumococcal vaccine third dose coverage increasing steeply between 2010 and 2013, the pneumonia incidence in children under five years old has been dropping in tandem to 51.8 per 1,000 in 2013. Pneumonia fatalities have more than halved in this age group to 3.1% in 2013.

The incidence for children under two years old who were underweight for age was below provincial levels at 71.4 per 1,000 in 2013. However, the rate was almost double in the Thulamela Sub-district. The incidence of children under five years old with severe acute malnutrition was 4.6 per 1,000 in 2013, with only the Mutale Sub-district having a markedly lower rate. This led to a district fatality rate of 13.2% in 2013, though the rate in the Musina Sub-district was almost double this.

The overall picture of child health in Vhembe District is not completely clear as several examples of data-quality issues were found and discussed. It was of particular concern that rates for most of these indicators were highest in the Musina Sub-district, which has 25.2% informal dwellings.

6.6.12 Recommendations

- Rates of stillbirth and inpatient early neonatal death suggest that care during the third trimester and intrapartum period is good in Vhembe District, though there is room for further improvement. This is supported by inconsistencies reported in Section 6.5 regarding ANC and delivery issues. There are particularly opportunities for health education, encouraging earlier use of ANC facilities and cutting delays in seeking medical help.
- This health education should be extended to grandmothers caring for small children, for instance, as they are not always well informed as to which health problems require prompt or emergency treatment.
- Cooperation with traditional health practitioners should be recruited in terms of reducing the herbal enemas given to small babies.
- Health education should include discussion of the importance of breastfeeding, guidance on breastfeeding and complementary feeding, including where necessary the risks of incorrect mixing of infant formula.
- Inconsistencies in immunisation coverage should be eliminated.
- Drinking-water quality should be improved across the district.
- Specific attention should be given to improving performance indicators linked to Millennium Development Goals 4 and 5 to reduce child mortality and to improve maternal health by using ward-based outreach teams to provide health education on breastfeeding and complementary feeding, as well as:
  - Assessing children for signs of malnutrition and referring them for care.
  - Strategies to improve data quality as a more accurate guide to health strategies should be developed.
6.7 Disease prevention: Non-communicable diseases

As mentioned in Section 5, Burden of Disease, non-communicable diseases are among the leading causes of premature mortality. Cerebrovascular diseases (5.2%) and diabetes mellitus (4.5%) are both prominent on the list of 10 single causes of premature mortality (YLLs).

6.7.1 Hypertension

Hypertension incidence is measured as newly diagnosed hypertension clients initiated on treatment per 1 000 members of the population aged 40 years and older within a year. This indicator has been falling over time in Vhembe District, from 26.9 per 1 000 in 2010 to 10.0 per 1 000 in 2013 (Figure 82).

District hypertension rates fell in two steps, from 26.9 per 1 000 to 19.1 per 1 000 and 17.8 per 1 000 in 2011 and 2012 respectively. A further marked fall in the district hypertension incidence occurred in 2013, with a drop to 10.0 per 1 000. This pattern was largely driven by a peak in Thulamela Sub-district of 39.1 per 1 000 in 2010. This rate fell steeply by more than half to 18.7 per 1 000 in 2011. Since then the Thulamela hypertension rate has declined to 14.7 per 1 000 in 2012 and a low for the period of 13.0 in 2013.

While Thulamela reduced its hypertension rates by two-thirds between 2010 and 2013, the remaining three Vhembe sub-districts reduced theirs by about half. Makhado and Musina Sub-districts showed fairly similar rates at the beginning and end of the period – 16.7 per 1 000 and 14.0 per 1 000 in 2010 and 7.5 per 1 000 and 8.4 per 1 000 in 2013. However, Makhado had a spike of 22.1 per 1 000 in 2011, followed by another rise to 24.2 per 1 000 in 2012. There was a slight rise to 15.2 per 1 000 in the Musina Sub-district in 2011 but otherwise the indicator consistently trended downwards. Mutale Sub-district had consistently the lowest levels of hypertension, falling from 12.8 per 1 000 in 2010 to 6.2 per 1 000 in 2013, though showing a spike to 15.2 per 1 000 in 2011.

Figure 82: Hypertension incidence across Vhembe sub-districts, 2010-2013

6.7.2 Diabetes incidence

In Vhembe District, the diabetes incidence, measuring newly diagnosed diabetes clients per 1 000 of the population, was 1.5 per 1 000 in 2013 within a year (Figure 83). No data was available on earlier years. The 2013 district rate was just below the Limpopo provincial incidence of 2.0 per 1 000 and the national average of 1.6 per 1 000.

Within Vhembe District, diabetes incidence was highest in the sub-districts of Makhado at 1.7 per 1 000 and in Thulamela at 1.6 per 1 000. However, it was apparently considerably lower in Musina (0.4 per 1 000) and Mutale (0.2 per 1 000).
Diabetes detection rates

Diabetes detection rates measure the newly diagnosed diabetes clients who have been initiated on treatment as a proportion of the population in two age groups, under and over 18 years of age. In Vhembe District in 2013, the detection rates were 0.5 per 1,000 for those under 18 years old; and 2.2 per 1,000 for those 18 years and older in 2013 (Figure 84). No data was available for earlier years.

The provincial average for diabetes new client 18 years and older detection rate was 3.0 per 1,000 and the national rate 2.2. The district rates were therefore noticeably lower than the provincial average for both the under 18 year group and the 18 years and older group, though similar to national rates. In the under-18 age group, the district diabetes detection rate of 0.5 per 1,000 was the same as the national rate and just slightly below the Limpopo Province average of 0.6 per 1,000.

Across the district’s municipalities, Makhado had the highest diabetes detection rate for those under 18 years old at 0.9 per 1,000, compared to 0.2 per 1,000 in Thulamela and 0.1 per 1,000 in Musina. In the 18 years and older group, however, Thulamela had the highest diabetes detection rate at 2.6 per 1,000, with the Makhado Sub-district very close at 2.3 per 1,000. The Musina and Mutale Sub-districts had much lower rates of 0.6 per 1,000 and 0.4 per 1,000 respectively.

The relatively low rates of hypertension and diabetes mellitus in Vhembe District are inconsistent with the fact that cerebrovascular diseases and diabetes are among the leading 10 single causes of premature mortality (YLLs) in Vhembe District in 2011, as well as being out of line with national and global trends. This suggests a need to prioritise case-finding and treatment of non-communicable diseases in the future.
### 6.7.4 Mental health case load

The mental health case load measures mental-health clients as a proportion of the total PHC headcount. Mental-health conditions relate to those with psychological, emotional and/or physical problems, requiring:

- Mental-health intervention, including counselling for rape or sexual assault cases, substance abuse cases, physical abuse cases and behavioural problems in children and adolescents;
- Psychotropic medication;
- Referral to a mental-health worker.

Examples of such conditions are: mood disorders; anxiety; post-traumatic stress disorders and severe psychiatric conditions such as schizophrenia, organic brain disease, dementia, psychosis, mental handicap, attention-deficit disorders and enuresis. Other such conditions include bereavement, psychomatic problems, relationship difficulties, stress and burn-out, and adjustment problems.

In Vhembe District, the mental-health case load increased between 2010 and 2013 from 1.2% to 1.9%, with the main growth occurring in 2011 as the case load increased from 1.2% to 1.8% (Figure 85). The 2013 rate was in line with the provincial average of 1.8% and slightly above the national rate of 1.6%. Taking into account the wide range of conditions that affect mental health, it appears there is an undercount of mental-health cases.

Across the Vhembe sub-districts, the case load also grew fairly consistently across the period, with each sub-district reflecting the 2011 district spike in case load. At 2.1% in 2013, the mental health case load was highest in the Thulamela Sub-district, where it had almost doubled from 1.1% in 2010, and also Makhado where it had increased more slowly from 1.6% to 2.1%, though there the sub-district had a slight spike of 2.2% in 2011. In the Mutale Sub-district, rates were considerably below the district rate, ranging from 0.8% in 2010 to 1.2% in 2013, with a minor spike of 1.3% in 2011. Rates in the Musina Sub-district were markedly lowest, ranging from just 0.3% in 2010 to 0.4% in 2013, though rates for 2011 and 2012 were slightly higher at 0.6% and 0.5% respectively.

**Figure 85:** Mental health case load (%) across Vhembe sub-districts, 2010-2013

The mental health case load 18 years and older measures the specific case load of mental-health clients aged over 18 years as a proportion of all mental-health clients. These figures have generally increased over the past four years, moving from 93.3% in 2010 to 98.7% in 2013 in Vhembe District (Figure 86). This was somewhat higher than the provincial average of 97.5% and the national rate of 96.5%.

Differences across Vhembe’s sub-districts were small. However, it is worth noting that the rate fell in the district and in all sub-districts except Musina in 2011, where it increased from 94.7% to 100.0%. Looked at from another point of view, mental-health case loads grew somewhat in the under-18 year age group during 2011, except in the Musina Sub-district, before dropping in 2012 and 2013.
6.7.5 Dental extraction to restoration ratios

The dental extraction to restoration ratio compares the number of teeth extracted to the number of teeth restored. In Vhembe District, this has been fluctuating since 2010 and was 16.4 in 2013, meaning that 16.4 teeth were extracted for every tooth restored. This is higher than the provincial ratio of 11.2 but lower than the national ratio of 19.1 in 2013 (Figure 87).

By comparison, the ratios in the sub-districts of Makhado and Thulamela were 17.9 and 12.6 respectively. No dental services were rendered in Musina and Mutale.

6.7.6 Summary

There is concern that hypertension rates have been falling sharply across Vhembe District, which is contrary to national and global trends. The district incidence was 10 per 1 000 in 2013. However, diabetes incidence of 1.5 per 1 000 was close to the provincial and national averages. The highest diabetes detection rates were in the Makhado Sub-district though, as with hypertension, case-finding seemed low across the district as a whole.

Mental-health case loads were dominated by clients aged 18 years and older at 98.7% in 2013. Case loads were especially low in the Musina Sub-district at 0.4% in 2013 against the district average of 1.9%.

Dental extraction to restoration ratios were lower than the national average at 16.4 in 2013. Part of the reason for this discrepancy is because dental services were not rendered in the Musina and Mutale Sub-districts.
6.7.7 Recommendations

- Strategies should be developed and implemented to improve case-finding and treatment rates for hypertension and diabetes.
- Attention should be given to finding mental-health cases among the total population, especially the population aged under 18. School health teams might particularly assist in this. Data-quality with regard to mental-health caseload should be addressed.42
- Strategies should be found to offer dental services in the Musina and Mutale Sub-districts as part of the population's right to a basic range of healthcare.
### 6.8 Disease Prevention and Control: Communicable diseases

#### 6.8.1 Malaria

Malaria is a notifiable disease and accordingly data was retrieved for analysis from Vhembe District and the national malaria surveillance programme. The only cases notified and entered into the system were those positively confirmed by either microscopy or rapid diagnostic tests.

As the World Health Organization has noted, 90% of all world malaria deaths occur in sub-Saharan Africa among children under five years old, making malaria control a national and regional health priority. Malaria transmission is seasonal, generally occurring from September to May, with the number of cases and deaths peaking in January and the lowest numbers of cases in June, July and August. As a result of this pattern, malaria cases and deaths are best presented using seasonal data, with the indicator **number of reported malaria cases** giving the number of confirmed malaria cases for the season from 1 July to 30 June the following year. Similarly, the indicator **number of deaths from malaria** measures deaths from the disease per malaria season.

In the 2013/14 malaria season in Vhembe District, there were 3,524 cases of malaria, with 44 resulting in death (Figures 88 and 90). This was much higher than the previous three seasons due to a malaria outbreak, which might have been due to the heavy rains, leading to a much higher number of cases than might have been expected based on previous years.

**Figure 88:** Malaria cases, Vhembe District, 2010-2013

![Malaria cases, Vhembe District, 2010-2013](image)

Source: Limpopo Province Malaria database

Malaria rates were much higher among males in every year surveyed at 55.7% of cases in Vhembe District in 2013 (Figure 89). The numbers of males infected with malaria were 51.4% higher than the numbers of females in 2012 and 25.6% higher in 2013.

**Figure 89:** Malaria cases: male, female and total cases, Vhembe District, 2010-2013

![Malaria cases: male, female and total cases, Vhembe District, 2010-2013](image)

Source: Limpopo Province Malaria database
As mentioned, the number of deaths due to malaria in Vhembe District was markedly higher in 2013, with a total of 44 (Figure 90).

Figure 90: Number of deaths due to malaria, Vhembe District, 2010-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Deaths</th>
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<tbody>
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<td>6</td>
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<td>2012</td>
<td>10</td>
</tr>
<tr>
<td>2013</td>
<td>44</td>
</tr>
</tbody>
</table>

Source: Limpopo Province Malaria database

However, the malaria case-fatality rate, measuring the proportion of deaths from all malaria cases, was only slightly higher (1.2%) in 2013 than previous seasons (Figure 91). Nevertheless, only in 2011 was the rate below the district target for 2014 of 0.6% and the national target of 0.5%.

Figure 91: Malaria case-fatality rate (%), Vhembe District, 2010-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
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<tr>
<td>2011</td>
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<tr>
<td>2013</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Source: Limpopo Province Malaria database

In general, Thulamela experiences the highest number of malaria cases, which more than doubled from 2010 and 2011 levels of 704 and 674 cases respectively to 1,815 in 2013 (Figure 92). However, Thulamela recorded very few cases comparatively in 2012, just 74. The pattern is more consistent in Mutale, which has the second highest number of malaria cases at 751. The Musina Sub-district’s level of cases was similar to Mutale, but with a noticeable low of 47 in 2012. Makhado had the lowest number of malaria cases, ranging between 176 in 2011 and a high of 349 in 2013. The sub-district breakdown of cases suggests rates fluctuate markedly both by season and also by area within each season.
Malaria cases were usually highest in Thulamela, except in 2012. In that year, cases dropped to 74 in Thulamela but peaked at 512 in Mutale, underlining the relation of the disease to local seasonal factors.

6.8.3 Recommendations

- Malaria control measures, such as spraying of dwellings and availability and use of bed nets, should be assessed and strategies developed for greater adherence where necessary.
- A contingency plan to counter malaria during seasons when rains are exceptionally heavy should be developed. This should include measures such as respraying houses after flooding in endemic malaria areas; alerting residents to increased malaria risk; and reminding them of signs and symptoms of the disease which require treatment.
- Malaria cases are generally much higher among males than females, suggesting that behavioural factors may be in conflict with malaria-control recommendations. Understanding these factors and implementing further health education may help reduce this malaria burden.
7. Data quality

Throughout this report, data quality has been mentioned as a major probable reason for higher or lower incidences or rates than expected. This was particularly critical when assessing the burden of disease in Vhembe District (Section 5).

7.1 Background

Ensuring good-quality data was the goal when the National Department of Health introduced a standard operating procedures (SOP) to be used at facility level. This is known as the District Health Management Information System (DHMIS) Standard Operating Procedures: Facility Level. The role of each clinician, including medical practitioners, is clearly defined in the SOP.

The qualitative element of this study included distributing and then analysing a questionnaire to determine the adherence of the medical practitioners to the SOP. Part of the qualitative work for the study was also to review death-notification forms for completeness and to determine whether medical practitioners experience problems with the completion of death-notification forms and the use of ICD-10 coding.

7.2 Adherence to SOP

Copies of the introductory letter to the facility to be surveyed and of the survey questionnaires are included as Addenda A, B and C.

The results of this survey from the one district hospital where 22 doctors participated were:

- More than half of the medical practitioners (54.5%) (n=12) indicated that they have no role in routine data collection. The rest (n=10) saw their role as just to write clinical notes in the patient folders.
- The majority of them (59.1%) (n=13) also indicated that they do not complete any routine data-collection tools. The rest (n=9) regarded the clinical notes, completion of death-notification forms and notification forms, such as to notify TB, as routine data-collection tools which they completed as part of their workload.
- 95.5% (n=21) of the participants indicated that they do not know the definitions of the National Indicator Data Set (NIDS) data elements.
- 68.2% (n=15) of the participants indicated that they have never received feedback regarding data- and information-management issues. The rest (n=7) regarded clinical audits as feedback.
- 45.5% (n=10) record individual patient data in the facility-retained clinical records and if relevant in the patient-retained records.
- 36.4% (n=8) use only standardised abbreviations in clinical patient records.
- 13.6% (n=3) record required data in line with the NIDS definitions in the standardised data-collection tools during or directly after each patient contact.
- 40.9% (n=9) indicate that the patient file number is written clearly on the standardised data-collection tools.
- 18.2% (n=4) calculate and sign daily sub-totals clearly on standardised data-collection tools.
- 9.1% (n=2) complete and sign the weekly summary-sheet forms.
- 4.5% (n=1) file and store weekly summary-sheet forms in a locked facility.

It is therefore clear that the medical practitioners have not been adhering to the SOP. The main reason for this is that they have not received any training on it. Since it is also clear that these medical practitioners do not understand their role in data- and information-management, training is needed on several aspects thereof.

7.3 Information-technology availability and quality

The medical practitioners surveyed were found to have limited access to information technology, including access to e-mail, intranet and internet, despite the fact that it is essential that all medical practitioners have access to information technology both to participate in the DMHIS and to remain up to date with developments in the medical field.
Among the participants, access to computers was revealed as follows:

- Only 40.9% (n=9) of the participants have access to a computer by using their own notebooks or laptops of which more than half use out-dated MS office programmes (2007 and XP versions).
- The remaining 51.9% (n=13) have no access to a computer at all.

Among participants with computer access, use of anti-virus software was as follows:

- Only 11.1% (n=1) update the anti-virus software every day.
- 44.4% (n=4) update this once a week.
- 22.2% (n=2) never update the anti-virus software.
- 22.2% (n=2) do not have any anti-virus software installed.

None has access to IT support.

### 7.4 Completeness of death-notification forms

The main reason given by medical practitioners surveyed for not completing death-notification forms was that details were incorrect in in-patient files and the diagnosis was incorrect.

The medical practitioners surveyed varied in their involvement with death-notification forms:

- 9% (n=2) indicated that they experience challenges regarding the completion of the death-notification forms.
- 82% (n=18) do not experience problems.
- 9% (n=2) have never completed a form.

The participating medical practitioners were asked if there are instances where they have not recorded the correct cause of death on the death notification form. Responses were as follows:

- 45.5% (n=10) indicated No
- 45.5% (n=10) indicated Yes
- 9% (n=2) indicated that they have not completed a death notification form yet.

Some reasons for not recording the correct causes of death on the death-notification form were:

- Unsure of cause of death.
- Insufficient information in file (especially for patients who die 24 hours after admission.
- Definite cause of death is difficult to determine before post-mortem.
- Diagnosis is not clear / insufficient time to reach diagnosis.
- Attending doctor did not make the correct diagnosis.

The results of this part of the survey show that the completion of death-notification forms by medical practitioners is definitely problematic and contributes to the high percentage of ill-defined death and so-called “garbage coding”.

In Section 5, Burden of Disease, it was emphasised that medical practitioners are one link in the chain of constructing accurate cause-of-death data. It was also noted that data for deaths certified by headmen also needed improving and recommendations for this were included. Further adaptations to the new death-notification form were also discussed to enable local mortality statistics to be available for public-health analysis and to contribute to policy development.

### 7.5 Use of ICD-10 coding and other guidelines

Almost all the medical practitioners surveyed (95%; n=21) indicated that they did not use ICD-10 coding because this was not available for use in the hospitals. This was confirmed by two clinical managers in charge of medical practitioners. A hospital information officer also noted that ICD-10 coding for billing purposes was done by clerks and that accounts submitted to medical-aid schemes are often rejected due to incorrect ICD-10 codes.

The patient-folder review to determine whether ICD-10 coding was used by medical practitioners showed that this coding was not done by the medical practitioners. They did not even complete the TPH 3(a) form correctly. In most cases, the final diagnosis was not filled in and fieldworkers had to check through doctors’ notes to determine the final diagnosis.
When asked whether they use the Integrated Management for Childhood Illness (IMCI) guidelines in diagnosing conditions and causes of death in children, responses were:

- 68% (n=18) indicated that they use IMCI guidelines.
- 23% (n=5) do not use these guidelines.
- 9% (n=2) indicated that they use them sometimes.

7.6 Summary

A selected qualitative survey of 22 medical practitioners at Elim District Hospital revealed that they generally do not adhere to the data-quality requirements of the SOP, mainly because they have not been trained on it and so do not understand their role in the chain of data- and information-management. Lack of access to information technology compounds this.

It also emerged that they experience particular challenges regarding completion of death-notification forms, including the lack of availability of ICD-10 coding. Almost half of the medical practitioners surveyed reported that they are aware of not always recording the correct cause of death on death-notification forms. In turn, this presents further challenges for calculating the burden of disease, as outlined in Section 5.

Similarly, most do not use IMCI guidelines when diagnosing conditions and causes of death in children.

7.7 Recommendations

- For health-monitoring and policy-development purposes, data quality from the DHIS needs to be improved.
- Within this initiative, improving death notification needs specific attention to assist assessment of the burden of disease. Recommendations in this particular regard were included in Section 5.
- ICD-10 coding should be made available to medical practitioners for use in their data inputs.
- Medical practitioners should receive training in order to be able to adhere to the SOP, including the correct completion of death-notification forms and use of IMCI guidelines.
- Medical practitioners should all have access to information technology in order to perform data-related tasks satisfactorily.
8. Main findings and interpretation

This core of this study developed into a death and disease profile review of Vhembe District instead of a true burden-of-disease assessment, where both mortality (Years of Life lost, YLLs) and disability (Years Lived with a Disability, YLD) are measured. This shift in emphasis was due to two key limitations: YLDs are not currently assessed as part of the burden-of-disease work conducted by the Medical Research Council of South Africa’s Burden of Disease Unit; and data and information on Environmental Health Services and Forensic Pathology services data was not available. It was, however, possible to give an overview of factors such as causes of mortality, the incidence/prevalence of most major diseases in Vhembe District and the burden on health facilities.

8.1 Demographic, socio-economic and service delivery environment

Vhembe, a National Health Insurance pilot district, is the nineteenth largest district of the 52 districts in South Africa, with an estimated population in 2011 of 1 294 723. Its predominantly rural nature and ranking is among the poorest (Quintile 2) districts in South Africa are borne out by a range of social and economic indicators. The high levels of poverty and unemployment, coupled with the mostly scattered population and rural nature of the district, present significant challenges for individual health maintenance and access to health services when necessary.

Thulamela is the largest local municipality (sub-district), followed by Makhado, Mutale and Musina. Agriculture and mining are the primary economic activities, with a significant proportion of the population involved in agricultural activities. Only 7.2% of the population has medical-insurance coverage, meaning that the vast majority of the population relies on the public sector for healthcare.

Vhembe’s population mainly consists of economically active people (15 to 64 years), with more than half of the population (55.1%) aged 24 years or younger. In terms of gender the population is relatively evenly spread, though from the age of 50 years upwards there is a markedly larger number of females than males. These observations will have an impact on case-finding and treatment of non-communicable diseases and on PHC utilisation in general.

The links between unemployment and literacy rates and health are well-known. In Vhembe District, both the overall (38.7%) and especially youth unemployment rates (50.6%) are very high, the latter being twice as much as the national figure. The district features among the 200 most deprived schools and has the highest learning-deprivation index. It also has the lowest adult literacy rate in the country.

A large proportion of schoolgoers drop out of school, particularly due to poor performance, but also because of disability and illness, the latter of which should be noted. Another major factor is family commitments, especially among girl learners, causing about one in eight dropouts. This requires further investigation as to whether dropouts are due to parents dying because of HIV and AIDS, resulting in child-headed households, or directly due to poverty rates.

Many girls stay in school, but overall in Vhembe District 6 out of 10 do not attend school at all. Education of females is important to ensure that well-informed childcare practices are adopted. The positive link between the two is well documented.

About one in six households have flush toilets connected to sewerage and 43.5% have piped water into the house, generally well below national averages. Water and sanitation are important for ensuring diarrhoea prevention. The Musina Sub-district has the best municipal-delivery figures but also has a higher percentage of informal dwellings (25.2%) compared to the other districts.

A number of social and economic factors are said to influence health, commonly referred to as the social determinants of health. These are often non-health issues related to other sectors, though directly or indirectly influencing health outcomes. Addressing these requires upstream (policy or legislative) and downstream (community, biological) solutions. Levels of employment, educational status and environmental health and infrastructural conditions (sanitation, waste removal, types of housing) are key examples. In South Africa, environmental health services (non-health functions) are functions overseen by local municipalities and not the district health systems.

Mutale is the only sub-district that does not have a district hospital. Musina has no community health centres and only four clinics and one mobile health service. The latter is important to note given the high proportion of the Musina Sub-district’s population living in informal settlements. Musina does, however, have the smallest population compared to the other districts. In general, clinics and community health centres appear unevenly distributed across Vhembe’s sub-districts.
Vhembe District has a higher average PHC utilisation rate than both the Limpopo Province and national averages, but with lower clinical workloads for PHC professional nurses and doctors. The exception, however, is the Musina Sub-district’s low utilisation rates and high clinical workloads. This could be due to the presence of only four clinics and the sub-district’s inability to see all the patients, hence many are turned away. More enquiry is needed here.

8.2 Burden of diseases

The age distribution of deaths in Vhembe is typical of a population experiencing an HIV/AIDS epidemic with high numbers of deaths in children under five years and a peak in adults between 30 and 45 years of age.

The main causes of death in Vhembe District in 2009 were: non-communicable diseases (41.3%); communicable diseases (excluding HIV and TB), maternal, perinatal or nutrition causes (38.3%); HIV and TB (18.0%); and injury-related causes (7.2%). The analysis of premature deaths for 2011 showed that the highest proportions of Years of Life Lost (YLLs) were due to communicable diseases (excluding HIV and TB), maternal, perinatal or nutrition causes (34.8%), non-communicable diseases (32.4%), HIV and TB (22.9%) and injuries (9.9%).

The leading 10 single causes of YLLs in Vhembe District in 2011 were:

1. Tuberculosis (13.6%)
2. Diarrhoeal diseases (12.0%)
3. Lower respiratory infections (11.2%)
4. HIV/AIDS (9.3%)
5. Cerebrovascular diseases (5.2%)
6. Diabetes mellitus (4.5%)
7. Road injuries (3.5%)
8. Accidental threats to breathing (3.1%)
9. Septicaemia (2.3%)
10. Nephritis/nephrosis (2.3%)

Given that some of the mortality directly attributed to tuberculosis, diarrhoea and lower respiratory infections is probably related to HIV, these findings suggest that HIV-related mortality is by far the leading cause of YLLs.

The leading causes of death for children under five years old in Vhembe are: diarrhoea; protein energy malnutrition (PEM); and lower respiratory infections. Preterm conditions feature among the causes, but seem to be declining. Birth asphyxia and congenital conditions remain contributors to children under one year old.

Over the period from 2008 to 2013, leading causes of death among children aged from 5 to 14 years were: injuries; major infectious diseases, AIDS, TB, diarrhoea and pneumonia; and ‘other’ conditions which comprise mostly of infectious causes (meningitis, septicaemia, malaria), epilepsy, other neurological causes and renal disease.

Major infectious diseases and injuries were the leading causes of death among the age group of 15 to 24 years over this period, with diarrhoea as a leading cause, especially among women.

Cardiovascular diseases and major infectious diseases were leading causes of death among the 25 to 64-year age group, as well as among the 65+ age group.

It should also be noted that diabetes is not declining among the 65+ year age group. Cancers, which are related to chronic diseases of lifestyle, increased slightly over the past year in this age group.

It must be noted that across all age groups, diarrhoea remains a major cause of death, even in the older age groups. Early diagnosis and better management is required across all age groups, including an emphasis on early HIV diagnosis and initiation of ART in accordance with the guidelines as HIV and AIDS are strongly associated with this condition. Furthermore, close collaboration with local municipalities providing municipal-health services and other sectors is required especially with regards to waste removal, access to water and water quality. Community education and promotion of community IMCI, as well as service readiness during diarrheal seasons will do much to address the problem. Finally, better enquiry regarding causes and age groups affected will assist with prevention activities.
A heightened approach to prevention of cervical cancer is also required by the health department, given that 73 women died of cervical cancer in this period.

Analysis of the Vhembe death-notification data showed that the percentage of ill-defined deaths was 32.9%, the fourth-highest rate across South Africa’s 52 health districts. So-called “garbage codes” accounted for 10.9% of deaths. International recommendations state that ill-defined and garbage codes should account for less than 10% of all deaths, suggesting that the data for Vhembe District is of poor quality.

### 8.3 HIV and TB

The low male condom distribution coverage of 30.4 condoms per male aged 15 and older is an area of concern as male condom distribution coverage is normally used as a proxy for protection against HIV infection and reinfection that would increase viral load. It therefore seems highly likely that this prevention activity is not having the desired effect.

The HIV prevalence for the district is 5.6% (2013), with Musina showing the highest prevalence (10.9%).

The falling trend in Vhembe’s first antenatal-care visit coverage, from 88.4% to 76.1% between 2010 and 2013, creates concern as registration for ANC services is the initial step in the service cascade aimed at preventing mother-to-child transmission of HIV (PMTCT). It is a critical step for pregnant women to access HIV testing and subsequent services.

Almost one out of every four HIV positive antenatal clients in Vhembe District was not put on ART for PMTCT in 2013. Although the infant first PCR test positive at around six weeks of age of 2.6% almost reached the national target of less than 2.5% in 2013, more effort is needed to achieve the National Development Plan objective of ensuring “a generation of under-20s that is largely free of HIV by 2030”.

Numbers of patients remaining on ART have steadily increased over time, in fact tripling over the past three years. The number of children remaining on ART has doubled.

The incidence of all types of TB at 270.8 per 100 000 in Vhembe District in 2013 was the lowest in South Africa. While successful pulmonary TB treatment influences overall TB incidence, the current TB treatment outcomes should improve to keep the incidence low.

Most TB clients knew their HIV status in 2013. Although the number put on ART has increased, it was only about two thirds in 2013.

As demonstrated in this report, the major challenge for ensuring accurate assessments of HIV- and AIDS-related indicators is the quality of the data. Some of the major challenges also relate to there being no recorded data in some health facilities (as assessed on analysis of the data), and that hospitals are not recording some of the data that is essential for monitoring the TB and HIV programmes.

### 8.4 Maternal and child health

Most key child-health mortality rate indicators in Vhembe District showed an increase from 2010 to 2013. If the district performance is measured against the Millennium Development Goals, there is a risk of not reaching the Millennium Development Goals to reduce child mortality.

Child-health indicators in the Musina Sub-district are an area of concern. Across the Vhembe sub-districts between 2011 and 2013, the PHC utilisation rate for children under five years old of 4.4 in the Musina Sub-district had improved between 2010 and 2013, but remained the lowest in Vhembe District. Musina also demonstrated the lowest immunisation coverage compared to the other sub-districts. This sub-district’s rate of in-facility mortality for children under one year old was 16.9% in 2013, the highest among the Vhembe sub-districts in the same period. In Musina, both the inpatient neonatal death and neonatal mortality in facility rates were also higher than the district averages in 2013. Among children under five years old in Musina, the rate of inpatient death, the fatality rate for diarrhoea cases and the fatality rate for severe acute malnutrition were all also higher than the district averages in 2013. There is an urgent need to prioritise child-health services in Musina, working on both the causes as well as service and community responses.

The district stillbirth rate was 16.5% in 2013, lower than both the provincial and national averages. Over the previous three years, there was also a decrease in the maternal mortality in facility prevent mother-to-child transmission to 122 per 100,000, though this ratio is still much higher than the Millennium Development Goals indicator target for 2015 to improve maternal health. The district Caesarean section rate was 14.8% in 2013.

The impact of the absence of a district hospital in Mutale is most noticeable when analysing the MNCWH data, particularly with regards to the assessment of mortality and Caesarean section rates.
As for all the other programmes, data quality remains a substantial challenge when reporting.

8.5 Non-communicable diseases

The relatively low incidences and detection rates of hypertension (10.0 per 1,000) and diabetes mellitus (1.5 per 1,000 and 2.2 per 1,000 over the age of 18 years) in Vhembe District are not in line with the fact that cerebrovascular diseases and diabetes mellitus were identified among the leading 10 single causes of YLLs in 2011. As is the trend internationally, mental health is also a growing factor at 1.9% in 2013 in Vhembe District, despite data-quality challenges. The dental extraction and restoration ratio of 16.4 was affected by no service being rendered in the Musina and Mutale Sub-districts.

Given the non-alignment of the reported data and the leading causes of death, there may be a need to reprioritise case-finding and the treatment of non-communicable diseases in the future.

8.6 Disease prevention and control

Malaria is endemic in Vhembe District and during the 2013/14 malaria season, 3,524 cases were detected, with 44 deaths recorded. It is important to note that compared to the previous three seasons, the number of cases was much higher, particularly than that recorded in 2012, for example. This suggests a malaria outbreak attributed to heavy rains.

The case-fatality rate was 1.2%, only slightly higher than those reported for previous seasons but below the district target of 0.6%. This suggests a need to further improve early case-identification and management.

No other disease prevention and control information was made available for this study.

8.7 Data quality

Data quality was identified throughout the report as the probable reason for higher or lower incidences or rates than expected.

The qualitative study revealed that medical practitioners surveyed at Elim District Hospital showed poor adherence to the information management SOP and have limited access to the use of information technology. Problems are experienced with the recording of the correct cause of death on the death-notification form and with the completion of the death-notification forms in general. However, it is not possible to make any significant findings and conclusions from the questionnaire results in general.

Review of death-notification forms carried out at Elim, Donald Fraser and Tshilidzini Hospitals showed that the completion of death-notification forms by medical practitioners is definitely problematic. Patient-folder review was also carried out at the same institutions to determine whether ICD-10 coding was used by medical practitioners, which showed that the coding was not done by the medical practitioners. The TPH 3(a) form was not completed correctly either. In most cases, the final diagnosis was not filled in. This resulted in incorrect ICD-10 coding for billing purposes done by clerks and that accounts submitted to medical-aid schemes were often rejected due to incorrect ICD-10 codes.

8.8 Limitations

There were a number of important limitations to this body of work. These include:

- Completion of the questionnaires to inform the mixed-methods study was hampered by non-participation of two hospitals, thus limiting the ultimate sample size. This was despite numerous efforts on the part of the study team to collect the outstanding data.
- Due to resource and time constraints, deaths occurring outside health facilities could not be measured.
- The team was also unable to obtain Environmental Health Services and Forensic Pathology data.
9. Recommendations

Generally, recommendations have been listed at the end of each section of this study and are also reflected in the discussion included in the previous section, Main Findings and Interpretation. For ease of reference, key recommendations are compiled below.

9.1 Demographic, socio-economic and service-delivery environment

- Improve on liaison with other departments and structures which are key to service provision, possibly using a model such as KwaZulu-Natal’s Operation Sukuma Sakhe, to include:
  - Supporting business initiatives to improve unemployment rates;
  - Supporting roll-out of improved levels of municipal services that will in turn improve health and wellbeing for the district population;
  - Helping tackle levels of non-attendance and dropouts from school, particularly investigating where this may be due to illness among learners or family commitments;
  - Looking for strategies to help support girl learners in receiving an education, thereby improving their future understanding of health and, where appropriate, childcare issues.

- Make health services more accessible to the community by improving distribution of health facilities:
  - Expand the quantity and level of facilities in the Mutale and Musina Sub-districts to cope with demand and help consolidate health-seeking behaviour.
  - Revisit the aims of the District Health Plan to provide a district hospital in Mutale or strengthen the respective community health centres to provide a higher level of care within this sub-district. The population is widespread over a considerable area, making accessing hospital services in a neighbouring sub-district more challenging. Lack of a district hospital also impacts on facility utilisation in other sub-districts.
  - Expand the number of clinics in the Musina Sub-district or at least expand the mobile-clinic service to give immediate assistance in the sub-district, particularly given the high proportion (25.2%) of informal dwellings.

- Give further, immediate attention needs to staffing levels at facilities to ease patient workloads and free up time to give more attention to the detail of recording health data, thus improving data quality.

- Involve traditional health practitioners in the strategic planning of health issues in the spirit of the South African government’s recognition of the Traditional Health Practitioners Act (2007). Consider implementing strategies such as traditional-medicine managers, already working with traditional health practitioners on community HIV alleviation projects in KwaZulu-Natal, the Free State and North West should be considered.

- Increase or expand facilities in the Musina and Thulamela Sub-districts as a pragmatic solution to cope with reported burdens of patients from outside South Africa.

9.2 Burden of disease

Vhembe District quality of cause-of-death data needs improving to guide public-health policy and implementation, as well as specifically assessing the district burden of disease in the future. The following steps are recommended:

- Prioritise improving the quality of Vhembe District cause-of-death data to improve direction given to public-health policy development and implementation.

- Train medical practitioners in medical certification of cause of death, using trainers from institutions such as Statistics SA or the Medical Research Council. Attending such training should be a requirement for all doctors working in the public sector.

- Pursue discussion with the Department of Home Affairs to include on the death-notification form a field for manner of death to improve the quality of injury-mortality statistics. Consider models of collecting such data routinely in each facility, with systems such as the Western Cape Forensic Pathology Services case-management information system providing a possible starting point.

- Improve the quality of data for deaths certified by headmen, possibly by using ward-based community health workers to conduct verbal autopsies, which would also require instigating a process to alert community health workers to a death in the community.
- Or use InterVA computer software to select a probable underlying cause for each case.
- Develop a mechanism for routine access to district cause-of-death information, possibly modelled on the Western Cape mortality surveillance system.
- Support initiatives to encourage NDoH to engage DHA and Statistics SA to obtain access to identifiable cause-of-death data by amending the death-notification form, given the national importance of quality cause-of-death data for public health purposes – currently only Statistics SA officials have access to the Medical Certificate of Cause of Death section.
- Or request anonymised sub-district data from Statistics SA, though this excludes a mechanism for Health to monitor and improve the quality of death certification.
- Make budget available within a local mortality-surveillance system for resources such as data capturers and IT, as well as expertise in ICD-10 mortality coding, data management, data analysis and reporting of cause-of-death data. Source technical expertise, such as public-health specialist inputs, from local higher educational institutions for assistance with interpretation and detailed analysis of this data.

9.3 Epidemiology

9.3.1 HIV/TB control
- Review HIV testing practices, particularly in the Makhado and Thulamela Sub-districts, to improve uptake.
- Review male condom distribution strategies to increase coverage and particularly investigates reports of stockouts.
- Assess staffing and service-delivery issues for successful implementation of the new eligibility for ART up to a CD4 threshold of 500.

9.3.2 Antenatal HIV care and treatment
- Check the quality of data on ANC first visits to ensure statistics are not distorted.
- Emphasise the importance of clinics recording this service to ensure optimum use of resources.
- Make efforts to ensure clinic procedures are more efficient and patient-friendly.
- Improve the quality of HIV counselling to reduce the number of clients refusing to be tested.
- Close the gap in PMTCT of HIV by increasing ART uptake among eligible clients.
- Pursue community HIV education campaigns to address stigma issues.
- Focus greater attention on recording test results, in particular in maternity booklets and Road To Health cards.

9.3.3 TB
- Create strategies to engage successfully with the major priorities of South Africa’s National TB Control Programme: effective case finding and successful treatment.
- Tackle the BoD in Vhembe District by focusing on implementing the 2013 guidelines that all TB patients are tested for HIV and initiated on ART if positive; and that all HIV-positive patients are frequently screened for TB.
- Institute a follow-up system for TB patients.
- Strengthen the DOTS system in the district, recruiting DOTS supporters and improving clinic support.
- Provide vehicles to trace TB treatment defaulters.
- Pursue health-education initiatives with the community, patients on treatment and employers to improve treatment adherence and prevent further spread of TB. This should include help for patients with alcohol problems.
- Set up a partnership with traditional health practitioners along similar lines to those which tackle HIV/AIDS.
9.3.4 Maternal, child and women’s health & nutrition

- Tackle the rate of deliveries to women under 18 years of age, the increasing rate of termination of pregnancy and the particularly low CYPR rate by improving access to contraception. This could include family-planning services in schools. Community health education efforts should also be extended to reach the high rate of school dropouts in the district.
- Support staff in overburdened facilities, such as in the Thulamela Sub-district, to offer the appropriate quality of service at deliveries.
- Strengthen facilities in Mutale to offer service during complicated deliveries, C-sections and probably prevent maternal and infant deaths, preferably by providing a hospital service.
- Make available more obstetrics-skilled staff so that difficult deliveries are monitored and handled before they become emergencies.
- Use community health education to:
  - Encourage all pregnant women to attend antenatal care from an early stage in pregnancy;
  - Emphasise the vital role of antenatal care in preparing the patient and medical staff for any predictable delivery complications;
  - Stress the advantages of the maternal record card;
  - Underline the dangers of chronic conditions or overuse of alcohol;
  - Address the possible side-effects of using traditional medicines.

9.3.5 Child health & nutrition

- Eliminate inconsistencies in immunisation coverage, particularly rotavirus and pneumococcal vaccines.
- Include discussion of the importance of breastfeeding, guidance on breastfeeding and, where necessary, on the risks of incorrect mixing of infant formula in health education.
- Review feeding programmes to target protein energy malnutrition (PEM).
- Extend health education to grandmothers caring for small children so they are better informed as to which health problems require prompt or emergency treatment.
- Cooperate with traditional health practitioners to reduce the number of herbal enemas being given to small babies.
- Investigate problematic child-health indicators in the Musina Sub-district and prioritise strategies to improve the situation.
- Improve data recording generally in this category as a more accurate guide to developing health strategies.
- Give specific attention to improving performance indicators linked to Millennium Development Goals 4 and 5 to reduce child mortality and to improve maternal health by using ward-based outreach teams to
  - Provide health education on breastfeeding and complementary feeding;
  - Assess children for signs of malnutrition and refer them for treatment.

9.3.6 Non-communicable diseases

- Develop and implement strategies to improve early case-finding and treatment rates for hypertension, cardiovascular diseases and diabetes mellitus.
- Emphasise promotion of healthy lifestyles.
- Give increased attention to finding mental-health cases among the total population, especially the population aged under 18, using school health teams where appropriate.
- Investigate and address data-quality issues regarding mental-health case load.
- Devise strategies to offer dental services in the Musina and Mutale Sub-districts as part of the population’s right to a basic range of healthcare.
9.3.7 Communicable diseases

- Assess malaria control measures, such as availability and use of bed nets, and develop strategies for greater adherence where necessary.
- Develop a contingency plan to counter malaria during seasons when rains are exceptionally heavy, such as:
  - Respraying houses in endemic malaria areas after flooding;
  - Alerting residents to increased malaria risk and reminding them of signs and symptoms of the disease which require treatment.
- Investigate which behavioural factors cause malaria cases to be generally much higher among males than females and implement further health education to reduce this malaria burden.

9.3.8 Data quality

In addition to the points raised under Burden of disease (9.2), data quality from the DHIS needs to be improved for health implementation and policy development:

- Make available ICD-10 coding to medical practitioners for use in their data inputs.
- Ensure all medical practitioners have access to information technology to perform data-related tasks satisfactorily.
- Encourage medical practitioners to record their findings correctly in patient folders, enabling other staff to be able to retrieve the correct final diagnosis for death-notification forms or TPH 3(a) forms.
- Ensure data are collected for all NIDS data elements including for environmental health services.
- Train all staff, including medical practitioners, on data and information management and ensure monthly feedback as outlined in the SOP.
- Implement district-wide monitoring and evaluation of data at all levels.
## 10. Indicator definitions

<table>
<thead>
<tr>
<th>Indicator Name</th>
<th>Numerator</th>
<th>Denominator</th>
<th>Definition</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult remaining on ART at end of the month – total</td>
<td>Adults remaining on ART – total</td>
<td>-</td>
<td>Adults remaining on ART total</td>
<td>Number</td>
</tr>
<tr>
<td>Antenatal 1st caseload coverage (annualised)</td>
<td>Antenatal 1st visits – total</td>
<td>Population estimated pregnant women (at ~10 weeks)</td>
<td>The proportion of potential antenatal clients coming for at least one (booking) antenatal caseload. The census number of children under one year factorised by 1.15 was used as a proxy denominator – the extra 0.15 (15%) was a rough estimate to cater for late miscarriages (~10 to 26 w), still births (after 26 weeks gestation) and infant mortality. Pregnant women were regarded as potential antenatal clients from around 10 weeks gestation, i.e. spontaneous abortions before that as well as TOP cases were excluded.</td>
<td>%</td>
</tr>
<tr>
<td>Antenatal 1st visit before 20 weeks rate</td>
<td>Antenatal 1st visit before 20 weeks</td>
<td>Antenatal 1st visit total</td>
<td>Women who have a booking visit (first visit) before they are 20 weeks into their pregnancy as proportion of all antenatal 1st visits</td>
<td>%</td>
</tr>
<tr>
<td>Antenatal client HIV 1st test positive rate</td>
<td>Antenatal client HIV 1st test positive</td>
<td>Antenatal client HIV 1st test</td>
<td>Antenatal clients tested HIV positive as proportion of antenatal clients HIV tested for the first time during current pregnancy</td>
<td>%</td>
</tr>
<tr>
<td>Antenatal client HIV retest positive rate</td>
<td>Antenatal client HIV retest positive</td>
<td>Antenatal client HIV retest</td>
<td>Antenatal clients retested positive for HIV as proportion of antenatal clients retested for HIV</td>
<td>%</td>
</tr>
<tr>
<td>Antenatal client HIV retest negative rate</td>
<td>Antenatal client HIV retest negative</td>
<td>Antenatal client HIV 1st test negative</td>
<td>Antenatal clients retested for HIV as proportion of antenatal clients tested negative for 1st HIV tests done during current pregnancy</td>
<td>%</td>
</tr>
<tr>
<td>Antenatal client initiated on ART rate</td>
<td>Antenatal client initiated on ART</td>
<td>Antenatal client eligible for ART</td>
<td>Antenatal clients on ART as a proportion of the total number of antenatal clients who were HIV positive and not previously on ART</td>
<td>%</td>
</tr>
<tr>
<td>Child under 1 year mortality in facility rate (annualised)</td>
<td>Inpatient death under 1 year</td>
<td>Population estimated live births</td>
<td>Admitted children under 1 year of age who died per estimated 1,000 live births. Estimated live births in population was calculated by multiplying estimated population under 1 year by 1.03 to compensate for infant mortality</td>
<td>Per 1 000</td>
</tr>
<tr>
<td>Child under 2 years underweight for age incidence (annualised)</td>
<td>Child under 2 years underweight – new (weight between -2 SD and -3 SD new)</td>
<td>Population under 2 years</td>
<td>Children under 2 years newly diagnosed as underweight (weight between -2 and -3 Standard Deviations) per 1,000 children under 2 years in the population</td>
<td>Per 1 000</td>
</tr>
<tr>
<td>Child under 5 years diarrhoea case fatality rate</td>
<td>Child under 5 years with diarrhoea death</td>
<td>Child under 5 years with diarrhoea admitted</td>
<td>Proportion of children under 5 years admitted with diarrhoea who died</td>
<td>%</td>
</tr>
<tr>
<td>Child under 5 years diarrhoea with dehydration incidence (annualised)</td>
<td>Child under 5 years diarrhoea with dehydration new</td>
<td>Population under 5 years</td>
<td>Children under 5 years newly diagnosed with diarrhoea with dehydration per 1,000 children under 5 years in the population</td>
<td>Per 1 000</td>
</tr>
<tr>
<td>Child under 5 years pneumonia case fatality rate</td>
<td>Child under 5 years pneumonia death</td>
<td>Child under 5 years pneumonia admitted</td>
<td>Proportion of children under 5 years admitted with pneumonia who died</td>
<td>%</td>
</tr>
<tr>
<td>Child under 5 years pneumonia incidence (annualised)</td>
<td>Child under 5 years with pneumonia new</td>
<td>Population under 5 years</td>
<td>Children under 5 years newly diagnosed with pneumonia per 1,000 children under 5 years in the population</td>
<td>Per 1 000</td>
</tr>
<tr>
<td>Child under 5 years severe acute malnutrition case fatality rate</td>
<td>Child under 5 years severe acute malnutrition death</td>
<td>Child under 5 years severe acute malnutrition admitted</td>
<td>Proportion of children under 5 years admitted with severe acute malnutrition who died</td>
<td>%</td>
</tr>
<tr>
<td>Indicator Name</td>
<td>Numerator</td>
<td>Denominator</td>
<td>Definition</td>
<td>Type</td>
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</tr>
<tr>
<td>Child under 5 years severe acute malnutrition incidence (annualised)</td>
<td>Child under 5 years with severe acute malnutrition new</td>
<td>Population under 5 years</td>
<td>Children under 5 years newly diagnosed with severe acute malnutrition per 1,000 children under 5 years in the population</td>
<td>Per 1 000</td>
</tr>
<tr>
<td>Children under 15 years remaining on ART at end of the month – total</td>
<td>Children remaining on ART – total</td>
<td></td>
<td>Children remaining on ART total</td>
<td>Number</td>
</tr>
<tr>
<td>Couple year protection rate</td>
<td>Women protected against pregnancy by using modern contraceptive methods, including sterilisations, as proportion of female population 15-49 years. Contraceptive years were the total of (Oral pill cycles / 13) + (Medroxyprogesterone injection / 4) + (Norethisterone enanthate injection / 6) + (IUCD x 4) + ) Male condoms distributed / 200) + (Male sterilisation x 20) + (Female sterilisation x 10)</td>
<td>Contraceptive years dispensed (including sterilisations)</td>
<td>Female target population 15-49 years</td>
<td>%</td>
</tr>
<tr>
<td>Deaths from malaria</td>
<td>Deaths from malaria</td>
<td>-</td>
<td>Number of deaths from malaria</td>
<td>Nr</td>
</tr>
<tr>
<td>Delivery by Caesarean section rate</td>
<td>Delivery by Caesarean section</td>
<td>Delivery in facility total</td>
<td>Delivery by Caesarean section as proportion of total deliveries in health facilities</td>
<td>%</td>
</tr>
<tr>
<td>Delivery in facility rate (annualised)</td>
<td>Delivery in facility total</td>
<td>Population estimated deliveries</td>
<td>Deliveries in health facilities as proportion of expected deliveries in the population. Expected deliveries were estimated as population under 1 year multiplied by 1.07 to compensate for still births and infant mortality</td>
<td>%</td>
</tr>
<tr>
<td>Delivery in facility under 18 years rate</td>
<td>Delivery in facility to woman under 18 years</td>
<td>Delivery in facility total</td>
<td>Deliveries to women under the age of 18 years as proportion of total deliveries in health facilities</td>
<td>%</td>
</tr>
<tr>
<td>Dental extraction to restoration ratio</td>
<td>Tooth extraction</td>
<td>Tooth restoration</td>
<td>The ratio between the number of teeth extracted and the number of teeth restored 10:1</td>
<td>Number</td>
</tr>
<tr>
<td>Diabetes incidence (annualised)</td>
<td>Diabetes client treatment new</td>
<td>Population total</td>
<td>Newly diagnosed diabetes clients initiated on treatment per 1,000 population</td>
<td>Per 1 000</td>
</tr>
<tr>
<td>Diabetes new client 18 years and older detection rate</td>
<td>Diabetes client 18 years and older new</td>
<td>Population 18 years and older</td>
<td>Newly diagnosed diabetes clients (put on treatment) 18 years and older as a proportion of the population 18 years and older</td>
<td>%</td>
</tr>
<tr>
<td>Early infant diagnosis coverage (NHLS)</td>
<td>Number of PCR tests done in infants under 2 months</td>
<td>Estimated number of infants born to HIV-positive women</td>
<td>Proportion of infants born to HIV-positive mothers who receive a PCR test before 2 months of age</td>
<td>%</td>
</tr>
<tr>
<td>HIV prevalence among antenatal clients tested (survey)</td>
<td>-</td>
<td>-</td>
<td>Proportion of antenatal clients surveyed who test positive for HIV</td>
<td>%</td>
</tr>
<tr>
<td>HIV prevalence among client tested 15-49 years rate</td>
<td>HIV test positive client 15-49 years</td>
<td>HIV test client 15-49 years</td>
<td>Proportion of clients on whom an HIV test was done who tested positive for the first time</td>
<td>%</td>
</tr>
<tr>
<td>HIV testing coverage</td>
<td>HIV test client 15-49 years</td>
<td>Population 15-49 years</td>
<td>Clients HIV tested as proportion of population 15-49 years</td>
<td>%</td>
</tr>
<tr>
<td>Indicator Name</td>
<td>Numerator</td>
<td>Denominator</td>
<td>Definition</td>
<td>Type</td>
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</tr>
<tr>
<td>Hypertension incidence (annualised)</td>
<td>Hypertension client treatment new</td>
<td>Population 40 years and older</td>
<td>Newly diagnosed hypertension clients initiated on treatment per 1,000 population 40 years and older</td>
<td>Per 1 000</td>
</tr>
<tr>
<td>Immunisation coverage under 1 year</td>
<td>Immunised fully under 1 year new</td>
<td>Population under 1 year</td>
<td>Proportion children under 1 year who completed their primary course of immunisation. A child is regarded as fully immunised when there is documented proof of all required vaccines (BCG, OPV1, DTaP-IPV/Hib 1, 2, 3, HepB 1, 2, 3, PCV 1,2,3, RV 1,2 and measles 1) on the Road to Health Card/Booklet AND the child is under 1 year old.</td>
<td>%</td>
</tr>
<tr>
<td>Infant 1st PCR test around 6 weeks uptake rate</td>
<td>Infant 1st PCR test around 6 weeks</td>
<td>Live birth to HIV positive woman</td>
<td>Infants PCR tested for the first time around 6 weeks after birth as proportion of live births to HIV positive women</td>
<td>%</td>
</tr>
<tr>
<td>Infant 1st PCR test positive around 6 weeks rate</td>
<td>Infant 1st PCR test positive around 6 weeks</td>
<td>Infant 1st PCR test around 6 weeks</td>
<td>Infants tested PCR positive for the first time around 6 weeks after birth as proportion of infants PCR tested around 6 weeks</td>
<td>%</td>
</tr>
<tr>
<td>Inpatient death under 1 year rate</td>
<td>Inpatient death under 1 year</td>
<td>Inpatient separations under 1 year</td>
<td>Proportion of children under 1 year admitted/separated who died during their stay in the facility. Inpatient separations under 1 year was the total of inpatient discharges, inpatient deaths and inpatient transfer outs</td>
<td>%</td>
</tr>
<tr>
<td>Inpatient death under 5 year rate</td>
<td>Inpatient death under 5 years</td>
<td>Inpatient separations under 5 years</td>
<td>Proportion of children under 5 years admitted/separated who died during their stay in the facility. Inpatient separations under 5 years was the total of inpatient discharges, inpatient deaths and inpatient transfer outs</td>
<td>%</td>
</tr>
<tr>
<td>Inpatient early neonatal death rate</td>
<td>Inpatient death early neonatal</td>
<td>Live birth in facility</td>
<td>Early neonatal deaths as proportion of Infants who were born alive in health facilities</td>
<td>Per 1 000</td>
</tr>
<tr>
<td>Inpatient neonatal death rate</td>
<td>Inpatient death neonatal</td>
<td>Live birth in facility</td>
<td>Proportion of children 28 days admitted/ separated who died during their stay in the facility as a proportion of Live birth in facility</td>
<td>Per 1 000</td>
</tr>
<tr>
<td>Malaria case-fatality rate</td>
<td>Deaths due to malaria</td>
<td>All malaria cases reported</td>
<td>Proportion of deaths from all malaria cases reported</td>
<td>%</td>
</tr>
<tr>
<td>Malaria cases</td>
<td>Malaria cases</td>
<td>-</td>
<td>Number of reported malaria cases</td>
<td>Nr</td>
</tr>
<tr>
<td>Male condom distribution coverage</td>
<td>Male condoms distributed</td>
<td>Population 15 years and older male</td>
<td>Number of male condoms distributed to clients via the facility or via factories, offices, restaurants, NGOs or other outlets – per male 15 years and older</td>
<td>Number</td>
</tr>
<tr>
<td>Maternal mortality in facility ratio (annualised)</td>
<td>Maternal death in facility</td>
<td>Live birth in facility</td>
<td>Women who died in hospital as a result of childbearing, during pregnancy or within 42 days of delivery or termination of pregnancy, per 100,000 live births in facility</td>
<td>Per 1 000 000</td>
</tr>
<tr>
<td>Mental health case load</td>
<td>Mental health clients total</td>
<td>PHC headcount total</td>
<td>Mental health care clients as proportion of total PHC headcount</td>
<td>%</td>
</tr>
<tr>
<td>Mental health caseload 18 years and older rate</td>
<td>Mental health client 18 years and older</td>
<td>Mental health clients total</td>
<td>Mental health care client 18 years and older as proportion of total mental health care clients</td>
<td>%</td>
</tr>
<tr>
<td>Indicator Name</td>
<td>Numerator</td>
<td>Denominator</td>
<td>Definition</td>
<td>Type</td>
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</tr>
<tr>
<td>Neonatal mortality in facility rate (annualised)</td>
<td>Inpatient death early neonatal</td>
<td>Population estimated live births</td>
<td>Inpatient deaths within the first 28 days of life per 1,000 estimated live births. Estimated live births in population was calculated by multiplying estimated population under 1 year by 1.03 to compensate for infant mortality</td>
<td>Per 1 000</td>
</tr>
<tr>
<td>OPD new client not referred rate</td>
<td>OPD headcount not referred new</td>
<td>OPD new clients – total</td>
<td>Proportion of new OPD clients without a referral letter</td>
<td>%</td>
</tr>
<tr>
<td>Percentage of YLLs due to communicable, maternal, perinatal, nutrition causes</td>
<td>Number of YLLs due to communicable, maternal, perinatal, nutrition causes</td>
<td>Total number of YLLs</td>
<td>Percentage of YLLs due to communicable, maternal, perinatal, nutrition causes</td>
<td>%</td>
</tr>
<tr>
<td>Percentage of deaths due to communicable, maternal, perinatal, nutrition causes</td>
<td>Number of deaths due to Communicable diseases / Maternal conditions</td>
<td>Total number of deaths</td>
<td>Percentage of deaths due to communicable, maternal, perinatal or nutritional conditions</td>
<td>%</td>
</tr>
<tr>
<td>Percentage of deaths due to HIV or TB</td>
<td>Number of deaths due to HIV or TB</td>
<td>Total number of deaths</td>
<td>Percentage of deaths due to HIV or TB</td>
<td>%</td>
</tr>
<tr>
<td>Percentage of deaths due to injuries</td>
<td>Number of deaths due to injuries</td>
<td>Total number of deaths</td>
<td>Percentage of deaths due to injuries</td>
<td>%</td>
</tr>
<tr>
<td>Percentage of deaths due to non-communicable diseases</td>
<td>Number of deaths due to NCDs</td>
<td>Total number of deaths</td>
<td>Percentage of deaths due to non-communicable diseases</td>
<td>%</td>
</tr>
<tr>
<td>Percentage of YLLs due to non-communicable diseases</td>
<td>Number of YLLs due to non-communicable diseases</td>
<td>Total number of YLLs</td>
<td>Percentage of YLLs due to non-communicable diseases</td>
<td>%</td>
</tr>
<tr>
<td>Percentage of deaths due to communicable, maternal, perinatal, nutrition causes</td>
<td>Number of deaths due to communicable, maternal, perinatal, nutrition causes</td>
<td>Total number of YLLs</td>
<td>Percentage of deaths due to communicable, maternal, perinatal, nutrition causes</td>
<td>%</td>
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<td>Total number of deaths</td>
<td>Percentage of deaths due to communicable, maternal, perinatal, nutrition causes</td>
<td>%</td>
</tr>
<tr>
<td>PHC utilisation rate (annualised)</td>
<td>PHC headcount total</td>
<td>Population total</td>
<td>Average number of PHC visits per person per year in the population</td>
<td>Number</td>
</tr>
<tr>
<td>PHC utilisation rate under 5 years (annualised)</td>
<td>PHC headcount under 5 years</td>
<td>Population under 5 years</td>
<td>Average number of PHC visits per year per person under 5 years of age in the population</td>
<td>Number</td>
</tr>
<tr>
<td>PHC doctor clinical work load</td>
<td>PHC clients seen by doctor</td>
<td>PHC doctor clinical work days</td>
<td>Average number of clients seen per doctor per clinical work day. This includes doctors employed in the public and private sector</td>
<td>Number</td>
</tr>
<tr>
<td>PHC professional nurse clinical work load</td>
<td>Average number of clients seen by professional nurse</td>
<td>PHC clients seen by professional nurse</td>
<td>PHC professional nurse clinical work days</td>
<td>Number</td>
</tr>
<tr>
<td>Smear conversion rate at 2 months (new pulmonary smear-positive)</td>
<td>Number new smear positive cases that converted at 2 months</td>
<td>All smear positive cases due for testing. Proportion of new smear positive cases that converted at 2 months of all smear positive cases due for testing</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Still birth in facility rate</td>
<td>Still birth in facility</td>
<td>Total births in facility</td>
<td>Infants born still as proportion of total infants born in health facilities</td>
<td>Per 1 000</td>
</tr>
<tr>
<td>TB clients known HIV status</td>
<td>TB clients with known HIV status</td>
<td>TB cases</td>
<td>Percentage of TB cases with known HIV status</td>
<td>%</td>
</tr>
<tr>
<td>TB cure rate (new pulmonary smear positive)</td>
<td>Number of initially smear-positive PTB patients who converted to negative smears at two or three months after starting treatment</td>
<td>Total number of new PTB smear-positive cases started on treatment during the specified time. Proportion of new smear-positive PTB patients who completed treatment and were proven to be cured (which means that they had two negative smears on separate occasions at least 30 days apart)</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>TB default rate (new pulmonary smear positive)</td>
<td>Proportion of new smear-positive PTB patients who default on treatment</td>
<td>Number of initially smear-positive PTB patients who default on treatment</td>
<td>Total number of new PTB smear-positive cases started on treatment during the specified time.</td>
<td>%</td>
</tr>
<tr>
<td>Indicator Name</td>
<td>Numerator</td>
<td>Denominator</td>
<td>Definition</td>
<td>Type</td>
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<td>--------------------</td>
</tr>
<tr>
<td>TB/HIV co-infected client on ART (ETR.net)</td>
<td>HIV-positive TB cases who were on ART</td>
<td>HIV-positive TB cases</td>
<td>HIV-positive TB cases who were on ART</td>
<td>%</td>
</tr>
<tr>
<td>TB incidence (all types)</td>
<td>Number of diagnosed TB patients (all TB) starting treatment in the period</td>
<td>Total population</td>
<td>TB cases diagnosed (all TB) per 100 000 people in the catchment population</td>
<td>Per 100 000</td>
</tr>
<tr>
<td>TB incidence (new pulmonary smear positive)</td>
<td>Number of diagnosed TB patients (new pulmonary sm+) starting treatment in</td>
<td>Total population</td>
<td>New TB cases diagnosed (pulmonary smear positive) per 100 000 people in the</td>
<td>Per 100 000</td>
</tr>
<tr>
<td></td>
<td>the period</td>
<td></td>
<td>catchment population</td>
<td></td>
</tr>
<tr>
<td>TB (pulmonary) case finding index</td>
<td>TB suspect 5 years and older sputum sent</td>
<td>PHC headcount 5 years and</td>
<td>Proportion of clients 5 years and older, who were identified as TB suspects and for whom sputum was sent to the laboratory</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>older</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TB rifampicin resistance confirmed client rate</td>
<td>Number of Rifampicin resistant clients</td>
<td>Number of GeneXpert tests</td>
<td>Proportion of Rifampicin resistant clients</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>done</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TB successful treatment rate (all TB)</td>
<td>TB client cured OR completed treatment</td>
<td>TB (new pulmonary) client</td>
<td>Proportion TB clients (ALL types of TB) cured plus those who completed treatment</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>initiated on treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Termination of pregnancy rate (annualised)</td>
<td>Termination of pregnancy performed</td>
<td>Population estimated</td>
<td>Pregnancies terminated in health facilities as proportion of all expected pregnancies in population. Expected pregnancies in population was calculated by multiplying estimated population under 1 year by 1.15 to compensate for still births and infant mortality</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>pregnant women (at ~10 weeks)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendices

Appendix A: Quantitative data collection

Both primary and secondary data were collected and analysed. Secondary data was selected to supply the broader context, both provincially and nationally. It was selected to supply socio-economic and sociodemographic data, HIV and TB data, maternal, neonatal, child and women’s health data, disease prevention and control of communicable and non-communicable disease data.

Primary data was collected via patient folders and death notification form reviews at the abovementioned hospitals, checked for data quality and analysed as required.

As part of the data overview, it was important to determine which health-indicator data was available at district level; to assess the reliability and quality of the data; and to ensure the most current data was presented. As a result of this process, it was agreed that the following list of indicators would be included in the project:

**HIV diagnoses and prevalence:**
- Male condom distribution
- Number tested for HIV
- HIV prevalence among pregnant women
- HIV test positive client 15-49 years
- TB/HIV co-infected client on ART (ETR.Net)/TB/HIV co-infected client initiated on ART rate
- Percentage of TB cases with known HIV status (ETR.Net)
- Total number of adults and children on ART

**HIV prevention:**
- Antenatal client initiated on ART rate
- Early infant HIV diagnoses coverage/Infant 1st PCR test around 6 weeks
- Mother-to-child transmission rate of HIV <2 months of age/ Infant 1st PCR test positive around 6 weeks

**Tuberculosis monitoring:**
- Incidence (diagnosed cases) of TB by age group and gender
- % of TB patients co-infected with HIV
- Number of laboratory-diagnosed cases of MDR-TB
- TB rifampicin resistance confirmed client rate

**Women’s health:**
- Termination of pregnancy rate (under 18 years and 18 years and older if available)
- Couple year protection rate

**Maternal health:**
- Antenatal visits before 20 weeks rate
- Delivery rate in facility
- Delivery in facility under 18 years
- Caesarean section rate
- Maternal mortality ratio in facility/Maternal mortality ratio (NCCEMD)

**Neonatal and child health:**
- Stillbirth rate
- Early neonatal mortality rate (<7 days)
- Late neonatal mortality rate (8-28 days)
- Infant and under-5 mortality rates
- Facility mortality rate for children <1 and children <5
- Diarrhoea with dehydration incidence under 5 years
- Pneumonia incidence under 5 years
- Severe malnutrition under 5 years
- Child under 5 years with diarrhoea death rate
- Child under 5 years pneumonia death rate
- Child under 5 years severe acute malnutrition death rate
- 10 major leading causes for death for children 0-12 years

**Non-communicable diseases:**
- Hypertension incidence
- Diabetes incidence
- Diabetes new client under 18 years detection rate (annualised)
- Diabetes new client 18 years and older detection rate (annualised)
- Dental extraction to restoration ratio
- Mental-health case load

**Notifiable conditions:**
- Number of reported malaria cases and deaths
Appendix B: Qualitative data collection

A key factor in the assessment of data quality was completion of a questionnaire on data issues by medical practitioners. The following health institutions were approached: Tshilidzini Regional Hospital; Elim District Hospital; Donald Fraser District Hospital. Medical practitioners at the Elim District Hospital agreed to complete the survey questionnaire.

This questionnaire (Addendum A) focused on:
- Reasons for incorrect cause of death
- Reasons for incorrect completion of the death notification form
- Use of ICD-10 coding
Addendum A: Rapid assessment questionnaire for medical practitioners

Rapid Assessment for the Estimated Burden of Disease for Vhembe Health District

Good morning and welcome. We invite you to participate in the rapid assessment for the estimated Burden of Disease study for Vhembe Health District by completing the questionnaire to explore your role in mortality and morbidity data collection. Please feel free to share your point. There are no right or wrong answers to the questions. It will take approximately 30 min of your time.

The purpose of the questionnaire is to obtain information from you regarding data on underlying causes of death and morbidity data, the use of ICD-10 coding and your role in routine data collection. The data on the morbidity and mortality due to the most important diseases and risk factors will provide the health care system with information on priority areas to be addressed.

The data on underlying causes of death and morbidity data (incidence/prevalence) are needed for research and policy formulation, implementation, monitoring and evaluation of health interventions aimed at increasing life expectancy and improving the health status of the population. Furthermore, evaluation of prevention and treatment approaches will give direction to the comprehensive primary health strategy that is needed in order to deal with the transitional changes in health that is occurring in the country. However, for Vhembe District, Limpopo Province, no overview document is available, clearly summarizing available data on mortality, morbidity and risk factors.

The completion of the questionnaire is voluntarily and anonymously. Your name will not be mentioned in any report or other publication.

I would like to thank you for taking the time to participate in the study by completion of the questionnaire.
Addendum B: Questionnaire to medical practitioners

Questions

A. Major causes of death
1. According to your view, what are the 10 major leading causes for death in general?
2. According to your view, what are the 5 major leading un-natural causes for death in general?
3. According to your view, what are the 10 major leading causes for death for children 0-12 years?

B. Patient diagnosis
4. Do you experience any challenges regarding the recording of clinical notes in patient folders?
5. Do you use ICD-10 coding?
6. Do you experience any challenges regarding the use of ICD-10 coding?
7. Do you use the IMCI guidelines in diagnosing conditions in children?

C. Death notification form completion
8. Do you experience any challenges regarding the completion of death certificates?
9. Do you sometimes not record the correct cause of death on the death certificates and why?

D. Routine data and information management
10. What is your role in routine data collection?
11. What routine data collection tools are completed by you?
12. Do you know the definitions of the National Indicator Data Set (NIDS) data elements?
13. Do you ever get feedback regarding data and information management issues?
Addendum C: Rapid assessment questionnaire for medical practitioners

Rapid Assessment on health data and information management as part for the estimated burden of disease study for Vhembe health district

Questionnaire for Medical Practitioners

PLEASE ANSWER THE QUESTIONS AS HONESTLY AS POSSIBLE AS THIS HELPS US TO DETERMINE THE STATUS OF DATA AND INFORMATION MANAGEMENT IN HOSPITALS

Each participant is requested to complete sections A to D of the questionnaire.

A. General information:
   Sub-district: _________________________ Hospital: _________________________

B. Participant information:
   Job title of participant: ___________________________________________________________
   Period of time in position:

<table>
<thead>
<tr>
<th>Period of time</th>
<th>Less than 1 year</th>
<th>1 – 2 years</th>
<th>2 – 3 years</th>
<th>3 – 5 years</th>
<th>More than 5 years</th>
</tr>
</thead>
</table>

C. IM Training:
   Did you attend Data Element definition training in the last 2 years? Yes No
   Did you attend Use of Information for Management training in the last 2 years? Yes No
   Did you attend IM Facility level SOP training in the last 2 years? Yes No

D. Data quality review:
   Record individual patient data in the facility retained clinical records and if relevant in the patient retained records Yes No
   Use only standardises abbreviations in clinical patient records Yes No
   Record required data in line with the NIDS definitions in the standardised data collection tools during or directly after each patient contact Yes No
   Indicate the patient file number clearly on the standardised data collection tools Yes No
   Calculate and sign daily sub-totals clearly on standardised data collection tools Yes No
   Complete and sign weekly summary sheet forms Yes No
   File and store weekly summary sheet forms in a locked facility Yes No

Please indicate which of the following IM functions are performed by you

E. Information technology:
   Please indicate your access to information technology and specifications of the computer currently in use

<table>
<thead>
<tr>
<th>Type of computer</th>
<th>Desktop</th>
<th>Notebook/Laptop</th>
<th>Both desktop &amp; laptop</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows version</td>
<td>MS Office 2010</td>
<td>MS Office 2007</td>
<td>MS Office XP</td>
<td>Older version than MS Office XP*</td>
</tr>
<tr>
<td>Dept. Intranet reliability</td>
<td>From my own computer</td>
<td>From another PC</td>
<td>Out of order for more than 1 week</td>
<td></td>
</tr>
<tr>
<td>Dept. Intranet access</td>
<td>From my own computer</td>
<td>From another PC</td>
<td>None *</td>
<td></td>
</tr>
<tr>
<td>*If none, ignore next questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-mail reliability</td>
<td>Always working</td>
<td>Has never worked</td>
<td>Out of order for more than 1 week</td>
<td></td>
</tr>
<tr>
<td>E-mail access</td>
<td>From my own computer</td>
<td>From another PC</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Internet reliability</td>
<td>From my own computer</td>
<td>From another PC</td>
<td>Out of order for more than 1 week</td>
<td></td>
</tr>
<tr>
<td>Feature</td>
<td>From my own computer</td>
<td>From another PC</td>
<td>Out of order for more than 1 week</td>
<td>Never worked</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>----------------------</td>
<td>-----------------</td>
<td>-----------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Internet access</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anti-Virus software update</td>
<td>Every day</td>
<td>Once a week</td>
<td>Never</td>
<td>Don’t have any</td>
</tr>
<tr>
<td>IT support Turnaround time</td>
<td>Immediately</td>
<td>Less than 5 days</td>
<td>5 – 10 days</td>
<td>Never</td>
</tr>
</tbody>
</table>

Thank you for completing the questionnaire.
Addendum D: Death notification form 1

```
<table>
<thead>
<tr>
<th>File No.</th>
<th>07223156</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of Birth</td>
<td>1873-07-09</td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
</tr>
<tr>
<td>Date of Death</td>
<td>03-04</td>
</tr>
<tr>
<td>Place of Death</td>
<td>Mabhube Hospital</td>
</tr>
<tr>
<td>Place of Registration of Death</td>
<td></td>
</tr>
<tr>
<td>Citizenship of Deceased</td>
<td></td>
</tr>
<tr>
<td>Date of Birth</td>
<td>1873-07-09</td>
</tr>
<tr>
<td>Date of Death</td>
<td>03-04</td>
</tr>
<tr>
<td>Place of Death</td>
<td>Mabhube Hospital</td>
</tr>
<tr>
<td>Place of Registration of Death</td>
<td></td>
</tr>
<tr>
<td>Citizenship of Deceased</td>
<td></td>
</tr>
<tr>
<td>Date of Birth</td>
<td>1873-07-09</td>
</tr>
<tr>
<td>Date of Death</td>
<td>03-04</td>
</tr>
<tr>
<td>Place of Death</td>
<td>Mabhube Hospital</td>
</tr>
<tr>
<td>Place of Registration of Death</td>
<td></td>
</tr>
<tr>
<td>Citizenship of Deceased</td>
<td></td>
</tr>
</tbody>
</table>
```

**Particulars of Informant**
- Name:  
- Relationship to Deceased: Parent
- Address:  
- Church:  
- Registration No.:  
- Funerals:  
- Name:  
- Address:  
- Church:  
- Registration No.:  

**Particulars of Undertaker**
- Name:  
- Address:  
- Church:  
- Registration No.:  

**Certificate by Attending Medical Practitioner / Professional Nurse**
- Name:  
- Address:  
- Church:  
- Registration No.:  

**Certificate by District Surgeon / Forensic Pathologist**
- Name:  
- Address:  
- Church:  
- Registration No.:  

**For Official Use Only**
- Address of Death:  
- Postal Code:  

* Someone who smokes tobacco on most days.
Addendum E: Death notification form 2
References


5. http://beta2.statssa.gov.za/?page_id=735&id=1


21. Personal communication, Rob Dorrington.


42 Lund C (30 October 2014). South African Mental Health Policy Framework and Implementation. Alan J. Flisher Centre for Public Mental Health, University of Cape Town

43 http://www.who.int/malaria/media/world_malaria_report_2013/en/


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