



The economic implications of the Umthombo Youth Development Foundation Scholarship Scheme

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Summary

Background

More than twenty years after the dawn of democratic governance, many South Africans living in rural areas still do not have access to affordable, good quality and comprehensive health care. The challenges of access to care have been acknowledged in many government strategies and are the focus of the proposed National Health Insurance and the Human Resources for Health Strategy. However, universal health coverage cannot be achieved without massive injection of resources into training to provide skilled health professionals. Consideration must be given to the costs and efforts required to retain skilled personnel in rural areas, where the shortage is greatest. This report assesses the cost of the Umthombo Youth Development Foundation bursary scheme, showing the different ingredients that go into this investment, as well as the potential benefit of the bursary scheme to the economy and society at large.

The Umthombo YDF scholarship scheme

The Umthombo YDF scheme provides support to rural youth to become qualified healthcare professionals, in an effort to address the shortage of health workers at rural hospitals. The majority of Umthombo YDF students receive full cost bursaries, which covers tuition, accommodation, books, food, minor equipment and incidental expenses. The UYDF education and training process involves an integrated model of recruitment at school level, selection, support during education and training, and employment support and retention on return to the local rural workplace.

The costs and benefits of the bursary

The analysis was undertaken from a provider perspective and involved the identification of all costs related to the support towards education in the books of accounts and administrative records of Umthombo. Costing was done across the five main project cost centres: recruitment; education support; mentorship; post graduate support and administration. The value of the Umthombo YDF investment was measured in terms of the internal rate of return (IRR) and the lifetime earnings of the programme's graduates.

In the period 2009 to 2015, Umthombo YDF provided approximately 166 bursaries a year. The estimated annual cost of these bursaries was R17m. The average amount per student per year for tuition fees was R42,000; Accommodation – R19,000; meals – R13,000; Books – R4,600. This amounts to R78,600, which constitutes the total for education support. In addition to the education support, R7,368 was spent on mentoring support per student. Including the costs of recruitment (R663), graduate support (R615) and administration (R13,722) the total cost to the bursary scheme was R102,015 per student per year.

A total of 254 graduates were supported by the Umthombo scheme. The total cost of training these graduates was estimated to be R186 million (Table 2). These graduates are expected to generate an estimated R15 billion in lifetime earnings, which would be equal to R4 billion at current prices. The internal rate of return is 63%, much higher than the interest rates on commercial loans. When national throughput and pass rates obtained in higher education institutions are applied to Umthombo graduates, as many as half of the students would otherwise not graduate. This could have wide implications for the attractiveness of the investment, and society would stand to lose about R7 billion in lifetime earnings at these lower student pass and throughput rates.

Projections for future funding

Projections of future funding were made based on 2016 cost estimates. A total budget of R25 million is estimated to cover 220 students in 2017. If all the students are covered by an NSFAS grant, Umthombo YDF will need to raise about R8.8 million to cover mentoring support, school outreach, graduate support and organisational expenses.

Background

More than twenty years after the dawn of democratic governance, many South Africans living in rural areas still do not have access to affordable, good quality and comprehensive health care. This is despite the massive improvements that have occurred in the South African health system since 1994, such as the introduction of free primary health care (PHC), the establishment of a district-based health system, as well as the essential drugs programme and the hospital revitalisation programme. The right to access health services is also enshrined in section 27 of the South African Constitution, but this has not enabled the Government to fully remove the inequalities that permeate the rural health system. As a result, the burden of disease is highest in rural areas, which also have the highest burden of poverty. However, the allocation of both public and private health resources is skewed towards urban areas. This has happened, not for a lack of will to effect changes on the part of the Government, but as a result of several structural factors among others, which have perpetuated historical inefficiencies.

Even in the context of free PHC, substantial barriers remain to receiving care. Costs of accessing health services can be prohibitive, particularly for rural populations which have a high burden of poverty. Many rural households do not live in close proximity to health facilities and have to travel long distances to get care. Fifteen per cent of poor rural households live more than an hour away from the closest clinic and 20% live more than an hour away from the closest hospital.¹ This is worsened by the fact that transport is not reliable and is expensive, as the transformation of the transport sector has not eased barriers to access in rural areas.

Compounding these challenges is the fact that there is a critical shortage of health workers in South Africa. In 2013, it was estimated that South Africa had 60 doctors per 100,000 population, compared to a global average of 152/100,000.² Large inequalities in the distribution of resources between rural and urban areas exacerbate the shortage.

Though government has sought to address the shortage of health workers, it is not easy to attract health personnel to rural areas for various reasons. The lack of social amenities makes it difficult for families to thrive in these settings. There also seems to be a tendency for government policy to focus on the provision of medical doctors, and other cadre of health workers are neglected.

Decisive action must be taken to remove the barriers to care if rural populations are to be adequately serviced. The challenges of access to care have been acknowledged in many government strategies and are the focus of the proposed National Health Insurance and the Human Resources for Health Strategy. However, universal health coverage cannot be achieved without massive injection of resources into training to provide skilled health professionals. The expansion of the health work force, however, is not an easy and quick process. There is a lot that must go into the supply of the various cadre of health personnel, and a significant amount of resources must be committed to building an adequate supply of skilled labour. More importantly, consideration must be given to the costs and efforts required to retain skilled personnel in rural areas, where the shortage is greatest.

It is important that the different ingredients of support to the sustainable supply of human resources are well understood. However, very few studies have looked at the cost of education in South Africa, or tracked the resources and efforts required to maintain an adequate supply of health personnel.

¹ Econex (2010). Health Reform Note 1 - The Role of Primary Healthcare in Health Reform.

² Econex (2015). Identifying the determinants of and solutions to the shortage of doctors in South Africa: Is there a role for the private sector in medical education?

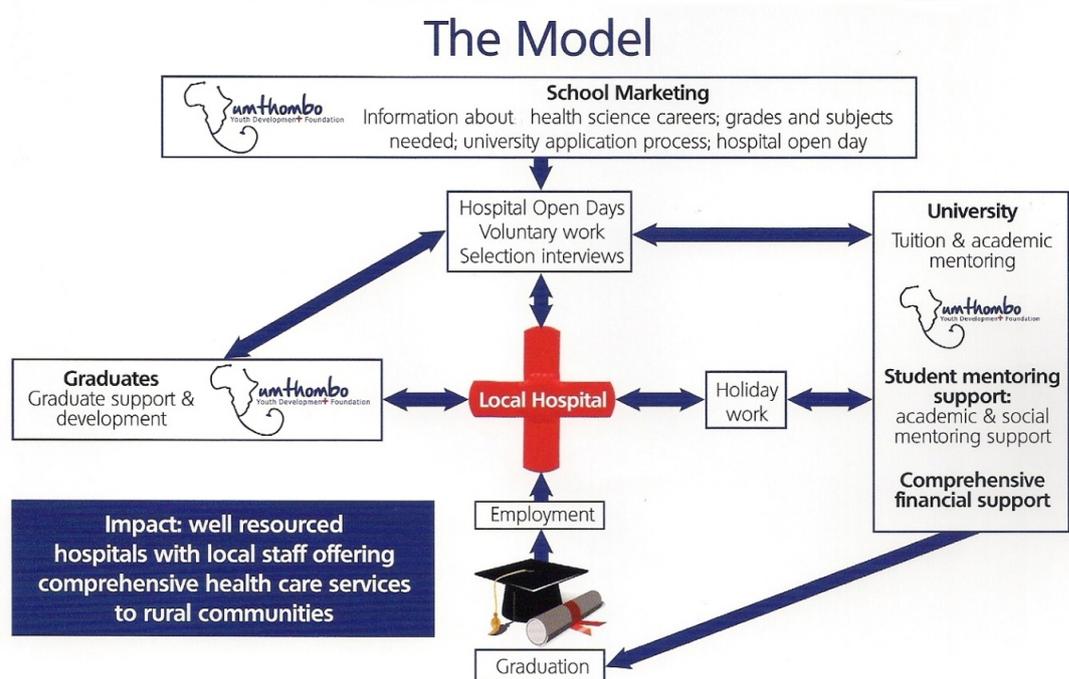
This report assesses the cost of the Umthombo Youth Development Foundation bursary scheme, showing the different ingredients that go into this investment. It shows the potential benefit of the bursary scheme to the economy and society at large. The cost-benefit of the programme is shown, and an Internal Rate of Return (IRR) is calculated to show the return on investment.

The Umthombo scholarship scheme

The Umthombo Youth Development Foundation (UYDF), originally Friends of Mosvold Scholarship Scheme, was started in January 1999 in Ingwavuma, one of the most socially deprived and educationally challenged areas in the country. The aim of the scheme is to address the shortage of qualified healthcare workers at rural hospitals through the training and support of rural youth to become qualified healthcare professionals.³ The scheme started with supporting four students and has now seen more than 200 graduates in various health disciplines.

The UYDF education and training process involves an integrated model of recruitment at school level, selection, support during education and training, and employment support and retention on return to the local rural workplace (Figure 1).

Figure 1. Umthombo health professional education and employment model



Rural hospitals as the ultimate beneficiaries, are at the centre of the programme. The hospitals are involved in the identification of required skills, student selection, training and mentoring. The students are recruited with the aim of developing skills that are lacking in hospitals, and are guaranteed employment upon completion of their training. Umthombo YDF has a Memorandum of Agreement with the KwaZulu-Natal Department of Health which facilitates the employment process. The role of Umthombo YDF is to provide the support needed to participating hospitals and conduct the critical aspects that the hospitals are unable to do, such as outreach to schools; providing mentoring support to students at university as well as raising the necessary financial resources.

An Umthombo staff member works closely with the district Department of Education and rural schools in the participating districts to identify and capacitate Teacher Champions. Through this programme learners are made aware of careers in health science, as well as receive information on the subjects and grades needed to obtain entry into University, university application closing dates, and information regarding obtaining financial support. Interested learners are then invited to attend

³ www.umthomboyouth.org.za accessed 23rd August 2016

the Hospital Open Day, where they are able to learn more about the specific health science disciplines.

Selection of the students takes place at the local hospital, by a committee of hospital and community representatives, with an Umthombo YDF staff person assisting the committee and playing an oversight role. The criteria for student selection are: i) they must come from the area; ii) must have obtained a place at University to study a health science degree; iii) must have done at least one weeks voluntary work at the hospital; iv) have a financial need; v) be selected by a local committee; and vi) be willing to sign a work back contract. Once selected, every student is allocated a mentor who they meet monthly. Umthombo YDF uses a “network of local mentors” who are situated close to the academic institutions where the students are studying. The mentor assists students to devise strategies to address their challenges and holds them accountable.

As part of the mentoring support, students are required to do at least 4 weeks holiday work a year at their local hospital. This is an opportunity for students to learn in a non- threatening environment as well as an important opportunity for relationships to be built between the hospital staff and the students. It also helps the students to become passionate about “their” hospital, resulting in them looking forward to going to work there when they qualify. Another component of the mentoring support is the Student Life Skills Imbizo which is held annually. The purpose of the Imbizo is to develop the “soft” skills among the students and hence involves topics such as: managing and motivating oneself; overcoming the pitfalls that youth face such as drugs, teenage pregnancy, peer pressure; good values and ethics of committed health care workers.

The local participating hospital employs the graduates on completion of their studies. The fact that the students have done holiday work every year at the hospital and they are well known by the hospital staff facilitates the timely advertising of posts and their employment.

Funding model

The majority of Umthombo YDF students receive full cost bursaries, which the organisation has been responsible for raising each year. With this, Umthombo YDF provides comprehensive financial support to each student, covering tuition, accommodation, books, food, minor equipment and incidental expenses. The organisation receives an annual allocation from the National Student Financial Aid Scheme (NSFAS) which is used to write loans to the medical students supported on the programme. However, the NSFAS loan does not cover the full cost of medical education and is insufficient to provide such students with a food and book allowance. The Umthombo YDF thus provides top-up funding to these students, which consists of a monthly food allowance of R1,500, an annual book allowance of R4,000, and payment of the holiday work stipend and accommodation costs and covers any outstanding tuition fees not covered by the NSFAS loan.

What does it cost to train health personnel and what are the economic implications?

Methods for costing the Umthombo bursary

The analysis was undertaken from a provider perspective and involved the identification of all costs related to the support towards education in the books of accounts and administrative records of Umthombo. Costing was done across five major categories which were identified as the main cost centres, according to the Umthombo project model (Figure 1). These were recruitment; Education support; mentorship; post graduate support and administration. Recruitment included costs of school marketing, hospital open days and selection interviews, and half a staff person's salary for activities intended to recruit students. Education support included costs of fees, accommodation, books, meals and other costs such as equipment, uniforms, professional registration fees etc. The mentorship cost centre included costs related to provision of mentoring support to students, such as: the organisations full time mentor (salary, travel & accommodation), stipends and associated costs paid to the network of mentors, and stipends paid to students on completion of holiday work. Postgraduate support included costs related to additional training and development of Umthombo graduates and hospital staff as well as half a Umthombo YDF staff person's salary. The administration cost centre was for all costs necessary for running the programme including: salaries of three staff, bookkeeping and auditing costs, overheads, office rental, communication and travel.

Costing was undertaken for the years 2009 to 2015 and was undertaken from an economic perspective, meaning that the opportunity cost of resource use was considered. Costs were classified as recurrent or capital. Recurrent costs included items such as stationery, fuel, utilities and personnel time. Capital costs included items such as vehicles, computers and furniture, and other items whose useful life was more than a year. Capital costs were annualised, to reflect their annual value. The annual economic cost of capital items was calculated using a discount rate of 6% (the Central Bank's annualised rate). Useful life years used were 10 years for furniture, 3 years for vehicles and 4 years for office equipment and computers. All costs were adjusted to 2015 prices using a Consumer Price Index.⁴

The cost centre costs were aggregated into a total project cost and divided by the number of students in each year to obtain an annual average cost of supporting a student. Average costs are also provided per study discipline.

Estimating return on investment

The purpose of this analysis was to gauge the value for money of the Umthombo Youth Development Fund, in order to assess whether the programme was a worthwhile investment. This analysis was done in several stages. First, the cost of gaining education was calculated. This included the cost of supporting a student through university (the cost of the bursary as described above) and the opportunity cost of education, which was considered to be the wages forgone in the period that a student stayed at University. The annual salary of clerks and cashiers coming straight from school was used as the proxy for wages forgone. Secondly, the annual wage streams for the various cadre of health personnel that are produced by Umthombo were estimated. The wage streams were calculated over the expected working life of all graduates. An assumption was made that the average graduate will leave university to start work at 22 years and retire at the age of 65. The salary data for public health workers in 2015, obtained from the Department of Public Service and

⁴ Stats SA (2016). CPI History - http://www.statssa.gov.za/?page_id=1871

Administration, was used to calculate wage streams, assuming an annual increase of 5%. The combined wage streams during this period were used as the proxy for the benefit to the economy and society at large.

Using the costs and wage streams calculated above, the internal rate of return (IRR) to the Umthombo bursary and the net present value (NPV) of the expected benefits were calculated. The IRR measures the efficiency of an investment and can be used to assess the profitability of an investment. The higher an investment's IRR, the more desirable it is to undertake the investment. The NPV allows for the expression of future costs and benefits in terms of the current prices. A discount rate of 6% was used for NPV.

Costing results

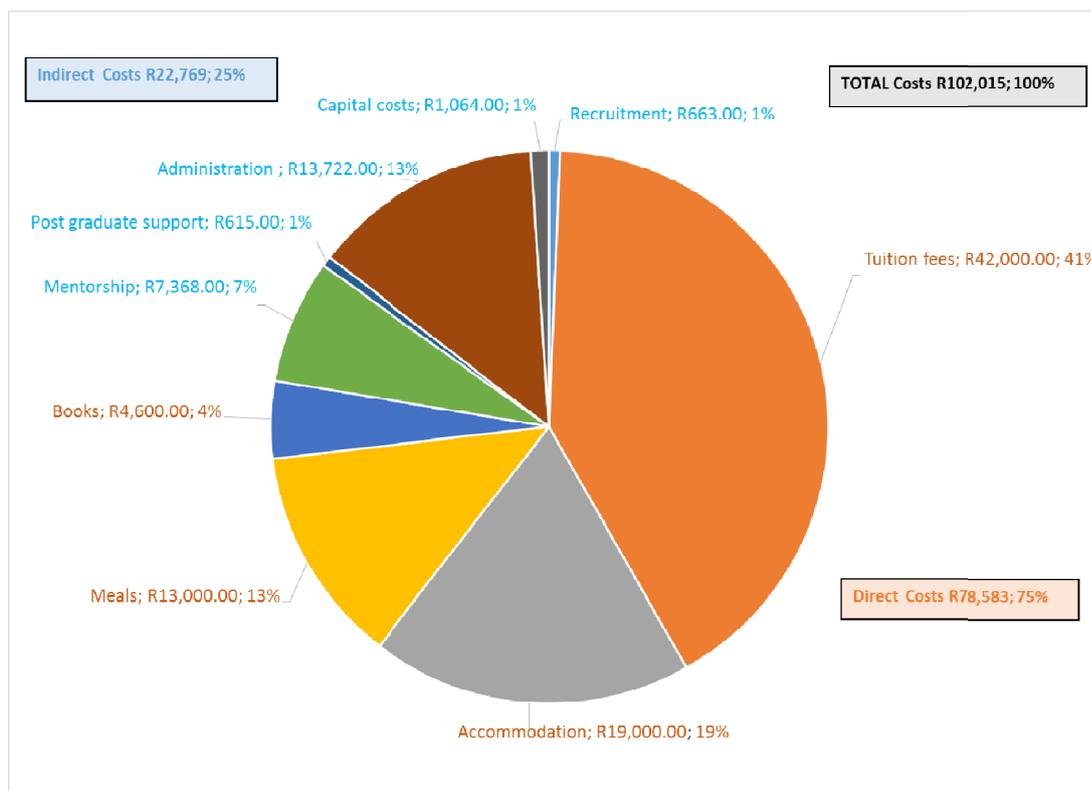
Average cost of the Umthombo bursary

In the period 2009 to 2015, Umthombo YDF provided approximately 166 bursaries a year. The estimated annual cost of these bursaries was R17m (Table 1 and Figure 2). About 75% of the total cost was spent on education support, 15% on administration and 8% on mentorship.

Table 1. Total and average annual costs of supporting students, ZAR (2015 prices)

Cost centre	Total cost	Cost per student	Percent
Recruitment	109,821	663	0.6%
Education support	13,022,407	78,583	77.0%
Mentorship	1,221,051	7,368	7.2%
Post graduate support	101,842	615	0.6%
Administration and overheads	2,273,861	13,722	13.5%
Capital costs	176,301	1,064	1.0%
Estimated cost per year	16,905,283	102,015	100.0%

Figure 2: Analysis of the average annual cost structure for a health science student – 2015



The costs under education support included meals, fees, books, accommodation and other costs related to equipment and professional fees. The cost of accommodation varied greatly across students, and in some cases was equal to or more than the cost of university fees. The fees structure also differed across universities and disciplines. Mentorship costs include the cost of the organisations full time mentor, a network of local mentors to whom stipends are paid for services rendered, student holiday work stipend and accommodation, and attendance of the annual Student Lifeskills Imbizo.

From the analysis undertaken on the 2009-2015 books of accounts, the average amount per student per year for tuition fees was R42,000; Accommodation – R19,000; meals – R13,000; Books – R4,600. This amounts to R78,600, which constitutes the total for education support. In addition to the education support, R7,368 was spent on mentoring support per student. Including the costs of recruitment, graduate support and administration the total cost to the bursary scheme was R102,015 per student per year. For NSFAS funded students, a monthly food allowance, annual book allowance, holiday work accommodation and stipend, as well as any tuition fees shortfall was covered, amounting to approximately R37,000 per student per year.

Return on investment

A total of 254 graduates were supported by the Umthombo scheme. The total cost of training these graduates was estimated to be R186 million (Table 2). These graduates are expected to generate an estimated R15 billion in lifetime earnings, which would be equal to R4 billion at current prices. The IRR is 63%, much higher than the interest rates on commercial loans, showing that Umthombo is a highly efficient programme. For example, the types of IRR's that would be considered satisfactory in commercial settings might be 10% for acquisition of a stabilized asset, 15% for acquisition and

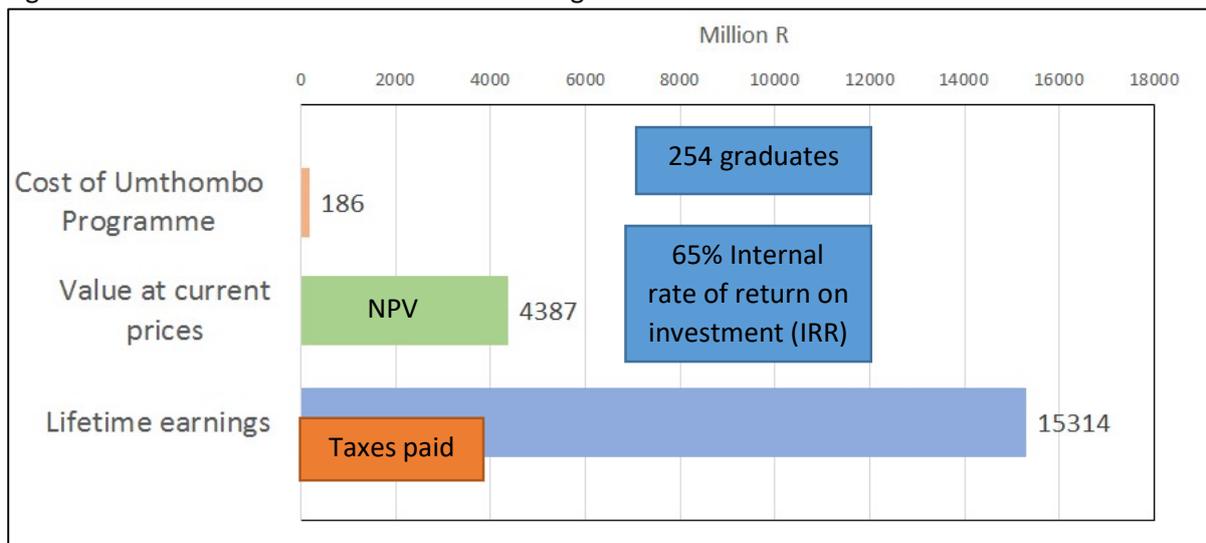
repositioning of an ailing asset, 20% for development in established area and 35% for development in an unproven area.⁵ Umthombo’s IRR is outstanding.

Table 2. Costs and benefits of Umthombo graduates, ZAR (2015 prices)

Disciplines	Graduates	Total cost	Lifetime earnings	NPV	IRR
1 Occupational Therapy	5	3,384,293	198,093,126	56,732,609	46%
2 Radiography	20	13,537,171	798,263,387	228,617,547	46%
3 Pharmacy	19	12,860,312	1,497,155,785	428,775,876	86%
4 Biomedical Technology	14	8,047,815	542,987,675	155,508,210	52%
5 Nursing	32	21,659,474	980,647,587	280,851,220	37%
6 Physiotherapy	20	13,537,171	798,263,387	228,617,547	46%
7 Medicine	79	69,590,138	7,539,302,053	2,159,208,063	81%
8 Dental Therapy	9	5,173,595	329,530,887	94,375,546	50%
9 Dietetics	8	5,414,868	320,499,764	91,789,090	46%
10 Optometry	12	8,122,303	479,754,305	137,398,576	46%
11 Speech Therapy	8	5,414,868	320,499,764	91,789,090	46%
12 Social Work	14	9,476,020	431,033,007	123,445,106	37%
13 Psychology	7	4,738,010	578,601,746	165,707,853	90%
14 Environmental Health	1	676,859	39,980,080	11,450,040	46%
15 Nutrition	1	676,859	41,804,317	11,972,490	48%
16 Clinical Associate	1	574,844	37,667,577	10,787,754	51%
17 Dentistry	4	3,115,493	380,556,795	108,989,041	90%
Total	254	186,000,091	15,314,641,244	4,387,131,017	63%

Given that graduates once working as qualified professionals will pay a significant amount of tax over their lifetimes (20-30%, say R4 Billion), the costs of the Umthombo investment will be paid for several times over as shown in Figure 3.

Figure 3: Return on investment for Umthombo graduates



NPV is the acronym for net present value. Net present value is a calculation that compares the amount invested today to the present value of the future cash receipts from the investment. In other words, the amount invested is compared to the future cash amounts after they are discounted by a specified rate of return.

Internal rate of return (IRR) is the "annualized effective compounded return rate" or rate of return that makes the net present value of all cash flows from a particular investment equal to zero, in other words, the rate at which an investment breaks even. It is used in capital budgeting to measure and compare the profitability of investments. This excludes external factors such as inflation

Cost-benefit of the mentoring programme

The Umthombo YDF has been successful in getting a lot of underprivileged youth to graduate from University, achieving a pass rate of 93% in the last four years. In comparison, the throughput rates for undergraduate students in South African Universities are quite low. A Department of Higher Education and Training (DHET) report⁶, which followed cohorts of first time undergraduate entrants between 2000 and 2008 showed that in the 2008 cohort, the throughput rates were 42% after four years and 61% after 6 years.

This clearly shows that there are losses in the system, which may be quite costly. The Umthombo YDF model provides an example of how these losses can be minimised. The success rate at University has been mainly attributed to the Umthombo YDF mentorship programme, which provides students with support to enable them cope with both academic and social pressure, and creates a system of accountability.

The potential loss associated with non-graduating and failing students was estimated by applying the throughput rates provided in the DHET report to the Umthombo YDF cohort of 254 graduates: assuming pass rates of 19% after three years, 42% after four years and 61% in year six.

In the scenario analysis provided in Table 3, if the pass rates are adjusted according the DHET throughput rates, this would imply that only 114 students would have graduated (about 45% of the 254 cohort). Thus instead of the potential lifetime earnings of R15 billion estimated in Table 2, society would only realise R7.7 billion (or R2 billion instead of R4 billion at today's prices).

Table 3. Scenario analysis applying DHET pass rates to Umthombo YDF graduates

	Graduates	Total cost	Lifetime earnings	NPV
Occupational Therapy	2	1,184,502	70,607,451	20,221,524
Radiography	7	4,738,010	280,686,129	80,386,719
Pharmacy	7	4,501,109	526,558,727	150,803,064
Biomedical Technology	5	2,816,735	191,301,708	54,787,590
Nursing	11	7,580,816	344,221,072	98,582,721
Physiotherapy	7	4,738,010	280,686,129	80,386,719
Medicine	51	45,233,590	4,902,215,377	1,403,963,244
Dental Therapy	3	1,810,758	116,519,209	33,370,359
Dietetics	3	1,895,204	113,468,861	32,496,759
Optometry	4	2,842,806	169,207,950	48,460,079

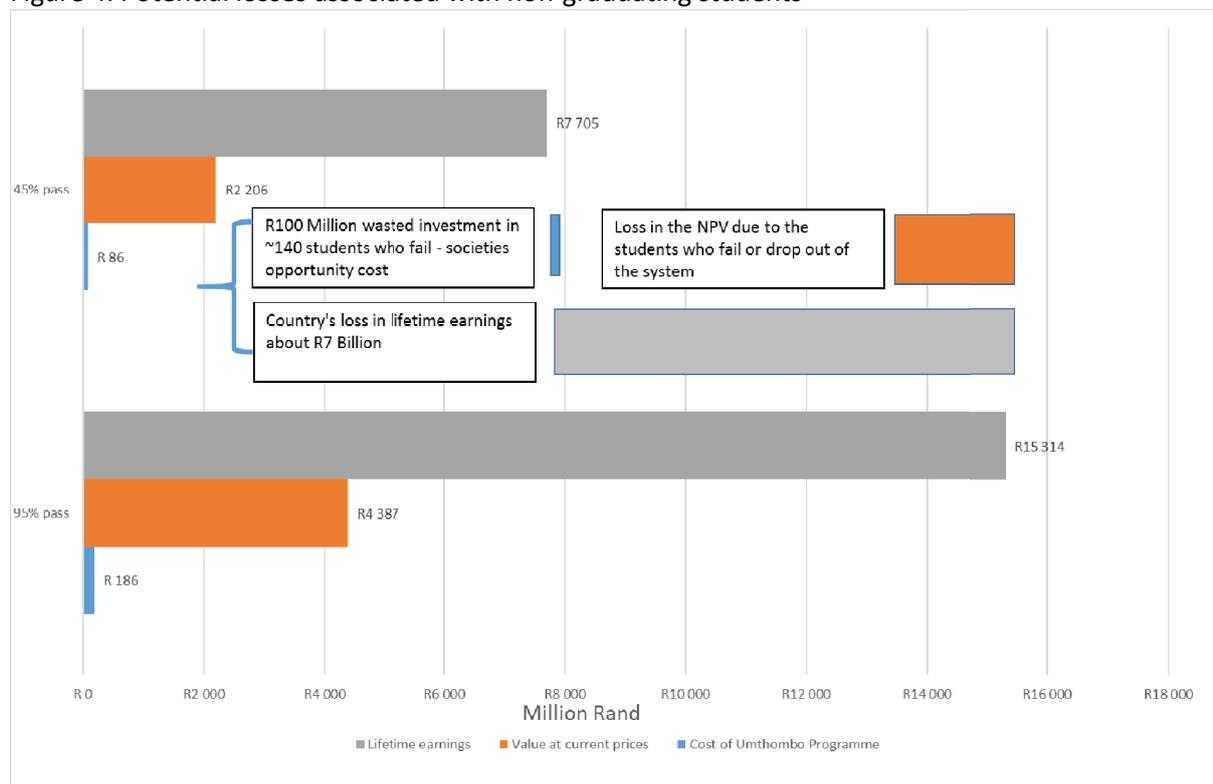
⁶Statistics (DHET (2016) 2000-2008 First time entering undergraduate cohort studies for public higher education institutions

Speech Therapy	3	1,895,204	113,468,861	32,496,759
Social Work	5	3,316,607	151,858,604	43,491,336
Psychology	2	1,658,303	205,177,924	58,761,650
Environmental Health	0	-	-	-
Nutrition	0	-	-	-
Clinical Associate	0	-	-	-
Dentistry	3	1,947,183	239,609,834	68,622,729
Total	114	86,158,838	7,705,587,834	2,206,831,251

The potential losses are not only in terms of the lifetime earnings (benefits), but also a ‘wastage’ of resources that could be spent on supporting students who succeed at university and graduate. In the scenario provided in Table 3, a total of 140 students do not graduate. This translates into approximately R100 million that would have been spent supporting students who do not eventually get their qualifications. This R100 million is the opportunity cost to society, as these resources would have been invested in alternative ventures that could yield some future benefits.

Figure 4 illustrates the potential losses associated with non-graduating students. The net present value (NPV) is halved to about R 2 million and society loses about R7 billion in lifetime earnings at lower student pass and throughput rates. Thus, with an investment of approximately R7,400 in mentorship (about 10% of total education support), the Umthombo YDF model can make huge savings and ensure a higher future earnings potential.

Figure 4. Potential losses associated with non-graduating students



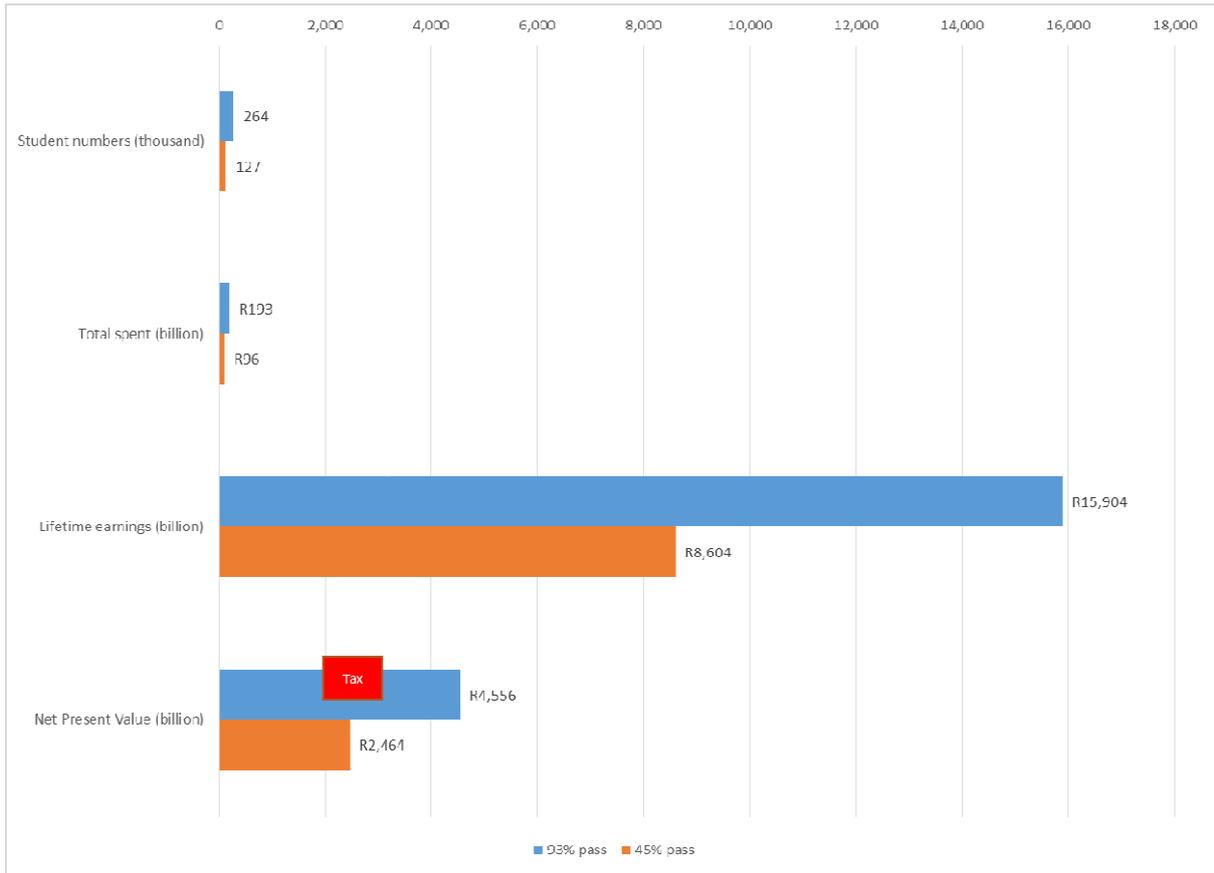
Extrapolating the Umthombo model to the national scale

The following scenario, shows the astounding implications of applying the Umthombo YDF model on national student numbers. In 2013 there were approximately 1 million (1,103,639) students in higher education institutions and a further 1 million in Further Education and Training (FET) and Adult Education and Training (AET) institutions. A total 283,622 of these student were studying sciences, engineering and technology (which included all the health sciences).⁷

If we apply the scenarios generated above for throughput rates achieved by Umthombo YDF and compare them against those achieved on average in Higher Institutions of Education, the following applies (Figure 5): Out of the 283,622 students, about 127,000 would graduate at pass rates of 45%, compared to 264,000 if the pass rate was 93%, with lifetime earnings of R8 trillion and R15 trillion respectively. Thus society stands to lose approximately R7 trillion in earnings over the next few years if the pass rates were at 45% (compared to 93%).

Figure 5. Application of Umthombo pass rates to national science student population

⁷ DHET (2015). Statistics on Post-School Education and Training in South Africa: 2013, Pretoria



Thus for an additional investment of R7,400 per student per year in mentorship (about R10 billion for 284,000 students over 5 years), the numbers of graduates over a period of about five years would more than double (from 127,000 to 264,000) and the lifetime earnings would also increase (from R8 trillion to R15 trillion). The Net Present Value of this would also double from about R2.5 trillion to nearly R5 trillion. Income tax on this difference would be in the region of R500 billion, much larger than the investment. The likely contribution to the economy and in decreasing unemployment would thus appear to be overwhelming.

Projections for future funding

Table 4 presents the projected funding requirements for Umthombo for 2017 to 2019. A total budget of R25 million is estimated for 2017, to cover 220 students. Taking 2017, the total cost of the NSFAS allocation is R76,108 per student. The estimated cost of training per student is however R88,675. This means that there is an estimated shortfall of R12,567 (which is the gap funding) per student. The total budget for 220 students is about R19.5 million, resulting in a of R2.7 million shortfall (gap funding) between the NSFAS allocation and total student costs. A total of R6 million will be required to cover mentoring support, school outreach, graduate support and organisational expenses. Thus out of the total budget of R25 million, Umthombo YDF will be required to raise R8.8 million in 2017 should all students receive a NSFAS loan.

Table 4. Projected funding streams (ZAR)

ITEM	Cost per Student	Cost per student	Budget	Cost per student	Budget	Cost per student	Budget
	2016	2017	2017	2018	2018	2019	2019
Number of students			220		260		300
NSFAS allocation & Request (maximum request)	71,800	76,108	16,743,760	80,674	20,975,240	85,515	25,654,500
Tuition & Accommodation (average cost 2015 +)	58,500	61,425	13,513,500	64,496	16,769,025	67,721	20,316,319
Book allowance	4,000	5,000	1,100,000	5,000	1,300,000	5,500	1,650,000
Food allowance (monthly)	15,750	19,250	4,235,000	19,250	5,005,000	21,450	6,435,000
Holiday work stipend & accommodation	3,000	3,000	660,000	3,000	780,000	3,500	1,050,000
Total cost per student (tuition, accommodation, food, books, holiday)	81,250	88,675	19,508,500	91,746	23,854,025	98,171	29,451,319
Gap funding for students (costs less NSFAS max allocation)	9,450	12,567	2,764,740	11,072	2,878,785	12,656	3,796,819
Private donors							
Mentoring support total	7,809	7,809	1,717,995		1,868,225		2,006,605
Organisation's Mentor's salary			758,995		812,125		877,095
Mentors travel & accommodation			231,000		254,100		279,510
Annual gathering UYDF students			330,000		360,000		360,000
Local Mentor stipends			398,000		442,000		490,000
School Outreach programme	1,691		371,950		412,956		494,503
Graduate support programme	2,268		498,960		542,476		547,556
Organisational expenses	10,595		2,330,959		2,468,583		2,602,169
NSFAS Loan repayment for graduates	5,154		1,133,781		1,225,814		1,555,407
Total expenses covered by private donors			6,053,645		6,518,054		7,206,240
Total cost per student	108,767		116,192		116,816		122,192
Total budget			25,562,145		30,372,079		36,657,559
Total to raise (gap plus org costs)			8,818,385		9,396,839		11,003,059

Note: A 6% annual increase is applied on the NSFAS loan amount; Despite an anticipated 0% fee increase, a 5% increase for accommodation has been included; Book allowance to be covered by NSFAS/NSF; Food allowances for 2017 and 2018 are R1750/month x 11; 2019 R1950x11. Depending on the tuition fees, some of this cost will be covered by NSFAS/NSF; Holiday work stipend can be obtained from HWSETA to cover work experience.

Case studies to show the cost-effectiveness of deploying health personnel in rural areas

Psychologist – Sphamandla Mngomezulu

Siphamandla Mngomezulu, 32, grew up in Ntabayengwe, 15 km from the town of Ingwavuma in rural KwaZulu-Natal. He was raised by a single mother, who worked as a Community Health Worker, earning R400 a month, to support him and his sister. He attended local primary school in Ntabayengwe and completed his matric at Ingwavuma High School in 2003. Having passed his matric, he had few prospects of getting support for higher education as his mother could not afford to pay for it. Faced with this tough reality, he was almost giving up on his dream of attaining a university degree.⁸

“It was a very difficult time for me... Things were not going my way as I was not getting the sponsorships I was looking for... My only option now seemed to go to my uncle, do a short mining course and get a job on the mine.”

He eventually got a scholarship from the Friends of Mosvold (now Umthombo Youth Development Foundation) to attend the University of Zululand, where he graduated with a degree in psychology. He eventually went on to complete his masters degree at the University of Johannesburg, and undertook his internship as a clinical psychologist in Bloemfontein.

Upon completion of the internship programme, he returned to KwaZulu-Natal and took up a position at Hlabisa Hospital as a clinical psychologist. Siphamandla was the first psychologist to work at Hlabisa hospital when he started there in 2010. All the hospitals in the district referred patients to him and this soon became a challenge.

“I fought with the medical manager for beds and it seemed like I was exhausting Hlabisa’s budget.”

As a solution to this problem, he decided to visit all the hospitals in the district. Though it was an easier solution, his schedule soon became too busy. To cope with this, he requested the district to place community service psychologists whom he worked with at the other hospitals.

Siphamandla rejected several lucrative offers to practice psychology in urban areas and moved back to his rural community upon completion of his studies. He was motivated by the desire to see his family move out of poverty. He made sure that his mother was well taken care of and he takes pride at the honour this has brought to his family.

“Since I have been back my family has been transformed... We live in a new house that I’ve just finished building... Even though my mom is a general orderly in Mosvold, a lot of people respect her because she has a son who is a psychologist and that has brought the dignity to my family.”

⁸ Ross AJ. On becoming a Health Care Professional in a rural context: lives, learnings and practice. PhD dissertation

Psychology services in Umkhanyakude district

Siphamandla's story shows the benefit of training local rural youth to take up positions in their communities. Being a member of this community, he endured and overcame several obstacles and was determined to improve the conditions of the local health sector. Through Siphamandla's efforts, Umkhanyakude district now has a psychologist at each hospital. Each year, more than 15,000 patients are screened and treated for various mental conditions in the district (Table 5).

Table 5. Selected mental health statistics in Umkhanyakude district hospitals

Year	Total clients	Mental health admissions	Screening and brief intervention for alcohol and other drugs	Referral to specialised mental health facility
2015	15,875	567	8,307	12
2014	15,643	335	5,636	29
2013	17,940	170	2,156	21

Source: Umkhanyakude district report (2016)

Costs and benefits of the Umkhanyakude district mental health programme

The value of Siphamandla's efforts can be seen in the contributions that he makes towards the wellbeing of his family and community, and the growth of the local economy. These benefits were quantified using a simple economic evaluation model.

Lund and Flisher's model for estimating the cost and utilisation of community mental health services in South Africa was adapted to undertake the evaluation (Lund and Flisher, 2009).⁹ This model calculates the health service resources for community mental health based on an estimation of the need for services in a given population. It is based on the WHO and South African mental health guidelines. Epidemiological data are used to measure the service needs of a population with a range of mental disorders. This is then used to identify the type of resources required to manage the burden of mental disorders, together with the service utilisation and staffing needs, which are combined to calculate the health service costs. In this current analysis, costing was undertaken from a health provider (district) perspective, using an ingredients approach with two main components of personnel and labour; and drugs and supplies. Staff remuneration was based on current salary structures of public health workers in South Africa.¹⁰ The staff complement was assumed to consist of a community psychologist and a general nurse at each hospital. Prices of requests for tender by the Department of Health were used as proxies for unit costs of drugs and supplies.¹¹ An assumption was made that the distribution of mental disorders followed that estimated at the national level, as given in Lund and Flisher (2009).

Based on Umkhanyakude's population of 638,011¹², the model estimated that approximately 56,000 people (9% of the population) would have one or more forms of mental disorder. This implies that presently, the district is able to manage about 29% of the expected level of mental disorders (16,000/56,000). Without the influence of Sphamandla in recruiting Psychologists to each of the

⁹ Lund C and Flisher AJ (2009). A model for community mental health services in South Africa. *Trop Med Int Health*; 14(9):1040-7.

¹⁰ Department of Public Service and Administration - <http://www.dpsa.gov.za/>

¹¹ National Department of Health - <http://www.health.gov.za/tenders.php>

¹² Stats SA 2011 National Census of Population and Housing.

hospitals in the district, these patients would have had no opportunity to receive care. The ramifications of this can only be imagined.

At the current level of coverage, the cost to the district of managing mental disorders is estimated to be R4.5 million per year. When compared against the number of people that are screened and treated (which we will consider to be the benefits), this translates to a cost-effectiveness (or benefit) ratio of R281 per patient per year (can be considered to be the incremental ratio in this case). The intervention can be considered to be cost-effective, since its incremental cost-effectiveness ratio is well below the district per capita health expenditure of R974.¹³ This gives impetus to the scaling up of the mental health programme in the district. While this type of analysis using patients screened/treated as an outcome is useful, it does not provide the more meaningful assessment of the programme's impact on health outcomes. These health benefits could not be reported in this report due to lack of information, but one can talk about the potential of the programme to avert the burden of disease attributed to mental illness.

Estimating other contributions to the local and national economy

Using the basic starting salary of a psychologist in the public sector, the potential financial contribution to the district economy can be estimated. With a salary package of R570,000 per year, Siphamandla can generate a total of R3.2 million in the five years that he has spent in the district, most of which will probably be spent on his living expenses. This is compared to a total of R370,000 that could have been his salary package in the same five years if he were to earn an annual salary of about R67,000 (the equivalent of a clerk straight from high school with no tertiary education). Siphamandla has been able to build his family a house and make other investments which have ripple effects in the local community.

The total taxes on an annual salary package of R570,000 is approximately R140,000. This is Siphamandla's contribution to the national economy, which would not have been possible if he were not employed as a psychologist. In fact, he would not pay any taxes on an annual salary of R67,000 that he would be earning if he was not educated. Further, Siphamandla is one less person that qualifies for a social grant, thus he does not only make savings for the national fiscus, but contributes to it through his taxes.

Similar economic estimates can be made for the other four psychologists who have been employed in the district, mainly as a result of Siphamandla's efforts and desire to improve the wellbeing of people in his community.

Other non-tangible benefits

Siphamandla is a role model to many rural youth who will most likely be inspired to take a similar path. This is one of the benefits of the scholarship scheme, that it generates local 'heroes' who provide a vision for others and widen the scope of their possibilities. These benefits cannot be easily quantified, but the potential future benefits can be seen in the reality that is Siphamandla.

Siphamandla is now married and has a daughter. For as long as he is present and his future income guaranteed, his daughter will be provided for and will not need to be supported by the state in the form of social grants or education bursaries. This translates to huge savings on the part of the state.

¹³ Massyn N, Peer N, Padarath A, Barron P, Day C, editors (2015). District Health Barometer 2014/15. Durban: Health Systems Trust.

For example at today's prices, approximately R71,800 (support under NSFAS) per person removed from the state bursary scheme would be saved annually.

At present, Sphamandla has also taken up a lecturing position at University of Zululand. Thus at the moment, his contribution to the economy is increasing, as he is adding to the national labour force and creating potential for the nation to expand its fiscus.

Contribution of Umthombo YDF to the supply of medical doctors in rural areas

Umthombo YDF produced 254 graduates by 2015, out of which 79 (30%) were medical doctors. Some of these medical doctors are pursuing further studies for specialisation in various fields, while others have taken up employment outside the province. At present, there are 32 UYDF Doctors working in four districts of KwaZulu-Natal (about 40% of the graduate doctors). In keeping with national policy on human resources for health, Umthombo YDF has produced a considerable number of doctors in a short space of time. More importantly, a sizeable number of medical doctors have remained in rural areas, helping to address the shortages of medical doctors in rural health facilities. These additions of medical doctors to the national pool, particularly in rural areas where they are needed the most, provides significant benefits to the health system, economy and society at large.

What impact would an increase in the number of medical doctors have on a health system?

Reid and Conco (1999) assessed the impact of increasing the supply of medical doctors through South Africa's national community service programme in KwaZulu-Natal, Eastern Cape and Northern provinces.¹⁴ The authors showed that the supply of medical doctors had a positive impact on the health system, particularly in small rural health facilities. They reported that the increased supply of medical doctors was associated with a relief of work pressure on the health team members, better staffing, less crowding of the out-patient units, a fast turnover of patients in the wards and improved clinic visits.

A similar study in Limpopo province evaluated the impact of the national community service programme on the supply of medical doctors, and showed that the programme led to improved health services delivery and alleviated work pressure, in addition to providing a constant supply of manpower and increased the utilisation of health services at community level.¹⁵

Umthombo YDF activities therefore have a positive impact on the health sector in rural areas. The increased number of medical doctors in rural health facilities provides relief for existing human resources which are already stretched. More patients are likely to be treated and this contributes positively to the health of the population in rural areas.

Implications for population health

It is mostly taken as a given that more medical doctors should be produced to provide much needed health services, and thus there are few studies (mostly in developed countries) in the literature that have assessed the impact of the supply of medical doctors on population health. A study by Macinko et al (2007) assessed the primary care effect size and the predicted effect on health outcomes of a

¹⁴ Reid SJ and Conco D (1999). Monitoring the implementation of community service for doctors in South Africa. Centre for Health and Social Studies, University of Natal, Durban.

¹⁵ Omole OB et al (2005). Perceptions of hospital managers regarding the impact of doctors' community service. SA Fam Pract 2005;47(8): 55-59

one-unit increase in primary care doctors per 10,000 population.¹⁶ The doctor supply was associated with improved health outcomes, including all-cause, cancer, heart disease, stroke, and infant mortality; low birth weight; life expectancy; and self-rated health. Pooled results for all-cause mortality suggested that an increase of one primary care doctor per 10,000 population was associated with an average mortality reduction of 5.3 percent, or 49 per 100,000 per year.

Experiences of an Umthombo YDF graduate medical doctor

The estimated changes in Macinko et al could be more significant for the rural populations that the Umthombo YDF graduates work in, and thus the supply of medical doctors through Umthombo YDF can be seen to be positive in the same light. The experiences of some of the graduates have shown that they can make significant contributions to health outcomes in their communities.

“When I started the TB cure rate was below 40%, by the end of the first year we managed to get it up to 60%, then we got it up again to 75% so it’s been a wonderful journey.” Lungile Hobe, medical doctor and Umthombo YDF graduate

Lungile Hobe, a medical doctor and graduate of Umthombo YDF is from Mseleni in Umkhanyakude district. She studied medicine at Nelson R Mandela Medical School at the University of KwaZulu-Natal where she graduated in 2006. After her internship, she completed her community service at Bethesda Hospital in Umkhanyakude district in 2009 and worked as a medical officer at Mseleni hospital in Umkhanyakude district from 2010 until she joined the Family Medicine registrar program at Bethesda Hospital in January 2014.

Living and working in a rural area was not easy for Lungile, she faced a lot of challenges that made her almost give up being a medical doctor all together. The hospital that she worked in was understaffed, and there was not enough support from senior medical doctors, who were also overwhelmed by hectic workloads.

“The hospital was short-staffed... we ended up having to do a lot of stuff on our own [as junior doctors] which was very, very frustrating... Everyone had always said rural medicine was horrible and I had experienced that first hand... I couldn’t stay in rural medicine, the only option was just to quit and go do fashion designing.

..in December when my contract ended I packed everything and said, ‘I’m leaving medicine’ and I stayed at home without a job.”

These challenges were not unique to Lungile and they are faced by numerous medical staff in rural areas on a daily basis. What helped Lungile overcome these challenges and stay in medicine was that she eventually got the much needed support and mentorship.

“I started working in Mseleni Hospital... I received such a warm welcome from the staff most of whom had known me as a kid. [The senior staff] were very supportive and very good with junior staff.”

At her new hospital, she was supported in her work and she managed to complete a Diploma in HIV Management.

¹⁶ Macinko J et al (2007). Quantifying the health benefits of primary care physician supply in the United States. Int JHS; 37(1): 111–126

This experience shows the importance of having more medical doctors in rural areas to support and encourage their peers. As shown in Reid and Conco (1999), increased supply of medical doctors is associated with a relief of work pressure on the health team members. This helps workers to preserve their mental fortitude and determination to endure the various challenges that they encounter.

For many of the Umthombo YDF graduates, however, the ability to endure the hardships of working in rural areas is also driven by the desire to see their communities thrive. They feel an attachment because this is where they grew up, it is the home that they share with their families. Lungile drew strength from knowing that she was home and close to her family.

“When I moved back to Mseleni I moved back home... I have remained at Mseleni because it’s comfortable and I just love being close to my mom. I think she suffered a lot when we were younger and she worked so hard to raise us... I just am glad for the years that I’ve been here, I know she just needed to see me and appreciate being around me and appreciate my success. I have also stayed for the community as well...”

“Because I grew up in the community, I schooled in the community, I kind of know what the challenges are. There are a lot of patients that are really poor, really really destitute. And I think that makes me say that I want to help as much as I can.”

The economic contributions that Lungile makes to her community and the economy can be estimated as shown in Siphamandla’s case above. Lungile does not only contribute income to the national tax pool but invests in her local community. Being in close proximity to her family helps her keep her mother and siblings out of poverty.

“My little sister couldn’t get a loan at university, and my mom was still working at that time, but she needed a lot of help. My sister was doing a degree in psychology, so she couldn’t do it alone so I had to help her. And then in 2011 when my mom retired, my little brother was still in college doing public relations. He was in his final year, so I took over his fees, and just generally taking care of him.”

Conclusions

It is possible to transform the rural health sector and improve access to health care. This can be done with leadership and the implementation of innovative rural-centric solutions. A key lesson learned from the Umthombo Youth Development Foundation is that the design of solutions to the problem of health care in rural areas can only be achieved if the rural context is taken into account. For example, staffing in rural areas will greatly be improved if local youth are trained to take leadership positions, since they are more likely to stay in their areas and are more motivated to improve them.

New models are needed in the approach to rural development, particularly in the way in which resources are allocated to the health sector. Umthombo provides an example of what works for the problem of staffing. Consideration should be made to the inclusion of such models in current development efforts.

Policy implications

The importance of Umthombo's activities cannot be overemphasized. The programme has transformed individuals and their families, and more importantly created a sustainable pool of health workers to contribute to the wellbeing of rural communities. As the nation grapples with the problem of staffing in rural areas, the Umthombo model provides evidence of what works in the development of critical mass. Since its inception, the Umthombo Youth Development Foundation has produced 254 graduates from disadvantaged backgrounds, many of whom would otherwise not have had an opportunity to study at university. The success of the programme however, is the fact that they have assisted so many disadvantaged youth to successfully navigate tertiary education and graduate, and they have managed to get a substantial number of these graduates to serve in the public sector in rural communities. Its worth can be seen in the contribution that it makes to several national and international priorities and strategies aimed at socio-economic development.

Sustainable rural development

Poverty reduction has been at the core of the government's development agenda since 1994. Several strategies have been developed and implemented, to reduce the negative effects of apartheid era policies. There was not much investment in rural South Africa, which was consequently left underdeveloped and impoverished. To foster rural development post 1994, the government adopted several measures, chief being the implementation of the Integrated Sustainable Rural Development Programme (ISRDP) in 2001. The programme was aimed at improving the lives of the rural poor through sustained local economic development.¹⁷ It advocated the harnessing of already available resources in order to eradicate poverty. The vision of the programme was "socially cohesive and stable communities with viable institutions, sustainable economies and universal access to social amenities, able to attract skilled and knowledgeable people, equipped to contribute to their own and the nation's growth and development".¹⁸ The ISRDP was focused on 15 of the country's poorest districts, one of which was Umkhanyakude district.

¹⁷ The Public Service Commission (2010). An Evaluation of Integration and Coordination in the Integrated Sustainable Rural Development Programme.

¹⁸ Department of Provincial and Local Government (2005). The Integrated Sustainable Rural Development Programme: Programme Design Document.

In 2009, the government elevated rural development to one of its top-five priorities, and created a Ministry for Rural Development and Land Reform, which adopted a Comprehensive Rural Development Programme (CRDP) as the main framework for improving the well-being of rural communities, with special emphasis on reducing unemployment, poverty and food insecurity.¹⁹ This vision has been carried over into the National Development Plan, whose aim is to eliminate poverty and reduce inequality by 2030. The NDP states that it can “realise these goals by drawing on the energies of its people, growing an inclusive economy, building capabilities, enhancing the capacity of the state, and promoting leadership and partnerships throughout society”.²⁰

The activities of Umthombo Youth Development Foundation fall within the remit of the government’s rural development agenda. It has offered rural youth an opportunity to develop careers in much needed health disciplines, and also accorded them an opportunity to generate income to support their families, essentially moving them out of poverty. The 254 success stories attest to the potential of the Umthombo Youth Development Foundation to immensely contribute to poverty alleviation if implemented at scale.

The analysis estimated potential net earnings of R15 billion that will be generated by the 254 Umthombo Youth Development Fund graduates over the next 40 years. A percentage of this will be paid in tax to boost the national fiscus and a significant amount will be used locally in the district to better the livelihoods of the graduates and their families. Many of the graduates invest in accommodation and housing, and other ventures, creating ripple effects that in turn contribute to employment creation in the district.

National Health priorities

South Africa’s national health policy is centred on the improvement of health for all through the removal of barriers to access and reduction of health inequalities. The vision of the National Department of Health is “A long and healthy life for all South Africans”, and its mission is states that it wishes “To improve health status through the prevention of illnesses and the promotion of healthy lifestyles and to consistently improve the healthcare delivery system by focusing on access, equity, efficiency, quality and sustainability”.²¹ These priorities are addressed in the activities of the Umthombo Youth Development Foundation, as it directly contributes to the development of skilled personnel who work to improve population health.

Siphamandla’s story provides a good example of how this is achieved. It is widely recognised that mental disorders contribute significantly to South Africa’s burden of disease. The prevalence of major depression is considerably high in South Africa, with lifetime depression estimated at 9% among adults.²² It has been estimated that the government spends approximately \$59 million on depression and other mental illnesses, and persons affected by mental disorders experience losses in earnings amounting to \$3.6 billion annually.²³ Similar effects can be expected in Umkhanyakude district, where the burden of mental disorders can be expected to be high due to high levels of poverty. Siphamandla’s efforts thus greatly contribute to the betterment of the population in Umkhanyakude district, offsetting the negative effects of mental disorders and ensuring a healthy and productive population.

¹⁹ <http://www.ruraldevelopment.gov.za/about-us/office-of-the-director-general/8-about-us/3-crdp#.V9HerPI97IU>

²⁰ National Planning Commission (2012). National Development Plan 2030 – Executive Summary.

²¹ National Department of Health - <http://www.health.gov.za/index.php/shortcodes/vision-mission>

²² Tomlinson M et al (2009). The epidemiology of major depression in South Africa: results from the South African Stress and Health study. SAMJ: 99:368-373

²³ Lund C et al (2012). Mental illness and lost income among adult South Africans. SPPE: 1-7

Perhaps the most important contribution of the Umthombo Youth Development Foundation to national health priorities is the development of critical mass in rural areas, which is the focus of the Human Resources for Health strategy. The success of the programme can be seen in its ability to get a large number of graduates to live and work in their rural communities. This is achieved by obtaining commitments that are reinforced in a mentorship programme that enables students to see the value of serving their communities. These resources that are being placed in rural areas will be critical to the realisation of Universal Health Coverage and the implementation of the National Health Insurance.