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PROFESSIONAL EDUCATION & TRAINING | RESEARCH ARTICLE

Context, types, and utilisation of decentralised training platforms in undergraduate medical education at four South African universities: Implications for universal health coverage

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Abstract: In concert with global developments, South Africa has embarked on an ambitious set of health care reforms towards universal health coverage (UHC) that necessitate the transformation of health workforce education. This study explored the context, types, and utilisation of decentralised training platforms (DTPs) in undergraduate medical education at four South African universities, and the implications for universal health coverage. The study was conducted at the health sciences faculties of Sefako Makgatho Health Sciences University, the University of KwaZulu-Natal, Walter Sisulu University and the University of the Witwatersrand. Following informed consent, semi-structured interviews were conducted with 17 key informants who were selected purposively based on their in-depth knowledge of and current involvement in undergraduate medical education. The questions focused on the number and type of DTPs used in undergraduate medical education, benefits of DTPs, innovations or good practices, community engagement, the challenges or constraints of DTPs and institutional investment in DTPs. The interviews were analysed using thematic analysis. The study found that context, notably the history and evolution of DTPs and the expressed vision and philosophy of medical education, influenced the type, characteristics, and utilisation of DTPs. All four



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PUBLIC INTEREST STATEMENT

The platform for the education and training of medical students is critical to achieving long-term changes in the attitudes of graduates, and their decisions to work in rural and other underserved areas. Decentralised training platforms (DTPs) have the potential to achieve these changes. These DTPs are characterised by their location away from the main university campus, and include clinics, small hospitals and community organisations. However, there is not a lot of information on these DTPs in South Africa. Hence, we interviewed key individuals in senior positions at four South African universities to obtain new knowledge on DTPs. The study found that these four universities mostly used small hospitals as DTPs, rather than clinics and community organisations that required more resources [120 words]

universities reported utilisation of various DTPs in the undergraduate medical education programmes, but there were differences in the institutional arrangements on medical education, and the type and nature of investments in DTPs. The DTPs were primarily hospital-based, with the utilisation of PHC facilities constrained by insufficient resources, and competition with clinical disciplines. DTPs are an essential component of transformative medical education, and require an explicit vision, and institutional investments in human resources, finances, and infrastructure to realise the goal of UHC.

Subjects: Higher Education; Medical Education; Primary Health Care & Family Practice

Keywords: decentralised training platforms; distributed medical education; health workforce; transformative medical education; South Africa

1. Background

The twin challenges of achieving universal health coverage (UHC) (WHO, 2014) and of solving the global health workforce crisis (WHO, 2016) cannot be achieved without transforming health professional education. The urgency to transform health professional education is hastened by the need to respond to a combination of demographic and epidemiological transitions (Crisp & Chen, 2014) and to meet the needs for health professionals in rural, remote and under-served areas (WHO, 2016). In concert with global developments, South Africa has embarked on an ambitious set of health care reforms towards UHC (NDoH, 2017) that underscore the importance of PHC and the transformation of health workforce education (Academy of Science of South Africa, 2018).

Decentralised training platforms (DTPs) refer to any education or learning environment such as a primary health care (PHC) facility, district hospital, non-governmental or community-based organisation that is used for health professional education and training. Situated away from the main university campus, DTPs exclude tertiary academic hospitals and are close to and/or engage with communities. DTPs have been proposed as one of the important strategies to achieve health workforce educational reforms, in conjunction with other reforms such as rural student selection (Frenk et al., 2010; Strasser et al., 2009; De Villiers et al., 2017; Woolley et al., 2016).

The theory of change of DTPs is exposure of students to prevalent health conditions (rather than rare conditions seen in tertiary hospitals), the social determinants of health (SDH), and the diversity of communities and cultures (Dunbabin & Levitt, 2003; Hirsh et al., 2012; Strasser et al., 2009; Strasser & Neusy, 2010). The DTPs facilitate community engagement and relationship building, enabling students to view people holistically in their social contexts (MacLeod et al., 2015; Mennin & Mennin, 2006; Strasser & Neusy, 2010). Learning in a community-based context provides an opportunity for students to experience the continuum of health care and to build socially accountable relationships with communities (Strasser et al., 2009; Woollard, 2010). Students also experience different pedagogies at the DTPs (MacLeod et al., 2015). The anticipated outcomes of DTPs are an increased proportion of skilled medical practitioners willing to work in general practice and/or rural and other under-served areas (Strasser et al., 2009) and a more equitable distribution of health professionals, especially in low and middle-income countries (LMICs) (Crisp & Chen, 2014; Woolley et al., 2016).

The majority of studies on the impact and/or critical success factors of decentralised or distributed medical education have been done in Australia (Sen Gupta et al., 2014; Solarsh et al., 2012; Woolley et al., 2016; Woolley et al., 2016), Canada (Lanphear & Strasser, 2008; Strasser et al., 2009; Strasser et al., 2018; Saxena et al., 2018; Snadden & Bates, 2005; Veerapen & Sean, 2010), and the United States of America (USA) (Cosgrove & Bar-on, 2017; Greer et al., 2018). These studies have found that rural student recruitment, different pedagogical approaches, longitudinal placements, community participation, university investment, adequate

resources, and leadership and stakeholders' support are important to achieve transformative medical education, and sustained community level impact (Greer et al., 2018; Solarsh et al., 2012; Woolley et al., 2016). In LMICs such as Vietnam (Luu & Wright, 2008) and de Souza et al., 2008), medical education reforms have focused on community-university partnerships, community-based education, and transforming curricula in support of health care system goals (de Souza, Zeferino and Ros 2008). These initiatives provide valuable lessons, but the context is different to that in South Africa, and there is insufficient published information on the DTPs.

In sub-Saharan Africa, the Medical Education Partnership Initiative (MEPI) (Goosby & Deborah, 2014 benefited 13 Medical Schools in 12 sub-Saharan African countries, including South Africa (Omaswa et al., 2018). Although the nature of the medical education reforms differed, MEPI enabled an increase in the use of and time spent at DTPs, and placement of students in rural areas (Kebaabetswe et al., 2017; Kibore et al., 2014; Kiguli-Malwadde et al., 2015; Kizito et al., 2017).

In 1994, South Africa inherited a higher education system that reflected the apartheid legacy of race, class and gender inequalities in access to and provision of higher education (The Presidency, South Africa, 2019). The 1997 Government White Paper on the transformation of Higher Education provides the policy framework for new planning, governance and funding arrangements to address the historical inequalities, structural inefficiencies and service duplication under apartheid (Department of Education, 1997). In 2016, there were 26 public Higher Education Institutions (HEIs) in South Africa (The Presidency, South Africa, 2019). Public HEIs receive government funding through the Department of Higher Education and Training. These are the only institutions that are legislated to provide medical education (Burch, 2007). At the time of the study, eight of the 26 universities provided undergraduate medical education (Van Der Merwe et al., 2016). Seven of the eight medical schools offer a six-year curriculum for the undergraduate medical degree, one offers a five-year programme, and one of the eight offers a graduate entry programme (Van Der Merwe et al., 2016). In 2014, these eight universities offered close to 2000 places to first-year medical students, with a range of 120–300 per university (Van Der Merwe et al., 2016). Notwithstanding individual institutional rules regarding admission, the majority of students admitted into the undergraduate medical programme are those who have completed the senior or school-leaving certificate (Van Der Merwe et al., 2016).

In South Africa, there have been encouraging medical education reforms since 1994, which marked the formal end of apartheid (Academy of Science of South Africa, 2018). These reforms include curriculum reforms, faculty development, and inclusion or expansion of DTPs as part of the teaching platform of medical students (Hartman, 2009). Since 2015, two scoping reviews explored the characteristics of DTPs, and the pedagogies used at these sites (Mlambo et al., 2018; De Villiers et al., 2017). One study reported that DTPs did not influence medical students' stated intention to return to these communities after graduation (Van Schalkwyk et al., 2018). Nonetheless, the reported benefits of DTPs include the expansion of the teaching platform to increase the production of medical graduates (WHO, 2013), attraction to and retention of graduates in rural and other underserved areas (Couper & Hugo, 2014), enhanced social accountability of graduates (Green-Thompson et al., 2012), and changing negative views about PHC or non-tertiary level services (Couper & Hugo, 2014; Hartman, 2009).

Importantly, knowledge gaps remain on the types of DTPs used at different universities in South Africa, whether these DTPs are an integral part of the undergraduate curriculum, the extent of engagement with, or participation of communities, and the views of key policy actors on the benefits, challenges and constraints of DTPs. Hence, the aim of this study was to explore the context, types, and utilisation of DTPs in undergraduate medical education at four South African universities, and the implications for UHC. The paper is part of a larger doctoral study on DTPs, transformation and undergraduate medical education.

2. Methods

2.1. Study setting

This study was conducted at four South African universities: Sefako Makgatho Health Sciences University (SMU), the University of KwaZulu-Natal (UKZN), Walter Sisulu University (WSU) and the University of the Witwatersrand (Wits). These four universities were selected purposively, as part of a larger study funded by the South African National Research Foundation (NRF). These four universities constitute 50% of the universities that offer under-graduate medical education (Van Der Merwe et al., 2016). Furthermore, the four universities provide examples of different levels of resources, urban or rural location, and length of time since the commencement of medical education. Refer to [Table 1](#) for an overview of the study setting.

2.2. Study design

This was a comparative case study, using qualitative methods, specifically in-depth interviews with key informants in the four selected universities. The interviews were complemented with a review of each institution's curriculum documentation for final year students in the medical programme.

Table 1. Overview of the study setting

Characteristic	SMU	UKZN	WSU	Wits
Provincial location	Gauteng	KwaZulu Natal	Eastern Cape	Gauteng
Size of the provincial population*	15 176 116 (25.8%)	11 289 086 (19.2%)	6 712 276 (11.4%)	15 176 116 (25.8%)
Urban-rural population distribution	Urban 97.2% Rural 2.8%	Urban 46.0% Rural 54.0%	Urban 38.8% Rural 61.2%	Urban 97.2% Rural 2.8%
Historical background(Burch, 2007)	Previously known as Medical University of South Africa (MEDUNSA), which opened a medical school in 1977, SMU was established in 2014.	Established in 2004 through the merger of University of Natal, opened medical school in 1951, and the University of Durban-Westville.	WSU formed by a merger between the previously known as University of the Transkei (UNITRA), and the former Border and Eastern Cape technikons. University of Transkei opened medical school in 1986. WSU was established in 1977.	Classified as a historically white university had the year medical school opened as 1921.
Total student population	6 410	46 510	32,081	38 350
Length of medical degree programme	6 years	6 years	6 years	6 years for 2/3 of students. Only university in South Africa with graduate entry medical programme- graduates who meet the entry requirements, do four years of study
Annual first-year medical student intake	~230	~250	~150	~250

*Statistics South Africa: Mid-year Population Estimates 2019(STATS SA 2019)

Census 2001: Investigation into appropriate definitions of urban and rural areas for South Africa(STATS SA, 2003)

2.3. Key informant selection

The aim of the study was to explore the context and utilisation of DTPs at the four selected universities. Consequently, the principal researcher selected key informants purposively based on their roles, current involvement in the undergraduate medical education and in-depth knowledge of DTPs. At each university, the senior academic (dean or other designation) responsible for teaching and learning was interviewed (four individuals). The principal researchers also interviewed four heads of departments from family medicine, three heads of departments from obstetrics and gynaecology, three heads of departments from public health, two heads of departments from paediatrics and one co-ordinator from an undergraduate unit for medical education.

These individuals met the criteria for the comparative case study (Tomaszewski et al., 2020), as they were the custodians of the undergraduate medical education programmes. These departments have historically used DTPs in the teaching of medical students. Hence, we identified 20 potential key informants to interview.

2.4. Development of the interview guide

In line with the study objectives, the interview guide focused on: the nature, number and type of DTPs used in undergraduate medical education; inter-professional education; university investment; resource allocation; perceived benefits of DTPs; institutional innovations; community engagement and relationships; and the challenges or constraints of DTPs. Three researchers assisted with the content validity of the interview guide.

The interview guide was piloted with an educational expert to determine clarity of questions, applicability across four universities: and the length of time taken for the interview. The educational expert has extensive experience of under-graduate health professional education, including medical education. At one stage, the person headed the education unit at one of the four selected universities, with the institutional memory on medical education transformation initiatives, including policy decisions on DTPs. The expert recommended a change to the flow of questions, which was implemented after the pilot.

2.5. Data collection

The principal researcher (ARD) contacted key informants to request their voluntary participation. Once the key informant agreed to participate, the principal researcher arranged to conduct the interview at a convenient time and venue. Each key informant received a verbal explanation of the study and a detailed information sheet. Following written, informed consent for both the interview and recording, the principal researcher conducted the interview using the interview guide. At the end of the interview, the principal researcher requested a comprehensive list of the DTPs utilised, and copies of the undergraduate medical education curricula, including DTP objectives.

All interviews were conducted in English and recorded digitally. Each interview lasted an average of 40 minutes, but the length of time varied depending on the key informant responses. The principal researcher also took detailed notes. All data was stored on a password-protected computer.

2.6. Data analysis

Each interview was allocated a unique identifier to ensure confidentiality of information and transcribed verbatim. The principal researcher ensured quality assurance of all the transcribed interviews.

The interviews were analysed using thematic analysis and inductive coding (Joffe, 2012). The initial step in the analysis was to read, and re-read the interviews to ensure familiarisation of the data (Braun & Clarke, 2006). Three researchers—the principal researcher, supervisor and a senior external academic with extensive teaching expertise—read and coded three interviews independently. Once the codes were generated, a meeting was held to agree on codes and to generate themes, thereby ensuring inter-coder-reliability (Nowell et al., 2017). The principal researcher coded the remainder of the interviews systematically.

2.7. Ethical considerations

The Human Research Ethics Committee (Medical) of the University of the Witwatersrand approved the study (M170 704). All ethical guidelines were complied with, including a detailed information sheet, informed, written consent, voluntary participation, and confidentiality and anonymity of individual responses. The digital recordings of the interviews are stored on a password-protected computer. These recordings will be deleted two years after the publication of the PhD thesis.

2.8. Trustworthiness and rigor

We ensured credibility by prolonged engagement with key informants, audio recording of the interviews, verbatim transcription of the data, and ongoing quality assurance (Mandal, 2018). We ensured dependability by having a semi-structured interview schedule and a detailed description of the methods, data collection and analysis. Conformability was ensured through independent coding of three, diverse interview transcripts, discussion of, and agreement on, the codes and themes by three researchers, and application of the themes to the data (Mandal, 2018; Nowell et al., 2017).

3. Results

3.1. Characteristics of key informants

The principal researcher conducted 18 in-depth interviews, made up as follows: SMU (4); UKZN (4); Wits (6) and WSU (4). One key informant participated in the interview, but upon completion requested that the information be withdrawn. One prospective key informant withdrew from the interviews because there was no utilisation of DTPs at the time of interviews. One key informant was unable to commit to an interview date and time and after seven attempts to schedule the interview, the person was excluded. Hence, we present the results of 17 key informant interviews.

The majority of the key informants were male (10/17 = 59%), which could be due to the skewed gender profile of senior academic staff at the selected universities. There were variations in the length of time of the key informants in their respective portfolios that ranged from two years at the time of the interview, to more than 30 years. All the key informants were well positioned to speak about their respective medical education programmes and of the characteristics and utilisation of DTPs.

3.2. Emerging themes

Although inter-related and inter-dependent, five themes emerged from the interviews. These themes and sub-themes are shown in Table 2 and described further below.

3.3. Institutional arrangements on medical education

All four institutions had a senior academic responsible for teaching and learning of all undergraduate health sciences students, who provided strategic leadership of health professional education and participated in the health sciences executive management structures.

Three institutions (SMU, WSU and Wits) have specialised units to oversee and coordinate undergraduate medical education programmes. SMU established their unit in 2003, WSU in 2014 and Wits in 2016. At UKZN, a specialised unit for DTPs was established in 2016 as a joint initiative of the KwaZulu-Natal Department of Health (KZN-DOH) and UKZN's College of Health Sciences.

3.4. Context of DTPs

Key informants reported that the context fundamentally shapes DTPs utilised in the undergraduate medical education programmes. This context includes the history and evolution of DTPs at each institution and within each of the selected disciplines, the interplay of political and social factors, and the institutional vision of DTPs.

Table 2. Summary of themes and subthemes

Theme	Subtheme/s
(1) Institutional arrangements on medical education	• Leadership and management of medical education • Level of seniority
(2) Context of DTPs	• History and evolution of DTPs • Political and social factors • Institutional vision of DTPs
(3) Philosophy of medical education	• Community-based education • Social accountability • Inter-professional education • Focus on social determinants of health
(4) Characteristics of DTPs	• Geographical location • Type of DTP • Practice of DTPs (site utilization, length of rotation, integration/synergies) • Logistics • Supervision of students • Engagement and representation of stakeholders
(5) Investments in decentralised education and training	• Investment in human resources • Financial investment • Infrastructure and technology investment

Three of the four institutions (SMU, WSU and Wits) indicated that the institution's commitment to DTPs evolved from the changing context of medical education as well as global and national imperatives for the transformation of medical education. Only the UKZN curriculum documentation included DTPs and associated guidelines explicitly.

At SMU, key informants indicated that there is a long history of DTPs, with strong PHC and community focus, which starts early in the undergraduate programme. Students do home visits and complete a community resource visit.

They do their home visit, and there's also an assignment, called the community resource visit. They [medical students] identify the resources around the clinic, or around the hospital, and they visit one resource. The [students] say: "We are learning more about the community, also family medicine, because it's not only a clinical problem." (KI 11, SMU)

However, the extent of DTP utilisation varied across the disciplines, and the exposure to PHC appears to be for short periods. Some key informants highlighted the poverty in many of the surrounding communities, which in turn shapes both the experiences, attitudes, and safety of students at these DTPs, and ultimately their utilisation.

At UKZN, key informants highlighted major developments since 2010, including curriculum changes, increased integration across disciplines, a strong PHC approach, community-oriented primary care in family medicine, and significant university investments in decentralised medical education.

The organisational decentralisation, so a shift within the system, moving from tertiary to primary and then to the community. In first year, that's all at Medical School, second year the selectives are actually in PHC clinics and in the community. The fourth year IPC (Integrated Primary Care) 1 is in PHC clinics. The fifth year is in the district hospital OPD. And final year is in the rural district hospitals, but within that block they go out with the ward-based outreach team,

the WBOTs. And then we've also got a volunteer program where students can choose to live in the community. (KI 4, UKZN)

Key informants highlighted that the PHC and public health content of the majority of the lectures was elementary.

It's a year-long module that undergraduates are exposed to, in which we coordinate, but it is joint input from Public Health Medicine, Family Medicine, Behavioural Medicine, and Occupation Environmental Health. The majority of the lectures focus on public health, and dealing with the history of public health, introducing them to concepts of primary health care and public health, and concepts of epidemiology and disease burden. (KI 02, UKZN)

Transformative medical education was seen as an important UKZN mandate, which involved curriculum changes, a formal memorandum of agreement with the provincial department of health, and innovations like homestays. The latter is a voluntary programme where medical students can choose to live with families in the community.

Although DTPs have been used since 1992, WSU introduced the Integrated Longitudinal Community Clerkship in 2014. This involves fifth year medical students spending 20 weeks at one of the designated DTPs. Key informants highlighted the support from the provincial department of health, with joint appointment of staff at the decentralised sites whose responsibility is to teach the students. The benefits of the longitudinal clerkship included students choosing rural areas where they grew up and giving inspirational talks to high school students.

Wits University has utilised DTPs for more than 30 years, but the type of DTP, innovations, and relationships with provincial health departments have changed over the period. Key informants pointed out that PHC clinics were the predominant DTPs used in the early years, as well as the "rural" block as part of public health. However, because of larger class sizes, and logistical difficulties, there has been a reduced utilisation of PHC clinics for medical training.

Wits University has invested variably in PHC facilities in Gauteng Province and in the Wits Rural Facility in Mpumalanga Province. Since 2014, Wits has invested in a large regional hospital in North West Province. Key informants pointed out that the attractiveness of the latter is its ability to serve as a DTP for more than one clinical discipline. However, this necessitates University partnerships with three provinces, which introduced both complexities, and changes in the DTPs and/or relationships with stakeholders.

3.5. Philosophy of medical education

The majority of key informants reported on educational changes introduced, especially in the preceding decade. They underscored the importance of medical curricula that are responsive to the needs of communities, while ensuring the production of competent medical doctors who meet the requirements of the Health Professions Council of South Africa (HPCSA). Key informants described the underlying medical education philosophies implicitly, and varied teaching approaches including the use of standard national guidelines, logbooks, portfolios, clinical case studies, case scenarios, simulated learning tools, clinical procedures and video presentations. However, the curricula were not explicit on the underlying educational philosophies at the DTPs.

At SMU, the key informants highlighted community-based education, a strong focus on relationships with communities and with the health facilities, the importance of the social determinants of health, and of social accountability. This is embedded in the first-year medical student community profile of which students have to give feedback on the assessment to the community, as well as provide practical advice.

At UKZN, WSU and Wits University, key informants also referred to community engagement, community-based education and social accountability, and the importance of teaching medical students about the social determinants of health.

Key informants at WSU emphasised community-centredness and social accountability embedded in the programme.

Also, that social accountability, responsibility. They (medical students) know ... if you interview at the end of their ILCC (Integrated Longitudinal Community Clerkship), they know that they need to go back to these rural areas. (KI 4, WSU)

At Wits University, key informants highlighted social accountability, community-based interactions as part of different disciplinary activities, and both a recognition of, and teaching on the social determinants of health.

In their fifth year, they go out to Bushbuckridge [a rural area] as part of their public health block. We expose them to programmes outside the health facility that are related to public health and to the prevention of disease. So environmental health, the malaria control programme as a population-based intervention, they visit the homes, they talk to people in the home, just to get a sense of people's living conditions, environment where people live, and some of the health needs of people. (KI 10, Wits)

3.6. Characteristics of DTPs

The institutional context, the evolution and nature of the medical education programme and the needs of individual clinical disciplines influenced the characteristics of the DTPs, with great variation across the four institutions.

SMU reported a mix of DTPs in urban, informal settlements and in rural areas dependent on availability and proximity to the main campus for logistical reasons. The DTPs include community visits, PHC facilities, and district hospitals, but implementation of DTPs is complex.

In first year, they spend four days, four Fridays. In second year, they spend five Wednesdays. In third year, they spend five Tuesday afternoons in the one block, and then one Tuesday afternoon in the other block, so it's about six Tuesdays. In fourth year, they go on two Mondays, two Thursdays, to clinic areas and communities, and two Saturdays to casualties also. In year five, we do not send students out. (KI 4, SMU)

The SMU programme employs doctors and nurses as supervisors, and they utilised custom-developed learning guides. Key informants reported that patients and communities were happy with the services provided by staff and students, and often expressed a desire for more services. Other key informants highlighted that internet connectivity and safety considerations play an important role in the utilisation of DTPs.

UKZN DTPs include a mix of community-based sites, PHC facilities, and rural district hospitals. The disciplines of Family Medicine and Public Health at UKZN work closely together, creating continuity across the first three years of the programme. Fourth- and fifth-year students are based primarily at PHC clinics and in the outpatient departments of district hospital respectively. In the final year, there is a seven-week rural block where the students spend six weeks in the rural hospital as junior interns.

As with SMU, key informant interviews highlighted the complexity of DTPs, across the entire under-graduate medical education programme.

Our decentralised platforms are our clinical education platforms in the later years. Our entire fifth year program is on a decentralised platform, meaning that is away from the central or traditional clinical platforms that were Durban based. (KI 13, UKZN)

Key informants underscored critical success factors of financial and human resources, and good relationships with stakeholders, especially the provincial department of health. While investment in supervision at the DTPs and building relationships with staff at rural sites have been positive, reported challenges included high turnover of staff at some DTPs and under-investment in public health.

At WSU, the majority of DTPs consist of PHC facilities and district hospitals in rural areas. The university has invested in comfortable student accommodation on hospital premises, with the necessary infrastructure. In some hospitals, the authorities have provided student accommodation, with joint management of the accommodation, while transport is a university responsibility. Key informants highlighted the good relationships with the provincial Department of Health. Students are also encouraged to use the hospital's facilities and to interact with other professionals, mostly nursing students. Notwithstanding WSU's 20-week integrated longitudinal community clerkship, key informants highlighted the challenge of community participation and/or relationships:

In the main, it [community participation] has not yet happened. The community is aware that there are students because we would go and inform the hospital boards that there are students that will be spending some time. Even those students do outreach, so they visit the nearest clinics, but it's still within the facility. They have not yet gone out to the community. (KI 4, WSU)

At Wits University, the DTPs used were dependent on the relevant discipline, but included a mix of urban and rural sites, the latter primarily used by public health. Some key informants reported that the utilisation of PHC facilities has diminished over the years, mainly due to logistical issues. These include transport of students to clinics and getting clinic staff to teach students. In addition, the relationships with the local authority have also changed over the years.

The University has invested in the upgrading of the Wits Rural Facility (WRF) in a rural part of the Mpumalanga Province. The WRF includes comfortable staff and student accommodation, recreational facilities, as well as information technology infrastructure. Additional investments have been made in the North West Province regional hospital DTP for provision of transport, accommodation, computers, and internet connectivity. The practice of DTPs varies, depending on the relevant disciplines. One key informant explained the family medicine DTP as follows:

The primary vehicle by which we train our undergraduate medical students, is a programme called the Integrated Primary Care rotation. It hosts some 55 students spread across 12 different sites who spend a six-week rotation as one of seven blocks during their final year. (KI 9, Wits)

Key informants highlighted that there is good administrative support and good supervision at the DTPs. Stakeholder engagement was mostly with staff at the DTPs, with reportedly little engagement with actual communities.

3.7. Investments in decentralised education and training

At each university, key informants described the investments made in decentralised medical education and training. These included infrastructure (new buildings, student accommodation, libraries, etc.), information technology, and transport for students, human resources, and finances.

Key informants at all four institutions highlighted the importance of the financial investments through government grants, university investments and donor funding. This financial investment

has facilitated the joint appointment of staff between the Universities and the Department of Health at DTPs, provision of infrastructure, technology, accommodation and transport services.

Most of the human resource (faculty) investments have been in the form of joint provincial government-university appointments. This means that the provincial health department pays the salaries of the joint staff, who have an appropriate university appointment (e.g., lecturer, or professor) that allows access to university resources. Key informants questioned the sustainability of these appointments because of the relative lack of control of universities. In addition, the confusion and/or lack of clarity of the role and responsibilities of the preceptors at the DTPs could further undermine the sustainability of the DTPs. Key informants at all universities also underscored the importance of investing in relationships, especially with provincial government health departments, and for intellectual investment in DTPs.

4. Discussion

This study has generated new knowledge on the institutional context, the types, and utilisation of DTPs in undergraduate medical education at four South African universities.

All the selected universities in this study have embarked on reforms in undergraduate medical education. These reforms included the creation of specialised units to oversee and coordinate undergraduate medical education programme, the appointment of senior academics, curriculum reforms, and the expansion of DTPs. There have also been various innovations, ranging from longitudinal placements of medical students at DTPs (SMU, WSU), to an entire DCTP at UKZN and a multi-disciplinary Wits Rural Facility. These reforms have been in response to the changing context of medical education and global and national education transformation imperatives. These reforms at the four universities are encouraging and appear to respond to the WHO's vision of, and guidelines on, the transformation of health professional education to ensure that graduates are responsive to health needs (WHO, 2013).

The study found that context, notably the institutional history and evolution of DTPs and the expressed vision and philosophy of medical education, influenced the type, characteristics, and utilisation of DTPs at the four universities. Notwithstanding the reported utilisation of DTPs in all four medical education programmes, these DTPs were primarily hospital-based. At SMU, the exposure to PHC is for short periods, in part due to the small size of PHC clinics relative to the number of students, logistical issues such as transport, and safety concerns. UKZN's innovative homestay programme is a voluntary programme of short duration. The utilisation of PHC facilities is constrained by insufficient resources, and competition with the time required for the clinical disciplines. Similarly, WSU's innovative Integrated Longitudinal Community Clerkship is based at rural, district hospitals. While this is positive because of the rural exposure, relationships with communities are transient, and a PHC focus insufficient. Although Wits has utilised DTPs for more than 30 years, PHC and rural DTPs appear to be peripheral activities, rather than central to the medical education programme. The university rationale for the investment in a large regional hospital in a more rural province is the hospital's ability to serve as a DTP for more than one clinical discipline.

Our study findings suggest that hospital-based DTPs are unlikely to achieve the medical education reforms needed for UHC. This is because PHC is critical for the achievement of UHC globally (WHO, 2019) and in South Africa (Academy of Science of South Africa, 2018). Given the relative neglect of PHC DTPs at all four universities, there must be a concerted effort to prioritise PHC, and to invest sufficiently in making PHC training a significant part of medical education. This has been done in Malaysia where faculty at Monash university introduced one year-long clerkships at public PHC clinics (Solarsh et al., 2012). Such expansion and investment in PHC DTPs will enable medical students to emerge in PHC within the context that they will practice once they graduate (Hartman, 2009).

WSU has the longest student exposure of 20 continuous weeks at rural district hospitals. However, across the four universities the medical student immersion at rural DTPs appears to be insufficient. Existing evidence, albeit from high-income countries, suggest that the development and retention of a rural medical workforce requires long-term investment and prolonged rural exposure (Bing-You et al., 2014; Denz-Penhey et al., 2005; Sen Gupta et al., 2014; Talib et al., 2013; T. Woolley et al., 2016).

At all the study sites, the curricula reviewed were not explicit on the underlying educational philosophies at the DTPs. Although the key informants' narratives emphasised responsiveness to community needs, community-based education, and social accountability, these intentions do not appear to have translated into demonstrable relationships with communities. The challenges of community-service interaction were also found in a study in Brazil that evaluated a dedicated programme to transform medical curricula in support of the needs of the national healthcare system (de Souza, Zeferino and Ros 2008).

The reported teaching on the social determinants of health at all study sites is commendable, but this is done by the public health and/or family medicine portfolios. In the case of public health, the discipline remains under-resourced, and neglected, competing for time, space and resource prioritisation. Exploring the disconnections between medical education and medical practice, Benatar and Daneman have argued that "improvement in health also requires education on disease prevention and public health, and greater emphasis on the social and societal determinants of health" (Benatar & Daneman, 2020): page 1293.

The finance, infrastructure, and human resource investments varied across the four universities and across disciplines, with the clinical disciplines as the main beneficiaries. Some key informants highlighted the importance of long-term relationships with provincial health departments, hospital managers, and staff at the DTPs. Although these investments are commendable, a study on medical schools in sub-Saharan Africa stressed the importance of ongoing investments in medical education (Mullan et al., 2011). Our study found that there were insufficient investments in community-university relationships, that were either evolving, transient, or largely absent. The experience in other countries has shown that tangible resources and shared community-university initiatives helped to develop positive and trusting collaborative relationships (Perrault et al., 2011). Hence, more efforts are needed to ensure community participation, and socially accountable medical education programmes.

The study is limited by the relatively small number of key informants interviewed. However, the people interviewed were the key policy actors at the four universities, who shape and make decisions about undergraduate medical education, and hence the universe of perspectives were captured. The study found a lack of/or insufficient written information on DTPs, which is a limitation. This revealed the relative lack of prioritisation of DTPs across the study sites. The study focused on four of the ten South African universities that provide undergraduate medical education and may not be representative of all the undergraduate medical education programmes. The units at the universities that are responsible for the coordination of the undergraduate medical education programmes have been in existence for a number of years. A specialised unit for DTPs, the joint initiative of the KwaZulu-Natal Department of Health (KZN-DOH) and UKZN's College of Health Sciences, at UKZN was established in 2016. The study provides rich insights into context, types and utilisation of DTPs at these four universities, which combined, produce more than half of the country's young doctors. The comparative case study provides lessons for similar settings in other LMICs.

The medical education reforms, including academic leadership, innovations and investments at the four universities are commendable. Nonetheless, the DTPs remain primarily hospital-based, the PHC exposure is short, transient relationships with communities exist, the education on social determinants of health is not mainstreamed and inter-professional education happens by chance. DTPs provide major opportunities for transformation of health professional education in support of South Africa's UHC reforms (Greysen et al., 2011; Hartman et al., 2012). However, this can only be

realised with effective and visionary university leadership and governance (van Schalkwyk et al., 2020).

5. Conclusion

South Africa's ambitious health sector reforms will need to be complemented by health workforce educational reforms. DTPs are an essential component of transformative medical education, and require an explicit vision, and institutional investments in human resources, finances, and infrastructure.

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Data availability statement

Data cannot be shared publicly because the study consisted of in-depth interviews with senior academics at each of the selected universities. The Human Research Ethics Committee (Medical) of the University of the Witwatersrand (contact via <https://www.wits.ac.za/ethics/human-research-ethics-committee-medical>) has imposed restrictions because of the confidential and sensitive nature of the data. Data are available upon request from researchers who meet the criteria for access to confidential information, to contact: Zanele Ndlovu, the Administrative Officer in the Research Office via email Zanele.Ndlovu@wits.ac.za

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