Implementation of early hearing detection and intervention (EHDI) is a significant challenge in the South African context, despite its documented benefits. South Africa, like other low and middle-income (LAMI) countries, is confronted with specific contextual realities. These include the lack of a government mandate for universal newborn hearing screening (UNHS), major resource constraints, a high burden of disease with which EHDI has to compete, and significantly poor social determinants of health. This chapter deliberates on the various issues plaguing early detection in South Africa. It begins by describing the South African health care context and its challenges. This is followed by a more detailed and focused review of literature on the challenges around demand versus capacity and resources, the burden of disease, as well as research evidence on newborn hearing screening (NHS) in South Africa. A call for a ‘doing better with less’ approach is presented. Lastly, possible solutions and recommendations for hearing detection initiatives in the South African context are offered.

The former South African health minister, Aaron Motsoaledi (2012), pronounced ‘a long and healthy life’ as a motto guiding the ministry’s health strategy for the country during his tenure. This motto is supported by a key motivation for the national health insurance (NHI) plan reflected in the White Paper on NHI (Department of Health [DoH], 2017) and its subsequent National Health Insurance Bill of 2019. NHI is justified for the country because South Africa believes that access to health care is a human right. NHI is based on the following principles: the right to access health care, as outlined in the Bill of Rights, Section 27 of the Constitution of the Republic of South Africa (Act 108 of 1996); social solidarity, which relies on cross-subsidisation between the young and old, rich and poor as well as the healthy and the sick; equity; health care as a public good and not a commodity of trade; affordability, which implies reasonable cost as well as the sustainability of health care within the country’s available resources; efficiency with regard to value for money; effectiveness, which means that expected outcomes are obtained and acceptable standards of quality exist; and, lastly, appropriateness to the context and various levels of care (DoH, 2017).
The White Paper on NHI (DoH, 2017, p. 1) asserts that ‘good health is an essential value of the social and economic life of humans and is an indispensable prerequisite’. NHI aims to achieve a healthier nation, where people live longer and suffer less illness. This aim correlates with the goals of EHDI. NHI also aims to prevent illness and to ensure that patients receive treatment at an early stage of illness to avoid complications. Again, this is consistent with the goals of early intervention for children with hearing impairment. Furthermore, NHI aims to have family health teams in all neighbourhoods providing preventive health services and home-based care – strategies that improve access to health care services and would, for EHDI, be contextually relevant and responsive. Lastly, NHI encourages the expansion of primary health care (PHC) services, a model of health care that the South African government has adopted.

The South African hospital sector has distinct divisions between old historical divides and new developments, as well as between public and private health sectors. The public health sector services over 80 percent of South African citizens, who are not privately funded. The NHI proposes a harmonised approach to health care where citizens can access health services in both the public and private sectors at the NHI’s cost, irrespective of their socio-economic status. This indicates the South African government’s intention to achieve universal health coverage (UHC) and access to a high quality of care (Ranchod et al., 2017). However, this needs to occur in the context of the country attending to the long-term goal of tackling the social determinants of health. This has been acknowledged as a long journey where ‘the circumstances in which people are born, grow up, live, work and age, and the systems put in place to deal with illness are enhanced’ (Commission on the Social Determinants of Health [CSDH], 2008, p. 2). I believe that this approach should also carefully consider the risks and benefits of any initiative adopted to address health challenges in this resource-constrained context. This would require consideration of potential harms and positive effects of all audiology clinical initiatives, such as EHDI interventions and programmes adopted by the country. These would need to be checked for contextual relevance, responsiveness and accountability. Interventions and programmes should be systematic, comprehensive, have a strategic plan behind them, and involve audiologists in all stages, from their development to implementation and monitoring.

The World Health Organization’s (WHO) director-general, Tedros Adhanom Ghebreyesus (2017), asserts that all roads lead to UHC, highlighting that this is the goal. He acknowledges that countries adopt different paths to achieving UHC, whether public or private, but emphasises that countries ‘need to know where they stand on UHC, benchmarked against others’ (Ghebreyesus, 2017, e839). Furthermore, he stresses that UHC is not an end in itself, but allows realisation of other health-related sustainable development goals. Together
with the World Bank, the WHO has furnished guidance on tracking progress towards UHC in the form of the UHC service coverage index (Hogan, Stevens, Hosseinpoor, & Boerma, 2018; WHO, 2017).

South Africa is nowhere close to achieving UHC. Although NHI plans continue, final implementation dates have not been given. There are numerous challenges to achieving UHC in the near future in the country (Petersen & Ramma, 2015). These implementation challenges raise serious implications for attaining EHDI goals. Health financing remains a major challenge for the South African government. State spending on health is expected to grow by 7.8 percent per annum between 2017/18 and 2020/21. This is lower than the expected growth in spending on ‘learning and culture’ (8.5 percent) and social development (9.2 percent) (National Treasury, 2018, pp. 56–61). Consolidated government expenditure on health for the 2018/19 financial year was expected to be R191.685 billion, growing to R205.448 billion, R222.046 billion and R240.297 billion in the medium term. Noting that ‘provinces face substantial spending pressures in health and education’, Treasury indicated that the health sector is ‘working with provincial treasuries on a three-year turnaround plan’ (National Treasury, 2018, p. 72). A major challenge remains that of managing the public sector wage bill while simultaneously confronting increasing demands for health care services from an already overextended public health sector. The increasing demands for health care services arise in the context of insufficient capacity when it comes to health care professionals. Although this is a global phenomenon, the challenge is significantly greater in LAMI countries like South Africa, where the burden of disease is also much higher.

Demand versus capacity and resources

Globally, it is predicted that there will be a net shortage of 15 million health care workers by 2030, with middle-income countries unable to meet their own demand (Wilford et al., 2018). Wilford and colleagues (2018) advise that in order to boost efficiency, all health systems will need to explore task shifting and upskilling, making best use of community health workers (CHWs). In the case of EHDI, I suggest training PHC nurses. It has been argued that CHWs are central to integrated HIV and tuberculosis (TB) care and cover important gaps in maternal and child services (Wilford et al., 2018). Such strategies are important now in the developing world, and not just for 2030. Decentralising and professionalising certain aspects of service delivery, such as screening, as part of preventative care requires increased attention in order for the PHC approach to be successful in South Africa. Task sharing, task shifting and role release are important considerations given the human resource predicament the country finds itself in. This includes
training nurses, volunteers and CHWs. Clear minimum standards for training non-professionals would need to be established, and clear and specific scopes of practice promulgated. This would ensure protection of the public and prevent malpractice claims, which are a significant expenditure and undesirable in a resource-constrained context like South Africa. The National Treasury (2018) has acknowledged the impact on provincial health budgets of the contingent liabilities for malpractice claims. It noted that the ‘value of claims against health departments grew from R43.1 billion in 2016 to R56.3 billion in 2017’, and, while acknowledging that ‘some of these claims relate to serious errors in clinical practice or hospital management . . . others appear to be unjustified or excessive’ (National Treasury, 2018, p. 75).

As far as scopes of practice are concerned, role ambiguity and conflict are important impediments to the effective implementation of decentralised services. For example, implementation of district-based clinical specialist teams in South Africa is reportedly significantly impacted by role ambiguity and conflict (Oboirien, Harris, Goudge, & Eyles, 2018). It has been argued that having family physicians on the staff of both community health centres and district hospitals would lead to improved care. However, this has not been found to be true in the South African context, where the results have been mixed (Von Pressentin et al., 2018). Staff retention at this level of care was challenging. In a survey of 514 health care professionals (including doctors, dentists, dental therapists, pharmacists, physiotherapists and radiographers) employed at public sector district hospitals in KwaZulu-Natal, findings showed that 87 percent had worked in such settings for five years or less, while 65 percent planned to leave in the near future (29 percent at the end of the year in which the survey was conducted) (Ross, Gumede, & Mianda, 2017). Staff retention challenges are linked to limited career paths; budgetary constraints, including poor salaries; as well as the increasing pressure to accommodate ever-larger numbers of interns and community service practitioners (Health Systems Trust, 2018). These challenges apply equally in the speech-language and hearing (SLH) professions, and have significant implications for the provision of SLH services, including EHDI implementation.

According to the South African Health Review (Health Systems Trust, 2018), although over 80 percent of the South African population depends entirely on public health facilities, only 30 percent of specialists work in that sector. Only 3 out of every 10 doctors on the professional register work in public hospitals and clinics; 1 in 10 registered dentists works in a public hospital or clinic; 4 in 10 registered professional nurses work in public health facilities, with half of enrolled nurses employed in the public health sector; only 1 in 10 registered pharmacists works in a public hospital or clinic; fewer than 2 in 10 registered physiotherapists work in public facilities; and about 1 in 20 registered psychologists works in the public sector. Figure 5.1 and Table 5.1 depict numbers of SLH professionals registered
### Figure 5.1
SLH professionals registered with the HPCSA nationally, January 2020

Source: Based on data obtained from the HPCSA registration department (HPCSA, 2018a)

### Table 5.1: SLH professionals registered with the HPCSA in January 2020 by province

<table>
<thead>
<tr>
<th>SLH category</th>
<th>Aud</th>
<th>HAA</th>
<th>ST</th>
<th>STA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Cape</td>
<td>33</td>
<td>16</td>
<td>51</td>
<td>40</td>
</tr>
<tr>
<td>Free State</td>
<td>15</td>
<td>4</td>
<td>33</td>
<td>33</td>
</tr>
<tr>
<td>Gauteng</td>
<td>233</td>
<td>61</td>
<td>363</td>
<td>949</td>
</tr>
<tr>
<td>KwaZulu-Natal</td>
<td>273</td>
<td>25</td>
<td>278</td>
<td>131</td>
</tr>
<tr>
<td>Limpopo</td>
<td>23</td>
<td>11</td>
<td>15</td>
<td>107</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>47</td>
<td>5</td>
<td>55</td>
<td>88</td>
</tr>
<tr>
<td>North West</td>
<td>7</td>
<td>8</td>
<td>17</td>
<td>35</td>
</tr>
<tr>
<td>Northern Cape</td>
<td>11</td>
<td>6</td>
<td>22</td>
<td>10</td>
</tr>
<tr>
<td>Western Cape</td>
<td>141</td>
<td>28</td>
<td>440</td>
<td>197</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>783</td>
<td>164</td>
<td>1274</td>
<td>1590</td>
</tr>
</tbody>
</table>

Source: Based on data obtained from the HPCSA registration department (HPCSA, 2018a)

Note: Aud = audiologist; HAA = hearing aid acoustician; ST = speech therapist; STA = speech therapist and audiologist
with the Health Professions Council of South Africa (HPCSA) by January 2020, for the entire South African population, clearly highlighting the demand–capacity challenge. The lack of staffing norms for the SLH professions in the South African context complicates this scenario, as lobbying for posts becomes challenging.

State health spending in South Africa is challenging at a time of low economic growth and fiscal constraint (Blecher et al., 2017), with R183 billion having been spent in the public sector alone in 2017/18 (United Nations Children’s Fund [UNICEF], 2017). This lack of adequate funding has led to the health sector responding in various ways, with implications for EHDI implementation: personnel numbers have been reduced and various posts frozen when vacated; there is a focus on greater savings on medicine tenders; the establishment of ministerial non-negotiable budget items; budget cuts on administration and expenditure as well as on buildings and medical equipment; budget cuts on capital projects and equipment purchases; and increased emphasis on PHC (Blecher et al., 2017). Currently, the public health sector is in a well-documented staff crisis (Akintola, Gwelo, Labonté, & Appadu, 2016; Bateman, 2007), with the quality of care compromised and remaining staff overextended. These challenges affect health care initiatives, particularly those aimed at issues that are not considered life threatening, such as hearing impairment. It is therefore a challenge to implement EHDI in South Africa as it has to compete for attention with highly prevalent life-threatening communicable diseases such as HIV/AIDS and TB.

**Burden of disease**

HIV is the greatest contributor to the burden of disease in South Africa and uses most of the health budget. Health resources and the budget are geared towards curbing mortality, with insufficient attention being given to other health issues. The country in fact faces a quadruple burden of disease: maternal, newborn and child health; HIV/AIDS and TB; non-communicable diseases; and violence and injury. This quadruple burden, HIV/AIDS in particular, results in an increased workload for SLH professions. Thus, increased HIV infection rates raise implications for EHDI implementation, as detailed in chapter 11.

The most recent Joint United Nations Programme on HIV/AIDS (UNAIDS, 2019) estimates are that there were 37.9 million people living with HIV by the end of 2018, of whom 1.7 million were children. There were 1.7 million new HIV infections globally in 2018, with 160 000 being children aged 15 years or younger. Around 770 000 people worldwide died of AIDS-related deaths in
2018, with a 33 percent decline in AIDS-related mortality since 2010 (UNAIDS, 2019). South Africa, a developing middle-income country, is reported to have among the highest HIV/AIDS prevalence rates in the world, with 7.7 million people living with HIV in 2018, including approximately 320 000 children under the age of 14 (UNAIDS, 2019). National figures for South Africa reflected 240 000 new infections and 71 000 AIDS-related deaths in that year (UNAIDS, 2019). The 2018 UNAIDS Global AIDS Update reported on progress towards the 90-90-90 targets, which aim to ensure that 90 percent of people living with HIV know their status, that 90 percent of those who know their status are on treatment, and that 90 percent of people on treatment are virally suppressed. In 2018, globally, 79 percent of people living with HIV knew their status, 62 percent were reported to be accessing treatment, with 53 percent virally suppressed. In the same period, figures for South Africa reflect that 90 percent knew their status, 62 percent were on treatment and 54 percent were virally suppressed (UNAIDS, 2019). The 2019 UNAIDS report indicates a major milestone in the 90-90-90 targets, with 62 percent of all people living with HIV reported to be accessing antiretroviral therapy (ART). Improved access to ART resulted in 1.72 million fewer HIV-related deaths in adults from 2000 to 2014 than would have occurred otherwise (Johnson et al., 2017). In addition to reduced mortality and a reduction in the transmission of HIV, improved access has also had a measurable impact on the global workforce.

These are some of the realities that EHDI has to confront in the South African health care context, as they do not exist in isolation from other challenges in the paediatric population. HIV not only takes up the lion’s share of the budget, but it also contributes to the burden of hearing impairment, which increases the workload for audiologists, including for early hearing detection and intervention (Khoza-Shangase & Anastasiou, 2020).

Newborn hearing screening contextualised

NHS programmes are an important step towards early detection of hearing impairment and the provision of early intervention. These programmes require careful examination and planning in each context. The HPCSA (2018b) recommended specific contexts in which to actualise EHDI application. Numerous studies, detailed in chapter 2, indicate that South Africa is far from achieving what is advocated by the HPCSA position statement (Bezuidenhout, Khoza-Shangase, De Maayer, & Strehlau, 2018; Friderichs, Swanepoel, & Hall, 2012; Kanji & Khoza-Shangase, 2019; Kanji, Khoza-Shangase, Petrocchi-Bartal, & Harbinson, 2018; Khoza-Shangase & Harbinson, 2015). Studies exploring the feasibility and current status of EHDI implementation in the South African health care context at various levels (primary,
secondary and tertiary) have found a lack of formal, standardised and systematic EHDI implementation (Kanji, Khoza-Shangase, & Moroe, 2018; Swanepoel, Störbeck, & Friedland, 2009; Theunissen & Swanepoel, 2008). Various reasons are proposed for this: insufficient knowledge, lack of equipment, budgetary constraints and human resource challenges. Regardless of the level of care and varied resource allocations and levels of specialisation, EHDI implementation as advocated by the HPCSA in its 2018 position statement currently does not seem feasible, unless the barriers identified are addressed and NHS is mandated by the South African government. Findings from these studies also highlight the need to ensure that context-specific studies in EHDI are conducted. This is necessary to ensure that national position statements are sensitive to contextual challenges and allow for evidence-based practice. This is particularly important in South Africa, where resource constraints dictate the success or failure of a programme, no matter how well intended.

The HPCSA (2018b) guidelines and principles for EHDI are primarily based on guidelines from developed contexts, with slight contextual adaptations in terms of the timeframes for screening and diagnosis. These guidelines are geared towards UNHS and serve as the gold standard that audiologists in South Africa should aim to achieve. However, they may not be applicable in all health care sectors in the country, particularly the public health care sector. Kanji (2016) presents evidence from a research review of studies related to EHDI in South Africa. She notes the impracticalities of attempting to implement developed world models of NHS in LAMI countries, where contexts are very different. Kanji argues that the current status of NHS, coupled with human resources challenges, suggests that UNHS is currently not applicable in this country. The majority of registered audiologists in South Africa work in the private health care sector. There is thus a demand for personnel in the public health care sector given the higher prevalence rate of infant hearing impairment in that sector. Moreover, there is currently no established mid-level worker programme in audiology to facilitate hearing screening by personnel other than audiologists. These issues influence the ability of audiologists in South Africa to effectively implement UNHS and EHDI. Kanji (2016) argues for an interim approach to early detection of hearing impairment to identify affected newborns and infants who would ordinarily be missed given the absence of an NHS programme.

With hearing impairment in four to six of every 1 000 live births in the public sector, and three in 1 000 in the private sector in South Africa (Swanepoel et al., 2009, p. 783), there is a pressing need for systematic EHDI services. Progress is being made in offering NHS and studies have been conducted to document these processes in South Africa (Bezuidenhout et al., 2018; Friderichs et al., 2012; Kanji & Khoza-Shangase, 2018a, 2018b, 2019;
Moodley & Störbeck, 2015; Petrocchi-Bartal & Khoza-Shangase, 2014). However, due to the lack of a national and holistic overview of EHDI services to date, an accurate picture of the current status of EHDI is required. Moodley and Störbeck (2015) conducted a narrative review of EHDI in South Africa in order to document and profile what had been published in the field. Their findings revealed extensive knowledge related to paediatric hearing screening and intervention services. However, this evidence comes from studies mostly located in the provinces of Gauteng and the Western Cape (Friderichs et al., 2012). Furthermore, studies pertaining to the diagnosis of hearing impairment revealed that, although much has been written on the scientific aspects of the tools used, there is a lack of comprehensive information on diagnostic protocols and procedures (Kanji & Khoza-Shangase, 2018a; Moodley & Störbeck, 2015). Moodley and Störbeck (2015) note that despite the clear progress made in South Africa, comprehensive studies on protocols and procedures used in diagnosing paediatric hearing impairment are needed, with an expansion of focus beyond Gauteng and the Western Cape.

According to Petrocchi-Bartal and Khoza-Shangase (2014), there is a need for context-relevant research aimed at facilitating the efficacious provision of EHDI services in South Africa. Their findings illustrate that although South Africa is pushing the PHC agenda as its health strategy, PHC clinics in at least two provinces (one being the better-resourced Gauteng) did not provide formalised newborn or infant hearing screening and none of the facilities had the equipment to do so. Most sites attributed the lack of formalised hearing screening to budgetary and human resource issues, staff training in particular. Existing non-formalised hearing screening protocols demonstrated inconsistencies in application across districts and none complied with HPCSA clinic guidelines or any international guidelines. This is in addition to their lack of sensitivity and specificity. Petrocchi-Bartal and Khoza-Shangase (2014) conclude that unless assets and barriers to EHDI implementation are identified in the South African context, EHDI will remain an international goal that cannot be locally attained. They argue that it is important to establish what existing protocols are in use, and to review their implementation and effectiveness before national plans are recommended.

Petrocchi-Bartal and Khoza-Shangase (2014) found that the deprivational index did not influence their findings on screening procedures and protocols used at PHCs in South Africa. They suggest that this has implications for forward planning in PHC. The main reasons for the lack of formalised hearing screening – budgetary and human resource constraints, with staff training in particular being important – should be considered when planning for EHDI.

The ideal hearing screening measure is yet to be defined, with various NHS protocols currently being recommended for different contexts.
Such diverse recommendations create challenges where resources have to be negotiated and rationalised. No standardised protocol has been adopted in South Africa, hence Kanji and Khoza-Shangase’s (2018a) call for further exploration and definition of feasible and context-specific protocols, as well as careful deliberation around high-risk registries (Kanji & Khoza-Shangase, 2019). Based on findings from their study, Kanji and Khoza-Shangase (2018a) recommend the use of a two-stage automated auditory brainstem response (AABR) protocol or transient evoked otoacoustic emission/AABR protocol in resource-stricken contexts, where the availability of all screening measure options may not be feasible.

‘Doing better with less’ approach

The implementation of risk-based or targeted newborn hearing screening (TNHS) programmes by trained volunteers or nurses seems to be the most feasible initial step while resources are procured for comprehensive UNHS. Bezuidenhout et al. (2018) highlight the fact that in South Africa, TNHS has not been formally and systematically implemented as the intermediate, small step towards a larger UNHS programme. Kanji (2016) suggests careful consideration of a number of factors for effective implementation of TNHS in South Africa, including the choice of screening measures and how they are employed in a screening protocol. This should occur while taking into account contextually relevant and established risk factors for hearing impairment in the various levels of service delivery in the South African health care system. Kanji and Khoza-Shangase (2019) extend the argument of contextualising risk factors by introducing the idea of always considering the quadruple influences on risk factors for hearing impairment in South Africa.

The currently used high-risk factors for hearing impairment stipulated by the HPCSA (2018b) are based on position statements from developed contexts and have been adapted to include two conditions that are considered unique to the South African context. While research findings from higher-income developed contexts may be of value, they are difficult to implement in practice in LAMI countries as they are contextually incongruent and often focus on non-communicable diseases that are prevalent in developed contexts. There is therefore a tendency to neglect the specific, local needs of lower-income or developing countries. This is a serious challenge, particularly in LAMI countries where the social determinants of health are vastly different to those in developed contexts. It is important to identify and contextualise risk factors for hearing impairment. Infants displaying any of these factors in their neonatal history have a greater chance of presenting with hearing impairment (Colella-Santos, Hein, De Souza, Do Amaral, & Casali, 2014;
Section One: Early Detection of Hearing Impairment

Kanji & Khoza-Shangase, 2018b). Therefore, contextual research is imperative in guiding relevant clinical practice.

A variety of health care contexts need to be explored as possible platforms for the establishment and provision of NHS services, particularly TNHS as an interim approach. This is important as the context may influence coverage rates and follow-up return rates, two key determinants of effective and successful NHS programmes (Kanji, 2016). PHC clinics in South Africa have been proposed as a platform for conducting NHS in order to ensure optimal coverage and follow-up return rates. A study in Gauteng revealed that a significant number of well neonates were missed because of early discharge soon after birth and some babies were born at home, making it difficult to coordinate screening (Bezuidenhout et al., 2018; Khoza-Shangase & Harbinson, 2015). Kanji (2016) is of the view that a two-tiered approach may be appropriate, involving early hearing screening of high-risk babies in the hospital setting, with screening of well babies at clinic level. This would ensure a more comprehensive coverage of babies, regardless of their health status, or time or place of birth. This requires coordinated and systematic planning by audiologists, who need to play an active role in piloting, planning, implementing and managing TNHS programmes in the South African public health care context.

The challenges outlined in this chapter are not unique to South Africa. Kumar, Kolethekkat, and Kurien (2015) studied the age of suspicion, confirmation and amplification of hearing handicap in children, and assessed the burden of parental delay in the evaluation of hearing loss in South India. They found significantly delayed ages of detection and intervention, with clear indications of EHDI not being feasible in their developing country context. They argue that these EHDI implementation challenges are due to lack of parental knowledge about the handicap and its identification, a dearth of hearing health care professionals, as well as resource constraints. They acknowledge that setting up EHDI through UNHS is a challenge in developing countries, although an unavoidable strategy. Hence, cost-effective national policies with well-structured scientific educational programmes that have community support should be considered in order to enhance the linguistic, psychological and social development of hearing-impaired children. Based on their research in Sudan, Ahmed, Hajabubker, and Satti (2017) recommend the early screening of neonates and infants with risk factors by introducing an NHS programme, the safe administration of drugs, activation of primary health programmes, as well as the establishment of audiological units throughout the country.

EHDI challenges in the South African context include poor follow-up return rates. This is especially problematic because follow-up appointments ensure that benchmarks are met and that no child with suspected hearing loss is left unidentified. Kanji and Krabbenhoft (2018) identified
factors influencing audiological follow-up of high-risk infants in a risk-based NHS programme in South Africa. Their findings reveal that the most common contributors facilitating participants’ attendance at follow-up appointments are friendly audiologists, a clear line of communication between caregiver and audiologist, and a reminder of the appointment. The most significant perceived challenge that participants described in returning for the follow-up appointment was living far away from the hospital. Kanji and Krabbenhoft (2018) conclude that demographic, socio-economic and interpersonal factors influence follow-up return rates. They recommend implementing an all-inclusive appointment day for the South African population in order to resolve this challenge. They further caution that it is not only important to look at what is being done to improve the follow-up return rate, but also how it should be done in terms of professional-to-patient communication and interactions. Findings from this study are supported by those of Kanji and Khoza-Shangase (2018b) in the same context, and those of Scheepers, Swanepoel, and Roux (2014). In Kanji and Khoza-Shangase’s (2018b) study, the return rate decreased significantly, to below 50 percent, for follow-up diagnostic assessment. Reasons for non-attendance varied from change of residential location (the most common) to maternal age. The mean maternal age of mothers who returned with their newborns for diagnostic assessment was significantly higher than for those who did not return. The authors conclude that reasons for follow-up default are influenced by contextual challenges, but may be improved by aligning appointments with other medical follow-up services.

Solutions and recommendations

Because NHS has become the standard of care internationally, with sufficient evidence proving its efficacy, South Africa needs to plan strategically in order to be able to implement successful EHDI programmes. In the framework of an intersectoral approach, each of the country’s nine provinces needs to put in place an EHDI programme responsible for establishing, maintaining and improving the system of services needed to serve children with hearing impairment and their families. This needs to take place at the various levels of health care to ensure increased access, and within the proposed NHI system. Furthermore, improved coordination is called for between the departments of health, education and social development. There is a need for audiologists to adopt an advocacy role to promote NHS/EHDI. This can be in the form of public–private partnerships, as well as government–non-government organisation collaborations, such as that with HI HOPES (Home intervention: Hearing and language opportunities parent
education services). This should take place while adhering to ethical conduct, HPCSA regulations around screening, and the protection of personal information. Such advocacy should include ensuring the sustainability of EHDI services in this context.

While there have been some developments in recent years, significant challenges to NHS, follow-up and early intervention still exist. The HPCSA SLH Board constituted an EHDI task team to put together national guidelines to be implemented in the public and private sectors. These guidelines require provinces to host national strategic planning activities to identify EHDI programme coordinators. These coordinators will in turn identify ways to implement the guidelines through the use of a SWOT (strengths, weaknesses, opportunities, threats) analysis framework. A SWOT analysis and subsequent TOWS (threats, opportunities, weaknesses, strengths) matrix analysis are commonly used methods of strategic planning, and are a strategy recommended by White and Blaiser (2011). Such strategic planning should include deliberations around the use of tele-audiology as a complementary approach to deal with the demand–capacity challenges around the availability of audiologists in the country.

Tele-audiology, a subset of telehealth, was established primarily to deliver audiological care in areas with limited access to health care due to a shortage of resources. Krupinski (2015) describes telehealth as the use of telecommunication technologies to reach out to patients, reduce barriers to optimal care in underserved areas, improve user satisfaction and accessibility to specialists, decrease professional isolation in rural areas, help medical practitioners expand their practice reach, and save patients from having to travel or be transported to receive high-quality care. An obvious advantage of tele-audiology is that it may help overcome common barriers to early identification of hearing impairment and obtaining hearing aids, such as cost and distance from service providers (Schweitzer, Moritz, & Vaughan, 1999).

In LAMI countries such as South Africa, many people continue to experience barriers to accessing health care services. While multiple factors contribute to these barriers (Khoza-Shangase & Mophosho, 2018), the establishment of tele-audiology was inspired by the extreme shortages of audiologists, speech-language pathologists and ear, nose and throat specialists (Fagan & Jacobs, 2009; Mulwafu, Ensink, Kuper, & Fagan, 2017). The health professionals that are available are often located in health centres in big cities and private practices, where many people cannot access their services. The situation is made worse for UNHS by the limited working hours of audiologists, who miss babies born during off hours, and babies born and discharged when audiologists are attending to other work responsibilities. Therefore, tele-audiology could become an alternative model of service delivery, with audiologists serving as programme managers or directors while trained screeners or nurses perform the screening services. However, South Africa has not made significant strides in its progress for health
technology assessment (HTA). A legal and policy landscape analysis reveals that no specific provision in the National Health Act for HTA exists, and HTA is narrowly and incompletely defined. Siegfried, Wilkinson, and Hofman (2017) put out a call for the National Department of Health to host an HTA summit, and hopefully resolutions from this summit will positively impact tele-audiology.

Tele-audiology in EHDI can use computer-based technology and internet connectivity to screen all babies requiring screening, and not just those with risk factors. This can be done in a variety of ways, either synchronous or asynchronous. Synchronous tele-audiology requires the audiologist to be present during the session, though in a different location to the baby, for example through video-conferencing and remote programming of hearing aids (Steuerward, Windmill, Scott, Evans, & Kramer, 2018). Hughes, Sevier, and Choi (2018) found that this method is useful for programming hearing technologies such as cochlear implants. However, given capacity versus demand issues, such as too few audiologists for the number of patients requiring audiology services, as well as challenges around network connectivity, the implementation of synchronous tele-audiology may not yet be feasible in South Africa.

The asynchronous telehealth method can be used in the absence of an audiologist, and would thus be ideal for implementing EHDI programmes in South Africa, where the services of audiologists are not readily available. Screeners or nurses can be trained to conduct certain audiological tests, save the results and forward them to the audiologist managing the programme. Studies have demonstrated the accuracy of asynchronous tele-audiology when compared to traditional face-to-face diagnosis by qualified professionals (Biagio, Adeyemo, Hall, & Vinck, 2013; Biagio, Swanepoel, Laurent, & Lundberg, 2014). I recommend using both synchronous and asynchronous tele-audiology in EHDI programmes, given the challenges around network connectivity, particularly in rural and peri-urban areas, as well as the shortage of audiologists. Swanepoel et al. (2010) believe that the asynchronous method is more feasible for the South African context, especially in school settings. This has been confirmed in the education sector, where findings demonstrate that asynchronous telehealth-based automated hearing testing in the school context can be used to facilitate early identification of hearing impairment (Govender & Mars, 2018).

If non-audiologists such as screeners and nurses are to be involved in NHS, they must be well trained and minimum standards must be adhered to. Because nurses are the backbone of PHC, and PHC is the first point of contact with the health system for at least 85 percent of the South African population (Khan, Joseph, & Adhikari, 2018), it is important to ensure that this level of care is adequately equipped and resourced to implement NHS. Khan and colleagues (2018) investigated PHC nurses’ experiences, practices
and beliefs regarding hearing impairment in infants in KwaZulu-Natal, South Africa. Their findings revealed that at least one-third of PHC nurses had never screened a child for hearing impairment, and most clinics did not have access to basic hearing screening equipment or materials. Only 49 percent of nurses had access to an otoscope, while 31 percent used the Road to Health development screener to check for hearing impairment. None of the clinics had access to an otoacoustic emission screener or the Swart questionnaire, a case history questionnaire that was used in the Western Cape at clinic level as part of the prevention of hearing impairment due to otitis media. Although nurses reported that they would refer to audiology services for some of the risk factors, as indicated on the Joint Committee on Infant Hearing (JCIH, 2007) list, they were less likely to refer if the child was in a neonatal intensive care unit (NICU) for longer than five days, had neurodegenerative disorders, meningitis, hyperbilirubinaemia requiring blood transfusion or was undergoing chemotherapy. Less than a third of nurses always referred if the child displayed additional non-JCIH risk factors or those pertinent to the South African context. Approximately 38 percent reported that communities believed that hearing impairment could have spiritual or supernatural causes. These findings are similar to those at PHC clinics in Gauteng and Limpopo provinces (Kanji et al., 2018; Khoza-Shangase, Kanji, Petrocchi-Bartal, & Farr, 2017; Petrocchi-Bartal & Khoza-Shangase, 2014, 2016). Such findings demonstrate that hearing screening and referral practices at PHC clinics need to be strengthened for successful EHDI implementation, through imparting knowledge and skills to nurses. Knowledge dissemination would need to be extended to include educating parents about risk factors and hearing impairment.

Studies have supported the need for parental education in order to enhance EHDI implementation in South Africa. Govender and Khan (2017) describe the knowledge (including cultural beliefs) of mothers in Durban regarding risk factors for hearing impairment in infants and their awareness of audiology services. Their findings reveal that just over half of the sampled mothers were aware of risk factors, such as middle ear infections, ototoxic medication and consumption of alcohol during pregnancy. However, two-thirds did not know which professional to seek help from. Seventy percent were unaware that NICU/mechanical ventilation for more than five days, prematurity, rubella and jaundice are considered risk factors for hearing impairment, highlighting the need for health education in this population. The cultural beliefs around causes of hearing impairment found in this study call for careful consideration of cultural diversity and its potential impact on EHDI implementation. Sixty percent of the mothers believed that bewitchment and ancestral curses can cause hearing impairment. This finding cannot be ignored as it has significant implications for health-seeking behaviours in South Africa. Evidence on global health indicates that groups that do not
form part of the dominant culture have worse health outcomes than dom-
inant populations (Flood & Rohloff, 2018). EHDI initiatives must therefore
take into consideration cultural influences if they are to be successful.

Success in programme implementation also relies on a proper data
management system that allows for tracking of identified infants as well
as coordinated referral pathways within a migration-aware health care
system, which South Africa encourages (Vearey, Modisenyane, & Hunter-
Adams, 2017). Data management includes data collection, storage, analy-
sis and interpretation to guide the future planning, implementation and
evaluation of EHDI programmes. A migration-aware health system calls
for a response to migration and health that acknowledges that people
move internally within South Africa, which has implications for EHDI
nationally. Moodley and Störbeck (2017) investigated data management
for EHDI in South Africa. They found that there was no uniform data
management system in use nationally, and no consistent shared system in
the public or private sectors. The majority of respondents in their study
(44 percent) used a paper-based system for data recording. No public or pri-
ivate hospitals were using data management systems that enabled sharing
of information with other medical professionals. These findings indicate
a significant barrier to successful EHDI implementation in the country.
Moodley and Störbeck (2017) argue that data management and tracking
of the pathway from screening to diagnosis to intervention need careful
attention in South Africa to ensure quality care and outcomes for children
identified with hearing impairment. Lack of uniform and adequate data,
poor record keeping and referrals practices, and lack of tracking present
significant barriers to EHDI service provision and monitoring. This needs
to be addressed.

Conclusion

South Africa has made strides in growing the knowledge base in the field of
EHDI, and has recognised and tried to overcome challenges in the implemen-
tation of EHDI services by researching and identifying alternative forums
for screening, parent reasons for refusing screening, and the availability of
early intervention services. However, studies have mainly been conducted in
Gauteng and the Western Cape. Additionally, a large portion of the research
is focused on the screening process, although some have looked at the use-
fulness of Auditory Steady State Response as a diagnostic tool and record
reviews related to diagnostic procedures. The research has shown that South
Africa lacks a nationally agreed battery of tests and protocols for diagnos-
ing hearing impairment in infants and babies. Although the HPCSA (2018b)
EHDI guidelines have been published, no process has yet been put in place to
ensure their implementation by the Department of Health. Studies looking at the development of universal screening, diagnosis and intervention across both the public and private health care systems will provide much-needed information on all aspects of EHDI in a developing world context. This will make EHDI implementation in South Africa contextually relevant, responsive and responsible.

Given that EHDI is key for newborns and infants with hearing impairment, it is important to consider the realities of the South African health care context to ensure better implementation. As far as early detection is concerned, Kanji’s (2018) recommendation that South Africa seriously consider targeted NHS as a starting point or interim approach, particularly in a hospital setting, should be carefully considered. Inclusion of NHS at the first follow-up visit at midwife obstetric units is recommended for all babies, including those without risk factors and those who were born at home. This approach respects both the documented evidence of established risk factors for hearing impairment, and the contextual challenge of resource constraints. It also responds to questions raised by Kanji (2018, p. 2) when she argues for a ‘doing better with less’ approach. She asks: ‘As a profession in South Africa, what should we be advocating as standard care in the quest for the ideal? Are we attempting to digest the elephant as a whole instead of piecemeal as a logical step?’ Targeted NHS can be argued to be a smaller logical step towards achieving the bigger UNHS target. This ‘doing better with less’ approach acknowledges that effective and quality health care is not only dependent on professionals but also involves using other stakeholders (Moyakhe, 2014), such as volunteers and nurses as screeners. It is only when such a strategic approach is adopted that the goals of EHDI in eradicating the negative impact of hearing impairment can be achieved.

This chapter addressed the challenges to EHDI implementation in South Africa. The issues around EHDI implementation are multidimensional, multilayered and complex. The chapter suggested that any response by South African stakeholders must be cohesive, comprehensive and integrated into existing service delivery platforms in an effort to ‘do better with less’. An overview was provided of the South African context and the realities that need to be confronted when considering EHDI non-implementation in relation to competing priorities, such as the high burden of disease, resource limitations and the generally poor socio-economic status of the country. The chapter described relevant legislation and threats to the progressive realisation of the right to health care in South Africa, including EHDI. While in favour of UNHS, it was argued that it may not be immediately feasible given contextual limitations. Thus, contextually relevant risk-based screening should be implemented and the reasons for poor return
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rates explored. The chapter provided an evidence-based perspective in the South African context while acknowledging global trends, and concluded by offering suggestions for hearing detection initiatives that are contextually relevant.

References


Section One: Early Detection of Hearing Impairment


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