BRIEF ONE

1. Staring into the abyss:

What we know about the burden of non-communicable diseases in South Africa

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Research briefs on non-communicable diseases in South Africa

Percept has developed a series of briefs aiming to explain, explore and quantify the burden of non-communicable diseases (NCDs) in South Africa. Throughout the briefs, both existing quantitative data as well as emerging qualitative data are drawn together. The primary qualitative data – presented in the form of vignettes – was collected by Dr. Beth Vale through in-depth ethnographic research, which was gathered in a community in the Karoo. Given the rising global burden of NCDs, particularly in low- and middle-income countries (LMICs) these briefs are incredibly relevant. They also present important insights as Covid-19 continues to attack those with pre-existing conditions more fatally.

Given South Africa's high prevalence of HIV, there's also recently been a focus on the link between HIV and NCDs, especially since the population living with HIV grows increasingly older with the successful uptake of ART. As we'll explain in the briefs, an ageing population is more at risk for NCDs. Moving towards universal health coverage (UHC), it's imperative to understand the current needs of our population – and how these may change going forward.

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- Actuarial Society of South Africa (ASSA): ASSA has an interest in being part of the development of high-quality evidence to support resource allocation and decision-making, and the interplay between the supply and demand sides of the health system.
- RGA Reinsurance Company of South Africa Ltd (RGA): RGA has an interest in the ways in which life insurance can be responsive to the changing burden of disease, and the ways in which we can use data to drive decision-making.
- Board of Healthcare Funders (BHF): BHF is a regional representative body of health funders, administrators, and managed-care organisations. It is committed to universal health coverage, value-based healthcare, and accountability for health. Addressing the NCD burden is an important element to achieve some of its objectives.

Take-home messages

- Non-communicable disease (NCD) is a catch-all term for diseases that are not infectious, which means that an affected person generally cannot transmit the illness to anyone else. It is widely accepted that NCDs are borne out of a complex mix of environmental, socio-economic and lifestyle factors.
- NCDs are driven mainly by four individual risk-related factors: tobacco use, harmful alcohol use, unhealthy diets and physical inactivity. However, systemic factors such as poverty, access to healthy food options and workplace standards (e.g., tobacco-free workplaces) also have an impact on the risk of developing an NCD.
- Because of the increasing importance and growth of NCDs, this group of diseases can now be considered *a public health emergency*.
- In this series of briefs, we will deep dive into some of the key NCD conditions and analyse South Africa's incidence and prevalence – and what that means for the type of healthcare required in future. We'll use several datasets to do this, including the General Household Survey, National Income Dynamics Study (NiDS), Demographic and Health Survey (2016/17), cause of death data, Council for Medical Schemes data, underwriting data from insurers, National Health Accounts and District Health Information System data.

What are Non-Communicable Diseases?

Non-communicable disease (NCD) is a catch-all term for diseases that are not infectious, which means that an affected person generally cannot transmit the illness to anyone else. It is widely accepted that NCDs are borne out of a complex mix of environmental, socio-economic and lifestyle factors.[1] The five main groups of NCDs include cardiovascular (heart) diseases; diabetes; cancer[a]; chronic respiratory diseases (including asthma); and mental health conditions.[2] The addition of mental health as an NCD is a recent development and reflects the growing recognition of the underlying burden of mental health conditions.[2]

Historically, NCDs were referred to as 'diseases of lifestyle', given the way that these conditions are contracted – through the foods we eat, whether we choose to use tobacco products, our weight, physical activity, or general living circumstances. However, this punitive naming was quickly recognised as unhelpful and devoid of the complexity and inter-relationship between humans and their environments, including the systemic factors that shape their environments.

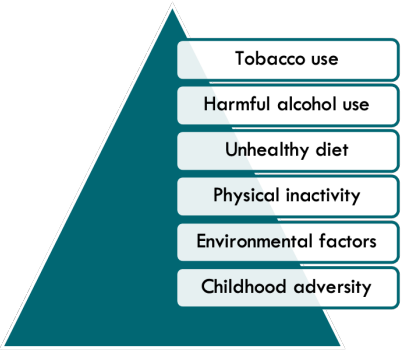
In low- and middle-income countries (LMICs), where NCDs are becoming a pressing problem, researchers have found a link between socio-economic status and NCDs.[3] This relates not only to a lack of access to healthy and affordable food options (for example) and lower educational content around healthy choices, but also to exploitative working conditions that may encourage or facilitate unhealthy habits or poor health-seeking behaviour.[3] It is also recognised that there are many systemic factors beyond the control of the individual which correlate with socio-economic status and have given rise to the growth of NCDs.

Importantly, a person can have more than one NCD[4]. In fact, this is increasingly becoming the norm in LMICs, given the shared risk factors for many of the diseases – such as cardiovascular disease and diabetes – which are both influenced by food choices and body weight (among other factors that lie outside of someone's control, such as genetic predisposition).

[a] Cancers caused by viruses, e.g. the Human Papillomavirus (HPV), are an exception to this general definition of non transmission – HPV can be transmitted via sexual or other contact.

What drives NCDs: individual and system-level factors

The individualistic lens



NCDs are driven mainly by four individual risk-related factors: tobacco use, harmful alcohol use, unhealthy diets and physical inactivity.[5] Some global health research and official policy documents also mention environmental risks factors as a fifth factor, e.g., air pollutants and plastics.[6] Given the increasing recognition of mental health as a group of NCDs, there's more recently also been a call to include childhood adversity as a risk factor.[2]

Policy discussions have focused predominantly on how to better educate the population on the harmful effects of these factors and to disincentivise unhealthy behaviours by applying punitive taxes (referred to colloquially as 'sin taxes'). We've seen a dramatic reduction in LMICs in the use of tobacco products as a result of stricter regulations around where they may be consumed, and punitive taxes making tabacco products unaffordable for most.[7] Evidence shows this reduction in usage was also accompanied by a reduction in associated NCDs.[7]

On its own, the approach however reflects a largely individualistic view – namely the notion that individuals are responsible for their own health and can address the circumstances that may result in them engaging in unhealthy habits. The approach of increasing sin taxes was also not successfully applied to any other behaviour. For example, the sugar tax that's been implemented in South Africa has been reported to fall way short of what may realistically change behaviours and health outcomes.[8] The University of the Western Cape has reminded South Africans that regulations alone cannot decrease the incidence of NCDs – all the systemic factors and enablers that make the habit/item attractive to consumers need to be addressed.[8]

The role of systems

Multiple systemic factors that go beyond the individual are at play. These include poverty, access to healthy food options and workplace standards (such as tobacco-free workplaces). They don't only impact on NCDs, which means that these efforts need to come from a collaborative inter-governmental approach, rather than from the health sector alone. It also highlights why it's so difficult to control and manage these types of illnesses.

Access to healthy food is a prime example of this complexity. The term 'food desert' has gained traction in recent years and refers to a section in the market that offers readily available, cheap and unhealthy food (like fast-food restaurants), but very little in the way of healthy, fresh food.[9] It makes unhealthy options cheaper and more accessible. The added pressure of needing to be satiated on a

limited budget also makes the fast-food industry's offerings more attractive as they're carbohydrate-heavy. This can contribute to obesity and related NCDs (diabetes, cardiovascular disease, hypertension). In Vignette 1, we explore the difficulty for individuals to make good nutritional choices in a compromised food environment.

Historically, high-income countries experiences high rates of NCDs. However, as the problem escalated, higher-income countries started to put more regulations in place to help discourage some people from making unhealthy choices. While it's still a burning issue in high-income countries and the regulatory problem remains, the focus has shifted to LMICs. The rate of NCDs is increasing rapidly in LMICs due to the absence of coherent or coordinated plans to prevent or manage the diseases in many of these countries.[5] Poor governance and weak political systems can make countries very vulnerable to big corporations (such as the tobacco or sugar industries), and therefore, the strength of governance is also a key driver of NCDs.[7] Furthermore, the regulatory NCD 'big wins' advocated by entities such as the World Health Organization may not always be in the immediate economic (or other) interest of LMICs, and are therefore difficult to implement.[10]

Vignette 1: What Drives NCDs in the Eastern Cape Karoo? An illustration of food 'choices' vs food environment

Over the past 50 years, the Karoo Heartland has undergone significant political, economic and environmental shifts – all of which have been concurrent with its changing epidemiological realities. Perhaps the most significant of these, for the purposes of understanding NCDs, has been the changes to the food environment.

Livestock farms that had once been largely self-sufficient – growing vegetables and wheat alongside their animal stock, and feeding farm dwellers off their produce – are now re-orienting themselves. Increasingly, the survival of farms has depended on scale and 'cost-efficiency', resulting in larger farms and fewer workers. Owners opt for temporary contract workers over permanent staff. They are are increasingly switching to game farming, which is more lucrative and less affected by droughts. The labour needs are also vastly different.

"It's no longer a lifestyle, it's a business," one farmer's wife commented. Many farms bypass local markets for more lucrative markets abroad or in larger metros. The prices at which farmers can sell their produce are decreasing, while the price to consumers is increasing; meaning that those who make food cannot afford to buy it.

This has had immense impact on available food choices, both on and off farms. Payment has moved from a package of farm food and very limited wages, to a purely cash-based system based on a newly instituted minimum wage. Workers must travel long distances to shop for food, with wages that don't stretch very far. As a result, many buy food that is cheap, processed and non-perishable to make it last longer.

With so many job losses on farms, unemployment has risen, and many more people have relocated to the region's small towns – a manifestation of urbanisation in rural regions.

Since the 1990s, big-chain supermarkets have proliferated in these towns, alongside small spaza shops. Given that the primary employment here is hard labour (whether domestic, construction or farm), workers also find themselves eating on the move and prioritising quick energy.

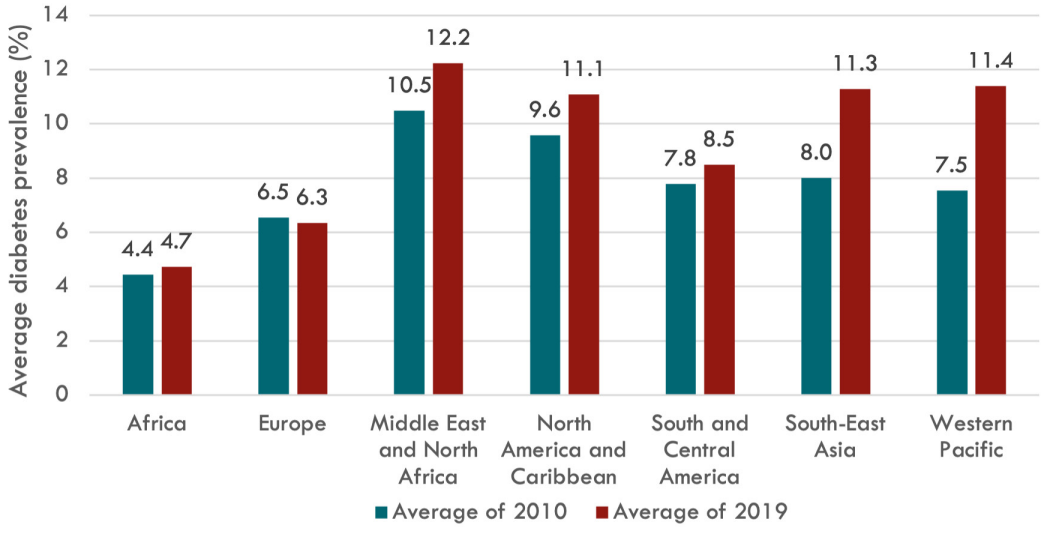
Why worry?

NCDs have moved high on the global health agenda. Most of them require chronic medication and life-long interaction with the curative and rehabilitative health system. This places a severe burden on health systems, and more specifically on public health systems, which have the added constraint of delivering free at-point-of-care services with limited budgets. Because of the increasing importance and growth of NCDs, this group of diseases can now be considered a **public health emergency**.

Below, type II diabetes is used as an example to show the increasing trend in global prevalence from 1990 to 2017. Prevalence refers to the proportion of a population who already have the condition, while incidence measures the rate at which new cases of a disease or condition occur in a population over a given period i.e., the change in the disease or health condition's prevalence over time. The prevalence of NCDs rises fast because in most cases, the conditions are life-long. In other words: new cases of the diseases add to a growing group of people who will have it for the rest of their lives. With other diseases that resolve after medication/intervention (for example, malaria), the prevalence remains stable given the natural movement in the diseased population (those with malaria). This is an important factor to consider for NCDs, in terms of the burden on the health system and the wellbeing of the population.

Data from the International Diabetes Federation (IDF) shows the increase in diabetes (both type 1 and 2) from 2010 to 2019.11 Across all regions except Europe, the prevalence has increased (Figure 1). The prevalence in Africa has increased from 4.4% in 2010 to 4.7% in 2019. However, we know there are substantial challenges in the case-finding and reporting in the region.

Figure 1: Market players in South Africa



In South Africa, the trend is particularly worse. The IDF estimates the prevalence of diabetes in South Africa as 4,581,200 in 2019, as compared to 1,283,400 in 2010. This is a 257% increase over the decade. It's unsurprising in a middle-income country though, given the epidemiological change processes LMICs go through as they urbanise and industrialise. NCDs place a large burden on the South African health system due to the ongoing care required by these patients. It therefore becomes pivotal to find ways to manage stable clients outside of health facilities. The added complexity of NCDs in a primary healthcare context is made real through Vignette 2, in which a day in the life of a primary healthcare doctor in a rural setting is described.

Vignette 2: A day in the life of a primary healthcare doctor

It's early March 2019. The morning mist hasn't yet lifted as I approach the public clinic, bypassing stray dogs and roaming livestock. The clinic sits on the outskirts of a small town in the Karoo Heartland. We are nowhere near an urban centre, and yet, this region has some of the highest (age-standardised) rates of NCDs in the country. Two vans marked 'Mobile Clinic' are parked alongside the entrance. They are among the fleet whose role it is to venture into the farming hinterlands, delivering medication and providing basic screening to those far-removed from town's centre.

Inside the clinic waiting room, the benches are full. The doctor, who visits each of the town's clinics weekly, leads me down a narrow corridor and into one of the consultation rooms. Space is a precious commodity here, as it is in all of the town's clinics. Each consultation room serves many functions, with health staff manoeuvring carefully around one another as they share equipment, filing cabinets and work surfaces. "Space is a problem," the doctor says, clearing her work area. "But, you know, these clinics were built before chronic illness really hit us."

While they may not be technically 'communicable', here, the escalated awareness and diagnoses of NCDs has often felt like a similar 'contagion'. Some say, "I have my mother's illness" – referring to asthma or diabetes and signalling that for all their 'non-communicability', NCDs travel through households and generations.

Many people here are taking three or four chronic medications at once, with the town's health staff desperately trying to support adherence, manage drug interactions, and cope with stock-outs.

Of the 22 patients we would see that day, nearly half would be living with more than one chronic condition, usually multiple NCDs, but sometimes HIV in combination with one or other NCDs. The most- treated condition that day is high blood pressure (including some who have survived strokes), followed by diabetes, heart disease and arthritis.

The direct costs of the growing burden are substantial. Not only do these clients require pharmacological intervention and regular consultation with healthcare professionals, but this population also represents a riskier one. The confluence of NCDs with age, morbidity and secondary illnesses is significant. This means that the potential cost of these clients to the health system could be much higher than clients without NCDs.

Furthermore, there are knock-on effects on the economy, including people missing work because they are ill, or in queues to receive chronic medication. These are known as indirect costs. NCDs can also have a very large impact on one's quality of life, and they can result in a massive deterioration in everyday functionality, through, for example, amputations necessitated by diabetes complications, or the untreated symptoms of depression. This, in turn, can also have negative economic effects. It can aggravate the stress on both the individual and society through the need for caregiving and having to cope with chronic illness.

Individuals with NCDs also pose large costs to insurers and an inability to correctly measure and price their risk can have significant implications. Cancer already contributes roughly 30% of the total claims for retail insurers (see brief 7). Another ~25% of claims are due to cardiac and cardiovascular causes, with a further 10% due to stroke and respiratory disorders together. The huge burden and cost of these diseases is crucial to robust and sustainable financial protection in death, disability as well as critical illness insurance products. Understanding the human impact and ensuring relevant cover, given the changing risks at play as well as pricing these risks, are fundamental to successful insurance protection to deal with family and business security.

In later briefs, we will deep dive into some of the key NCD conditions and analyse South Africa's incidence and prevalence and what they mean for the type of healthcare required in the future.

Which data sources can help us quantify the need?

One of the reasons that it's so tough to find data on NCDs is that the conditions are generally not notifiable (i.e., there is no public health regulation enforcing data capturing, as there is for example, for tuberculosis). This is starting to change, with some cancers becoming notifiable as health systems try to keep track given the increasing incidence. Another reason has been the historical domination of communicable diseases and the urgent response these conditions have required. The most obvious example is HIV, where data was crucial to case-finding, disease prevention and adherence.

The data systems and analytics for NCDs have lagged especially in countries like South Africa, where HIV has been the predominant public health focus. The impact of not knowing what is happening in your population primarily relates to not being able to plan. Also, given the immense impact of HIV on mortality at early ages, a larger share of the population – at least in the last twenty-five years – was not living long enough to start to develop age-related NCDs. This has however now changed with the wide-scale roll-out of antiretroviral treatment (ART).

Given the absence of comprehensive data, we use several datasets in order to get a picture of the burden of NCDs – no one dataset fully explains the picture for the entire country. In the table below we lay out the available datasets. After this, we explain some of the difficulties with each of these datasets.

Figure 1: Market players in South Africa

DATA SOURCE	PUBLIC SECTOR	PRIVATE SECTOR	TOTAL SA POPULATION	COMPLETENESS
General Household Survey	X	X	X	Nationally representative survey, minimal data on objective measures of NCDs. Only self-reported conditions that have been diagnosed by a medical professional (GP, nurse or other). Self-reported prevalence reflects healthcare access.
National Income Dynamics Study (NiDS)	X	X	X	Nationally representative survey. Contains data on self-reported conditions that have been diagnosed by a medical professional (GP, nurse or other). Self-reported prevalence reflects healthcare access rather than true prevalence. Only NCD for which objective measure(s) is available is hypertension.
Demographic and Health Survey (2016/17)	X	X	X	Nationally representative survey, but not frequently repeated. The last survey was in 2002. Survey with best objective NCD measures: hypertension and HbA1c blood sugar test (proxy for diabetes). Contains data on self-reported conditions that have been diagnosed by a medical professional (GP, nurse, or other). Self-reported prevalence reflects healthcare access.
Cause-of-death data			X	Cause of death can be unrelated to burden of disease, therefore it under-estimates NCD prevalence. It also doesn't contain detailed socio-demographic or healthcare access data.
Council for Medical Schemes		X		In-depth data according to basic demographic characteristics (age and sex) for the population covered by medical schemes only. NCD prevalence in this dataset defined by diagnosis AND treatment (strict definition).
Underwriting data from insurers		X		Mostly mortality data, but also morbidity data, for those covered by life insurance products and disability/critical illness products
National Health Accounts	X	X	X	National Department of Health project, matching funding to disease areas (amongst other things). Very high-level, and private-sector data based on a sample of medical schemes' member data.
District Health Information System	X			Indicators on very few NCDs are collected.

While data from nationally representative household surveys like the General Household Survey (GHS), the National Income Dynamics Study (NiDS) and the DHS capture rich individual and household-level data on geographic and socio-economic characteristics, the self-reported disease data in the surveys have limitations. The disease questions in these surveys are typically asked in the context of a diagnosis by a clinician (doctor, nurse or a medical provider), e.g., "have you ever been diagnosed by a nurse or doctor with hypertension". This means data on the number of people who have been diagnosed with a disease reflect constraints on access to healthcare.

Depending on the nature of the disease, people may also be reluctant to admit to the survey enumerator that they've been diagnosed with a particular condition. Reporting biases may be systematically correlated with certain characteristics, e.g., income or even sex[a]/gender[b] that helped to give rise to the disease.

Clinical data, like data from the health system (whether public or private) is therefore the preferred data source for understanding how many people have a disease. But this data doesn't always contain indicators on the socio-economic conditions or behaviours which may have helped to give rise to the NCD in the first instance, or data is only reported in an aggregated way and not available at an individual level, masking the many individual underlying dynamics.

While also being prone to limitations, burden-of-mortality data offers one big benefit. It can compensate for some of the shortcomings of other data sources that require healthcare access (e.g., DHIS data). It doesn't require people to have previously interacted with the health system in order to classify their death as being due to an NCD-related cause. However, it will only reflect NCDs in as far as the NCD led to death, e.g., heart disease, and will not reflect details of the living circumstances of the individual and their household.

Although primary quantitative data analyses are important to show the scale of the problem and highlight socio-demographic and other NCD covariates, secondary data and contextual information is needed to position quantitative analyses. For this, we draw widely on the available NCD literature. In particular, the Global Burden of Disease Study provides international data points against which we compare South Africa's NCD prevalence.

[a] Referring to a biological characteristic.

[b] Referring to a biological characteristic.

Conclusion

Some of the preliminary data presented shows that South Africa faces an immense NCD burden. This poses a very large and potentially destabilising burden to the health system and country's economy. There are high levels of still undiagnosed and untreated NCDs. This is driven by the very high prevalence of risk factors for NCDs in the South African population. Different groups are disproportionately affected depending on their socio-demographic characteristics – these characteristics can vary by sex or gender, age, or income, to mention just some.

This can have a very large negative impact on the everyday wellbeing of individuals, their family and society. It is therefore important that we understand and address the origins and risk factors (individual and systemic) of these diseases, be able to identify who is most affected, and continue to monitor and explore the interaction between different NCDs and NCDs and other diseases.

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