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## PREVALENCE AND TREATMENT CASCADES FOR HYPERTENSION AND DIABETES IN SOUTH AFRICA: DATA FROM SANHANES

### Background

Hypertension and diabetes are important causes of global morbidity and mortality, as a result of population aging, urbanization, and changing lifestyles and dietary patterns.<sup>1-3</sup> Africa has the world's highest prevalence of hypertension,<sup>3</sup> and although the prevalence of diabetes is low, Africa has the highest diabetes mortality rate and the highest percentage of undiagnosed cases.<sup>4</sup>

In South Africa, the prevalence of hypertension was 31% for men and 36% for women aged 15 and above in 2008.<sup>5</sup> Prior estimates of levels of screening, diagnosis, treatment, and control for hypertension in South Africa vary significantly.<sup>6</sup> The true prevalence of diabetes in the country, as well as the magnitude of unmet need for diabetes care, remains unclear, as prior estimates for South Africa are largely based on self-reported data.<sup>7</sup> There are currently no robust national health surveillance data to confirm self-reports, identify disparities among population groups, or generate a clear picture of the need for additional diagnosis and care.

In 2013, South Africa outlined its strategy for the prevention and control of non-communicable diseases (NCDs).<sup>8</sup> The strategy called for a 20% reduction in the prevalence of hypertension by 2020 and a 30% increase in the proportion of patients with controlled diabetes. Effective implementation of the strategy will require high-quality nationally representative data on current NCD prevalence and the uptake and outcomes of care—information that has not been previously available.

### Methods

We used data from the first comprehensive national survey on NCDs, the South African National Health and Nutrition Examination Survey (SANHANES, 2011-2012),<sup>9</sup> to evaluate the prevalence of hypertension and diabetes among South Africans aged 15+ and the health system response to these conditions through separate

*Hypertension: Blood pressure > 140/90 mm Hg or use of antihypertensive medication*  
*Diabetes: Hemoglobin A1c ≥ 6.5% or currently on treatment for diabetes*

hypertension and diabetes care cascades.<sup>10,11</sup>

For both analyses, we constructed a care cascade by decomposing the population with the condition into five mutually exclusive and exhaustive subcategories: (1) unscreened and undiagnosed, (2) screened but undiagnosed, (3) diagnosed but untreated, (4) treated but

uncontrolled, and (5) treated and controlled. We examined the proportion of respondents who reached each stage in the care cascade to identify transitions with the greatest loss of access to care.<sup>12,13</sup> We then used multivariable logistic regression models to explore factors associated with prevalent and undiagnosed hypertension/diabetes.

### Results

The national, age-standardized prevalence of hypertension in the sample was 35.1% (n=5,871). Among those with hypertension, 48.7% reported that they had never been screened for hypertension. An additional 23.1% were screened but undiagnosed, 5.8% were diagnosed but untreated and 13.5% were treated but uncontrolled. Only 8.9% of individuals with hypertension were controlled.

The age-standardized prevalence of diabetes was 10.1% (n=4,083). Among individuals with diabetes, nearly half were unscreened (45.4%). An additional 14.7% were screened but undiagnosed, 2.3% were diagnosed but untreated, and 18.1% were treated but uncontrolled. Only 19.4% of diabetic respondents were treated and controlled.

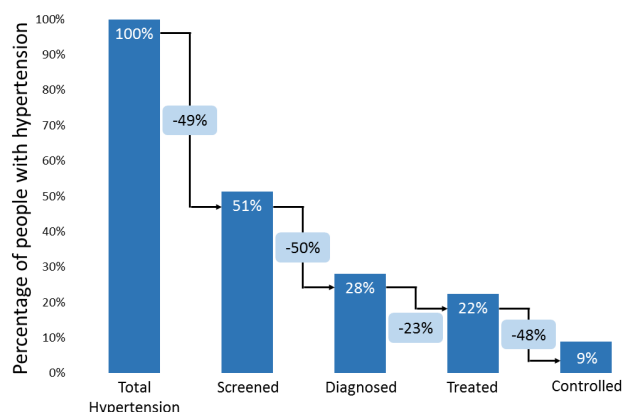
The hypertension care cascade (Figure 1) indicates that 51% of those with hypertension reported that they have only ever had their blood pressure measured, a significant loss to care. Among those who self-reported ever being screened, 50% had been told they had high blood pressure by a health professional. Among those who reported a prior diagnosis, 77% had taken blood pressure medication in the last 30 days. Among those treated for hypertension, 52% had controlled blood pressure (<140/90 mm Hg).

The diabetes care cascade (Figure 2) shows 54.6% of those with diabetes had ever been screened for high blood sugar. Among those who were screened, 72.5% reported that they had been previously been diagnosed with high blood sugar or diabetes. Among those who self-reported a prior diagnosis, 93.7% were currently taking medication to treat/control their diabetes. Among those treated for diabetes, 51.2% had controlled blood sugar (HbA1c < 7.0%).

In the multivariable analysis of predictors of hypertension prevalence, we found significantly elevated odds ratios associated with higher age, rural formal areas, high BMI, and a family history of hypertension. Men were significantly more likely to be hypertensive compared with women, while Indian/Asian/other South Africans were significantly less likely to be hypertensive compared

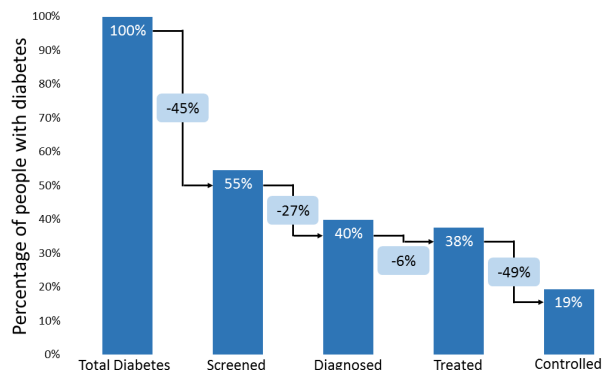
with those of the African race. In the analysis of predictors of undiagnosed hypertension (includes unscreened and screened, undiagnosed groups) among those with hypertension, we found that being older and being male increased risk of being undiagnosed.

**Figure 1. The hypertension care cascade, 2011-2012<sup>10</sup>**



In the multivariable analysis of prevalent diabetes, we found elevated odds ratios associated with higher age, Indian/Asian/other race, BMI in the overweight and obese range, and family history of diabetes, whereas an inverse association was found for white South Africans. In the analysis of predictors of undiagnosed diabetes, the Indian/Asian/other racial group (compared with the African racial group) and older adults had elevated risk of being undiagnosed. We also found family history of diabetes was associated with a lower risk of having undiagnosed diabetes.

**Figure 2. The diabetes care cascade, 2011-2012<sup>11</sup>**



## Policy Relevance

Our analyses revealed high prevalence of both hypertension and diabetes and substantial unmet need for care in the South African population.<sup>10,11</sup> We found that 35% of South Africans aged 15+ have hypertension and 10% have diabetes, and we estimated that 91% of the hypertensive population and 81% of the diabetic population in South Africa have an unmet need for care.

The hypertension care cascade reveals that the key gaps in the population-level management of hypertension are proper screening and diagnosis; nearly half of hypertensive respondents reported never having their blood pressure measured. Of those who had been screened, only 50% received a diagnosis, another significant loss.

The diabetes care cascade reveals proper screening is also a major gap in the management of diabetes; nearly half of diabetic respondents reported never even having their blood sugar measured. Of those with diabetes who reported prior screening/testing, more than a quarter never received a diagnosis, another significant loss between screening and diagnosis. In total, only 40% of those with diabetic level HbA1c reported awareness of their condition. For both hypertension and diabetes, a substantial proportion of those in treatment have not achieved control.

These data document high levels of unmet need for hypertension and diabetes care among South African and point to stages in the hypertension and diabetes care continuums with the biggest gaps in population-level management. Until recently, health policy, programming, and funding in South Africa have largely focused on infectious diseases. With the recent launch of the national NCD strategy,<sup>8</sup> however, momentum to tackle the burden of NCDs is growing. The current estimates should serve as a benchmark for evaluating the design and effectiveness of the proposed reforms.

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