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22 August 2016

National Treasury of South Africa
40 Church Street,
Pretoria

Dear Mr Legote

RE: SUBMISSION ON THE SUGAR SWEETENED BEVERAGES POLICY PAPER FROM THE SCHOOL OF PUBLIC HEALTH AND FAMILY MEDICINE, UNIVERSITY OF CAPE TOWN

Thank you for the opportunity to contribute to this important tax policy reform process. The submission from the School accompanies this letter.

The staff of the School of Public Health and Family Medicine welcomed the opportunity to engage with the Sugary Sweetened Beverages Policy Paper Release by the Treasury (8 July 2016) and through considered analysis and debate of the document, have provided inputs and suggestions from their positions as concerned citizens, academics and practitioners engaged in the pursuit of the human right to good quality universal health care for all those who live within South African borders.

We look forward to further engagement with this important process and will endeavour to continue our contributions in shaping and strengthening the South African health system in our capacity as public health practitioners, researchers and academics.

We wish you well with the next phase of the process.

Sincerely,

A handwritten signature in blue ink, reading 'MF Jeebhay'.

Mohamed F Jeebhay (MBChB DOH MPhil MPH PhD)
Professor and Head: School of Public Health and Family Medicine

COMMENTS TO THE SOUTH AFRICAN NATIONAL TREASURY ON THE PROPOSED SUGARY DRINK TAX (8 July 2016)

SUBMISSION MADE BY THE SCHOOL OF PUBLIC HEALTH AND FAMILY MEDICINE (SOPH&FM), FACULTY OF HEALTH SCIENCES, UNIVERSITY OF CAPE TOWN

Date: 22 August 2016

INTRODUCTION

1. We make this submission on the proposed Sugary Drink Tax (as described in the Taxation of Sugar Sweetened Beverages Policy Paper release by the Treasury on 8 July 2016) as researchers in the School of Public Health and Family Medicine at the University of Cape Town, who have been involved in different aspects of research into population approaches to preventing the Burden associated with Non-Communicable Disease. As part of the School of Public Health and Family Medicine, we are committed to the concept of a healthy population having equitable access to the resources they need for health and a better quality of life. We are cognisant of the social and biological determinants of health and believe we can bring our population health skills to contribute towards just social development for all in South Africa. We therefore are strongly invested in healthy futures for all South Africans, and affirm the evidence that chronic and non-communicable diseases represent significant, growing problems in South Africa. Moreover, we agree with evidence that suggests that the consumption of sugar, particularly sugar in processed food and drinks, contributes to the epidemic of chronic disease (Mayosi et al., 2009).
2. We value the opportunity to participate in this policy development and implementation process. We commend the South African National Treasury for undertaking this process and welcome the opportunity for collective engagement on this important tax policy.

3. This submission is structured as follows:

- 3.1. We juxtapose increasing rates of obesity in South Africa with a historical policy orientation towards food insecurity and undernutrition.
- 3.2. Second, we argue for an increasing consideration of the food environment given simultaneously high rates of obesity and undernutrition constituting two parallel and linked epidemics.
- 3.3. Thirdly, we consider the experience of other countries with sugary drink tax, most notably Mexico, and the possible implications for the South African case.
- 3.4. Fourthly, we locate the introduction of a sugar tax within a human rights framework, one that recognises state obligations to fulfil the right to health, whilst recognising the need for adherence to constitutional rights when limiting the rights of individuals. This analysis concludes that there is sufficient justification to consider the sugar tax consistent with the provisions of Bill of Rights in which limitations of rights are dealt with.
- 3.5. Lastly, we propose recommendations for sugary drink tax in South Africa.

HIGH RATES OF FOOD INSECURITY AND OBESITY

4. We believe it is important to situate obesity in relation to historical hunger amongst many South Africans. The South African national health and nutrition examination survey (SANHANES-1) found that over 32% of urban informal residents experience hunger. Results from interviews in research conducted by the African Food Security Urban Network (AFSUN) study showed that almost 49% of the population ate foods that they did not want to eat, or did not consume food that they preferred (Battersby, 2011). Moreover, South Africa is one of the twenty countries worldwide with the highest burden of undernutrition (Bryce et al., 2008), and is ranked 146th globally in the Global Nutrition Index (Rosenbloom, Kaluski, & Berry, 2008).
5. It is important to acknowledge that obesity and hunger are interwoven. In other countries, continued policy focus on caloric insufficiency has at times led to programmes that increase rates of obesity. Over 50% of women and 30% of men in

South Africa are overweight or obese (Kimani-Murage, 2013; Puoane, Matwa, Bradley, & Hughes, 2006; Rossouw, Grant, & Viljoen, 2012). Ten years ago, a study of obesity amongst primary school children in Cape Town found that obesity trends in this group were similar to those in the USA between 1976 and 1980 (Armstrong, Lambert, Sharwood, & Lambert, 2006). In particular, black girls had very high rates of obesity.

6. Obesity is more likely amongst populations who have recent historical experiences of hunger. In low and middle countries like South Africa, the more rapid the transition to cheap calories, the more likely those who were previously food insecure will face obesity and related chronic diseases: a growing body of literature shows that children born to mothers who were malnourished during pregnancy are more prone to obesity than those born to well-nourished mothers (Popkin et al., 2012). Central obesity and metabolic disorders are also interconnected, and individuals who have experienced food scarcity as children are not only more likely to have central obesity, but also more susceptible to diabetes as a result (Popkin et al., 2012).
7. Obesity and associated non-communicable diseases are currently prevalent among all population groups in South Africa, including the poor (Kruger, Puoane, Senekal, & van der Merwe, 2005; Van Der Merwe & Pepper, 2006). Joubert and colleagues, writing in 2007, attempted to quantify the burden of disease attributable to excess body weight. Based on data from 2000, they found that excess weight was implicated in 7% of all deaths (Joubert, 2007).
8. More worryingly, there is evidence that the rates of obesity and overweight amongst women have risen by more than 20% in the past decade and that obesity and overweight amongst children has more than doubled (Igumbor et al., 2012). The consequences of such increases for the Non-Communicable Disease burden are substantial. For example, rates of diabetes in South Africa have risen by more than 50% and impaired glucose tolerance by more than 67% since 1990 (Peer et al, 2012).

9. More recent evidence emerging in observational studies is an association between asthma and dietary intake, with diet being a possible link between obesity and asthma (Jeebhay et al., 2014). One cross-sectional study (Shi et al., 2012) demonstrated that consumption of half a litre of soft drinks per day was associated with a 26% increased odds of asthma and chronic obstructive pulmonary disease in adults..
10. The economic consequences of obesity are serious and growing, including considerable economic burden on individuals, households, employers, the health system and the society at large. Associated with the economic and financial burden are direct and indirect costs; while direct costs include expenditure on healthcare and mortality due to obesity, the indirect costs include loss of income due to job loss, reduced physical functioning and overall productivity (Seidell, 1998) that could slow down the national economies; according to a macroeconomic analysis , a 10% rise in NCDs is associated with 0.5% lower rate of annual economic growth (Stuckler, 2008). A further economic estimation demonstrated that forgone national income from labour supply losses due to two diseases directly linked to obesity (stroke heart disease and diabetes) in low and middle income countries ranges between 20% and 21% (Abegunde et.al, 2006). Furthermore, the labour market effect of obesity suggest a negative impact on employment status in South Africa (Some et. al, 2014),

THE ROLE OF THE FOOD ENVIRONMENT IN SHAPING OBESITY

11. We argue that the food environment has played an important role in increasing rates of obesity in South Africa. McLachlan and Landman (2013) suggest that changing dietary patterns are driven by urbanisation, the expansion of supermarkets and the availability of processed foods (McLachlan & Landman, 2013). The top 10 soft-drink companies account for 79% of the total soft-drink sales in South Africa with three companies – Coca-Cola Co., PepsiCo Inc., and Danone Groupe – accounting for 64.7% of the market between them, with the other top companies each contributing less than 3.5% (Igumbor et al., 2012). These companies transform the food environment by altering the foods that are acceptable, affordable, and available to South Africans

(Igumbor et al., 2012). Research indicates that compared to the global average of 89 Coca-Cola products per person per year in 2010, South Africans consumed 254 Coca-Cola products per person per year, an increase from around 130 in 1992 and 175 in 1997 (Igumbor et al., 2012).

12. The size of these companies matters because with size comes immense political and marketing power, and this power is not focused on the health of their consumer base. Large food corporations tend to favour foods with a long shelf life, which have been produced with cheap ingredients, because these foods can be transported over longer distances, and stay in warehouses for longer periods, thereby maximising profits. The motivation to maximise profits are not always symbiotic with good nutrition or health. Moreover, in addition to corresponding to increased consumption of ultraprocessed foods, sugar, fat and salt, the money spent in supermarkets contributes little to strengthening the local economy (D'Haese & Van Huylenbroeck, 2005).
13. Monteiro (2013) and others have argued that a major problem driving increasing rates of obesity revolves around processed and ultraprocessed foods, where ultraprocessed foods induce overeating. In Cape Town, a study observed that cookies, sugar, margarine, and oil were among the cheapest sources of energy. A wide range of healthier food choices was nearly always available (Temple & Steyn, 2011). Yet nutrient-dense foods such as lean meats, fish, fruit and vegetables cost more than processed food products (Igumbor et al., 2012). One study of food choices in rural areas found that while "healthier" foods were available, they were 10-60% more expensive than other, less healthy calories (Battersby, 2011).
14. The growth of supermarkets has accelerated this process. A recent study, showed that supermarkets now share at least 50-60% of food sales in South Africa, with the majority of this growth occurring after 1994 (D'Haese & Van Huylenbroeck, 2005). Moreover, nearly two-thirds of households in a rural area in South Africa were now buying their food at supermarket rather than from smaller distributors or local production.

15. In conclusion, there is abundant evidence that the food environment in South Africa shapes unhealthy dietary patterns. It should be noted that the downstream costs of obesity: increased burden of diabetes and musculoskeletal disorders, are largely borne by the public health sector, although the main drivers of obesity such as the food environment, lie outside the health sector. This highlights the importance of interventions that target the food environment in order to support healthy choices and prevent chronic diseases.

LESSONS LEARNED FROM PAST CONTROLS ON SUGARY DRINKS

16. The most recent example of a similar measure to control the consumption of sugary drinks is derived from Mexico. Thus far, data is limited but there seems to be a small decline in consumption, with a larger decline amongst the poor (Colchero et al., 2016).

16.1. Some commentators have suggested that a larger tax would have had a more marked effect on consumption.

16.2. Greater decline in sugary drinks amongst the poor may be conceived as positive *if* the poor are food secure.

16.3. South Africa has a much higher Gini coefficient than Mexico (63.4 as compared to 48.1 for Mexico) and a much higher percentage of the population living on less than US\$1.90 per day (16.6% as compared to 2.7% for Mexico (World Bank, 2016).

17. There is other evidence suggesting that increases in prices of sugary drinks in Brazil was associated with reduced consumption, more so for poorer people, and that the high SSB price elasticity found suggested that a tax on purchased weight or volume was likely to lead to reductions in SSB consumption (Claro et al). A Meta-Analysis of the effect of SSB taxes or price increases on consumption levels, obesity, overweight and body mass index (BMI) found that higher prices were associated with a lower demand for SSBs, and in 6 US studies, higher prices could also lead to a decrease in BMI, and decrease the prevalence of overweight and obesity (Escobar et al, 2013).

Further, a 2013 review drawing on evidence from well-powered prospective cohorts, a meta-analysis of RCTs commissioned by the World Health Organization, two further meta-analyses of cohort studies and two large RCTs demonstrating that reducing consumption of SSBs significantly decreases weight gain and adiposity in children and adolescents, provide compelling evidence that decreasing SSBs will decrease the risk of obesity and related diseases (Hu, 2013).

18. As researchers, policymakers, and activists from across the world gather in South Africa at the World Nutrition Congress on 30 August 2016 (<http://www.wncapetown2016.com/>), a spotlight will be on the role of policy regulation of the food environment, particularly sugar consumption, to positively impact health. The proposed tax demonstrates South Africa's role in leading intersectoral policy action to address the epidemic of obesity and to improve its population health.

THE SUGARY DRINK TAX AND THE RIGHT TO HEALTH IN SOUTH AFRICA

19. Some arguments have raised the question of autonomy and human rights as threatened by the introduction of a tax on SSBs. For example, Leon Louw, writing in Business Day Live on 2nd March (see <http://www.bdlive.co.za/opinion/columnists/2016/03/02/health-tax-bodes-ill-for-societal-freedoms>) suggested that the tax was a threat to “societal freedoms” and a form of “discrimination against people who have no control over innate inclinations” that will victimise people who are “socially stigmatised, overweight people who happen to have a sweet tooth.”
20. However, these argument fail to pass muster on both public health and legal grounds for the following reasons;
 - 20.1. Taxes are widely used by many countries, including those with the most free market orientations, to achieve public interest goals. The question is not whether tax is a legitimate instrument of public policy but whether it limits rights in ways inconsistent with our constitution.
 - 20.2. To answer the latter question, Section 36 of the Bill of Rights outlines how individual rights may be limited if if and only if the “limitation is reasonable and

justifiable in an open and democratic society based on human dignity, equality and freedom, taking into relevant factors, including— (a) the nature of the right; (b) the importance of the purpose of the limitation; (c) the nature and extent of the limitation; (d) the relation between the limitation and its purpose; and (e) less restrictive means to achieve the purpose.

20.3. In the public health context, we exercise regulatory functions all the time that limit individuals' rights based on exactly these consideration – but only do so when these stringent criteria are met. For example, the control of the Ebola epidemic would not have been possible without justified limitations of certain rights related to freedom of movement. Similarly, protecting people from harms of environmental tobacco smoke, would not be possible without limiting rights of people to choose where to smoke.

20.4. With respect to the SSB tax, we believe that on all counts, there is no inconsistency with Section 36 of our constitution:

20.4.1. The right being limited is not one related to equality or autonomy (as suggested by the Free Market Foundation above). Persons who wish to drink SSBs are not prevented from doing so, nor are companies making profits from SSBs prevented from continuing their economic activities. Rather, an economic instrument is being used to shape their choice through price elasticity.

20.4.2. The purpose of the limitation is cogent and supported by evidence – to reduce the burden from obesity and other NCDs related to high intake of SSBs. Resources which would otherwise need to be spent on treating NCDs and the consequences of the growing epidemic of obesity can be deployed to to address urgent health needs. Moreover, the state has an obligation in terms of the International Covenant on Economic Social and Cultural Rights, ratified in 2014, to fulfil the right to health through controlling epidemic and endemic diseases. In terms of General Comment 14 on the Right to Health, state obligations would extend to taking steps which include “appropriate legislative, administrative, budgetary, judicial, promotional and other measures towards the full realization of the right to health” and which are

intended to “create, maintain and restore the health of the population.” To our understanding, the SSB tax, far from being a measure contrary to human rights, is actually part of the State’s obligation to fulfil the right to health, which, since ratifying the ICESCR, is now incumbent on the South African government, as part of domesticating the covenant.

20.4.3. The nature and extent of the limitation created by the SSB tax is not an undue hardship nor particularly intrusive on the individual. In contrast, the nature and extent of the rights that the state is fulfilling by implementing the SSB tax are far-reaching and long-lasting, since the benefits of reducing obesity and NCDs are major in terms of quality of life and mortality, particularly for children – for whom all policies and programmes should make their best interests a primary consideration.

20.4.4. The relationship between the limitation and its purpose is supported by a raft of international peer-reviewed evidence, cited above. SSB taxes reduce SSB consumption and reduced SSB consumption is associated with reduced obesity and NCD burden. The cost of inaction – failure to implement the SSB tax, has been estimated at an additional 1 287 000 obese adults in South Africa by 2017, 22 % of which will be due to increased SSB consumption..

20.4.5. Lastly, the question of less restrictive means to achieve the purpose arises. Alternatives to taxation have been suggested such as consumer education to balance calorie choices, but systematic reviews confirm that such interventions lack evidence for effectiveness and that interventions to reduce SSB consumption in children and adolescents across the socioecological spectrum do not provide the necessary information for dissemination and implementation in community nutrition settings settings. It is therefore important to note that the obesity epidemic is fuelled not only by economic and psychosocial factors but by the increased availability of energy dense food and beverages (Friel et al). The 2008 WHO Commission on the Social Determinants of Health confirmed the importance of responding to a policy context that “actively encourages the unfettered production, trade, and consumption of foods high in fats and sugars.” Strategies that focus on

individual interventions to get people to make healthier dietary choices and to exercise will ‘miss the heart of the problem: the underlying unequal distribution of factors that support the opportunity to be a healthy weight’. Treasury has done well to take a first step in a complex health problem requiring multi-faceted and co-ordinated inter-sectoral action.

21. We therefore urge the Treasury not to be swayed by inappropriate use of rights language in opposition to the bill, recruited for the purpose, not of advancing people’s rights to health, but of protecting the free market for purposes of ongoing commerce.

RECOMMENDATIONS FOR SUGARY DRINK TAX

22. Given the prevalence of both obesity and undernutrition in South Africa, efforts to improve the health of South Africans through the food environment must improve the *accessibility, affordability, and acceptability* of minimally processed foods.

- 22.1. It is vital that this effort include significant and progressively stronger controls of Big Food and Big Drink.
- 22.2. This effort includes, but should not be limited to, the sugary drink tax. In other words, the Sugary drink tax should be complemented by other appropriate public health measures to provide a comprehensive response to the problem.

23. Based on the evidence from Mexico, a larger tax may be necessary to evoke significant decline in consumption of sugary drinks.

- 23.1. However, given a much larger proportion of very poor people (less than \$1.90) in South Africa as compared to Mexico, it is vital that tax revenue *directly* subsidize the provision of healthy calories to poor families.

24. Revenue from the sugary drink tax should be directly funnelled into efforts to promote better food security and access to alternate beverages. These efforts should include evidence-based interventions such as:

- 24.1. Consistent access to clean drinking water, including water fountains and taps.

- 24.2. Subsidizing healthy foods, including minimally processed foods.
 - 24.3. Better access to open green spaces to promote physical activity which is necessary, alongside decreased sugar consumption, to impact on obesity rates.
 - 24.4. Improving levels of food sovereignty by investing in South African agriculture.
25. The policy should be implemented in tandem with an effective monitoring and evaluation system to track trends in SSB usage, substitution of SSBs with other sugary drinks, levels of obesity and NCDs – all with an equity lens.

CONCLUSION

South Africa has an extraordinary burden of non-communicable disease requiring co-ordinated inter-sectoral action. The use of tax instruments to shape behaviour for public health is not unusual, atypical or inconsistent with our constitutional values. On the contrary, where taxation provides an effective upstream measure to reduce the burden of disease from non-communicable disease, the state has an obligation to consider such measures. We recognise, as voiced by the World Health Organisation, that it is essential that such interventions occur across the whole population, in a variety of settings, and through multiple strategies. The use of price and tax strategies – for public health objectives in general and for addressing obesity in particular - is backed by a considerable body of evidence at global level. We urge the Treasury to keep the evidence in mind when considering submissions on the policy.

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References

- Abegunde, D., & Stanciole, A. (2006). An estimation of the economic impact of chronic noncommunicable diseases in selected countries. *World Health Organization, Department of Chronic Diseases and Health Promotion*, 2006.
- Armstrong, M. E. G., Lambert, M. I., Sharwood, K. a, & Lambert, E. V. (2006). Obesity and overweight in South African primary school children -- the Health of the Nation Study. *South African Medical Journal = Suid-Afrikaanse Tydskrif Vir Geneeskunde*, 96(5), 439–444. doi:10.1080/22201009.2006.10872144
- Arthur, R. (2016, April 12) 'The way to tackle obesity is...' ICBA president on alternatives to sugar tax. Retrieved from <http://www.beveragedaily.com/Regulation-Safety/The-way-to-tackle-obesity-is-ICBA-president-on-alternatives-to-sugar-tax>
- Battersby, J. (2011). Urban food insecurity in Cape Town, South Africa: An alternative approach to food access. *Development Southern Africa*, 28(4), 545–561. doi:10.1080/0376835X.2011.605572
- Boutayeb, A. (2006). The double burden of communicable and non-communicable diseases in developing countries. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 100(3), 191–199. doi:10.1016/j.trstmh.2005.07.021
- Bryce, J., Coitinho, D., Darnton-hill, I., Pelletier, D., Pinstup-andersen, P., Undernutrition, C., & Group, S. (2008). Maternal and child undernutrition: effective action at a national level. *Lancet*, 371, 510–526. doi:10.1016/S0140-6736(07)61694-8
- Claro RM, Levy RB, Popkin BM, Monteiro CA. (2012). Sugar-sweetened beverage taxes in Brazil. *Am J Public Health*. Jan;102(1):178-83. doi: 10.2105/AJPH.2011.300313. Epub 2011 Nov 28.
- D'Haese, M., & Van Huylenbroeck, G. (2005). The rise of supermarkets and changing expenditure patterns of poor rural households case study in the Transkei area, South Africa. *Food Policy*, 30(1), 97–113. doi:10.1016/j.foodpol.2005.01.001
- Escobar, M. A. C., Veerman, J. L., Tollman, S. M., Bertram, M. Y., & Hofman, K. J. (2013). Evidence that a tax on sugar sweetened beverages reduces the obesity rate: a meta-analysis. *BMC public health*, 13(1), 1.
- Friel S, Chopra M, Satcher D. (2007). Unequal weight: equity oriented policy responses to the global obesity epidemic. *BMJ*. Dec 15; 335(7632): 1241-3
- Hu, F. B. (2013). Resolved: there is sufficient scientific evidence that decreasing sugar-sweetened beverage consumption will reduce the prevalence of obesity and obesity-related diseases. *Obesity Reviews*, 14(8), 606-619.

Jeebhay, M. F., Ngajilo, D., & Le Moual, N. (2014). Risk factors for nonwork-related adult-onset asthma and occupational asthma: a comparative review. *Current opinion in allergy and clinical immunology*, 14(2), 84-94.

Joubert, J., Norman, R., Bradshaw, D., Goedecke, J. H., Steyn, N. P., Puoane, T., & Collaboration, S. A. C. R. A. (2007). Estimating the burden of disease attributable to excess body weight in South Africa in 2000. *South African Medical Journal*, 97(8), 683-690.

Kimani-Murage, E. W. (2013). Exploring the paradox: double burden of malnutrition in rural South Africa. *Global Health Action*, 6(1), 19249. doi:10.3402/gha.v6i0.19249
Kruger, H. S., Puoane, T. R., Senekal, M., & van der Merwe, M. T. (2005). Obesity in South Africa: challenges for government and health professionals. *Public Health Nutrition*, 8(5), 491–500.

Lane H, Porter K, Estabrooks P, Zoellner J. (2016) A Systematic Review to Assess Sugar-Sweetened Beverage Interventions for Children and Adolescents across the Socioecological Model. *J Acad Nutr Diet*. 116(8):1295-1307.

Manyema, M., Veerman, L. J., Chola, L., Tugendhaft, A., Sartorius, B., Labadarios, D., & Hofman, K. J. (2014). The potential impact of a 20% tax on sugar-sweetened beverages on obesity in South African adults: A mathematical model. *PloS one*, 9(8), e105287.

Mayosi, B. M., Flisher, A. J., Lalloo, U. G., Sitas, F., Tollman, S. M., & Bradshaw, D. (2009). The burden of non-communicable diseases in South Africa. *The Lancet*, 374(9693), 934-947.

Peer, N., Steyn, K., Lombard, C., Lambert, E. V., Vythilingum, B., & Levitt, N. S. (2012). Rising diabetes prevalence among urban-dwelling black South Africans. *PloS one*, 7(9), e43336.

Popkin, B. M., Adair, L. S., & Ng, S. W. (2012). Global nutrition transition and the pandemic of obesity in developing countries. *Nutrition Reviews*, 70(1), 3–21. doi:10.1111/j.1753-4887.2011.00456.x

Puoane, T., Matwa, P., Bradley, H., & Hughes, G. (2006). Socio-cultural factors influencing food consumption patterns in the black African population in an urban township in South Africa. *Human Ecology*, 14, 89–93.

Rosenbloom, J. I., Kaluski, D. N., & Berry, E. M. (2008). A global nutritional index. *Food and Nutrition Bulletin*, 29(4), 266–77. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/19227051>

Seidell, J. C. (1998). Societal and personal costs of obesity. *Experimental and clinical endocrinology & diabetes*, 106(S 02), 7-10.

Shi, Z., Dal Grande, E., Taylor, A. W., Gill, T. K., Adams, R., & Wittert, G. A. (2012). Association between soft drink consumption and asthma and chronic obstructive pulmonary disease among adults in Australia. *Respirology*, 17(2), 363-369.

Stuckler, D. (2008). Population causes and consequences of leading chronic diseases: a comparative analysis of prevailing explanations. *Milbank Quarterly*, 86(2), 273-326.

Some, M., Rashied, N., & Ohonba, A. (2014). *The Impact of Obesity on Employment in South Africa* (No. 475). Economic Research Southern Africa.

Van Der Merwe, M. T., & Pepper, M. S. (2006). Obesity in South Africa. *Obesity Reviews*, 7(4), 315–322.

Wang Y, Cai L, Wu Y, Wilson RF, Weston C, Fawole O, Bleich SN, Cheskin LJ, Showell NN, Lau BD, Chiu DT, Zhang A, Segal J. (2015). What childhood obesity prevention programmes work? A systematic review and meta-analysis. *Obes Rev*. 16(7):547-65

World Health Organisation. (2013). Population-based approaches to Childhood Obesity Prevention. WHO: Geneva

World Health Organisation. Using price policies to promote healthier diets. WHO Europe Office: Geneva.