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Letter to the Editor: Response to Singh et al (2018). Is there more to the equation? Weight bias and the costs of obesity. *Canadian Journal of Public Health*. <https://doi.org/10.17269/s41997-018-0146-2>. Online first: 26 October 2018

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Singh et al (2018) outline the role that weight-related stigma plays in inflating the supposed economic costs of obesity. However, despite their thorough and helpful synthesis of the literature, one cost that was not well elucidated in their model was the direct impact of weight stigma on physical morbidity. In addition to indirect effects via delayed or inappropriate medical treatment, exposure to a chronic stigmatising environment, even in the absence of personal discriminatory experiences, has a direct impact on physical health via the body's dynamic neuroendocrine response to stress – allostasis. Allostasis maintain homeostasis in the face of physical, environmental, or psychosocial stressors and involves multiple systems within the body, including the cardiovascular and immune systems. While allostasis represents an adaptive response to acute stress, chronic or repeated stress over time can result in multi-system biological dysregulation – a concept known as allostatic load, which is linked with a wide range of disease conditions, including cardiovascular disease, diabetes, hypertension, and cancer (Beckie, 2012). This situation is not specific to high-weight individuals. The wider stigma literature provides a wealth of evidence suggesting that exposure to personal and systemic prejudice and ill-treatment places members of disadvantaged and marginalized groups at particular risk of developing these conditions (Hatzenbuehler, Phelan, & Link, 2013; Pascoe & Smart Richman, 2009). Hostile environments may also drive adverse physical health outcomes, for example, chronic pain conditions and poorer birth outcomes, via psychological distress (Brown et al., 2018; Lauderdale, 2006).

In the case of high-weight individuals, experienced weight stigma has been linked with higher levels of cortisol and inflammatory markers (Jackson, Kirschbaum, & Steptoe, 2016; Sutin, Stephan, Luchetti, & Terracciano, 2014) and impaired glucose metabolism (Tsenkova, Carr, Schoeller, & Ryff, 2011), with a recent longitudinal study supporting a causal relationship: in a cohort of 986 adults age 25–75 years in the Midlife Development in the US Biomarker Sub-study, perceived weight discrimination was associated with a two-fold increase in the 10-year risk of high allostatic load (Vadiveloo & Mattei, 2017). Experienced weight stigma and weight-related bullying were also linked with overt disease prevalence, including arteriosclerosis, diabetes, and minor cardiac conditions, in a sample of over 21,000 high-weight adults in the National Survey of Alcohol and Related Conditions study (Udo, Purcell, & Grilo, 2016). As many of these health problems are generally attributed to carrying excess weight, any calculation of the economic burden of 'obesity' must consider the direct causal role played by weight stigma in healthcare costs associated with physical as well as psychological morbidity.

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Conflict of Interest: The authors declare that they have no conflict of interest.