



influenza

Thinking about burden of disease with equity in mind

Everyone deserves to live a long life in full health, but not everyone is so fortunate.¹ Some individuals and groups are more at risk of falling ill, becoming severely ill or disabled, or dying prematurely (that is, before the average expected life span). In other words, the *burden of disease* falls more heavily on some populations than on others.

If our aim is to protect and promote the health of all, how do we achieve more equitable outcomes? First, we need information about burden of disease—which illnesses are most common and most harmful for which populations. Second, we need a better grasp of why some populations experience different types and degrees of disease burden. Third, we need to disseminate this information to public health planners and practitioners and encourage them

to incorporate this knowledge into interventions that promote and support greater health equity. Finally, we need to monitor and evaluate public health interventions in order to identify barriers and ensure equitable outcomes.

How do we currently think about—and measure—burden of disease?

Burden of disease measures are important for monitoring and evaluating the impact of infectious and non-communicable diseases. These measures typically tell us how many people are sick, disabled, or die prematurely as a result of disease. They also estimate the economic impact of illness, disability, and death on individuals and households, healthcare systems and societies. The most commonly-used measures focus on the *direct*

causes and *downstream* effects of illness—how diseases affect peoples' bodies and how, in turn, the impact of diseases on people creates physical and economic hardships. Information about the physical and economic impacts of disease is valuable for making public health policy and practice decisions about how and when to intervene.

So, what else do we need?

Standard burden of disease measures identify differences in disease patterns and trends for a population, but do not always look for differences within the population. The risk and impact of disease are often measured in terms of the effects on physical health by age, less consistently with regard to differences for females and males, and occasionally compare





across income levels. However there are substantial gaps in our understanding of which sub-populations experience the greatest burden of disease and these information gaps need to be filled.

Even when burden of disease measures identify *who* is sick and dying, they may not be able to explain *why* some populations are more likely than others to be exposed to infectious agents, to develop non-communicable disease, to become severely ill or disabled, and to die prematurely. Standard measures provide only a partial view of burden of disease because they do not evaluate and monitor the *indirect* or *upstream* causes. For example, they do not generally consider how the conditions in which people live affect risk and severity of disease and disability or contribute to premature death. They also do not consider the ways in which illness, disability, and premature death adversely affect the conditions in which people live. We need a different approach to thinking about and measuring burden of disease—one that considers the social determinants of health and the effects of inequity.

The case of influenza

It might be challenging to think about how to approach burden of disease from new or different angles. Influenza is a concrete example we can use to consider how we might think differently about burden of disease and respond differently to disease burden.

How might we think differently about burden of disease?

We know that influenza is caused by viruses, such as H1N1. Standard burden of disease measures will tell us how many people contract influenza, become sick enough to consult a doctor, are hospitalized, or are admitted to an intensive-care unit, and perhaps die prematurely as a result of the disease. In 2009-2010, for example, the H1N1 influenza in Canada resulted in:

- “8,678 hospitalized cases (highest numbers in age <20 years);
- 1,473 (17.0%) of whom were admitted to ICU (<5 years and 45-64 years);
- 428 (4.9%) deaths (median age: 54 years)”ⁱⁱ

Burden of disease measures revealed that influenza (H1N1) was more common and more severe in some populations than in others. Data disaggregated by age revealed that young children were highly susceptible to infection

while those over 65 years of age who contracted influenza were more likely to die.ⁱⁱⁱ Some Indigenous communities were also disproportionately affected by influenza. For example, in the province of Manitoba, rates of infection among children under age five were 12 times higher for First Nations than for non-First Nations populations. The rate of hospitalization was 22 times higher.^{iv} Other groups at increased risk of adverse outcomes were pregnant women in their second and third trimesters and new mothers with children under 4 weeks of age.^v

While standard burden of disease measures identify differences among these populations, they do not necessarily explain them. In the case of influenza, some researchers and practitioners have suggested that the disease is more common among children and pregnant women because their immune systems are under-developed or compromised.^{vi} Similar factors might also be responsible for higher rates of influenza deaths among the elderly. But it is harder to account for more—and more severe—cases of influenza amongst First Nations children in this way. Why would their immune systems be at greater risk than those of other children? An explanation for the difference may be found

when we consider the social determinants of health. According to some researchers, “low-quality housing, crowded living conditions, high exposure to indoor air pollutants, lack of access to critical infrastructure, [and] higher prevalence of predisposing health conditions and co-morbidities” may contribute to the spread of influenza and more severe illness in Indigenous communities.^{vii} Because many of these drivers of influenza are rooted in historic and on-going inequities, we can see that the burden of disease for Indigenous communities is not only heavier, but also inequitable. Considering the indirect as well as the direct causes of disease gives us a different interpretation of burden of disease than we get by using only standard measures.

How might we respond differently to the burden of disease?

Standard burden of disease measures tend to monitor and evaluate the impact of disease on physical health (bodies), and so public health interventions often focus on preventing or controlling the spread of disease from one person to the next. In the case of influenza, this may involve:

- Promoting the development and use of vaccines;

- Encouraging health-promoting behaviours, such as hand-washing, the use of face masks, and sneezing into sleeves rather than hands or the air;

- Reducing exposure by isolating those who are sick or closing schools and cancelling larger gatherings;^{viii}

Strategies like these have proven highly effective in the management of influenza.^{ix}

On the one hand, it is important to realize that while standard burden of disease measures may not include indirect causes of disease, they can still help us to address inequitable burden. For example, in Saskatchewan and Manitoba, public health officials used standard burden of disease measures along with analyses of socio-economic and health inequities in planning their response to the influenza pandemic of 2009-10. In Saskatoon, children in low-income neighbourhoods were identified as a priority population for vaccination.^x In Manitoba, First Nations, Northern and isolated communities were targeted for “early distribution of the H1N1 vaccine, post-exposure anti-viral medication, and infection prevention and control supplies such as hand sanitizer.”^{xi}

On the other hand, ignoring the social determinants of health




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may create or worsen inequitable burden of disease. In the case of infectious diseases such as influenza, public health planners and practitioners may decide to close schools to limit the spread of disease. This appears to make sense because school-aged children are highly susceptible to influenza and can pass it on easily to classmates, teachers, family members, and caregivers with whom they are in close contact. But a growing body of research suggests that school closures can deepen social and economic inequities because they are more likely to have a negative effect on low-income households.^{xii} Further, even interventions that are designed to promote more equitable outcomes, such as targeted vaccination programs, may have less impact on burden of disease than interventions aimed at addressing the indirect causes, such as over-crowding, food insecurity, and air or water quality.^{xiii}

Where to from here?

Public health practices that consider the upstream causes as well as the downstream effects of disease are important in the fight for health equity, as evidenced by the response to influenza in Manitoba and Saskatchewan.

Nevertheless, we need more and better data to help guide public health decisions. Burden of disease



measures are a cornerstone of public health planning and practice. They provide valuable information about the impact of disease and help guide decisions about when and where to intervene.

While public health planners and practitioners are increasingly aware of the role of inequity in health, burden of disease measures have not kept pace with this knowledge. Public health interventions based on standard burden of disease measures are hampered by this lack of attention to the social determinants of health: rather like using a bandage to treat a wound that requires stitches, they may help but they won't address the underlying problem.

We need burden of disease measures that consider the context of disease, disability, and premature death—both to reveal inequities that contribute to poor health outcomes and to support public health planning and decision-making that promotes health equity.^{xiv}

NOTES

- i. About Global Burden of Disease, <http://www.healthdata.org/gbd/about>
- ii. K. Scott. 2010. Pandemic Influenza H1N1 2009 – The Canadian Experience. *J Popul Ther Clin Pharmacol*. 17(3) Fall 2010: e358-e362.
- iii. J. Juno, K. Fowke, Y. Keynan. 2011. Epidemiology of the 2009 Pandemic Influenza A (H1N1). Winnipeg: National Collaborating Centre for Infectious Diseases.
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- v. K. Scott. 2010. Pandemic Influenza H1N1 2009 – The Canadian Experience. *J Popul Ther Clin Pharmacol*. 17(3) Fall 2010: e358-e362.
- vi. K. Scott. 2010. Pandemic Influenza H1N1 2009 – The Canadian Experience. *J Popul Ther Clin Pharmacol*. 17(3) Fall 2010: e358-e362.
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- viii. NCCEH. 2014. Non-pharmaceutical measures to prevent the transmission of influenza. Vancouver: National Collaborating Centre for Environmental Health.
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- xii. NCCID. 2014. Is School Closure an Effective Strategy to Control Influenza?;. Winnipeg: National Collaborating Centre for Infectious Diseases
- xiii. Report on the NCCID Workshop: Starting at Square One: An equity model of burden of disease, 2015 Winnipeg: National Collaborating Centre for Infectious Diseases
- xiv. H. Isfeld-Kiely & S. Balakumar. 2015. Framing Burden: Towards a new framework for measuring burden of disease in Canada.. Winnipeg: National Collaborating Centre for Infectious Diseases.

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