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SPECIAL SECTION ON WHY PUBLIC HEALTH MATTERS TODAY: COMMENTARY

In defense of a population-level approach to prevention: why public health matters today

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Abstract
A focus on populations, and a corresponding population-level approach to intervention, is a foundation of public health and is one reason why public health matters today. Yet, there are indications that this foundation is being challenged. In some policy and practice domains, and alongside growing concern about the social determinants of health and health equity, there has been a shift from a population-level or universal approach to intervention, to a targeted approach focusing on those experiencing social or economic vulnerability. More than 30 years ago, Geoffrey Rose articulated strengths and limitations of population-level and high-risk approaches to prevention. In light of a strong analogy between "high risk" and "targeted" approaches, it seems timely, in a forum on *why public health matters today*, to revisit Rose's points. Focusing on points of overlap between strengths and limitations of the two approaches as described in public health (population-level; high-risk) and social policy (universal; targeted), I illustrate strengths of a population-level approach from the point of view of health equity. Although different circumstances call for different intervention approaches, recent discourse about the weakening of public health suggests that there is value in discussing foundations of the field, such as the population-level approach, that we as a community may wish to defend.

Résumé
L'accent sur les populations, et donc sur les interventions populationnelles, constitue l'une des bases de la santé publique et l'une des raisons de son importance aujourd'hui. Des fissures semblent néanmoins se dessiner dans cette fondation. Dans certains domaines de politiques et de pratique, avec le souci croissant pour les déterminants sociaux de la santé et l'équité en santé, un changement s'opère : la démarche d'intervention populationnelle ou universelle cède la place à une démarche ciblée sur les personnes vulnérables sur le plan social ou économique. Il y a plus de 30 ans, Geoffrey Rose expliquait les forces et les limites des démarches de prévention populationnelles et de celles axées sur les segments à risque élevé. Vu l'étroite similitude entre les démarches « ciblées » et « axées sur les segments à risque élevé », il semble à propos, sur une tribune qui demande *Pourquoi la santé publique aujourd'hui?*, de revenir sur les arguments de Geoffrey Rose. En m'intéressant aux recoupements entre les forces et les limites de ces deux démarches, comme décrites par les acteurs de la santé publique (populationnelle; axée sur les segments à risque élevé) et des politiques sociales (universelle; ciblée), j'illustre les forces de la démarche populationnelle du point de vue de l'équité en santé. Bien que différentes situations appellent différentes mesures d'intervention, le discours ambiant sur l'affaiblissement de la santé publique donne à penser qu'il serait utile de discuter des fondements de notre domaine, comme la démarche populationnelle, qu'il serait bon de défendre collectivement.

Keywords Public health · Population health · Population · Public policy · Universalism · Targeting · Equity

Mots-clés Santé publique · Santé des populations · Population · Politique publique · Universalisme · Ciblage · Équité

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Introduction

A focus on populations is a foundation of public health. Published definitions of public health, such as "the

science and art of preventing disease, prolonging life, and promoting health through organized efforts of society"[1] (Last 2001, p. 145), convey a population scope. Rose (1985) articulated this focus in his population-level approach to prevention. Public health as a medical specialty[2] distinguishes itself from other specialties by its population focus. The evolving field of public health ethics distinguishes itself from health care and bioethics by a focus on populations (MacDonald 2014).

Yet, there are indications that, alongside growing concern about the social determinants of health and health equity, this foundation is being challenged. My objective in this commentary is to describe some merits of a population-level approach (Rose 1985) from the point of view of health equity. It is acknowledged that different circumstances call for different intervention approaches, and that the spectrum of approaches is more complex than the population-level vs targeted dichotomy implies (Carey and Crammond 2017). However, in a forum on *why public health matters today*, itself prompted by concern about the weakening of public health (Guyon et al. 2017; Potvin 2014), it seems appropriate to identify and discuss foundations of our field—such as the population-level approach—that we as a community may (or may not) wish to defend.

The population-level approach to intervention: some recent trends

As described by Rose (1985), the population-level approach to prevention describes interventions, such as mandatory food product fortification, municipal transport policy, or large-scale health information campaigns, delivered to whole populations, while the high-risk approach (e.g., counseling, prophylactic drugs) focuses on individuals identified as having elevated risk of a particular outcome. In support of the population-level approach, Rose famously argued (and empirically demonstrated)[3] that "a large number of people at a small risk may give rise to more cases of disease than the small number who are at a high risk" (Rose 1985, p. 37). Analogous approaches in social policy are the universal approach, which describes policy (e.g., a universal Old Age Security pension) provided to a broad population regardless of income or social circumstances (though it may be constrained by parameters such as age), whereas the targeted approach, especially in its residual or means-tested form, is directed toward a population segment deemed "vulnerable" based on, for example, income or assets (e.g., needs-based housing benefits) (Alcock et al. 2001). The intersection of these two sets of concepts is appropriate and helpful for a broad definition of public health (Last 2001) that is concerned with the social determinants of health and health equity, for which social policy has an important role to play.

There are indications that the population-level or universal approach is being challenged (McLaren and McIntyre 2014; Carey and McLoughlin 2016). A shift from a population-level to a targeted approach is evident in some policy domains, such as family policy (e.g., child benefits) (Béland et al. 2014), dental public health (McLaren and Petit 2018), and public health nurse home visits to new parents (Glauser et al. 2016).[4] In other domains, such as health care, seniors' pensions, and public education, there have been significant pressures on universal systems in different contexts (Béland et al. 2014; Carey and Crammond 2017; McKee and Stuckler 2011). In the peer-reviewed literature, it is easy to find recent examples of scholarly work focused on "unintended [negative] consequences" of population-level interventions across a range of topics (McLaren and Petit 2018), and a growing focus on "vulnerability" in public health is apparent (Benmarhnia et al. 2018).

These challenges to a population-level approach reflect several factors that have been well described elsewhere, including neoliberal policies and a discourse of individualism (Labonté and Stuckler 2016); declining trust in government and authority (Bucchi 2008); demographic shifts which raise concerns about the affordability of universal policies (Emery et al. 2012); and advances in information systems that provide impetus and opportunity to identify "target" groups.

The population-level approach and health equity

Public health is concerned with health equity and the determinants thereof (Canadian Public Health Association 2017). While inequality refers to differences or variations between groups, inequities describe the subset of differences that are considered to be unnecessary, unfair, and avoidable (Whitehead 1992). To the extent that a shift from universal to targeted approaches is occurring, it is important to consider how well the two approaches align with an equity orientation.

The universal or population-level approach aligns most obviously with equality (treating everyone the same), and that

[1] Definition from the 1988 Acheson Report on Public Health in England. Cited in Last (2001).

[2] Public Health and Preventive Medicine; formerly Community Medicine (http://www.phpc-mspc.ca/en/students/what-is-phpm/).

[3] In the Canadian context, this principle was demonstrated by Hertzman and colleagues in their work on children's readiness for school across Vancouver neighbourhoods. They found that although the highest proportion of "vulnerable" children was found in the poorest neighbourhoods, "the *largest number of children at risk* [was] found more thinly spread across the middle class neighbourhoods that, taken as a whole, have a much larger number of young children than the poorest neighbourhoods" (Hertzman 2004, p. 8).

[4] This shift is somewhat obscured by the use of the word "population" to mean quite different things, for example, everyone within a jurisdictional boundary ("geopolitical population"), or a subgroup defined by social or economic circumstances (e.g., "vulnerable population").

has led to concern that such interventions could worsen inequities in health, due to inequities in access or uptake (Link and Phelan 1995; Frohlich and Potvin 2008). However, several population-level interventions are equitable in their impact (McLaren et al. 2016; Lorenc et al. 2013). As Whitehead (2007) pointed out, "classic" population-level public health interventions to improve living and working conditions, such as measures to ensure safe drinking water or health-promoting infrastructure, have "the potential to benefit the health of the population in general, but especially that of the people living in the worst conditions, bringing about a reduction in the gradient of health" (p. 475). In the social policy literature, the universal approach is anchored in concepts of collectivity and inclusion (Alcock et al. 2001; Carey and Crammond 2017), which are well aligned with an orientation concerned with upstream, social determinants of health, and health equity. Therefore, to argue that the population-level or universal approach is equal but not equitable, is incomplete, if one draws on evidence and theory from public health and social policy.

In contrast to universal approaches, targeted approaches involve identifying and then delivering policy such that some people are included and others are excluded. It is argued that targeted approaches can meaningfully consider social differences (Carey and Crammond 2017), which is very important from the point of view of health equity. However, those approaches may or may not address systemic and structural processes contributing to inequity between social groups. Graham (2004), in her analysis of how the goal of tackling health inequities has been represented in England's national policy documents, identified several different understandings of health inequity. On the one hand is a *gradients* conceptualization, concerned with the stepwise association between socio-economic circumstances and health across the population, which lends itself to intervention strategies focused on circumstances affecting the population as a whole (i.e., population-level). On the other hand is a *disadvantages* conceptualization, which focuses on those "at the bottom," and "turns socioeconomic [inequity] from a structure which impacts on all to a condition to which only those at the bottom are exposed" (p. 119). To the extent that a *disadvantages* conceptualization exists, targeted interventions are likely to be downstream in orientation, and narrowly focused on immediate circumstances or personal attributes of persons living in disadvantaged circumstances. In short, targeted approaches are not necessarily more capable of addressing social inequities in health than universal approaches.

[5] Targeted universalism "defines goals for all, identifies obstacles faced by specific groups, and tailors strategies to address the barriers…" (NCCDH 2013). Proportionate universalism argues that "to reduce the steepness of the social gradient in health, actions must be universal, but with a scale and intensity that is proportionate to the level of disadvantage" (Marmot 2010). Interestingly, there is a subtly greater emphasis on universalism in the latter than in the former.

Important work on *targeted universalism* (or proportionate universalism in the UK)[5] (NCCDH 2013; Marmot 2010) aims to bring together the two approaches. However, in light of challenges to the population-level approach, including examples described above where, rather than bringing the two approaches together, a universal approach has been replaced by a targeted approach, there may be value in trying to identify ways to defend—on the basis of health equity—approaches of a universal nature, either alone or as part of a multipronged strategy (Carey and Crammond 2017).

In defense of a population-level approach: recent examples

More than 30 years ago, Rose (1985) identified strengths and limitations of the population-level and high-risk approaches to prevention (summarized in Table 1). Strengths and limitations of universal and targeted approaches, as conceptualized in the social policy literature, are summarized in Table 2. Importantly, there are points of overlap between Tables 1 and 2 which are informative because they represent strengths and limitations of the intervention *approach* that transcend the type of factor (clinical/behavioural, or social/economic) used to define the target group. To illustrate the benefits of a population-level approach from the point of view of health equity, I focus on two points of overlap, using recent empirical examples.

(i) Cut points and misclassification

When describing the high-risk approach to prevention, Rose (1985) identified "difficulties and costs of screening" (i.e., to identify those who are eligible for a high-risk intervention) as a disadvantage. The disadvantage reflects that this process involves classifying individuals in relation to a cut point, which is at least somewhat arbitrary, on the basis of a risk factor that may not be static. Accordingly, the process can be complicated and costly, and the potential for misclassification is high.

These general concerns apply to targeted approaches, as illustrated in a study of individuals navigating eligibility for different forms of health insurance under the Affordable Care Act in the United States (Mulligan et al. 2018). Despite the significance of the Act for expanding access to coverage, people were found to have "actively and intensely struggled to enroll and were met with multiple obstacles, most of which were beyond their control." Changes in household structure (e.g., marital status, dependents), seasonal employment, and income that hovers around cut points were some of the factors that complicated eligibility, with significant consequences such as gaps in coverage.

Table 1 Advantages and disadvantages of the high-risk and population-level strategies of prevention, as described by Rose (1985)

High-risk strategy		Population-level strategy	
Advantages	Disadvantages	Advantages	Disadvantages
"Intervention appropriate to individual" (e.g., smoking cessation advice delivered to smokers) "Individual motivation" (i.e., patients know the reason for the intervention and see it as applying to them) "Physician motivation" (i.e., physicians feel justified in intervening) "Cost-effective use of resources" (i.e., makes sense to concentrate limited resources where need is greatest) "Benefit: risk ratio favourable" (i.e., if benefits to individual are high, benefit:risk ratio more likely to be favourable)	"Difficulties and costs of screening" (i.e., risk is not fixed or stable; uptake of screening may be higher among those at lowest risk; screening may detect large numbers of "borderliners" with risk hovering around the cut-point) "Palliative and temporary—not radical" (i.e., does not seek to alter the underlying causes but rather to identify those individuals who are particularly susceptible; does not deal with the root of the problem) "Limited potential for (a) individual and (b) population" (re individuals: our ability to predict future disease in individuals is often weak; re populations: "a large number of people at a small risk may give rise to more cases of disease than the small number who are at a high risk") "Behaviourally inappropriate" (i.e., behaviours are constrained by social norms; difficult for people to behave differently from their peers)	"Radical" (i.e., attempts to remove the underlying causes that make the disease common) "Large potential for population" (i.e., a small absolute reduction in risk can have a significant impact, if spread across a large number of people [a population]). "Behaviourally appropriate" (e.g., if non-smoking becomes "normal," it will be less necessary to persuade people to quit)	"Small benefit to individual ("prevention paradox")" (i.e., offers only a small benefit to each individual) "Poor motivation of individual" (i.e., stemming from small benefit to individuals) "Poor motivation of physician" (i.e., difficult for medical personnel to see health as a population vs individual issue) "Benefit: risk ratio worrisome" (because benefit to individual is small, it can easily be outweighed by even a small risk)

Note: The high-risk approach "seeks to identify high-risk susceptible individuals and to offer them some individual protection," whereas the population-level approach "seeks to control the determinants of incidence in the population as a whole" (Rose 1985, p. 429)

Rose (1985) went on to discuss the implications of being labeled "high risk," including marking an apparent "transition from healthy subject to patient" (p. 35). Labeling a group as "vulnerable" can likewise contribute to an illusion of a qualitatively different, internally homogenous group, with important implications such as stigma and perpetuation of inequity

Table 2 Advantages and disadvantages of targeted and universal approaches to social policy. Adapted from Carey and Crammond (2017) and Alcock et al. (2001)

Targeted approach		Universal approach	
Advantages	Disadvantages	Advantages	Disadvantages
• Can involve meaningful consideration of social differences	• Drawbacks associated with need for cutoffs • Potential for stigma (esp. with means-testing) • May lack political support ("a service for the poor becomes a poor service") • Can be costly	• Collective, inclusive ➔ can have considerable leverage to address root causes • Administrative ease	• "False universalism" –universal in theory not always universal in practice • "False universalism" –singular approach may be defined by dominant group. • May lack support in an individualistic society

Note: A universal approach describes policy provided to a broad population regardless of income or social circumstances, though it may be constrained by parameters such as age; whereas the targeted approach, especially in its residual or means-tested variety, is directed toward a population segment deemed to be vulnerable based on certain indicator(s), such as income and assets, with proof of need

(contrary to the intention of a targeted approach to meaningfully consider social differences [Table 2]). Important recent work has shed light on this concern. Mulinari et al. (2018) quantified heterogeneities within and overlap between social groups, and implications for targeted efforts to increase uptake of seasonal influenza vaccine based on racial/ethnic identification in the US. Benmarhnia et al. (2018) questioned and demonstrated considerable heterogeneity within the definition and experience of "vulnerability" used to describe certain groups in the context of a public health response to heat waves in Montreal.

(ii) Potential to address root causes

A main advantage of the population-level approach (Rose 1985) is that by virtue of its broad perspective, it is poised to act on upstream social determinants of health ("underlying causes" of health problems) that apply to large numbers of people. Its potentially significant impact led Rose to conclude that, although high-risk and population-level approaches should not be in competition, "the priority of concern should always be the discovery and control of the causes of incidence [via the population-level approach]" (Rose 1985, p. 38).

These merits of a population-level or universal approach vis-à-vis health equity are illustrated by a study on the lived experience of different forms of welfare entitlements (i.e., targeted and universal) among older adults in England (Green et al. 2017). In addition to the material dimensions of the entitlements (e.g., the amount of cash or service), experiences with universal and targeted benefits were found to have important psychosocial and structural dimensions. For example, in discussions about certain targeted entitlements (e.g., disability benefits, conditional on health status), participants raised questions about the legitimacy of others' claims, and described personal experiences of those entitlements as divisive and humiliating. In contrast, experiences with some universal entitlements (e.g., a winter fuel allowance provided to all older adults regardless of need) revealed that individuals felt respected, cared for, and integrated in society—i.e., social determinants of health and health equity. These benefits—which are less tangible than for the material aspects—reflected the population-level, inclusive nature of the intervention.

Conclusions

A population-level approach to prevention is not a panacea, nor is it appropriate in all circumstances. However, public health in Canada has been described as "weakening" and "under siege" (Guyon et al. 2017; Potvin 2014). If we wish to defend and strengthen public health, it seems important that we—as a community—identify our foundations and articulate why they are important. I applied this reasoning to the population-level approach to prevention and its merits, vis-à-vis public health's concern with health equity. While the ideas presented here are not new, there may be value in renewed consideration, in light of contemporary trends, such as precision public health[6] and data science,[7] that could represent challenges or opportunities for the population-level approach to prevention, and public health more generally.

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[6] For example, https://blogs.cdc.gov/genomics/2018/05/15/precision-public-health-2/.

[7] For example, https://www.ucalgary.ca/science/data-science/.

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