

SOCIAL INEQUALITIES IN HEALTH

Rose's population strategy of prevention need not increase social inequalities in health

Lindsay McLaren,* Lynn McIntyre and Sharon Kirkpatrick

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Geoffrey Rose's 1985 paper, *Sick individuals and sick populations*, continues to spark debate and discussion. Since this original publication, there have been two notable challenges to Rose's population strategy of prevention. First, identification of high-risk individuals has improved considerably in accuracy, which some believe obviates the need for population-wide prevention strategies. Secondly, and more recently, it has been suggested that population strategies of prevention may inadvertently worsen social inequalities in health. We argue that population prevention will not necessarily worsen social inequalities in health, and the likelihood of it doing so will depend on whether the prevention strategy is more structural (targets conditions in which behaviours occur) or agentic (targets behaviour change among individuals) in nature. Also, there are potential drawbacks of approaches that focus on discrete populations (i.e. high risk or vulnerable) that need to be considered when selecting a strategy. Although Rose's ideas need to be continually scrutinized, his population strategy of prevention still holds considerable merit for improving population health and narrowing social inequalities in health.

Keywords Health status disparities, prevention and control, vulnerable populations

Introduction

Geoffrey Rose's 1985 paper, *Sick individuals and sick populations*, sparked a critical thinking revolution. At the heart of the paper is a distinction between the causes of illness at the individual level (causes of causes) and at the population level (causes of incidence), and corresponding prevention strategies. Briefly, Rose's population strategy of prevention refers to prevention activities that target a whole population regardless of variation in individuals' risk status, whereas a high-risk strategy targets individuals identified (e.g. thorough screening) as having

elevated risk for some adverse health outcome.^{1,2} A citation index search indicates that Rose's paper has been cited more than 800 times since its original publication. Of the papers incorporating a reasonably in-depth analysis of his work, many provide empirical and conceptual support for the population strategy of prevention.^{3–7} Several commentaries and letters also attest to the continuing pertinence of Rose's work.^{8–13}

In this article, we consider the continued pertinence of Rose's ideas within the present context, which is characterized by, among other things, a growing research and policy literature on the social determinants of health.¹⁴ Since the publication of Rose's 1985 paper and his 1992 book, *The Strategy of Preventive Medicine*, there have been two notable challenges to his population strategy of prevention. First, there have been significant improvements to the accuracy with which individuals who are at high risk for adverse health outcomes can be identified,¹⁵ this

Department of Community Health Sciences, University of Calgary, Calgary, Alberta, Canada.

* Corresponding author. Department of Community Health Sciences, University of Calgary, 3330 Hospital Dr. NW, Calgary, Alberta T2N 4N1, Canada.
E-mail: lmclaren@ucalgary.ca

improvement is believed by some to reduce or obviate the need for population prevention strategies in favour of high-risk strategies. A second, and more recent challenge is that Rose's population strategy of prevention may inadvertently worsen social inequalities in health, and that a focus on the needs of vulnerable population may be appropriate.¹⁶ We consider these two challenges in turn.

Rose and risk identification

One prominent challenge of Rose's work^{15,17} is that, due to notable improvements in risk identification over recent decades, some key assumptions underlying the stated benefits of a population strategy are no longer valid. Specifically, when Rose developed his ideas about population prevention, risk identification was typically based on a single variable (e.g. blood pressure as a risk factor for cardiovascular disease). He thus asserted that more cases of disease come from those at moderate risk (numerous) than from those at high risk (few); and therefore by reducing the risk factor by a small amount in the general population, one could prevent more cases of disease than by reducing the risk factor by even a large magnitude in those identified as having elevated risk.^{1,2} Now, with widespread use of multi-component risk profiles (e.g. Framingham risk assessment), which enable more precise identification of those at elevated risk, a higher yield may accrue from the high-risk strategy than the population strategy. Simulations using population-based data show that a multi-component risk approach, coupled with effective medical intervention, may exceed a population strategy in terms of impact and efficiency even under conditions such as moderate drug adherence and consideration of adverse events from treatment.^{15,17}

Although improved risk identification is clearly advantageous for clinical practice, the implications for population health remain limited. In particular, the risk identification literature above neglects one of Rose's key points about high-risk approaches: they are, by definition, temporary and palliative.^{1,2} Regardless of how high-risk individuals are identified (and with what degree of accuracy), intervention for these individuals (e.g. drug treatment) will need to continue indefinitely because their risks are managed, not prevented, and rarely cured. This is a particular concern considering the high and rising prevalence of many risk factors, such as hypertension and obesity.¹⁸ Furthermore, because of the downstream nature of the high-risk approach, high-risk individuals will continue to emerge, and they too will require ongoing intervention. By way of illustration, Rose describes the high-risk approach as 'analogous to famine relief, which feeds the hungry but does not tackle the causes of famine' (p. 47).²

Rose's population strategy of prevention, and social inequalities in health

In contrast to the high-risk approach, the population strategy of prevention targets the whole population (areas, groups, jurisdictions, institutions, etc.) and acts on 'underlying causes' (also referred to as 'essential determinants' and 'causes of causes') of major health problems (p. 98).² Acting on underlying causes, according to Rose, requires a 'social and political approach'. Rose's 'underlying causes' is conceptually very similar to what has elsewhere been called 'fundamental causes':^{16,19} the array of resources, such as knowledge, money, power, prestige and beneficial social connections that enable people/groups to avoid risk and adopt protective strategies.¹⁹ The absence of these resources, as often observed in circumstances of low socio-economic position, constitutes risk that generates exposure to other risks.¹⁶ Although the term 'fundamental causes' more explicitly incorporates the socio-economic dimensions, we note that Rose elsewhere recognized that 'political changes that reduced economic inequalities would surely reduce also these health inequalities, with great benefit to national health overall' (p. 127).²

Clarifying these concepts of fundamental or underlying causes is important, considering a newer critique appearing in the literature; namely, that population strategies of prevention may inadvertently worsen social inequalities in health. In a recent commentary, Frohlich and Potvin¹⁶ raise questions about the validity of an important assumption underlying the population strategy of prevention: that the impact will be the same for everyone, regardless of where one falls on the risk distribution (in other words, that the population curve will shift without change in shape). If, as argued in their commentary, this assumption is untrue, population strategies can inadvertently increase social inequalities in health by disproportionately benefiting those at lower risk (i.e. increasing the dispersion or skew of the population distribution). According to Frohlich and Potvin,¹⁶ this potential worsening of inequalities in response to population prevention is due to insufficient attention to fundamental causes.¹⁹

How can it be that a prevention strategy that purports to act on underlying (now known as fundamental) causes, worsens inequalities? We argue that what Rose calls population prevention will not necessarily increase social inequalities in health, and that the two perspectives (population prevention and social equality) are actually quite compatible. Our approach is 2-fold: first, we make the point that population prevention strategies are not all the same, and some types of population prevention strategies may be less likely to worsen inequalities than others. Secondly, we raise some caveats with the vulnerable populations approach, which Frohlich and Potvin¹⁶ introduced as

a strategy for mitigating possible unintended consequences of population prevention.

Rose's population strategy of prevention: a structure–agency continuum

One of Frohlich and Potvin's examples of a population strategy that may increase disparities is health information campaigns regarding smoking. Given the complex social, economic and cultural context within which smoking occurs, it is not surprising that an information campaign would not impact everyone equally, but not because it is a population strategy. Rose² would consider this a superficial type of population strategy; one that is based on simply encouraging people to change their behaviours. On its own, this type of intervention is blind to structural (e.g. social and economic) barriers to change. Drawing from diffusion of innovations theory,²⁰ variation in uptake is to be expected between innovators and early adopters (who are likely to have adequate social and economic resources) and later adopters, who 'may require special efforts to overcome barriers' (p. 317).²¹

In contrast, a radical population strategy 'aims to remove the underlying impediments to healthier behaviour, or to control the adverse pressures' (p. 100).² In other words, the target for change in a radical population strategy is the context or circumstances within which behaviour occurs, rather than the behaviour itself. As such, the issue of uptake of the intervention by individuals is largely obviated, in contrast to superficial interventions where the individual must attend to and act on, for example, information provided. Thus, a radical population strategy will not necessarily worsen inequalities in health, and might even contribute to narrowing them. With smoking, for example, available evidence suggests that the impact of radical population strategies such as clean indoor air laws on smoking outcomes (e.g. smoking prevalence, consumption among smokers) does not vary by socio-economic status (SES), suggesting that it does not worsen inequalities.^{22,23} Fluoridation of drinking water—a familiar example of a radical approach—has been associated with a reduction in oral health disparities (e.g. decayed/missing/filled teeth) in the UK^{24–27} and Australia/New Zealand.^{28,29} Before abandoning the concept of population prevention, one might consider where the proposed intervention falls on a continuum from superficial to radical² or, drawing from Giddens, from agency (pertaining to an individual's capacity to make the choice to act) to structure (pertaining to social institutions and norms that shape the actions of individuals).³⁰ Population strategies that are more superficial in nature rely on individual agency and aptitude, and as such are potentially more likely to increase (worsen) social inequalities in health.

The preceding discussion is not meant to imply that radical/structural population strategies will never worsen inequalities. Though clean indoor air laws do not seem to have a differential effect by SES, as noted above, there could be unintended consequences for particular groups. For example, with smoking restrictions within workplaces, lower-income women may be more likely to work in environments that do not restrict smoking (e.g. hospitality industry), and smoking restrictions at their partner's place of work may result in increased smoking in the home (and thus heightened exposure to second-hand smoke) over which women may have little control.³¹ Among other things, such findings highlight the importance of considering implications of radical population strategies for various axes of inequality, such as gender and ethnicity as well as SES. In other health domains, the potential impact of radical population strategies on inequalities is simply not known. One example is efforts towards the elimination of trans fats by jurisdictions such as New York City,³² Denmark^{33–35} and Canada.³⁶ Intuitively, these efforts may have a selective advantage for those of lower income who are more likely to rely on low-quality diets characterized by, among other things, trans fats.³⁷ On the other hand, if the removal of trans fats leads to higher-priced products, these efforts could act in a regressive manner (i.e. greater burden felt by those of lower income) and increase social inequalities in diet. This latter scenario could occur if, for example, removal of trans fats is done on a voluntary basis by companies, leaving lower priced products that contain trans fats on the market.

Whether a prevention strategy is predominantly structural, predominantly agentic or somewhere between the two extremes (such as voluntary removal of trans fats), it is important to monitor its impact on social inequalities for the health outcome in question. Here one must consider whether inequality is measured on a relative or absolute scale, since this can influence the conclusions drawn about the impact of the intervention.³⁸ A challenge is that both metrics (relative and absolute) are associated—though differentially—with the overall prevalence of the health issue. Relative inequalities tend to be larger when the health issue is lower in prevalence, whereas absolute inequalities tend to be low at both very low and very high levels of prevalence.³⁹ These differential associations result in the common situation where, as a health issue declines in prevalence (improves) across a population, absolute inequalities (e.g. differences in rates in low- vs high-SES groups) might decrease while relative inequalities (e.g. ratio of rates in low- vs high-SES groups) increase: this was observed, for example, with inequalities in low-folate status after mandatory fortification of cereal–grain products in the USA.⁴⁰ In this case, even a structural intervention can appear to have contributed to worsening inequalities. Although relative risk is the more familiar metric to epidemiologists, several authors

have highlighted the importance of including a measure of absolute risk⁴¹ when monitoring health equity impact. If a health issue has dropped in prevalence across a population, remaining differences can look large on a relative scale even if the excess prevalence has dropped dramatically, and thus relative risk can be misleading. As recognized by Rose,² although relative risk is the domain of research, decisions should be made on the basis of absolute numbers, reinforcing the importance of including a measure of absolute inequality.

Radical/structural population prevention or vulnerable populations or both?

Frohlich and Potvin¹⁶ argue that population prevention may unintentionally increase social inequalities in health. To help mitigate this potential unintended consequence, these authors introduce 'vulnerable populations' as both a concept and an approach. Although we agree with these authors' emphasis on not worsening social inequalities in health, we have some concerns with the implications of a vulnerable populations approach: first, the possible (we would argue likely) conflation of vulnerable population and high-risk population; and secondly, some potential caveats of a vulnerable populations approach being participatory in nature.

Frohlich and Potvin¹⁶ carefully distinguish between a vulnerable population and a high-risk population: a vulnerable population is characterized by shared social and economic conditions, whereas a high-risk population is characterized by a 'homogeneously high level of exposure' to (usually) biologically based risk factor(s) (p. 218).¹⁶ Despite this explicit distinction between a vulnerable population and a high-risk population, we are concerned that a vulnerable populations approach could in practice be construed as singling out those of lower SES to be targeted by a specific intervention. Such an approach would thereby become a variant of a high-risk approach, the limitations of which have been outlined in depth by Rose and are noted above (most prominently, that they are temporary and palliative). The possibility of interchanging a high-risk and a vulnerable populations approach is apparent: in the original edition of Rose's² *The Strategy of Preventive Medicine*, high-risk status is described in terms of medical or behavioural factors (e.g. blood pressure, smoking, body weight), which accords with Rose's training and practice as a clinician. However, the commentary to the 2008 re-release of that book conflates the two under the label 'targeted' prevention: efforts directed at those most in need.⁴²

Efforts directed at 'those in need' require, for practical purposes, a cut point to define the group to be targeted. The cut point will necessarily be at least

somewhat arbitrary⁴² and this approach is thus akin to treating the 'needy' group as distinct from the rest of the population. Rose^{1,2} is clear about the fallacy of this view in his description of the sociological argument for population prevention: society exists as an entity and one cannot truncate the distribution. It is conceivable that concern about a cut point could lead—as it has in clinical epidemiology—to well-intentioned but somewhat misguided efforts to develop sophisticated multi-component indices of socio-economic vulnerability,⁴³ notwithstanding the value of deprivation indices for the purposes of surveillance and etiologic research. A vulnerable populations approach that acts on a (somewhat arbitrarily) defined group of individuals could also increase stigmatization of that group, who may already be marginalized, for instance, if the target group were publically identified for the purpose of intervention. This is not to say that targeted interventions directed at specific marginalized groups are never appropriate. For example, outreach and harm reduction with those who use injection drugs or engage in sex trade work may well constitute appropriate public health practice.⁴⁴ However, Frohlich and Potvin¹⁶ suggest that a vulnerable populations approach be complementary to population prevention. Although this seems reasonable in theory, we believe that within the reality of constraints around program funding, it will be very appealing to drop the population focus and revert to targeted prevention based on the intuitive (and perceived economic) logic of targeting those most in need.

Frohlich and Potvin identify that an important principle of a vulnerable populations approach is that interventions be participatory.^{16,45} This principle is based, appropriately, on the observation that social and cultural assumptions of public health practitioners (e.g. about the value and importance of health as a goal to aspire to) often fail to match those of target groups.¹⁶ Certainly prevention activities cannot stem exclusively from experts with solely academic or clinical credentials; however, we believe that some caution is warranted. Participatory may ultimately mean agentic, if structural conditions such as social and economic resources are not addressed. Furthermore, participatory may be confounded by hegemony. For example, if a vulnerable population such as homeless individuals were invited to participate in a discussion of their experience with health and social services, dominant discourse may actually overwhelm realities. A good illustration comes from a recent study⁴⁶ of homeless men in Calgary, a Canadian city recently known for its boom economy driven by oil and gas coupled with troubling levels of poverty and homelessness. Though cognizant of the city's notable wealth disparity, homeless men nonetheless characterized Calgary as '... a great city ...', 'generous ...' and '... the best of any city I've ever dealt with ...', suggesting

internalization of dominant beliefs. We caution that a participatory approach, emphasizing empowerment and consciousness-raising among those living with social and economic disadvantage,⁴⁷ may be insufficient in the absence of genuine improvement to daily living conditions (e.g. education, housing, workplace, urban infrastructure) and efforts to tackle the inequitable distribution of power, money and resources (e.g. through creating a strong, adequately funded public sector and an accountable private sector) as eloquently outlined in the final report of the WHO Commission on the Social Determinants of Health.¹⁴ Such efforts will necessarily be intersectoral, as emphasized by Frohlich and Potvin.¹⁶

Conclusions

We are enthusiastic about efforts to bring together Rose's work and the literature on social inequalities in health: it is difficult to overstate the importance of these two contributions to population and public health. Rose's population strategy of prevention will not necessarily worsen social inequalities in health,

and the likelihood of it doing so will depend on the type of intervention strategy employed on a continuum from structure to agency. Caution is warranted with an approach that targets discrete population groups, whether those groups are defined based on biological/behavioural or socio-economic characteristics. Although continued scrutiny of Rose's ideas is necessary, his population strategy of prevention still holds considerable merit towards improving population health and reducing social inequalities in health.

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KEY MESSAGES

- Geoffrey Rose's work on population vs high-risk strategies of prevention continues to spark debate.
- Recent analysis has focused on reconciling Rose's population strategy of prevention with research on the social determinants of health, and some authors have suggested that the population strategy may inadvertently worsen social inequalities in health.
- We argue that population prevention will not necessarily worsen social inequalities in health, and that certain types of population strategies (i.e. those of a radical nature) actually have the potential to narrow them.
- Caution is warranted with prevention strategies that target discrete population groups, whether those groups are defined based on biological/behavioural or socio-economic characteristics.
- Although continued scrutiny of Rose's ideas is necessary, his population strategy of prevention still holds considerable merit towards improving population health and reducing social inequalities in health.

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