



Discussion

From primary care to the revolving door of hospital readmission: Relevance of Geoffrey Rose's call for a population strategy

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ABSTRACT

The high-risk strategy in prevention has remained the preferred approach in health care. High-profile research predominantly emphasizes specific high-risk subgroups such as those who have extremely high cholesterol and super-utilizers of emergency departments. Dr. Geoffrey Rose's alternative population approach, though well established in principle, has failed to come to fruition in primary care research, aside from a few exceptions. The population approach extends intervention efforts to more moderate-risk people, attempting to shift the overall distribution in a positive direction, effecting change in more of the population. Despite requiring more initial investment due to the larger target group, the health-related gains and downstream cost savings through a population strategy may yield greater long-term cost-effectiveness than the high-risk strategy. We describe the example of extending prevention efforts from super-utilizers (e.g. those with ≥ 3 readmissions per year) to include those who readmit in moderate frequency (1–2 per year) in terms of potential hospital days and associated medical costs averted.

Despite the transition into the age of value-based care and the triple aim, in which population health serves as a central tenet, the “high-risk strategy” has largely remained the more appealing approach to prevention in primary care. Interventions, high-profile research, and health news headlines tend to be dominated by specific population subgroups, such as individuals with extremely high blood cholesterol, super-utilizers of hospital inpatient and emergency department services, or those who abuse illicit opioids. However, despite their increased likelihood of adverse outcomes, these targeted groups represent distributional extremes, often comprising of only a small proportion of the population. Early identification and timely intervention for the few with personal high risk are warranted and necessary; however, exclusive focus of prevention efforts on this group ignores a high volume of people whose risk factor profile is non-trivial, falling slightly above the center of the distribution (Rose, 2008). Most people with moderately-high cholesterol, those readmitted 1–2 times in a year, and those who overuse prescription opioids may face a comparatively smaller risk, but with potentially avoidable complications; when this silent majority's level of risk is reduced, the public health impact of health promotion and disease prevention can be substantial (Rose, 2008).

So why do we remain steadfast in our adoption of a high-risk, individual-focused prevention strategy? Perhaps it is because its messages

are “much more saleable” and that “everyone can see that the risk is not so remote,” as stated by Dr. Geoffrey Rose (2008). However, for most health outcomes, risk is not binary, rather it lies on a continuum, and sustainable and widespread prevention can be best realized through approaches that reduce risk even more at moderate levels. The use of this “population strategy” has the potential to shift the distribution curve of any outcome towards the left (i.e. lower risk); therefore, effective prevention would decrease the prevalence of disease in low-, medium-, and high-risk groups (Szklo and Nieto, 2014). But the debate ensues – individual-focused high-risk or population-based prevention? As is often the case, the answer is “it depends”. Consider the results of a simulated cardiovascular disease (CVD) study using data from the National Health and Nutrition Examination Survey III. The findings suggested that, in instances in which an intervention carried with it potential adverse effects, a targeted, high-risk approach is likely to yield superior outcomes (Zulman et al., 2008). However, for health outcomes whose interventions pose no threat or harm to individuals, a population strategy would be ideal.

Consider a high-risk approach that focuses on people with severe hypertension. As shown in Fig. 1 (an adaptation of Szklo and Nieto's figure), the high-risk approach only focuses its efforts on those who have severe hypertension, which is depicted at the bottom-right, tail-

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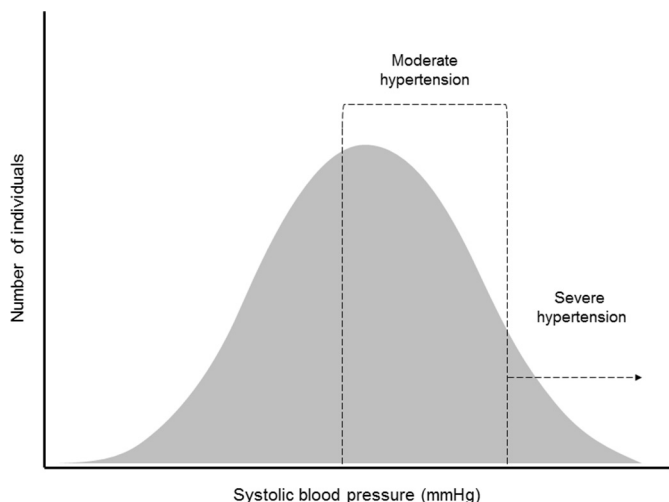


Fig. 1. Distribution of systolic hypertension.

end of the population.

With a population approach, intervention efforts would also extend to those with moderate hypertension, thereby targeting risk factor reduction in more of the population. The goal would be to shift the curve to the left, reducing systolic blood pressure in moderate- and high-risk groups, and likely preventing more future adverse outcomes in the process. Aside from rare exceptions – new guidelines for hypertension that results in large proportions of the population for which secondary prevention efforts are targeting larger proportions of the population – the extension of prevention efforts beyond high-risk subgroups is seldom done in medicine.

Dr. Rose's idea that the high-risk preventative strategy misses an opportunity by focusing on a small margin of the problem, and suggestion to extend intervention/prevention coverage to more individuals – the population strategy – have been around for decades (Rose, 2008). These ideas have been quoted in many textbooks and subject to praise and criticism, yet Rose's strategy has not come to fruition in research nor preventative medical practice. Why? Perhaps we have been too focused on the more “saleable” message. Or, perhaps we have not been successful in bridging the gap between public health and primary care by disseminating evidence as to the long-term value of population health. For example, a common quality indicator in the health services arena is the 30- or 60-day readmission rate (Fig. 2).

Most high-risk prevention activities target only super-utilizers (e.g. those with ≥3 readmissions per year), which ignores a substantial

portion of the population with a more moderate frequency (1–2 per year), but still contribute detrimental and costly repeat hospitalizations (Porter et al., 2019). A population strategy with a more comprehensive approach to elucidating risk factors for readmission is likely to shift the readmissions curve to the left, ultimately avoiding more preventable readmissions, overall. Based on data from the 2014 Nationwide Readmissions Database (NRD), the largest all-payer readmissions database in the United States, those with ≥3 readmissions comprised 11.3% of those hospitalized, but as expected, a whopping 55.4% of all hospital days (7.8 million days), and 32% of all hospital charges (\$60.1 billion) (Healthcare Cost and Utilization Project (HCUP), 2014). That certainly provides justification for targeting the super-utilizers. However, people with 1–2 readmissions per year, a group to which a population approach would likely extend prevention efforts to, contribute an additional 30.6% of people hospitalized, 39.5% of all hospital days (8.9 million days), and 39.1% of all hospital charges (\$73 billion). With the extension of prevention efforts beyond super-utilizers, it is evident that effective strategies have the potential to have a substantially larger impact on the number of hospitalized days and the associated direct costs of medical care.

This commentary, in part, represents a call to action regarding the need for rigorous cost-effectiveness analyses. Implementation and maintenance of a population-strategy for readmission prevention is undoubtedly more costly than a defined high-risk strategy. However, the health-related gains and cost savings associated with preventing readmissions through an effective population approach may outweigh the costs of extending prevention to a greater proportion of the population.

For many years, primary care has acknowledged the importance of community health; however, different academic endeavors have caused primary care and public health to work in silos (Michener et al., 2016). Merging and blending efforts between the two disciplines would help in keeping the population approach for preventative medicine in the forefront for primary care providers, and it would help in keeping innovative, clinically-relevant preventative strategies as tools for public health practitioners - both areas imperative to creating effective and permanent change in health (Michener et al., 2016).

Conflicts of interest

None.

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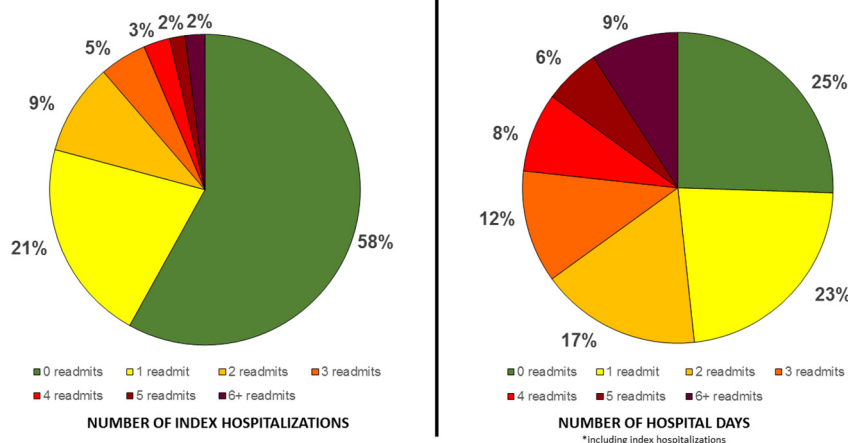


Fig. 2. Breakdowns of number of index hospitalizations and number of hospital days resulting from all-cause readmissions from the 2014 Nationwide Readmissions Database (NRD).

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References

- Healthcare Cost and Utilization Project (HCUP), 2014. HCUP nationwide readmissions database (NRD). Agency for Healthcare Research and Quality, Rockville, MD <https://www.hcup-us.ahrq.gov/nrdoverview.jsp>.
- Michener, J.L., Koo, D., Castrucci, B.C., Sprague, J.B., 2016. *The Practical Playbook: Public Health and Primary Care Together*. Oxford University Press, New York, New York.
- Porter, M., Quillen, D., Fe Agana, D., Chacko, L., Lynch, K., Bielick, L., Fu, X., Yang, Y., Carek, P.J., 2019. *J. Am. Board Fam. Med.* 32 (1), 58–64. <https://doi.org/10.3122/jabfm.2019.01.180052>. Jan-Feb.
- Rose, G., 2008. *Rose's Strategy of Preventative Medicine*. Oxford University Press, Oxford, England.
- Szklo, M., Nieto, J., 2014. *Epidemiology Beyond the Basics*, 3rd ed. Jones & Bartlett Learning, Burlington, MA.
- Zulman, D.M., Vijan, S., Omenn, G.S., Hayward, R.A., 2008. The relative merits of population-based and targeted prevention strategies. *Milbank Q.* 86 (4), 557–580. <https://doi.org/10.1111/j.1468-0009.2008.00534.x>.