From Stroke Prevention to Health Gain

Module 5: Rationale for Integrated Approach

Research shows compelling results

To help **policy makers and managers** understand the substantial benefits of an integrated approach, the following module provides a brief summary of the current burden of stroke in Ontario and the rationale for integrating community-based stroke prevention into an integrated chronic disease prevention strategy.

Data source for this module

The data for this module (and full report) came from a variety of sources. (See Appendices 1 and 2 of the full report.)

Burden of stroke and the scope for prevention — Report of the Joint Stroke Strategy Working Group, 2000; statistics from Health Canada and Statistics Canada; Southwestern Ontario Coordinated Stroke Strategy Environmental Scan, April, 2002; and Scientific Statement on Stroke, American Heart Association.

Effectiveness of Interventions — A systematic review of reviews, searching key journals and online databases for 1985 to 2001.

Current approaches and recommended models — A web search; feedback from knowledgeable public health and academic experts in Ontario, Canada and the U.S.; and consultation with Ontario-based organizations.

Full report

Mills, C., Manske, S., Dobbins, M., & Cameron, R. *From Stroke Prevention to Health Gain, Final Report.* CCS/NCIC Centre for Behavioural Research and Program Evaluation, University of Waterloo, Waterloo, Ontario, 2002.

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(Full report available at <http://www.opc.on.ca>.)

This research makes the case for integrating primary stroke prevention into a broader strategy for primary prevention of chronic disease. In exploring various approaches, it focuses on the following shared risk factors, which are both modifiable and amenable to a population-based approach.

- **hypertension**
- **smoking**
- **diabetes**
- **obesity**
- **physical inactivity**
- **excessive alcohol use**

Other modules in this series

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Burden of stroke is high, and increasing

In Ontario, stroke is a leading cause of death (about 6% of deaths) and adult neurological disability. About 128,000 Ontarians are living with the effects of stroke and a large proportion of the survivors require some form of chronic care.

According to the Report of the Joint Stroke Strategy Working Group (2000), stroke costs the Ontario economy almost a billion dollars a year. With the aging of the Ontario population, this burden can only increase. By 2031, when the entire baby boom generation has passed the age of 65, the age group at highest risk will be two and a half times the size it was in 1995.

The effect of population aging could well outweigh the effects of improvements in treatment and of encouraging temporal trends to reduced rates of age-specific hospitalization. While only a modest increase in numbers of Ontarians hospitalized for stroke is expected (about 9% between 1995 and 2010), a small increase in incidence can result in substantial increases in prevalence when accompanied by increased survival.

Many risk factors are preventable

There are many modifiable risk factors for stroke that are amenable to community-based prevention. They include hypertension, smoking and diabetes (the strongest well-documented risk factors which are also prevalent in the Ontario population), obesity, physical inactivity and excessive alcohol use (less well-documented). Prevalence ranges from 4.2% for diabetes to 49.6% for physical inactivity.

Potential savings for individual risk factors range from $7 million to $96 million dollars annually, and if all were reduced to the best rates already seen in Ontario, the savings in health costs would be almost $140 million dollars annually just for stroke. There would be even greater savings from reductions in other chronic diseases which share these risk factors, on the order of 6 to 9 times those calculated here for stroke.

Why integrated with chronic disease prevention and health promotion?

Integrating stroke prevention with chronic disease prevention is the strategy of choice for many reasons.

- Risk factors for stroke are shared with other major chronic diseases. [*3 67 122 123] (Fig. 7.1)
- Risk factors tend to cluster in individuals, especially at younger ages, so there is a high degree of overlap in target populations. [*3 124]
- There is good evidence that sufficiently intensive community-based disease prevention and health promotion interventions can shift the population distribution of shared chronic disease risk factors resulting in important health gains. [*79]
- When the risk factor profile of a country is shifted in a favourable direction, incidence of associated chronic diseases drops. [*79 125]
- There are many opportunities for economy and synergy in use of resources.
- It makes economic sense. Here are some examples showing the potential yield from investing in population-based chronic disease prevention and health promotion.
  - Katzmarzyk, et al. estimated that about $150 million annually in direct health care costs in Canada could be saved by reducing the prevalence of physical inactivity by 10%. [*126] As shown in Table 4.3 of the full report, the prevalence ratio between the Ontario average and the health unit with the lowest prevalence is 1.22, indicating that a 10% reduction target would be more than feasible.
  - The US Centers for Disease Control estimated that reducing population dietary fat intake by 1% to 3% would reduce the overall incidence of coronary heart disease by 32,000 to 92,700 cases, saving $4.1 billion to $12.7 billion in medical costs and productivity losses over 10 years. [*127]

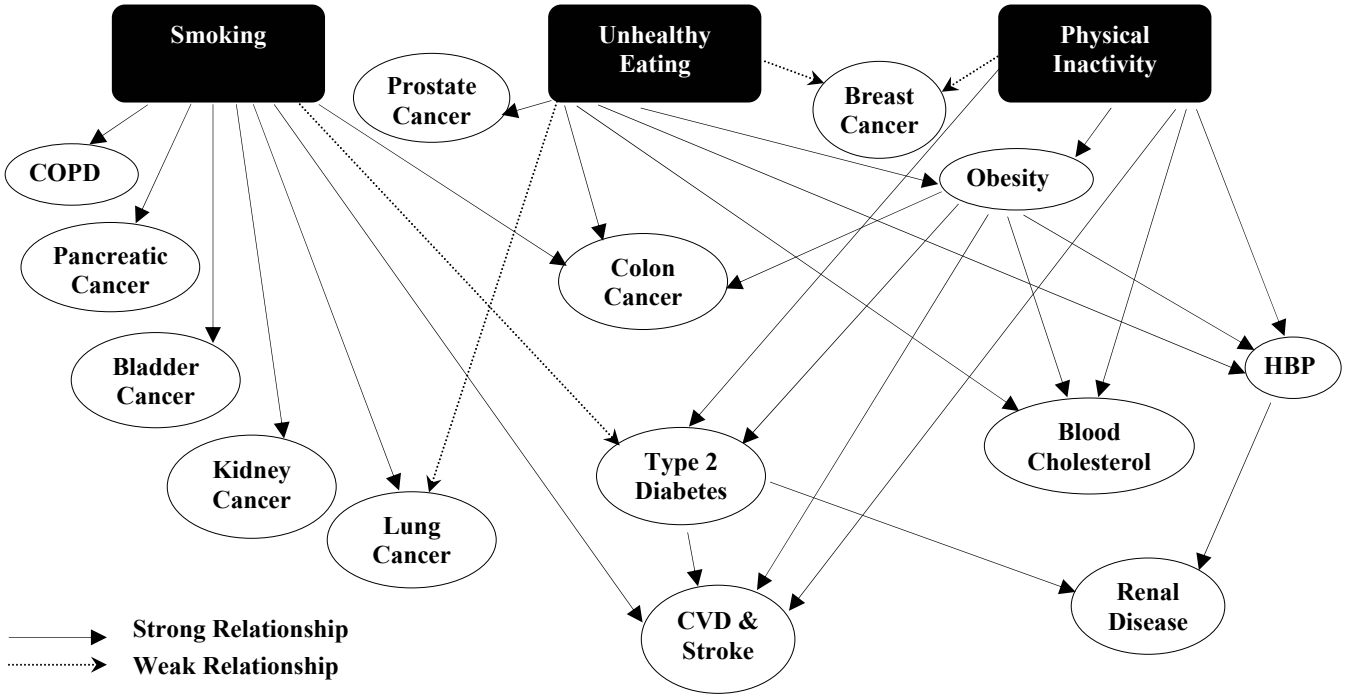

Figure 7.1 [from full report]: Socio-behavioural Risk Factors for Chronic Diseases (Harvey et al. [*128])

The life-course approach

WHO developed the "life course approach" in recognition of the fact that risk for chronic disease accrues with age and is influenced by factors acting throughout the life span. [*92]

This concept has been common in organization and delivery of public health programming for some time in many jurisdictions in Canada and is also part of the way many countries conceptualize their efforts in chronic disease prevention.

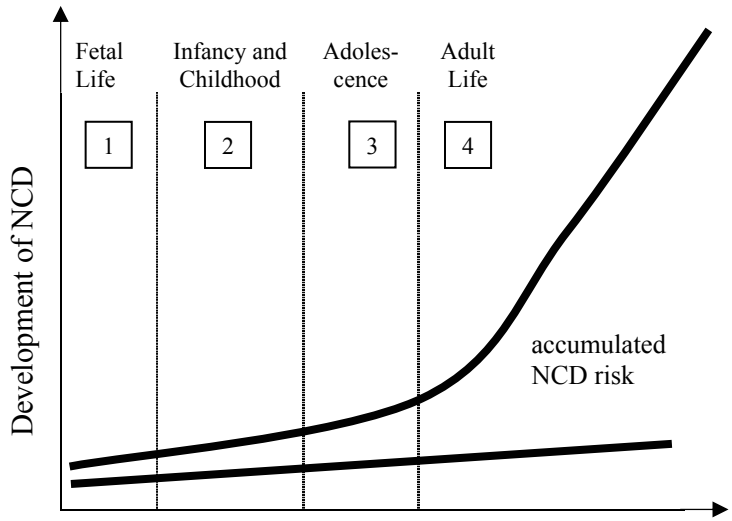

Figure A.3 [from full report]: A Life Course Approach to NCD Prevention (credit: WHO Life Course Perspectives on Coronary Heart Disease, Stroke and Diabetes)[*85]

The risk of noncommunicable diseases accumulates with age and is influenced by factors acting at all stages of the life span. The main factors at different stages of life include the following.

1. **Fetal Life:** fetal growth, maternal nutritional status, socioeconomic position at birth.
2. **Infancy and Childhood:** growth rate, breast feeding, infectious diseases, unhealthy diet, lack of physical activity, obesity, socioeconomic position.
3. **Adolescence:** unhealthy diet, lack of physical activity, obesity, tobacco and alcohol use.
4. **Adult life:** known adult behavioural and biological risk factors.

Clinical vs population approach

On the one hand, the clinical or high risk approach has the advantage that interventions are generally appropriate to the individual, who is therefore more likely to be motivated to make changes: if she is a smoker, she is advised to quit; if his blood pressure is high it is treated. On the other hand, a large number of people at only slightly increased risk may contribute more cases than a small number at high risk, so there is little population benefit.

Even the benefit to the individual may be questionable, since ability to predict disease on the basis of risk factors alone is weak for example, in the UK Heart Disease Prevention Project, risk factors alone predicted less than a third of myocardial infarctions. [*121] Also, it puts the onus on the individual to buck the tide of powerful social and cultural norms that encourage the smoking, eating, drinking, sedentariness, etc., that put him/her at risk. That is why Rose describes the high risk approach as palliative or temporary: it deals with the symptoms rather than the roots of the problem.

Because risk is continuous over a spectrum of exposure, only a minority of cases will be seen at the extreme of exposure, so the most effective strategies will be those which reduce the average level of exposure for the population, rather than identifying those at high risk for intensive intervention. *The population approach* seeks to move the whole distribution of risk factors in the population by acting on those things which determine the development of risk factors, not just fixing the risk factors once they emerge in vulnerable individuals.

As well, the population approach is behaviourally appropriate, in that it seeks to change the social norms, not just educate individuals to resist them. Unlike the high risk approach, it decreases the proportion of susceptible individuals over time, so is more sustainable; this is analogous to the herd effect in infectious disease control, by which non-immunized individuals benefit from mass immunization because it reduces their likelihood of being exposed to the infectious agent.

We are not proposing that Ontario discontinue clinical preventive services; there will always be a need from them. But because individuals at highest risk contribute a relatively small proportion of the cases in the population, clinical preventive services continue to be "necessary but not sufficient." We need to complement clinical preventive services with a population-based approach if we are to achieve an important reduction in chronic disease incidence.

Complexity

It is impossible to over-emphasize the importance of resisting the craving for simple solutions! The following far from exhaustive list of the "multiples" involved in chronic disease control provides an inkling of the number and kind of dimensions we need to consider.

- multiple risk factors
- multiple diseases
- multiple determinants of health (biology, physical environment, socioeconomic environment, culture, health system, etc.)
- multiple populations (whether determined by geography, socioeconomic status, ethnicity, language, age, attitude, etc.)
- multiple channels and settings (home, school, work, community)
- multiple jurisdictions (local, regional, provincial/territorial, national, international)
- multiple disciplines
- multiple stakeholders

A strategy involving such complexities, with multiple levels of interventions that incorporate policy and environmental interventions as well programs and services, will require highly sophisticated evaluation approaches. Randomized control trials, the traditional "gold standard" for determining efficacy, can only address a single dimension, efficacy. An evolving literature on evaluation of comprehensive public health strategies reflects attempts to develop measures to address the range of other dimensions we will need to understand to continue to improve our practice. The RE-AIM Framework extends beyond efficacy to consider reach, adoption, implementation and maintenance, all of which need to be assessed at both individual and institutional levels. *138

Recommendations from WHO

The World Health Organization (WHO) has set non-communicable disease prevention as a strategic priority because the rapidly increasing burden of chronic disease worldwide constitutes a threat not only to health, but to economic and social development, and because the burden is disproportionately felt among poor and disadvantaged populations. The strategy emphasizes integrated intervention at family and community levels to reduce risk factors for the four most prominent non-communicable diseases (cardiovascular disease, including stroke, cancer, chronic obstructive pulmonary disease and diabetes): tobacco use, unhealthy diet and physical inactivity. *90

The following text from the WHO's Department of Noncommunicable Disease Prevention and Health Promotion summarizes the major attributes of their approach:

> "Review of studies has shown that, for substantial reductions in the levels of risk factors and in disease outcomes, delivery of interventions should be of appropriate intensity and sustained over extended periods of time. However, even modest changes in risk factor levels will have a substantial public health benefit.
>
> - community participation
> - supportive policy decisions
> - intersectoral action
> - appropriate legislation
> - health care reforms
> - collaboration with NGOs, industry and the private sector" *91

These elements are present in virtually all the frameworks encountered during the authors' scan of the international, national and provincial context for the current document. Even where not elaborated as a formal planning or analytic framework, they are espoused as principles.

> Without paying attention to the quality and quantity of effort needed to obtain significant health outcomes, traditional small-scale demonstrations and ephemeral programs will not make a difference.
>
> — *Conference of Principal Investigators of Heart Health, 2000*[137]

Conclusion

Population-based primary prevention is the only way we can hope to reduce the population burden of stroke and other chronic diseases with which it shares important modifiable risk factors. Clinical prevention in susceptible individuals (e.g., treatment of hypertension, cholesterol-lowering agents) cannot address the underlying causes of incidence and needs to be complemented with a population approach. A population approach is not only where the greatest health gains are potentially achievable, but is the only strategy which can sustain the gains made.

* For all references in this module, please refer to "References" in full report.