

An Overview of the Process

The process for evaluating clinical prevention services in British Columbia is carried out in four sequential steps and includes addressing the following four questions.

STEP 1 – Is the Service Effective?

To answer this question we depend on thorough reviews completed by other respected agencies, primarily the work by the Canadian Task Force on Preventive Health Care and the US Preventive Services Task Force.

If these agencies find that the prevention service works (i.e. effectively achieves what it is intended to achieve), then we move on to STEP 2. For example, both the Canadian Task Force on Preventive Health Care and the US Preventive Services Task Force recommend universal screening for colorectal cancer between the ages of 50 and 74.^{1,2}

In British Columbia, there are approximately 3,400 new colorectal cancer cases³ and 1,230 deaths from colorectal cancer each year.⁴ Research by the Canadian Task Force on Preventive Health Care, applied to the British Columbia population, indicates that screening for colorectal cancer between the ages of 50 and 74 would result in a 22% reduction in mortality from colorectal cancer and an 18% reduction in the incidence of late stage colorectal cancer.⁵

STEP 2 – What is the Impact on the British Columbia Population of Implementing the Service?

To answer this we calculate what we call the clinically preventable burden associated with implementing the service. The clinically preventable burden is defined as the total quality-adjusted life years that could be gained if the clinical preventive service were delivered at recommended intervals to a British Columbia birth cohort of 40,000 individuals over the years of life that a service is recommended.

When calculating the clinically preventable burden, two key drivers are considered. First, how much of the population does the service impact? If it only impacts a small proportion of the population, the clinically preventable burden would be small. In the case of screening for colorectal cancer, the population impacted is everyone living in British Columbia between the ages of 50-74. Furthermore, colorectal cancer is a fairly common cancer, with approximately 3,400 new cases identified annually in British Columbia.

Second, what is the effect size of the service? For example, if a service reduced the risk of death by 1%, its effect size would be 1/10th of a service that reduced the risk of death by 10%. As noted above, the effect size for screening for colorectal cancer is a 22% reduction in mortality from colorectal cancer and an 18% reduction in the incidence of late stage colorectal cancer. If the service impacts a larger proportion of the population but the effect is minimal, then the clinically preventable burden would also be small.

The services with the highest clinically preventable burden are those that impact a large segment of the population and have a relatively large effect.

In calculating the clinically preventable burden, we try and compare what is currently happening in British Columbia with other regions of the world for the service under consideration. We find a region that has done the best possible job of implementing the service and compare this “best-in-the-world” result to the current provision of this service in

British Columbia. This gives a sense of how much service improvement is possible (i.e. the gap between the current British Columbia service and “best-in-the-world”). For example, current screening rates for colorectal cancer between the ages of 50 and 74 in British Columbia approximate 50%.⁶ Screening in the US state of Massachusetts, however, has achieved rates of 76%.⁷

The clinically preventable burden is calculated using a measure called a quality-adjusted life year. In calculating clinically preventable burden both benefits and harms associated with the service are taken into account. Note that not all services have identified harms associated with them.

If we are able to achieve colorectal cancer screening rates of 76% in a British Columbia birth cohort of 40,000, then our calculations suggest that we could add 1,734 quality-adjusted life years or a clinically preventable burden of 1,734.

STEP 3 – Is the Service Cost-Effective?

To answer this we calculate the cost per quality-adjusted life year added associated with implementing the service. The first part of this process, namely the calculation of the clinically preventable burden as the net gain in quality-adjusted life years, has been calculated during STEP 2. In STEP 3, we focus on estimating the costs associated with implementing the service, including the costs associated with screening and any interventions needed.

When looking at time costs, we include the time costs of both clinicians and the individuals receiving the service. Placing a monetary value on patient time costs is important as we are asking otherwise healthy individuals to engage with the health care system even though, in the long term, they may not be the ones who benefit.

In estimating the overall cost of the service, we take into account both costs resulting from the service as well as costs that might be avoided as a result of the service. For example, the costs associated with screening for colorectal cancer in a BC Birth cohort of 40,000 are estimated at \$81.8 million. Since screening for colorectal cancer reduces mortality due to colorectal cancer, we would also expect fewer early deaths from colorectal cancer and the costs of \$5.1 million associated with caring for these individuals during the process of dying from colorectal cancer would not be incurred. The net costs would therefore be \$76.7 million (\$81.8 million – \$5.1 million).

At the end of STEP 3, we calculate the cost per quality-adjusted life year. In our example this means dividing the \$76.7 million in net costs by the 1,734 quality-adjusted life years for a cost per quality-adjusted life year of \$44,213.

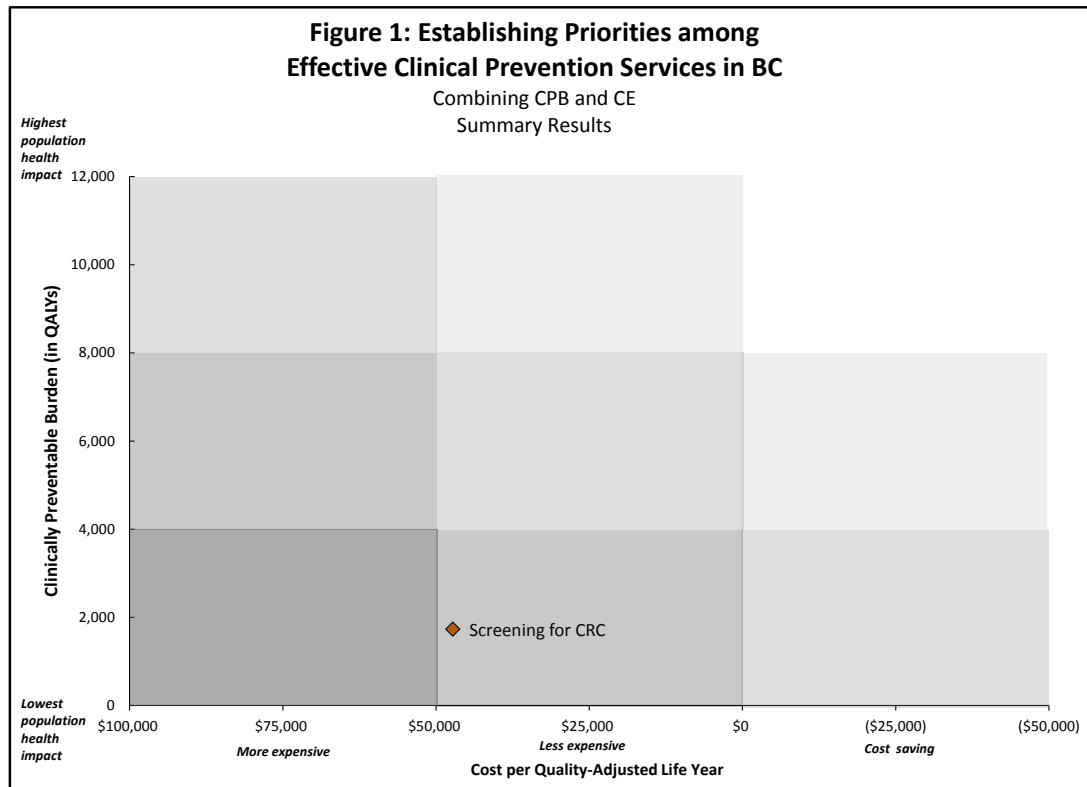
We refer to this cost per quality-adjusted life year as the cost-effectiveness of providing the service. More specifically, cost-effectiveness is defined as the average net cost per quality-adjusted life year gained in typical practice by offering the clinical preventive service at recommended intervals to a British Columbia birth cohort over the recommended age range.

STEP 4 – How Does the Service Compare with Other Effective Services?

In the final step we compare all the services that have gone through STEPS 1-3. By this stage we have calculated a unique clinically preventable burden value and cost-effectiveness ratio for each service. The clinically preventable burden and cost-effectiveness for each service is used to locate that service on the grid in Figure 1 below. Services that fall within the upper right hand segment have the highest population health impact (based on their clinically

preventable burden) and are cost-saving. Services that fall within the lower left hand segment have the lowest population health impact and are relatively expensive to implement.

Screening for colorectal cancer between the ages of 50 and 74 in a British Columbia birth cohort of 40,000 results in an estimated clinically preventable burden of 1,734 and a cost-effectiveness of \$44,213. This places the service in the lower row with respect to clinically preventable burden and the middle column with respect to cost-effectiveness (see Figure 1).



The results generated through this process are a key step in determining which current clinical prevention services in British Columbia require a concerted focus and which new clinical prevention services should be implemented. These results, however, should not be used in isolation. Any changes to service provision should be undertaken only when this research is supplemented by additional analyses, including a business plan and budget impact analysis. These supplementary analyses are important in addressing additional questions required in decision-making, such as the feasibility and total costs of enhancing current services or implementing new services.

Acknowledgement

The process for evaluating clinical prevention services in British Columbia was initially based on the process developed by the HealthPartners Research Foundation in the United States.^{8,9} In 2008 the HealthPartners Research Foundation provided the Lifetime Prevention Schedule Expert Committee with a number of models assessing the clinically preventable burden and cost-effectiveness of various clinical prevention services in the US. The Lifetime Prevention Schedule Expert Committee updated these models using British Columbia-specific data. The process in both British Columbia and the US has since evolved. All British Columbia models, for example, are now 'homegrown'. In the US, the renamed HealthPartners Institute continues to assess clinical prevention services using more sophisticated modelling approaches.¹⁰ They are also one of a number of groups in the US providing modelling support to the United States Preventive Services Task Force in assessing the effectiveness of various clinical prevention services.^{11,12}

References

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 - ⁴ See http://www.bccancer.bc.ca/statistics-and-reports-site/Documents/sas93_Cancer_Mortality_Counts_2014.pdf
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