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The economic value of Quebec’s water fluoridation program

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The economic value of Quebec’s water fluoridation program

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**Context**

- **The great problem of dental caries in the world**
  - Around 96% adults are affected in Canada and Quebec

- **Economic problem for people and public health services because many of them have any medical insurance**

- **Water fluoridation program**
  - World Health Organization (WHO), Centers for Disease Control (CDC) of USA, INSPQ suggest strongly to use fluoride water to prevent dental health
  - Several studies around the world have shown the positive effects (benefit) of the water fluoridation program on the health
  - Significantly contributes to helping make dental health services more accessible to everyone

- **Decision makers are interested in knowing how much money could we save when investing in this program**
Objectives

- **The main objective**
  - Demonstrate the economic value of water fluoridation program in Quebec. Do the benefits of the program are worth the costs?

- **The specific objectives**
  - Present the complexity of the program by building the logic model of the water fluoridation program in Quebec
  - Assess the cost of the water fluoridation program in Quebec in 2010
  - Assess the benefit when program contributes of the reduction of dental caries incidence
  - Analyse the economic value of this program
Methods (1)

- Data were collected from 15 municipalities in Quebec where the water fluoridation program had been existed until 2010.

- The analyses were conducted using an approach based on these steps:
  - building the logic model of program by identifying the resources, activities and effects (short, middle, and long term) of the program
    - Literature review
    - First draft model
    - Validation by three experts (2 Ministry of Health and Social Services (MSSS); 1 Direction of Public Health in Laurentides)
    - Final logic model
Methods (2)

- Assessing the economic value of the intervention by comparing the economic benefits and the costs of program
  - The cost of program was estimated based on:
    - Societal perspective
      - The costs of the products;
      - The annual value of building with 20 years of depreciation;
      - The salaries paid;
      - And, all administrative costs.
  - Economic benefit was assessed based on the costs of treatment and retreatment gained when the dental caries incidence was reduced (from 1% to 50%)
    - Only indirect effects (reduction in the cost of treatments related to dental caries, reduction in the cost of retreatment until 81 years, productivity and transportation gained) were valuated
  - Sensibility analyses were also conducted (rate of discount of 3%, 5% and 8%; and the reduction of dental caries incidence from 1% to 50%)
    - In the event the value of cost were over estimated and the benefits were underestimated
Results (1)

Logic model of the Water Fluoridation Program in Quebec

<table>
<thead>
<tr>
<th>Resources</th>
<th>Intervention</th>
<th>Chain of effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildings</td>
<td>Water fluoridation + promotion activities</td>
<td>Direct effects: reduced cavities among children, adults and older persons</td>
</tr>
<tr>
<td>Chemical products</td>
<td></td>
<td>Improved chewing</td>
</tr>
<tr>
<td>Salaries</td>
<td></td>
<td>Children’s healthy growth</td>
</tr>
<tr>
<td>Administrative costs</td>
<td></td>
<td>Better health, Reduced premature mortality among the elderly</td>
</tr>
</tbody>
</table>

Direct effects: population accurately informed

Indirect effects: Reduced dental care costs Reduced work days lost Reduced school days lost

Reduced public resistance to fluoridation

Other direct effects: reduction of dental health inequalities
Results (2)

- Costs of the water fluoridation program

<table>
<thead>
<tr>
<th>Discount rate</th>
<th>Mean cost of water fluoridation program per capita in Quebec 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>3%</td>
<td>1.93</td>
</tr>
<tr>
<td>5%</td>
<td>2.05</td>
</tr>
<tr>
<td>8%</td>
<td>2.25</td>
</tr>
</tbody>
</table>
Results

- **Benefit Cost Ratio (B/C)**

![Graph showing Benefit Cost Ratio (B/C) with reduction of dental caries incidence as the x-axis and a saving range of $71.1 to $82.04 as the y-axis.]

**Results:** If the reduction of dental caries incidence is 30%, each $ invested constitutes a saving ranging from 71.1$ to 82.04$.
Discussion (1)

- The main purpose was to demonstrate the economic value of the water fluoridation program

- We have found that this program is not only effective but also profitable (economic benefits outweigh the costs of the program)
  - Even if the program contribute to a reduction of only 1% of the dental caries

- Main interests
  - For public health
    - The Water fluoridation program has a positive effects to prevent dental caries and dental health
    - We have underestimated its economic value because we have not valuated all the benefits of this program shown in the logic model
Discussion (2)

- **Main interests**
  - **For decision makers**
    - Reinforce public health intervention by demonstrating the economic value of the program
    - Sensitizing other partners of the importance of prevention in health care (specially in this precarious national economic context)
    - May be, they will find the way to implement this program in other municipalities of Quebec because just 2.7% of the population benefit from fluoride water
  - **For Methodologists**
    - In order to demonstrate the economic value of a public health program, evaluating all the effects should not mandatory.
    - Focus should be placed on the economic benefits related to the treatment, productivity gained, hospitalization costs, and so on which are sometimes easier and less controversial to valuate
    - Valuating effects related to life or quality of life should be avoided because of ethical and methodological problems

- **Challenges**
  - Data were very difficult to find. We relied heavily on the assistance of experts and decision makers to find data and to validate the logic model
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Thank you !!!

Questions ???

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