Use of SMART Vaccines for Vaccine Priority Setting and Decision Making in Canada

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Purpose of Presentation

• Review the evaluation of *SMART Vaccines* ver. 1.0

• Describe recent activities for assessing and setting vaccine priorities in Canada

• Explore potential ways to integrate use of *SMART Vaccines* in vaccine priority assessment and decision making in Canada

• Discuss next steps in consideration and use of *SMART Vaccines*
Context—Action Plan on Vaccine Innovation

• Federal government-led national initiative begun in 2012 to promote, coordinate and facilitate well-focused national efforts for research, innovation and development of vaccines and related technologies to address evolving priority needs, interests and opportunities

• Coordinated by federal interdepartmental committees at the Director General and Assistant Deputy Minister level

• Linked with broad domestic and international strategies, priorities and commitments in public health, AMR, maternal and child health, science and technology, industry, security and agriculture

• Strong focus on priority vaccines and technologies
Canadian Interest in *SMART Vaccines* Tool

- *Initial consideration of potential approaches to vaccine innovation and development* at November 2012 multi-stakeholder consultation session
- *SMART Vaccines* has a potential role in achieving consensus on vaccines of public health priority for Canada: short, medium and long term
- PHAC and federal partners reviewed of 2013 and 2014 releases of *SMART Vaccines* tool and guide
- *Internal discussions around data requirements* and availability of Canadian data, to assess feasibility and benefits of the tool for some selected diseases and applications of: TB, *Chlamydia trachomatis*, all of Canada versus Northern populations
Testing of Version 1.0 (2014)

- **Improvements over 2013**, including ability to enter and use Canadian data
- **Three “hypothetical test case” diseases** with corresponding assumptions about vaccine characteristics
- **Compared rating/ranking results** by moving attributable weights
  - premature deaths averted
  - incidence cases prevented
  - net direct cost savings per year
  - work force productivity gains
  - cost-effectiveness
  - benefits to infants and children
  - benefits to women
  - possible elimination of disease
- **Use available Canadian data for TB and Chlamydia trachomatis**
Observations from Version 1.0 Evaluation

• **SMART Vaccines allows for ready assessment** of the relative impact on overall rating and ranking of vaccines based upon
  » different assumptions about key factors (e.g., incidence and burden of disease; cost of immunization; vaccine efficacy; etc.)
  » relative weighing of attributes and outputs, reflecting user values and policy criteria (e.g., address health inequities; target special populations; etc.)

• **Use of SMART Vaccines introduces a consistency, transparency and discipline** in the design of meaningful scenarios and tracking and comparing their implications

• **It is particularly useful in:**
  » forcing active consideration of critical factors and assumptions
  » demonstrating the sensitivity of different facts and/or assumptions in affecting rating/ranking scores—i.e., whether significant or trivial
Observations from Evaluation (cont’d)

- Care needed in selecting attributes for diseases with long latency (eg. TB) – “incidence” data in SMART Vaccines are based on presentation of illnesses not the incidence of new infections – for TB this would point to a priority focus on the elderly

- The software needs to provide sufficient options to make entries and adjustments for age and gender-specific morbidity rates and disease costs - for C. trachomatis these factors can be significant

- There is a need for a ready ability to link the disease with the population groups in which it spreads, eg. age profiles of regional populations of concern – TB is largely a Northern population issue, where the age profile is radically different from the national average

- Users have to be disciplined in selecting only a few weighting factors
Conclusions: Canadian Interest in *SMART Vaccines*

- We remain very interested in the potential use of *SMART Vaccines* as a tool to guide discussions and deliberations on vaccine priorities of public health importance.
- We look forward to the prospects of live demonstrations with active participation and inputs from representative audiences.
- We look forward to work with version 1.1, and will share our perspectives and suggestions for its continued refinement.
- In the meantime, we are readying more Canadian data and some useful scenarios for more in-depth testing.
Rating of Candidate Priority Vaccines

- Screening and consultation process identified some 30 candidate human vaccines of national interest with good prospects of development
  - Short Term ≤ 6 years
  - Medium Term 7–15 years
  - Long Term 13+ years

- Provincial/territorial Chief Medical Officers of Health then rated candidate vaccines on a scale of 1–10 (not urgent/significant to highly urgent/significant)

- A parallel exercise with Chief Veterinary Officers focused on a dozen candidate animal vaccine priorities

- Results will be used to shape priorities and focus federal attention in the Action Plan
Next Steps

• Apply the SMART Vaccines tool to assess higher-ranked vaccines in Canada identified through the consultation process.

• Focus on ways to highlight cost effectiveness, which will be a key attribute in Canada.

• Emphasize health equity as a variable of particular interest to Canada,
  » diverse regions
  » vulnerable populations

• Continue to share ideas and insights in refining the tool, mastering its applications, and communicating results responsibly and effectively.
Focus and Scope of Action Plan

• **New and/or improved vaccines**
  » address persistent and/or emerging vaccine-preventable human and animal diseases of concern
  » offer effective alternatives to existing vaccines
  » improve timeliness of production, especially in times of major outbreaks or pandemics
  » provide less invasive and more convenient and publicly acceptable options for vaccine administration,
  » minimize the numbers of vaccines and doses required

• **Innovative enabling technologies** vital to vaccine effectiveness and safety

• **Increased domestic manufacture** to expand Canadian business opportunities and strengthen security of vaccine supply

• **More focused, coordinated and accessible federal support** for the above
Whole-of-Government Approach

**Human Health**
- Health Canada
- Public Health Agency of Canada
- Canadian Institutes of Health Research

**Animal Health**
- Agriculture and Agri-Food Canada
- Canadian Food Inspection Agency

**International Development**
- International Development Research Centre
- Foreign Affairs and Trade Development Canada

**Medical Countermeasures**
- Department of National Defence
- Defence Research Development Canada

**Industry, Science and Technology**
- National Research Council
- Industry Canada
- Natural Sciences and Engineering Research Council
Identification of Candidate Priority Vaccines

• Preliminary review and screening of candidate *human* pathogens and vaccines of national interest, including consultations with industry and research community, and consideration of key criteria
  » incidence
  » mortality
  » case fatality
  » *communicability*
  » treatability
  » clinical impact
  » public and political profile
  » 10-year projection of incidence
  » economic impact
  » preventability (i.e., dependence on vaccines for health protection)

• A parallel exercise was undertaken for *animal* pathogens/vaccines, using animal/ agriculture-relevant criteria