Human Papillomavirus & HPV Vaccine Update

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November 10, 2010
A Very Brief Review

• HPV is responsible for >99% of squamous and glandular cancers of the cervix
• 510 000 cases worldwide, 230 000 deaths
• Almost 90% of cases and deaths in developing countries
• Canada 2010: 1300-1400 cases, 370 -400 deaths
• 400 000 abnormal Paps, 250 000 colposcopies
HPV

- Over 100 human papillomavirus (HPV) types have been described.
- These are virus particles consisting of circular DNA molecules wrapped in a protein shell. The shell is made up of two protein molecules, L1 and L2.
- These viruses infect differentiating epithelial cells of skin or mucosae. At least 40 HPV types are able to infect the genital tract.
- HPV infections are transmitted sexually by direct epithelial (skin or mucosa) to epithelial contact and vertically to an infant exposed to the virus in the maternal genital tract; as well, transmission from oral mucosal contact in head and neck infections is likely.
- Almost all cervical cancers can be traced to infection with oncogenic HPV types, including types 16 and 18. These types are referred to as high risk (HR) because of their link to cervical cancer.
- There are other HPV types, in particular 6 and 11, that are low risk (LR) for causing cancer, but cause the majority of genital warts; these are referred to as LR types.
HPV Vaccines

• Currently 2 vaccines licensed for use in Canada

• Gardasil (July 10, 2006)- quadrivalent HPV vaccine against types 6, 11, 16 and 18

• Cervarix (Feb 9, 2010) – bivalent HPV vaccine types 16 and 18, AS04 adjuvanted
HPV Programs

• Federal Budget 2007 provided $300 million to P/Ts through a third-party trust fund to launch HPV vaccine programs.

• The HPV Vaccine Trust, distributed on a per capita basis supported the purchase of the HPV vaccine by the provinces and territories over a 3 year period.

• MB launched its grade six program with these funds – the three year period has expired-now funding program from within
Opportunities

• HPV vaccines are safe and highly efficacious in RCTs
• Emerging positive real world effectiveness
• Need to improve school based uptake!!!
• New indications (Feb 2010) males 9-26
• Targeted High Risk Programs
• Catch-Up Programs
Challenges

• Direct costs of HPV program are substantial in vaccine terms and represent X% of Manitoba’s vaccine expenditures

• It costs MB almost XX% more per child to vaccinate against HPV than Measles Mumps and Rubella

• Current and pending NACI statements on Rotavirus, Zoster, Pneumococcal and Meningococcal, 2-Dose Varicella if implemented represent a doubling of costs
An analytical framework...

- An analytical framework for immunization programs in Canada.
- Erickson LJ, De Wals P, Farand L.

Abstract

We present an analytical framework, which we have developed to assist in the analysis and comparison of potential immunization programs. The framework includes 58 criteria classified into 13 categories, including:

- the burden of disease, vaccine characteristics and immunization strategy, cost-effectiveness, acceptability, feasibility, and evaluability of program, research questions, equity, ethical, legal and political considerations. To date this framework has been utilized in a variety of different contexts, such as to structure expert presentations and reports and to examine the degree of consensus and divergence among experts, and to establish priorities. It can be transformed for a variety of other uses such as educating health professionals and the general public about immunization.
Cost Effectiveness

- Table 3. Cost per Life Year Saved for Selected Vaccine Programs and Other Public Health Interventions (adapted from references)
- Vaccines
  - Cost per life year saved
  - Measles, mumps, rubella for children < 0 ($16 saved per $ spent)
  - DPT for children < 0 ($6 saved per $ spent)
  - Influenza for adults aged ≥ 65 years of age < 0 ($45 saved per $ spent)
  - Pneumococcal polysaccharide for adults aged ≥ 65 years < 0 ($8 saved per $ spent)
  - Varicella vaccine for children $16,000
  - Conjugate pneumococcal vaccine for children $125,000
HPV Cost Effectiveness

• For Canada, Brisson et al estimated that vaccination of 12-year-old girls would result in a decrease of 62% in cervical cancer cases at a cost of $20,512 to $31,060 per QALY gained


• Males? Genital Warts?
What, Me Worry?