

Vaccination is often cost-effective but not (currently) HPV vaccination for boys in NZ

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This blog looks at a study we just published on a cost-utility analysis around extending HPV vaccination to boys in NZ. In a nutshell, it is not currently cost-effective for boys. Here we put these results into a wider context of vaccination – which is often, but not always, a good use of limited health sector resources.

Similar to many developed countries, routine vaccination against human papillomavirus (HPV) is generally only funded for girls in NZ. Indeed, this is probably good value for money – as per a previous study we have done and blogged on. But given that the Australian Government is now providing fully subsidised HPV vaccination to school boys, we thought it useful to study this issue in the NZ setting. Our model involved simulating an annual cohort of 12-year-old girls and boys in 2011 in the context of either female-only or both-sex HPV vaccination. It captured the benefits of HPV vaccination on a wide range of future health outcomes (i.e., cervical cancer, pre-cancer (CIN I to III), genital warts, and various other HPV-related cancers – such as oropharyngeal cancer).

HPV vaccination of boys in NZ is not (currently) cost-effective

In our just published study (and summary), we found that at an assumed willingness-to-pay threshold of NZ\$45,000 (the GDP-per-capita of NZ), vaccination of boys (at equivalent coverage as currently achieved for girls) would not be cost-effective (at NZ\$117,500 per QALY gained, 95% uncertainty interval: NZ\$57,100 to \$215,000). Indeed, it was found that a more intensive girls-only programme in schools (achieving 73% uptake as per the current Australian programme) would always be a better investment. Vaccination of boys, after achieving a more intensive (73% uptake) for girls, only becomes cost-effective if we are prepared to spend NZ\$247,000 per QALY gained. And if we did this, there would be the likely opportunity cost of not funding interventions that achieve more health gain (i.e. inefficient resource allocation, or more bluntly not getting the biggest “bang for our buck” in the health sector).

But in the future the price of the vaccine is almost certain to drop, especially as PHARMAC has now taken over the role of price negotiating from the Ministry of Health (since PHARMAC can negotiate vaccine prices at the same time as contracts for other products from the same vaccine/pharmaceutical manufacturers). A lower vaccine price would improve the cost-effectiveness of vaccinating boys, so we ran some scenario analyses around lower vaccine prices and administration costs. These found that adding in HPV vaccination for boys could become cost-effective, but only when combined vaccine and administration costs were NZ\$125 or lower per dose delivered (for this 3-dose vaccination), or approximately half the estimated current price.

Possible policy implications for NZ

Given the findings of this modelling, policy-makers in NZ should probably focus more on improving HPV vaccination uptake in girls than adding HPV vaccination for boys. As we discussed previously – this could potentially be done by having a school-only and time-limited approach. There have recently been some moves towards a more time-limited approach. As of 1 July 2014, HPV vaccine will only be provided to girls for free prior to the age of 18 years (previously this was prior to 20) although girls born in 1993-1997 will be funded to complete the course if they start before the end of 2014. Another alternative may be to deliver one dose of the vaccine at the same time the current diphtheria/tetanus/pertussis (DTP) booster is given to 11-year-olds at school.

If there is a desire to fund HPV vaccination to boys, then it will be important to focus on ways to reduce the overall cost per vaccinated individual, in order to maximise the return on taxpayer investment. Options for policy-makers include:

- Gearing up for hard negotiations for the vaccine manufacturer to get lower vaccine prices. The decision to include boys in the Australian programme was made in the context of a substantially reduced vaccine price.
- Looking at ways to lower the vaccination delivery cost in schools (e.g., combining at least one dose with the DTP booster given in schools at age 11 years and focusing on high coverage for doses 1 & 2 with minimal follow-up effort for the much less critical third dose).
- Highlighting the capacity of the HPV vaccine to prevent multiple cancer types in information materials and communication around HPV vaccination, rather than predominantly focussing on the “cervical cancer” prevention aspect. This could be done regardless of any short-term plans to include boys.
- Consider shifting to a two-dose schedule for HPV vaccination (which has recently been

endorsed) by the World Health Organization for girls and is being adopted in the UK and is already used in parts of Canada. Other modelling studies show that if two doses protect for at least 20 years, the benefit of the third dose is small.

There have recently been changes to the National Immunisation Schedule to fund HPV vaccination in groups who are at higher risk of HPV-related disease, including transplant recipients and people who are HIV positive. It is probably worth considering whether HPV vaccination should also be fully-subsidised for young gay males (or at least more adequately researched). Fully-subsidised vaccination for this group of young men is quite likely to be cost-effective if they can be reached before they are naturally infected, as they are at higher risk of some HPV-related disease. It is possible that very targeted marketing could be done to encourage adolescent boys and young men who are gay to get the HPV vaccination from their GPs or sexual health clinics. Advertising on internet sites designed for young gay men is one possibility to test out and evaluate.

Other vaccinations and cost-effectiveness

Vaccination is often very cost-effective, especially if it wipes out an infectious disease such as it happened with polio in NZ just over 50 years ago. The NZ Government has recently added the rotavirus vaccination into the routine immunisation schedule – which is also probably fairly cost-effective (a NZ cost-effectiveness study was done on this – albeit using some conservative assumptions).

But there are a number of areas where we would like to see new cost-utility modelling for the NZ situation:

- Would vaccinating all adolescents or perhaps just students in hostels against meningococcal disease serogroup C be cost-effective? (A vaccination campaign against this disease was recently run in the Northland Region, as detailed in this article). The literature for other countries has produced results of highly varying levels of cost-effectiveness e.g., for the Netherlands (where it was actually reported to be cost-saving), USA, Canada, and Iceland.
- How cost-effective is the fully-subsidised annual influenza vaccination for the over 65 year age group, for selected groups (e.g., younger people with asthma), and for NZ workers? Of note is a Cochrane systematic review that suggests fairly limited benefits “influenza vaccines have a modest effect in reducing influenza symptoms and working days lost”.
- How cost-effective is the one-off pneumococcal vaccination for adults with chronic conditions (taking into account various probabilities of future influenza pandemics – in which illness from secondary bacterial infection is a consideration)? This approach is not well studied and was not included in this systematic review of economic evaluations of influenza pandemic interventions.

Answering these questions could improve NZ health sector confidence in making the best use of vaccination to reduce infectious disease burdens in cost-effective ways.

The BODE3 Research Programme publishes summaries of cost utility analyses, like the HPV boys vaccination. Click on the figure to go to these summaries.

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