ABC in NZ:
New Zealand’s experience with starting and stopping meningococcal vaccine programs

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April 2017
Outline

Vaccination programmes for NZ’s meningococcal epidemics: What decisions needed to be made? How were they made?

1. Meningococcal disease in NZ
2. Vaccine programmes to control epidemics
   • Serogroup A, C, B
3. Reflections:
   • Drivers and barriers for NZ’s vaccine programmes
   • Co-benefits
   • The bigger picture
Meningococcal disease in NZ

NZ has a high incidence of meningococcal disease compared to other high-income countries:

• USA around 0.5 – 1.0 case per 100 000
• NZ (in 1990) 1.5 cases per 100 000

Disease risk is highly correlated with disadvantage in NZ:¹

• Māori and Pacific ethnicity
• Close contact particularly household crowding (OR 10.7; 95%CI 3.9 – 29.5)
• Exposure to tobacco smoke

Figure 12.1: Notified cases of meningococcal disease, 1970–2013

Source: Institute of Environmental Science and Research
Decisions around meningococcal epidemics in NZ

• Decision to introduce a vaccine programme
• Determining the vaccine strategy
  • Who, when, where
  • Establishing infrastructure requirements
  • Managing risk reduction
• Implementation of the programme
• Developing the evaluation plan
• Deciding when to stop the vaccine
A serogroup epidemic

• Spikes of group A disease seen in Auckland in the winters of 1985 and 1986
• Vaccination strategy targeted 3 months – 13 years
• 90% of target population vaccinated
• Epidemic abated
C serogroup epidemic

- Winter 2011
- Localised outbreak in Northland in children and young adults
- 9 cases, 3 deaths
- DHB set up a steering group to manage the programme
- 34,000 people vaccinated (single dose of conjugate vaccine)
- Coverage of 73% in 12 weeks in target population (12 months to <20 y)
- Evaluations identified a need for system changes to reduce inequalities and increase uptake
B serogroup epidemic

B:4:P1.7b,4

No. of identified cases

Year


C serogroup
Other B serogroup
Undefined
Other serogroup
Epidemic strain
B serogroup epidemic: overview

- Duration approximately 1991 – 2007, peak 2001
- >6000 cases, 250 deaths
- Clonal epidemic: required a novel strain-specific vaccine
- Programme ran from July 2004 - 2008
- Final cost around $200m
Decision re: mass vaccination

• Surveillance data indicated a rise in incidence from the early 1990s
• Excess cases due to a single strain
• Previous experience in Norway indicated a likely long duration
• Disease modelling indicated high potential disease burden
• No available vaccine
Decision re: mass vaccination

What was persuasive for policymakers?

• Personal stories and graphic images of children raised awareness of disease effects
• High levels of news coverage and public awareness
• Communication of clear epidemiological and microbiological evidence

• Rising incidence
• High incidence relative to other countries
• Disproportionately affecting Māori and Pacifika

Graph: Michael Baker 2002

HEIRU Health Environment Infection Research Unit University of Otago
Complex partnership

• NZ Ministry of Health
• Chiron Corporation (Siena, Italy)
• Norwegian Institute of Public Health
• University of Auckland
• And others
Who, when, where

Epidemiological evidence base:
• Age groups (infants, school age, post school)
• Ethnicity
• Geographical regions

• Prioritise (but some balancing of priorities)
Meningococcal disease rate by age and ethnicity, 2002

Graph: Michael Baker
Meningococcal disease in NZ 1995 - 2006

Number of cases vs Age in years
Who, when, where

Epidemiological evidence base:
• Age groups (infants, school age, post school)
• Ethnicity
• Geographical regions
• Prioritise (but some balancing of priorities)
Meningococcal disease rate by health district, 2002
Rolling out from high risk to low risk areas
Who, when, where

Epidemiological evidence base:

• Age groups (infants, school age, post school)
• Ethnicity
• Geographical regions

• Prioritise (but some balancing of priorities)
Infrastructure

• Vaccine delivery – cold chain, service providers
• National immunisation register
• Surveillance of disease and adverse events
Risk Reduction

• Communication
• Adverse event monitoring (esp if new vaccine)
• Monitoring vaccine logistics and the cold chain
• Develop a strategy for anti-vaccination campaigners
Evaluation: RCT or observational?

Observational

- Allows for rapid rollout
- Also “broader populations and more realistic settings” – Kelly 2007

- Use causal analysis methods to reduce bias
- Sensitivity analyses to quantify bias
Deciding to stop the vaccine programme

- Decreasing number of cases due to epidemic strain
- Uncertainty about the duration of protection
- Cost – balancing other public health priorities
- Plan to introduce pneumococcal vaccine into schedule
- Extensive discussion to reach a consensus

Experts split on long-term value of vaccine

By Geoff Cumming
5:00 AM Saturday Aug 23, 2008
Reflections 1: Drivers and barriers

Drivers

• Devastating disease affecting children and adolescents
• Shared goal
• Crisis situation allows leaders to have autonomy
• Community engagement and communication essential

Barriers

• The scale of the problem
• Cost vs other public health priorities
• Difficult to model likely course of disease
• Conflict (disagreement, conflict of interest)
Reflections 2: Co-benefits

- Massive infrastructure development (e.g. national immunisation register)
- Fostered strong relationships between the agencies involved
- The push to reach disadvantaged populations increased uptake of other vaccinations / services
- Some protection against other B serogroup strains and gonorrhoea
- High-quality surveillance data can now be used to answer a variety of research questions
- Systems and processes can transfer to other epidemic situations
Reflections 3: The bigger picture

• During an epidemic, there is also a need to consider optimal management of cases in the community and in hospital
• Responding to epidemics with vaccine programmes can be an inefficient use of resources
• Prevention is not only about vaccines: Social determinants of meningococcal disease such as household crowding still drive high incidence rates in NZ
RESULTS: Pre-hospital parenteral antibiotics in meningococcal disease

Case fatality risk

- Overall: 4.0%
- GP cases: 2.9%
  - No antibiotics: 3.4%
  - Antibiotics: 1.9%

Adjusted OR of death following antibiotic treatment
= 0.53 (95%CI 0.31 to 0.89).
Reflections 3: The bigger picture

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Average age in years 1995 - 2006