Considerations for Public Health on Pertussis Case and Contact Management

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History of Pertussis and Immunization

- Pertussis outbreaks tend to be cyclical in nature, with increased disease activity approximately every 2 - 5 years. \(^1\)

- Protection against pertussis is not lifelong and wanes after 7-20 years of natural infection and approximately 4-12 years after vaccination with either whole cell or acellular pertussis vaccine (varies with age). \(^2\)

- There is some suggestion that acellular vaccines may be associated with earlier waning of immunity. \(^3\)\(^-\)\(^6\)

- Pertussis tends to be under-diagnosed, particularly among adolescents and adults.

- It is a relatively poorly controlled vaccine preventable disease.

- Young infants (less than four months of age) have the highest risk of mortality and this risk is greatest before they are eligible to receive the vaccine or before completion of their primary vaccine series.

What does this mean in clinical practice?

Clinicians should consider pertussis in the differential diagnosis of patients presenting with symptoms compatible with pertussis.

Clinically compatible signs and symptoms

- Paroxysmal cough of any duration OR
- Cough ending in vomiting, or associated with apnea OR
- Cough with inspiratory “whoop” OR
- Any cough illness lasting two weeks or more
Pertussis Diagnostic Laboratory Testing

Laboratory testing, using nasopharyngeal (NP) swabs, should only be done on patients with clinical signs and symptoms.\textsuperscript{7,8}

The following points are intended to help health care professionals understand and optimize the use of PCR testing for pertussis by avoiding common pitfalls leading to inaccurate results.

Important information about taking NP swabs for Pertussis

The NP swab is tested using a polymerase chain reaction (PCR) assay which allows more timely diagnosis.\textsuperscript{7,8} PCR is a molecular technique used to detect DNA of the \textit{Bordetella pertussis} bacterium and, unlike culture, does not require, nor can it distinguish, the presence of viable (live) bacteria in the specimen.\textsuperscript{7,8}

**ONLY test patients with signs and symptoms of pertussis**

Testing asymptomatic persons who are household contacts of a person with pertussis should be avoided as the PCR assay is very sensitive and detects low levels of DNA (e.g., even non-viable bacteria located in the nasopharynx). Thus the positive predictive value of the test will decrease in this situation. Therefore asymptomatic close contacts of confirmed cases should not be tested and testing of contacts should not be used for post-exposure prophylaxis decisions.

Optimal Timing for PCR Testing for pertussis is within three weeks of cough onset when bacterial DNA is present in the nasopharynx.

PCR testing following antibiotic therapy is NOT recommended, as the exact duration of positivity is not well understood.

There is no benefit in using PCR as a test of cure after five days of antibiotic treatment, as the result may remain positive at this time.\textsuperscript{7-9}

Understanding and Interpreting Testing Results

Positive PCR results should be interpreted in conjunction with the presence of clinical signs and symptoms consistent with pertussis and available epidemiological information (i.e., household contact of a confirmed case of pertussis with incomplete immunization history); this is especially important if the result is indeterminate. The positive predictive value of the test is low in cases that do not fit the clinical picture.
Pertussis Clinical Management

Chemoprophylaxis

Current recommendations as per the Canadian pertussis control guidelines identify that chemoprophylaxis should only be provided to:1,9

- household contacts (including attendees at family day care centres) where there is a an infant less than one year of age (regardless of vaccination status) or a pregnant woman in the third trimester
- for out-of-household exposures, infants less than one year of age (regardless of vaccination status) or a pregnant woman in the third trimester who have had face-to-face exposure and/or have shared confined air for greater than one hour.

Chemoprophylaxis is only recommended in the above identified contacts, even in communities that refuse immunization. It should be implemented as soon as possible after exposure as efficacy is related to early implementation. It is not likely to be beneficial after 21 days since the first contact.9

Repeating chemoprophylaxis in high risk contacts is based on the likelihood that there is little or no protection 24-48 hours after the last dose. If the individual still refuses immunization and subsequent exposure occurs after the cessation of prophylaxis, re-offering chemoprophylaxis based on the nature of their exposure and risk of infection may be prudent.

Lab testing should not be done to guide decisions around who should receive chemoprophylaxis in contacts.

Treatment

Treatment should be based on symptoms of early pertussis – efficacy is related to early treatment (unlikely beneficial after 21 days since initial contact). However, untreated symptomatic cases of pertussis whose PCR results are positive should be started on treatment regardless of time since symptom onset. Cases are not considered infectious after five days of treatment.
Vaccination Considerations

- The on time administration of the 2, 4 and 6 month doses of acellular pertussis vaccine are most critical in reducing infant mortality and hospitalization rates from pertussis\(^2,9\).
- Up-to-date vaccine status would vary with age. The current schedule for acellular pertussis vaccine is 2, 4, 6, and 18 months, 4-6 years, and 14-16 years. Adults should be considered up-to-date if they have had one adult dose.
- Acellular pertussis vaccines in Canada have an 80 - 85% estimated efficacy which is why infants less than one year of age (regardless of vaccination status) should receive chemoprophylaxis when exposed\(^1\).
- Vaccination is not recommended for outbreak management, but the outbreak provides an opportunity for patient education and to update the whole family’s vaccination status.
- It takes approximately two weeks to develop immunity after immunization.

For additional information on pertussis case and contact management, laboratory testing and vaccination, visit PHO’s pertussis webpage.
References


