Taking the Whoop Out of a Pertussis Outbreak
Outbreak Background
• 1,647 cases were identified in Iowa, a 417% increase when compared to the average of the past five years.

• CDC reported Iowa as 6th in the nation for pertussis activity; with Wisconsin leading, followed by Vermont, Minnesota, Washington and North Dakota.

• Cerro Gordo County was the 4th leading county in cases and 2nd per capita in the state of Iowa.
The Cerro Gordo County Department of Public Health (CGDPH) received notification of the first pertussis case on May 8, 2012.

- Additional cases of pertussis continued for 9 months, with the last case reported on January 14, 2013.

- Following active surveillance and case investigations
  - **166 cases** were identified.
  - additional **1,025 close contacts** were identified as needing prophylactic treatment by the end of the investigation.
A total of twelve separate school buildings, five daycare centers and one long term care facility were implicated in the outbreak.
$240,072

Community Medical Burden
$228,672 ($192) = office visit + medication
*(total does not include lost income due to isolation guideline)*

Public Health Response Expense
$11,400 staff hours
Symptom onset: April 9, 2012 - January 1, 2013
(peeked the second and third week of May)

Biweekly Probable & Confirmed Cases in Cerro Gordo County
53.6% were male / 46.4% were female.

Illness most frequently in the 9-12 age range, most prevalent in 9 and 10 year olds.
Two cases hospitalized (3 - 21 months of age) - No deaths

Range of “days coughed” varied from 12-63 days.

**Reported Symptoms**

- Apnea: 1%
- Inspiratory whoop: 18%
- Post-tussive vomiting: 36%
- Paroxysmal cough: 98.7%
On average, patients coughed for 12 days before seeking medical care.
On average, public health received notification of new pertussis cases within 17 days of cough onset.
Isolation efforts only effective on 60% of cases.
3 year old had cough onset Thursday, September 13\textsuperscript{th}. Child presented to medical provider on Friday, September 14\textsuperscript{th}. Pertussis testing and Zithromax was prescribed that day. However, no isolation orders were followed. Child attended preschool the following Monday & Tuesday while infectious.
16 children and 2 teachers were exposed that would not have been if isolation orders were followed. Of those, 3 children were tested for pertussis due to cough symptoms; 1 tested positive for pertussis. One teacher also sought medical treatment due to cough and missed 5 days of work. In addition, 13 children and 1 other teacher were placed on preventative medication.
23 year old had cough onset Wednesday, August 22\textsuperscript{nd}. Patient presented to medical provider on Thursday, August 23\textsuperscript{rd}. Pertussis testing and Zithromax was prescribed that day. However, no isolation orders were followed. Patient was a health care worker at a long term care facility who worked while infectious the next 3 days (Friday, Saturday, & Sunday).
Approximately 40 LTC residents & several co-workers were exposed over the 3 days the case worked. Local Public Health (LPH) received notice of the case on Monday and placed patient in isolation for the remaining 2 days of their infectious period. LPH (with consultation from IDPH) recommended preventative medication for only immunocompromised residents and/or residents the case spent a lot of one-on-one time with. Only 3 residents were placed on preventative antibiotics. However, the facility’s medical director instructed Director of Nursing to contact each resident’s medical provider to determine need for medication. In addition, several staff members were referred to their provider for medical care due to their exposure (2 were tested, treated, & missed 5 days of work due to symptoms). Staff and residents were monitored for pertussis-like symptoms until September 16th.
QI Initiative
Public Health received a Quality Improvement (QI) Program Grant through the National Network of Public Health Institutes

QI Pertussis Improvement Team Assembled Jan- Aug 2013

- LPH - Cerro Gordo County Public Health
- SPH - Iowa Department of Public Health
- Hospital - Infection Control Nurse
- Clinic - Quality Medical Clinic & Practice Leader
- Child Care - Child Care Nurse Consultant
- School - Mason City School Nurse

QI Initiative
Team tasked with evaluating current response process and identifying areas of improvement

Mapped our processes from the time case reported through case closure

Identified Root Causes

• Lack of Knowledge (community & providers)
• Lack of Standard of Care

QI Initiative
Revised Current Tools
• Health Alerts – “Call to Action”
• General & Contact Letters – decreased reading level & length of document

Developed New Tools
• Pertussis Tool Kits for childcare, schools, & medical providers
• YouTube video for general public
  http://www.youtube.com/watch?v=YIyNCIVFutY
School and Childcare Center Improvements
School/Childcare Toolkit
Childcare & School Pertussis Outbreak Algorithm

Monitor classroom for children with these symptoms:
- coughing attacks
- cough followed by high pitched whoop,
- cough accompanied with gagging or vomiting,
- appears normal between coughing attacks,
- cough with recent exposure to a pertussis case.

separate child exhibiting symptoms from other children and/or mask child
contact child’s parent or guardian to have child medically evaluated for cough
send “Release to return to school/childcare form” home with parent to have completed by medical provider
exclude child from facility until completed form is returned
medical provider evaluates, treats &/or tests child for pertussis

Isolation Recommendations
A child tested or prescribed medication for pertussis shall not attend school or childcare until five (5) days of antibiotics are completed (e.g. child began antibiotics on Friday, may return on Wednesday).
Release to Return to School/Childcare

Child’s Name: ______________________________________________

☐ I have examined said child and he/she is free from communicable
diseases and may return to school and/or childcare without
exclusions.

☐ I have examined said child and he/she may not return to school
and/or childcare until ____________________.

(Please note a child tested or prescribed medication for pertussis shall not attend school or
childcare until five (5) full days of antibiotics are completed (e.g.: child began antibiotics on
Friday may return on Wednesday)).

Medical Provider’s Signature: ________________________________

Date: ___________________
November XX, 20XX

Dear Parent/Guardian:

There is a case of pertussis (whooping cough) at the childcare center. The Cerro Gordo County Department of Public Health is asking you to watch your child for a cough. **Please have your child seen by their doctor if coughing is present.**

Symptoms of pertussis include:
- Long lasting cough and/or uncontrolled coughing spells.
- Vomiting or turning blue in the face during severe coughing spells.
- Person often does not appear sick between coughing spells.

Since pertussis has been confirmed at the center, public health recommends that you make sure your family’s pertussis vaccinations are up-to-date:
- **Children (up to 10 years of age)** – DTaP, a dose should be given @ 2, 4, 6, 15-18 months & 4-6 years of age.
- **Adolescent - (11-18 years) & Adults:** Tdap, single dose should be given
- **Expectant Mothers**- Tdap, a dose should be given during each pregnancy during the 3\(^{rd}\) trimester.

Please review the attached Pertussis Fact Sheet for more information. If you want further information, call the Cerro Gordo County Department of Public Health at 641-421-9323 or visit the website at [www.cghealth.com](http://www.cghealth.com).

Sincerely,
Karen Crimmings, RN, CIC
Cerro Gordo County Department of Public Health
May XX, 20XX

Dear Parent/Guardian:

There is a person with pertussis (whooping cough) in the childcare center. **Your child has had close contact with this person and may need to see their medical provider.**

*The following recommendations will help prevent further spread of pertussis:*

Your child will need medicine even if they are not coughing to prevent them from getting sick if they meet **ONE** of the following criteria:

- is younger than 12 months of age
- has a weakened immune system or lung problem (like severe asthma or cystic fibrosis)
- lives with someone diagnosed with pertussis
- has a lot of contact with or lives with:
  - a pregnant woman in their third trimester
  - an infant younger than 12 months of age
  - someone that has a weakened immune system or lung problem (severe asthma/cystic fibrosis)

*If your child does not meet any of the criteria above, your child will not need to receive medication because of their exposure. However, watch your child for signs of pertussis (listed below) for 21 days. If they start coughing please notify their medical provider of their recent exposure and symptoms.*

If your child is coughing, have him/her seen immediately by their doctor. Please let the clinic know your child is coughing and has been exposed to pertussis when you make the appointment.

- If your child is tested for pertussis they need to stay home and not have visitors until they have finished five full days of antibiotics. All public activities (school, childcare, sports, musical events, religious activities, shopping, etc.) should be avoided.
- **Please take this letter and the Release to Return to School/Childcare form with you to your child’s doctor appointment so that your child can begin medicine as soon as possible.**

Symptoms of pertussis include:

- Long lasting cough and/or uncontrolled coughing spells.
- Vomiting or turning blue in the face during severe coughing spells.
- Person often does not appear sick between coughing spells.

A staff member from the Cerro Gordo County Department of Public Health will contact you in the next 24-48 hours. Since pertussis has been confirmed at the center, we recommend that you make sure your family’s pertussis vaccinations are up-to-date. In the meantime, if you have questions please call u at 641-421-9323.

Sincerely,

Karen Crimmings, RN, CIC
Cerro Gordo County Department of Public Health

enc: Pertussis Fact Sheet
Additional Process Changes Made

• Once pertussis is identified in the area, Public Health may:
  • Send out Health Alerts to schools and/or childcare centers
  • Provide pertussis education to school nurses or childcare managers
• Expand Pertussis Education/Awareness with Parents:
  • Childcare Nurse Consultant (400+ childcare providers)
  • Utilize school/childcare parent e-mail list
  • Utilize school’s One Call System
  • Utilize school/childcare center newsletters
• Schools/childcare centers encouraged to assess:
  • Current health policy that may need to deviate during an outbreak (share with their families during the event)
  • Establish handwashing/mask station
  • Designated isolation room

School/Childcare
Medical Provider Improvements
• Introduction Letter
• Health Alert Example
• Pertussis Algorithm
• Medical Release

Medical Provider Toolkit
• September 2013 IDPH changed recommendations for use of antimicrobials for pertussis post exposure prophylaxis (PEP).

• The recommendations were updated to align with new guidance from the Centers for Disease Control and Prevention and to be more consistent with national pediatric recommendations (Red Book).
Focus is to protect persons at high risk of severe illness, including infants (<12 months of age), pregnant women in their third trimester, and persons with certain pre-existing health conditions.

Under the new guidance, antimicrobial prophylaxis would be recommended for the following exposed persons:

- Household contacts of laboratory confirmed cases
- Close contacts of laboratory confirmed cases who are at high risk of severe illness or who themselves have close contact with persons at high risk of severe illness. Those at high risk include:
  - infants (<12 months of age),
  - women in their third trimester of pregnancy, and
  - persons with pre-existing health conditions that may be exacerbated by a pertussis infection (including, but not limited to immunocompromised persons and patients with moderate to severe medically treated asthma).

PEP Recommendation Changes
Pertussis Health Alert

*THIS IS A TEST*

Date: May XX, 20XX
To: All Cerro Gordo County Providers, Clinics, & Lab Directors
From: Karen Crimmings, RN, Disease Prevention & Investigation Service Manager
Phone: 641-421-9323 Fax: 641-421-9350
Re: Pertussis in Cerro Gordo County

BACKGROUND:
A case of pertussis (whooping cough) recently occurred in Cerro Gordo County. The Cerro Gordo County Department of Public Health is conducting an outbreak investigation to identify further cases and others who may have been exposed. At this point, we have identified four cases, three school-aged children that attend public schools and an adult, all from the same household.

The Cerro Gordo County Department of Public Health has sent letters home with students to notify the parents that their child has been in close contact with a case of pertussis. Only those students that have been indentified as having close contact with a case received the letter. The letter advises the parents to contact their physician for preventative antibiotic treatment.

Because pertussis has now been identified in the area we ask that you begin evaluating patients for symptoms of pertussis. Symptoms compatible with pertussis are a prolonged cough, paroxysmal cough or post-tussive cough with vomiting. In adolescents and adults, pertussis often presents as an illness with a long lasting cough. Please refer to your Provider Pertussis Algorithm for further information.

### Pertussis Treatment/Prophylaxis

<table>
<thead>
<tr>
<th>Age group</th>
<th>Azithromycin</th>
<th>Erythromycin</th>
<th>Clarithromycin</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 month</td>
<td>Recommended agent. 10 mg/kg per day in a single dose for 5 days (only limited safety data available)</td>
<td>Not preferred. Erythromycin is associated with infantile pyloric stenosis. Use if azithromycin is unavailable. 40-50 mg/kg per day in 4 divided doses for 14 days</td>
<td>Not recommended (safety data unavailable)</td>
</tr>
<tr>
<td>1-5 months</td>
<td>10 mg/kg per day in a single dose for 5 days</td>
<td>40-50 mg/kg per day in 4 divided doses for 14 days</td>
<td>15 mg/kg per day in 2 divided doses for 7 days</td>
</tr>
<tr>
<td>Infants (aged ≥6 months) and children</td>
<td>10 mg/kg in a single dose on day 1, then 5 mg/kg per day (maximum: 500 mg) on days 2-5</td>
<td>40-50 mg/kg per day (maximum: 2 g per day) in 4 divided doses for 14 days</td>
<td>15 mg/kg per day in 2 divided doses (maximum: 1 g per day) for 7 days</td>
</tr>
<tr>
<td>Adults</td>
<td>500 mg in a single dose on day 1, then 250 mg per day on days 2-5</td>
<td>2 g per day in 4 divided doses for 14 days</td>
<td>1 g per day in 2 divided doses for 7 days</td>
</tr>
</tbody>
</table>
Pathway with a Symptomatic Patient
SYMPTOMS

Cerra Gold:
Department of Public Health

Patient Presents with:
- paroxysmal cough,
- cough followed by high pitched whoop,
- cough accompanied with gagging or vomiting,
- appears normal between coughing attacks,
- cough worse at night,
- apnea and/or cyanosis with cough,
- cough with recent exposure to a pertussis case,
- persistent cough in the absence of a more likely diagnosis.

Patient and healthcare worker don face masks

Determine if patient is coughing >21 days

Test patient: PCR nasopharyngeal swab sent to SHL

Prescribe medication regardless of vaccine status:
azithromycin, (alternatives: erythromycin, TMP-SMZ, clarithromycin)

Does patient attend childcare or school

Sign school/childcare release form

Vaccinate

End

Turn Page Over

Vaccine Recommendations:

- **DTaP**: Children should receive 5 doses of DTaP, one dose at each of the following ages: 2, 4, 6, 15-18 months, and 4-6 years of age.
- **Tdap**: Adolescents 11 through 18 years of age (preferably at age 11-12 years) and Adults 19 and older should receive a single dose of Tdap, especially if in close contact with infants. Expectant mothers should receive Tdap during each pregnancy, preferably at 27 through 36 weeks gestation.
Symptoms of Pertussis

- Coughing fits
- Cough followed by high pitched whoop
- Cough with gagging or vomiting
- Patient appears healthy between coughing attacks
- Cough worse at night
- Apnea or cyanosis with cough (infants)
- Cough with recent exposure to a pertussis case
- Persistent cough with no other likely diagnosis
Reminder for clinic staff to mask coughing patient AND don their own mask when providing close medical care.

Goal is to avoid occupational exposures to pertussis.

Personal Protection Equipment
PCR testing - send to State Hygienic Lab (SHL)
- Nasopharyngeal swab
- Nasal wash
- Nasopharyngeal aspirate
- Serologic testing is **NOT** recommended

*Free testing kits available through SHL. Cerro Gordo County Public Health stocks small amount at all times in case clinic/lab depletes their supply.*

**Note:** if a patient has coughed for > 21 days they are no longer contagious. No testing, treatment or isolation is necessary. Question if others in the home are coughing.
Treatment for Pertussis

**Drug of choice**
Zithromax (drug of choice) x’s 5 days

**Alternatives**
Erythromycin x’s 14 days
TMP-SMZ x’s 14 days
Clarithromycin x’s 7 days

**Note:** patient should receive antibiotics regardless of their vaccine status
Cases (or persons suspected) of pertussis should be isolated until they meet one of the following:

- Coughed for > 21 days
- Completed 5 full days of appropriate antibiotics
- Test returns negative AND provider believes cough is caused from something other than pertussis.
If child attends school or childcare complete *Release to Return to School/Childcare* form.

**Note:** in the event of an outbreak, many schools and childcare centers are requiring this form to be completed before a child can return.

**Complete Release Form**
• **Children:** 5 doses of DTaP, one dose @ 2, 4, 6, 15-18 months, & 4-6 yrs of age

• **Adolescents:** one dose of Tdap @ 11-18 yrs of age (preferably at 11-12 yrs); new Tdap law for all 7th graders

• **Adults:** if never received Tdap as an adolescent, one dose of Tdap

• **Expectant Mothers:** one dose of Tdap should be administered during each pregnancy, preferably at 27-36 weeks gestation.
Pathway with an Asymptomatic Patient
NO SYMPTOMS

Cerro Gordo County Department of Public Health

Patient Presents with:
- paroxysmal cough,
- cough followed by high pitched whoop,
- cough accompanied with gagging or vomiting,
- appears normal between coughing attacks,
- cough worse at night,
- apnea and/or cyanosis with cough,
- cough with recent exposure to a pertussis case,
- persistent cough in the absence of a more likely diagnosis.

Turn Page Over

Patient fits into one of the following groups:
- Household contact of the pertussis case
- High Risk Population
  - Infant younger than 12 months
  - Pregnant woman in 3rd trimester
  - Pre-existing health condition that may be exacerbated by a pertussis infection (e.g. immunocompromised or moderate to severe asthma)
- Has close contact with a person in the high risk population listed above

Do not test

Prescribe medication regardless of vaccine status: azithromycin, (alternatives: erythromycin, TMP-SMZ, clarithromycin)

Yes

No isolation necessary

No

Patient identified as close contact to pertussis case

Yes

Is vaccine status up to date? (vaccine recommendations below)

Yes

End

Vaccinate

No

Vaccine Recommendations: DTaP: Children should receive 5 doses of DTaP, one dose at each of the following ages: 2, 4, 6, 15-18 months, and 4-6 years of age. Tdap: Adolescents, 11 through 18 years of age (preferably at age 11-12 years) and Adults, 19 and older should receive a single dose of Tdap, especially if in close contact with infants. Expectant mothers should receive Tdap during each pregnancy, preferably at 27 through 36 weeks gestation.
Assess the patient to determine if they had close contact to a pertussis case AND they meet the new PEP recommendations.

If yes, antibiotic and vaccine recommendations are the same protocol as the symptomatic patient.

**Note:** there is no need to test, isolate, or complete the *Release to Return to School/Childcare* form.
**Additional Process Changes Made**

- Provided pertussis presentation to clinical nursing staff
- Expanded the group who receive health alerts (& include a copy of school/childcare letters)
- Clinic staff completed PPE competency
- Include respiratory precaution review in clinic daily huddle meetings
- OB clinic – offering Tdap vaccine to women in 3rd trimester
- Adolescent recall program improvements
Additional Process Changes Made

- Utilize our social media sites more often during an outbreak
- Share more frequent updates with Regional Epi to communicate outbreak activity with neighboring counties.
- Educate IDSS users to ensure the zip code look-up tool is used when creating a case = accurate county assignment
Did Our Efforts Work????
Clinic Nurse Survey

- PPE: 9.64 (Post-Survey), 6.91 (Pre-Survey)
- Close Contact: 9.64 (Post-Survey), 6.5 (Pre-Survey)
- Treatment: 9.55 (Post-Survey), 6.55 (Pre-Survey)
- Testing: 9.68 (Post-Survey), 6.36 (Pre-Survey)
- Vaccine: 9.82 (Post-Survey), 8.32 (Pre-Survey)
- Exclusion: 9.82 (Post-Survey), 6.0 (Pre-Survey)
- Symptoms: 9.41 (Post-Survey), 7.77 (Pre-Survey)

Not familiar
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Unsure

Very Familiar
Project Published on PHQIX

https://www.phqix.org/content/taking-whoop-out-pertussis-outbreak-improving-communitys-pertussis-mitigation-efforts
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