

Mumps Update

Communicable Disease Branch
Vaccine Preventable Disease Program
March 2016

Learning Objectives

1. Review mumps epidemiology and trends
2. Identify appropriate clinical specimens for mumps testing
3. Describe steps in mumps case investigation
4. List control measures for mumps
5. Review MMR vaccine indications

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CLINICAL FEATURES

Mumps-Pre Vaccine Era

Acute viral illness

Prodrome

- Myalgia, malaise, low-grade fever, anorexia, headache

Manifestations

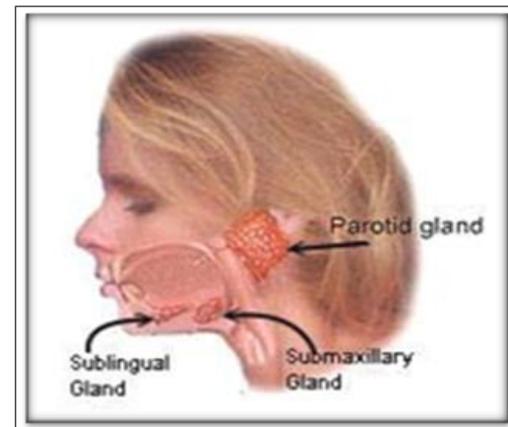
- Up to 20%: Asymptomatic
- 30-40%: Parotitis
- 40-50%: Non-specific, respiratory

Complications

- Aseptic meningitis (15% of adults)
- Symptomatic meningitis (up to 15%)
- Orchitis (up to 50% post pubertal males), oophoritis, mastitis
- 1 death per year (1980 – 1999)



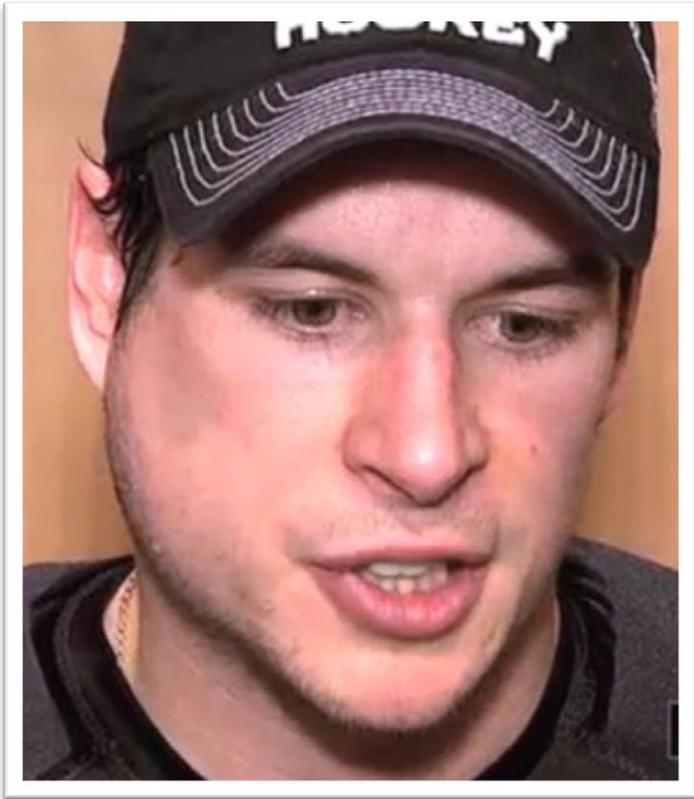
Photo: CDC Public Health Image Library



Clinical Presentation-Post Vaccine Era

- Complications less severe in vaccinated persons than unvaccinated persons
- Orchitis (postpubertal)- 3.3%-10%
- Mastitis (postpubertal)- <1%-1%
- Oophoritis- <1%-1%
- Pancreatitis, deafness, meningitis, encephalitis
-all <1%
- No mumps related deaths in recent outbreaks

NHL Mumps Outbreak 2014



- 18 players
- 2 referees
- 1 coach
- 1 sports reporter

Viruses Detected Among Sporadic Cases of Parotitis, United States, 2009–2011*

- 101 patients
- Median patient age: 19 years (range: 0.3 – 76 years)
- Number of patients from each jurisdiction
- AZ (6), CA (4), KS (13), MI (33), NC (15), PHL (10), TN (1), WA (19)

*Barskey et al. J Infect Dis, Sept. 19, 2013

Identified Causes of Parotitis

Virus	Number positive (n)	Percent positive (n/101)
Epstein-Barr virus (EBV)	23	23%
Human herpesvirus 6B (HHV-6B)	10	10%
Human parainfluenza virus 2 (HPIV-2)	3	3%
Human parainfluenza virus 3 (HPIV-3)	1	1%
Human bocavirus (HBoV)	1	1%
Mumps (MuV)	0	0%
Enteroviruses (EV)	0	0%
Human parechovirus (HPeV)	0	0%
Human herpesvirus 6A (HHV-6A)	0	0%
Human parainfluenza virus 1 (HPIV-1)	0	0%
Adenoviruses (AdV)	0	0%
Total	38	38%

*Barskey et al. J Infect Dis, Sept. 19, 2013

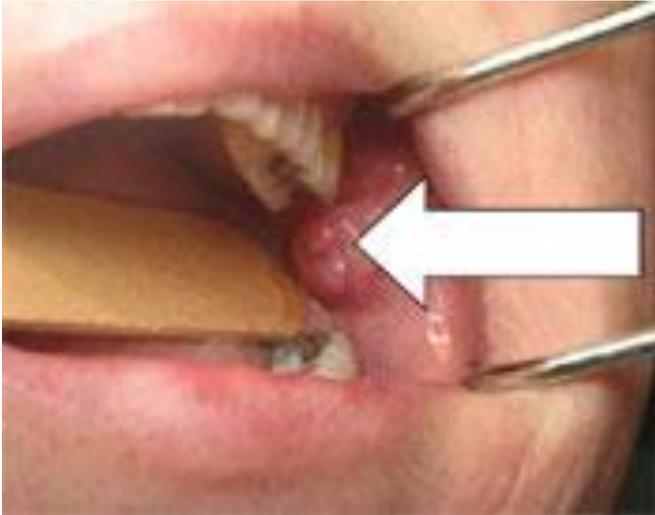
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LABORATORY TESTING

Mumps Lab Testing

Test	Specimen	Comments
PCR	Fluid-parotid duct swab, salivary gland, CSF, throat	SLPH: 1-3 days; Collect as soon as possible (within 3-8 days of parotitis/meningitis onset) Refer to SLPH Guide for details; Call Epi On Call for CD Branch approval
Mumps virus culture	Fluid-parotid duct swab, salivary gland, CSF, throat	SLPH: 3 weeks; Confirmed by IF, PCR Refer to SLPH Guide for details
IgM capture serology	Serology	Available at most commercial labs Unvaccinated: Collect after 3 days from onset Vaccinated: IgM response may be transient or absent
IgG serology	Acute/convalescent sera	SLPH: Paired sera- conversion from (-) to (+) Unvaccinated: rapid long lasting rise Vaccinated: elevated result in acute sera may prevent detection of 4 fold titer rise

Proper Collection Technique



Adapted from Illinois Dept. of Public Health – Div. of Laboratories (Chicago Virology Section)

Swab buccal cavity, which is the space near the upper rear molars between the cheek and the teeth.

- 1) Massage parotid area for 30 seconds.
- 2) Swab area between cheek and gum by sweeping the swab near the upper molar to lower molar area.

Lab Testing Do`s and Don`ts

- **Do** call CD Branch Epidemiologist On Call for testing approval (919-733-3419)
- **Do** write the name of approver on lab slip
- **Do** interpret serology results from commercial labs with caution
- **Don`t** rule out mumps based on negative lab results
- **Don`t** forget to review other tests for a more likely diagnosis

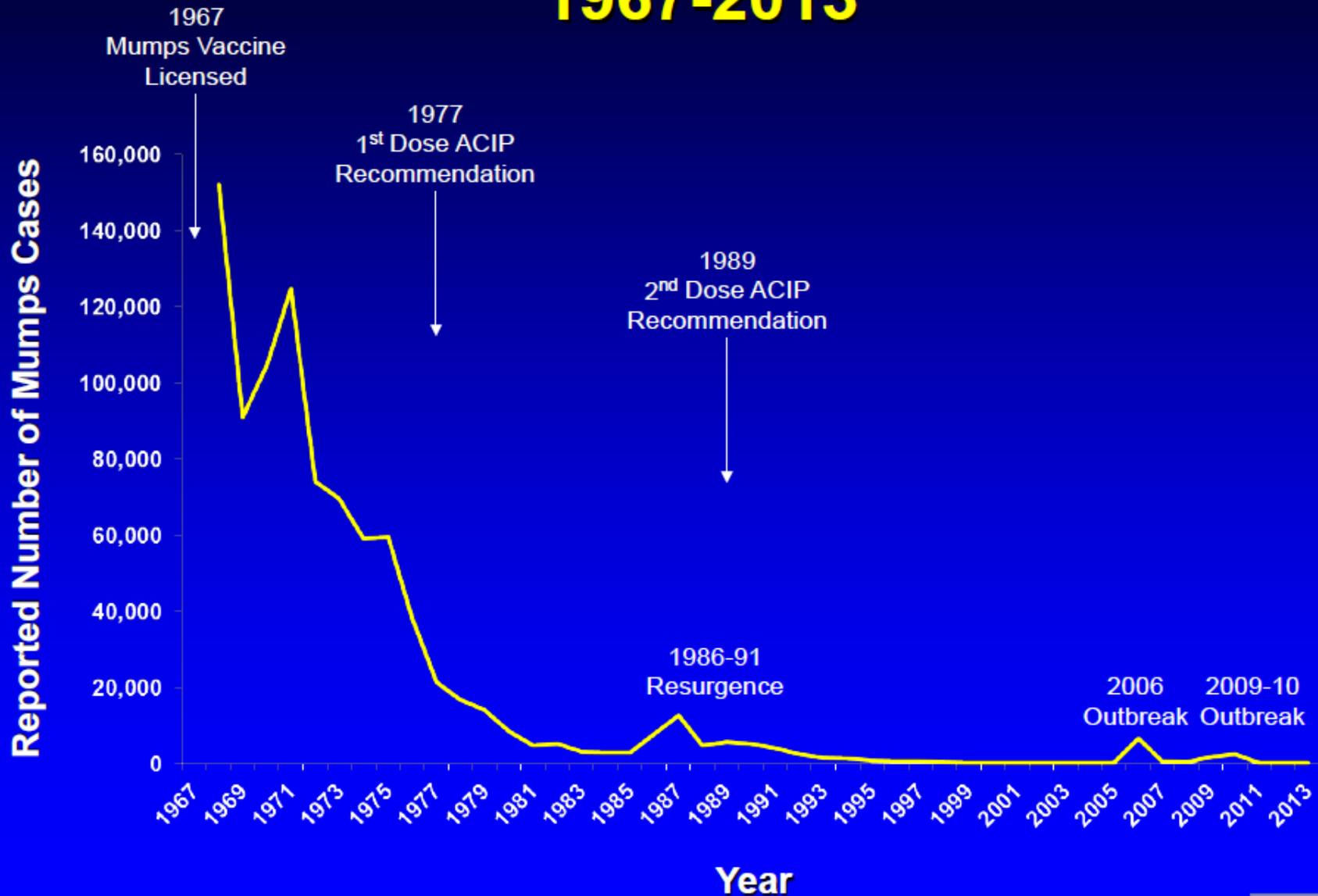
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EPIDEMIOLOGY

Mumps Epidemiology

- Reservoir human
 - asymptomatic infections may transmit
- Droplet transmission
 - direct contact with droplet nuclei or saliva
- Temporal pattern
 - peak in late winter and spring
- Communicability
 - several days before and after onset of parotitis

Mumps in the United States, 1967-2013



Key Message

- Mumps is increasing in the U.S. and N.C.
 - Outbreaks do occur in vaccinated populations
- People should check their vaccination status and contact physician if unimmunized or unsure

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CASE DEFINITIONS

Suspect Case-CSTE

- Parotitis, acute salivary gland swelling, orchitis, or oophoritis unexplained by another more likely diagnosis,

OR

- a positive lab result with no mumps clinical symptoms (with or without epidemiological linkage to a confirmed or probable case).

Suspect Case-Outbreak

- Parotitis, acute salivary gland swelling, orchitis, or oophoritis unexplained by another more likely diagnosis with onset on or after January 1, 2016 in a person who resided in or traveled to Iredell or surrounding counties during the 12–25 days before illness onset.

OR

- A positive lab result in a clinical specimen obtained on or after January 1, 2016 from a person with no mumps clinical symptoms who resided in or traveled to Iredell or surrounding counties during the 12–25 days before the specimen collection date.

Probable Case-CSTE

- Acute parotitis or other salivary gland swelling lasting at least 2 days, or orchitis or oophoritis unexplained by another more likely diagnosis, in: a person with a positive test for serum anti-mumps IgM antibody,

OR

- a person with epi linkage to another probable or confirmed case or linkage to a group/community defined by public health during an outbreak of mumps.

Probable Case-Outbreak

- Acute parotitis or other salivary gland swelling lasting at least 2 days, or orchitis or oophoritis unexplained by another more likely diagnosis in a person with who resided in or traveled to Iredell or surrounding counties during the 12–25 days before illness onset

AND

- A positive test for serum anti-mumps immunoglobulin M (IgM) antibody,

OR

- Epidemiologic linkage to another probable or confirmed case.

Confirmed Case-CSTE

A positive mumps laboratory confirmation for mumps virus with RT-PCR or culture in a patient with an acute illness characterized by any of the following:

- Acute parotitis or other salivary gland swelling, lasting at least 2 days
- Aseptic meningitis
- Encephalitis
- Hearing loss
- Orchitis
- Oophoritis
- Mastitis
- Pancreatitis

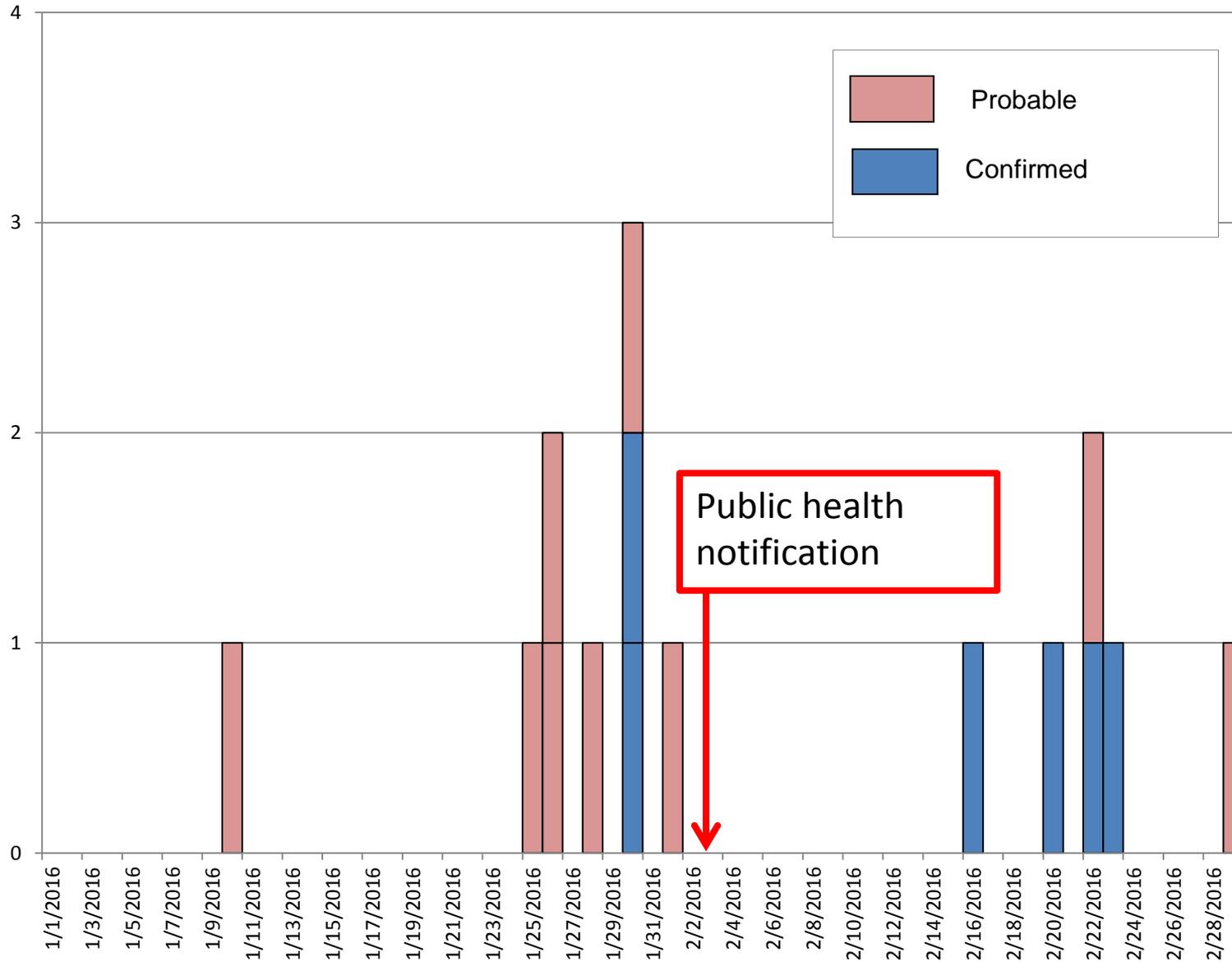
Confirmed Case-Outbreak

- Laboratory confirmation of mumps virus with reverse transcription polymerase chain reaction (RT-PCR) or culture from a clinical specimen obtained from a person who resided in or traveled to Iredell or surrounding counties or had an epidemiologic linkage to a probable or confirmed case during the 12–25 days before illness onset
- AND
- Acute illness characterized by any of the following:
 - Acute parotitis or other salivary gland swelling, lasting at least 2 days
 - Aseptic meningitis
 - Encephalitis
 - Hearing loss
 - Orchitis
 - Oophoritis
 - Mastitis
 - Pancreatitis

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IREDELL-MECKLENBURG OUTBREAK

Mumps Cases by Date of Parotitis Onset – Charlotte Region, 2016



Current 2016 Outbreak

- Mostly vaccinated population, although many lack documentation
- Age range- 21-50 years
- Settings of close prolonged contact
 - Corporate offices
 - Dental practice
 - University
 - Social settings
- No reported hospitalizations, complications

Mumps Outbreak Strategies

- Increase index of suspicion for mumps
- Document 2 doses in at-risk population or other evidence of immunity
- Provider education
- Community education
 - Consistent vaccination message
 - Social distancing
 - Respiratory etiquette, hand hygiene
 - Call ahead before presenting for healthcare
- Ongoing surveillance (50 days from last onset)

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MANAGEMENT OF CASES AND CONTACTS

VPD Case Investigations- Suspected Cases: Questions to Ask Yourself

Immune status

- What is the vaccine effectiveness?
- Does immunity wane?
- Do we expect a non-classic or modified clinical presentation?
- Lab results interpretation?
- Can they be used to rule in/out disease?

Suspected Cases: Questions to Ask

Clinical

- Signs & Symptoms?
 - Order of appearance
 - Type
 - Duration
- Testing performed?
 - Type
 - Results
- More likely *clinical* explanation for illness?

✓ *Has the case definition been met?*

Epidemiological

Immune status?

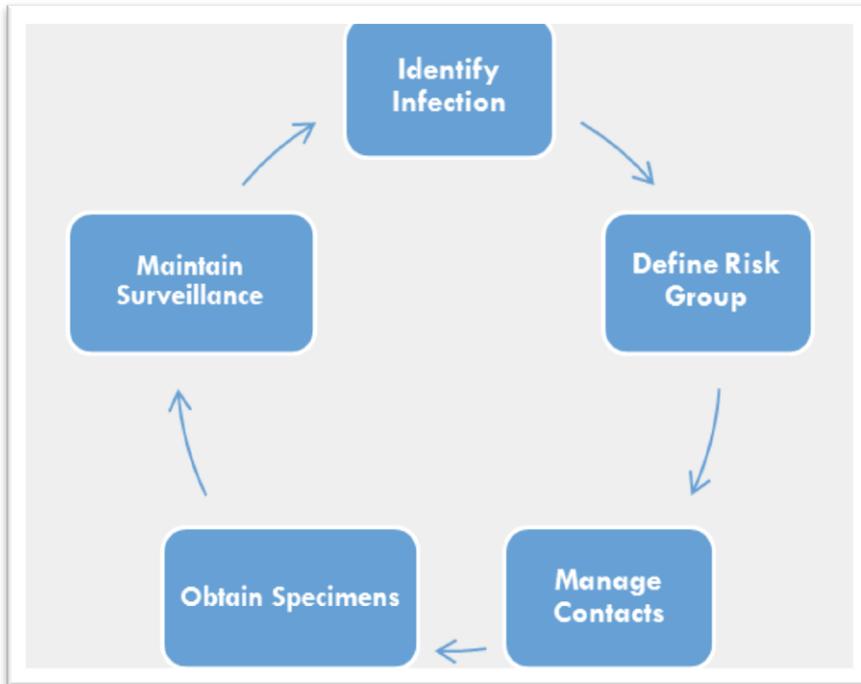
- Recent travel?
- Contact with traveler?
- Contacts with similar symptoms?
- More likely *epidemiological* explanation for illness?

- ✓ *Vaccine History*
- ✓ *Birth Year*
- ✓ *Serological Testing for Immunity*
- ✓ *Previous History of Disease*

Mumps Immunity

- Birth before 1957
- Serologic evidence of mumps immunity
- Laboratory confirmation of disease
- Documentation of adequate vaccination

Investigation Steps



- Collect information about each case and arrange (call ahead) for medical evaluation and testing when necessary
- Attempt to identify source of exposure
- Identify people who have been in close contact with mumps cases
- Offer MMR vaccine to those born after 1957 who are unvaccinated or unsure of their vaccination status
- Ensure that patients with mumps stay home from work or school and avoid contact with others until 5 days after the onset of parotitis/swelling

Mumps Control Measures

Control Measure	Indication
MMR Vaccine	Not indicated for PEP Vaccinate those without evidence of immunity
Immune globulin (IG)	Not indicated for PEP
Isolation	Case-patient: isolate/exclude for 5 days after parotitis onset Healthcare setting: use droplet and standard precautions
Quarantine	Exposed non-immune contacts- <i>Healthcare setting:</i> exclude from 12 th day after 1 st unprotected exposure through 25 th day after last exposure <i>School setting:</i> call CD Branch; exclude until 26 th day after onset in last case; may be impractical in community outbreak setting

Key Message

- Public health mumps response goals are to
 - reduce transmission
 - prevent serious complications in susceptible individuals

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MMR VACCINE

Mumps Vaccine

- Composition-live virus (Jeryl Lynn strain)
- Effectiveness- 88% (Range, 66%-95%) - 2 doses
- Duration of immunity-lifelong

MMR Indications

- One dose (as MMR) for preschool-age children 12 months of age and older and persons born during or after 1957 not at high risk of mumps exposure
- Second dose (as MMR) for school-age children and adults at high risk of mumps exposure (i.e., healthcare personnel, international travelers and students at post-high school educational institutions)

MMR Vaccine Contraindications and Precautions

- History of anaphylactic reactions to neomycin
- History of severe allergic reaction to any component of the vaccine
- Pregnancy
- Immunosuppression
- Moderate or severe acute illness
- Recent blood product

Key Messages

- If you can't find a shot date, vaccinate
- No vaccine is 100% effective
- Vaccination is still the best tool for prevention



Summary

- Mumps is increasing in the U.S. and N.C.
- Outbreaks happen even in vaccinated populations
- Vaccination is still the best tool for prevention
- Public health mumps response goals are to
 - reduce transmission
 - prevent serious complications in susceptible individuals