

Mumps Isolation Precautions An Update

Jane Seward MBBS, MPH

Preeta K. Kutty MD, MPH

Division of Viral Disease

**National Center for Immunizations and Respiratory
Diseases**



HICPAC meeting, February 11, 2008





Objective

- **Update HICPAC on scientific, program and policy issues of relevance to mumps isolation and precautions**
- **Inform on changes in mumps isolation guidelines from AAP and CDC**
- **Discuss proposed changes in guidelines for isolation and precautions in healthcare settings**

Overview

- Mumps etiology, clinical features, epidemiology and prevention
- Previous and current guidelines for isolation and precautions
- Mumps in healthcare settings
- Virus isolation/shedding in saliva specimens
- Prevention of transmission
- Conclusions and Recommendations

Mumps

- Transmission
 - Respiratory droplets, saliva
- Considerably less infectious than measles, varicella, pertussis*
 - Household SAR < 15 years: 31% (61% varicella, 72% measles)
- Infective period
 - Maximal infectiousness: 2-3 days before to 2-3 days after symptom onset
 - Virus isolation in saliva from 7 days before to 8 days after illness onset (parotitis)

**Hope-Simpson RE. Lancet, 1952, 549-54*

Mumps in Pre-Vaccine Era

- Acute, self-limited illness: approximately 4 days
- Incubation period: 16-18 (range: 12-25) days
- Asymptomatic 20-30%: more common among children
- Clinical presentation
 - Parotitis (60-70%) or other salivary gland swelling
 - Orchitis, aseptic meningitis w/o parotitis
 - Nonspecific or respiratory symptoms



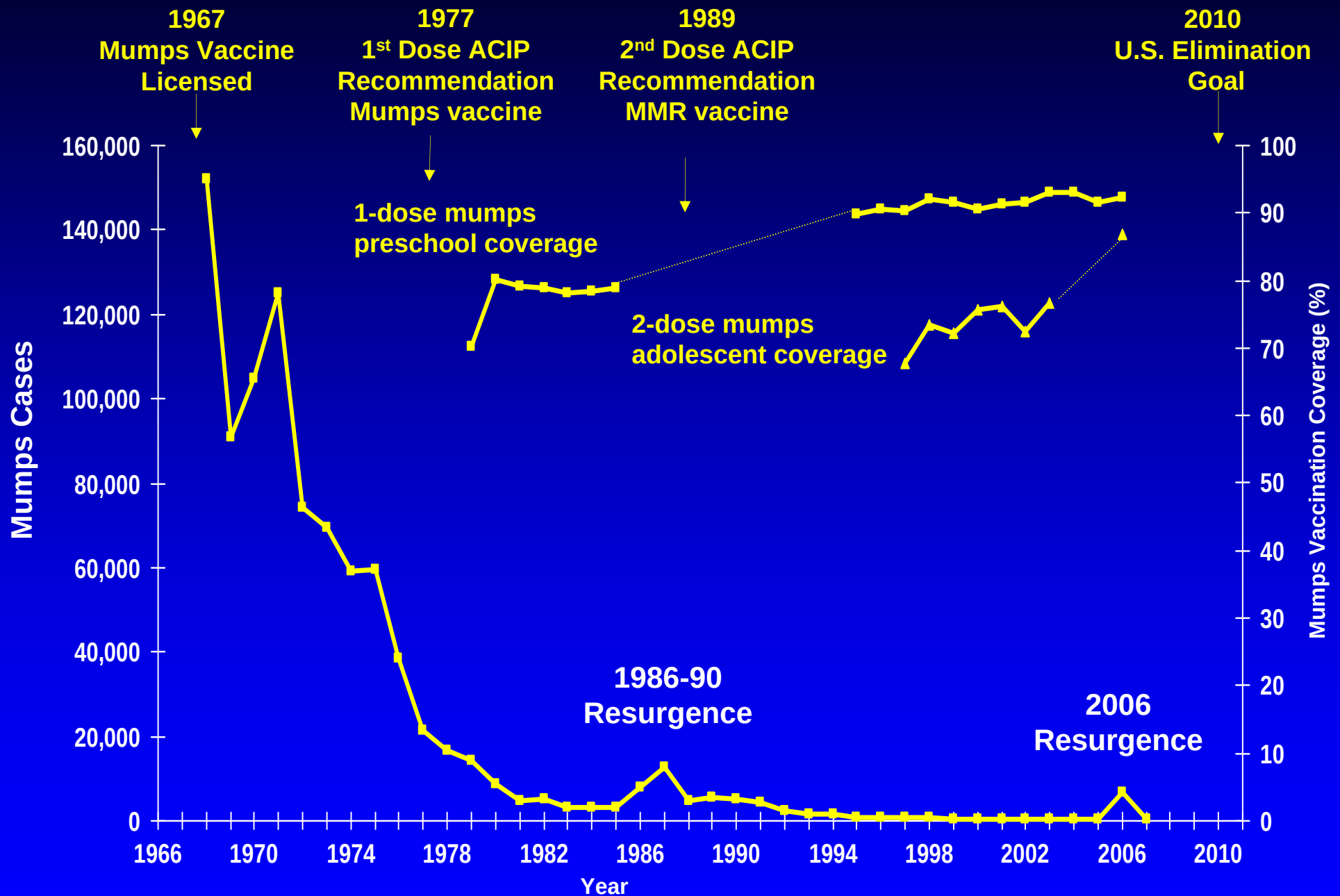
Mumps in Pre-Vaccine Era (cont.)

- Morbidity: Complications include deafness , aseptic meningitis, orchitis, mastitis
- Hospitalization: Uncommon, short duration
- Mortality: Extremely rare (encephalitis)
- Treatment: Supportive

Mumps Prevention and Control

- Live, attenuated mumps virus vaccine
 - One dose: children 1 – 4 years and low risk adults
 - Since 2006, two doses: children 4-6 years and older and high risk persons:
 - Health care personnel (HCP)
 - International travelers
 - Students in post high school educational facilities

Mumps – United States, 1968 – 2007*



*Provisional data through July 2007

Mumps Resurgence 2006

- 6584 mumps cases
- Highest incidence: 18-24 year olds
- Some states (e.g. Iowa) used 5 days for isolation guidance in community settings
- Some cases reported in HCPs
 - No serious problems in health care settings identified
 - Many queries regarding isolation, precautions, exclusion and vaccination
 - Vaccine coverage HCPs with one MMR dose likely sub-optimal

Previous and Current Guidelines for Isolation and Precautions for Mumps

	Previous	Current
Case isolation/exclusion community	9 days	5 days CDC and AAP
Case isolation health care setting	9 days	9 days
HCP work exclusion ambulatory care	9 days	5 days*
HCP work exclusion in patient care	9 days	9 days
Droplet precautions	9 days	9 days

AAP Red Book 2006, 27th Edition

<http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/InfectControl98.pdf>

<http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/Isolation2007.pdf>

***AAP policy statement, Pediatrics 2007 120: 650-665**

www.cdc.gov/pub/Publications/mmwr/rr/rr4618.pdf

Mumps in Healthcare Settings

Mumps: Healthcare settings

- Not described as a problem disease with respect to healthcare infections
 - HCPs: transmission rarely described even in the past when vaccine coverage in HCPs was low
 - Patients: not described as a more severe disease in immunocompromised populations including children with acute lymphoblastic leukemia
 - Health care settings: no reports in the published literature of outbreaks in ICUs, PICUs, HRNs, transplant centers, burn units, LTCFs, ambulatory care facilities

Mumps Outbreaks TN Hospital Survey*

- Tennessee, 1986-87, community-wide mumps outbreak
- Survey: Infection Control Practitioners in the state (154 hospitals)
 - 146 (95%) hospitals responded
- Low immunization rates:
 - immunization of susceptible employees with mumps vaccine: 11 (76%) of the hospitals replied 'No'

Mumps Outbreaks TN Hospital Survey (contd.)

- 11 (7.5%) hospitals were affected: 15 HCPs developed mumps without a known hospital exposure
 - most were household contact
 - no transmission in hospital setting
- 6 HCPs in three different hospitals developed mumps following exposure to patients
- Two institutions (long-term-care): 9 adolescents patients contracted mumps while hospitalized; had substantial contact with a community

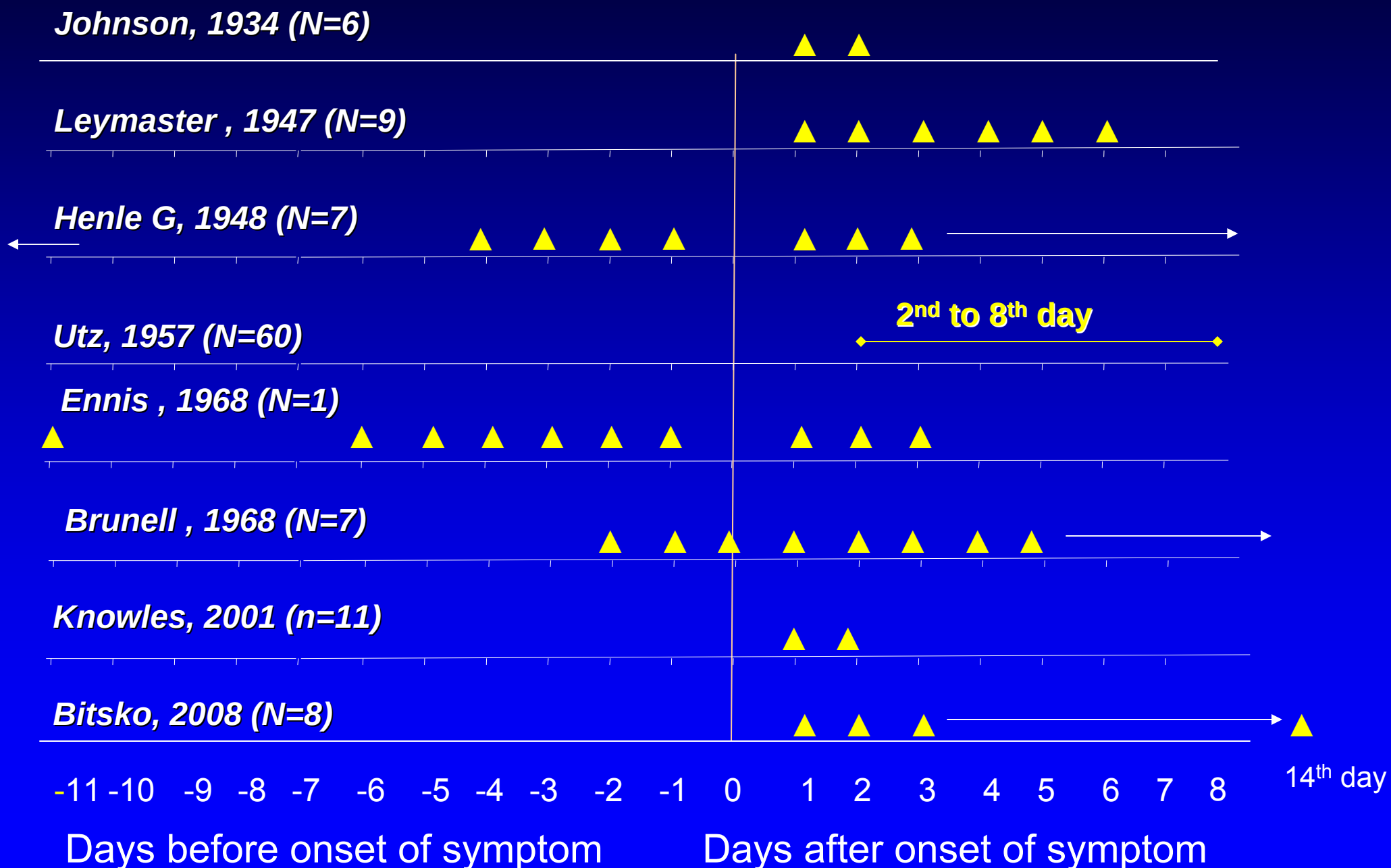
Virus Isolation/Shedding in Saliva specimens

Transmission of Mumps

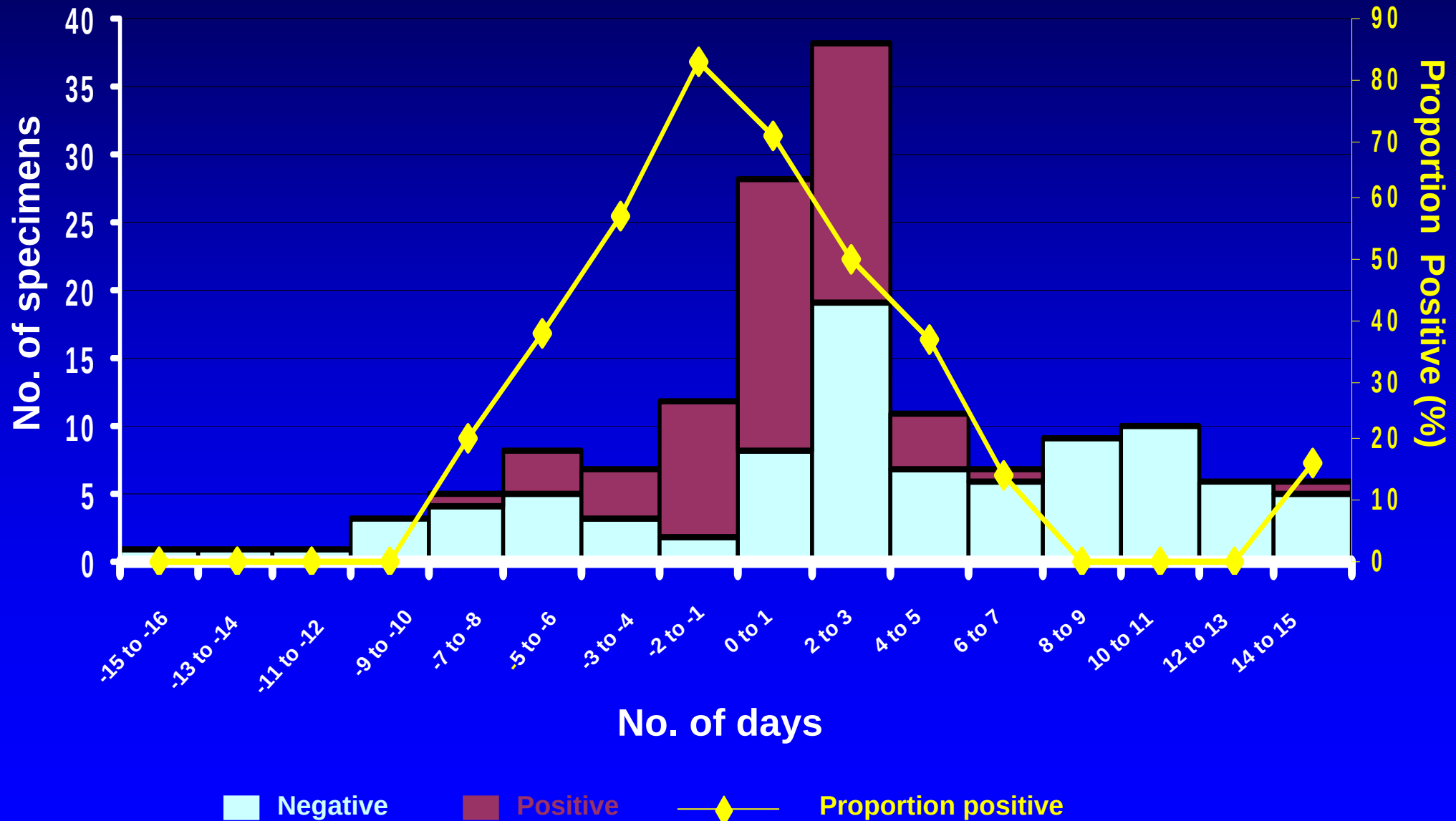
- Paucity of data on transmission
- Transmission may occur from asymptomatic*
 - Prodromal phase of illness
 - Subclinical infections
- Virus in saliva or respiratory secretions relevant to transmission
- Viral isolation and viral load considered to correlate with transmission risk

* Brunell P et al. *NEJM* 1968; 279: 1357-61; Henle G et al. *J Exper Med* 1948;88:223-232

Isolation of Mumps Virus from *Saliva* specimens

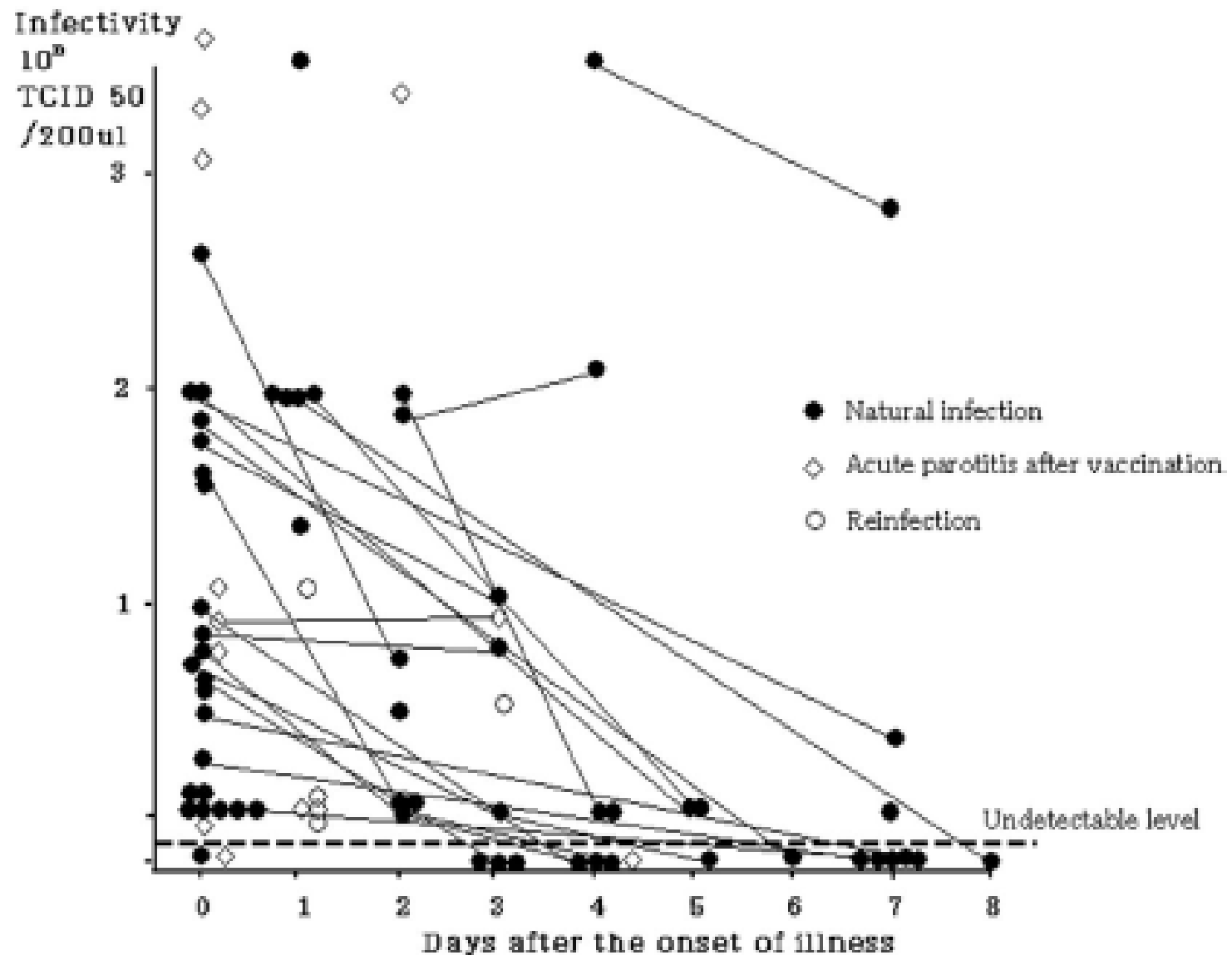


Detection of Mumps Virus from *Saliva* specimens



Viral Load

Okafuji T et al 2005: J Clin Microbiol



Prevention of Mumps Transmission in Health Care Settings

- Isolation/exclusion of cases
 - Patient: isolation
 - HCP: work restriction
- Post-exposure exclusion HCPs
- Isolation precautions

<http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/Isolation2007.pdf>

- Standard:
 - Apply to care of all patients in all health care settings for duration of stay
 - Includes respiratory hygiene and cough etiquette
- <http://www.cdc.gov/flu/professionals/infectioncontrol/resphgiene.htm>
- Transmission-based: droplet precautions

- **Vaccination** www.cdc.gov/pub/Publications/mmwr/rr/rr4618.pdf
 - Pre-exposure – HCPs should have evidence of immunity to care for a case

Community Settings

Challenges with Implementation of Isolation

- Kansas*
 - 183 students with suspected mumps
 - 132 requested to stay isolated
 - Significant (multivariable analysis):
 - Students isolated for 1-4 days were 3 times more compliant than those isolated for 5-9 days
 - 65% fully complied for 9 days
 - 98% fully compliant for at least 4 days

* Soud F et al , 2008 (In press)

Healthcare Settings

Ineffectiveness of Patient Isolation

- **Brunell P et al, 1968 ¹**
 - Contagious before onset of parotid swelling
 - 15 children exposed
 - All were infected despite all cases being isolated
- **Fischer et al, 1996 ²**
 - Isolation of patients was not very effective means of preventing subsequent cases
 - Secondary cases infected before diagnosis of index case
 - Asymptomatic patients
 - Best preventive strategy: vaccination of HCPs

Prevention of Mumps Transmission in Health Care Settings

- HCP mumps case
 - Exclude from duty for 9 days after onset of parotitis
- HCP exposed to mumps case
 - Exclude from duty 12 – 26th day following exposure
- HCP caring for mumps case
 - Standard precautions: respiratory hygiene and cough etiquette
 - Droplet precautions: 9 days
 - HCPs without evidence of immunity should not provide care if immune caregivers are available

● <http://www.cdc.gov/flu/professionals/infectioncontrol/resphygiene.htm>

<http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/Isolation2007.pdf>

<http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/InfectControl98.pdf>

Vaccination

- Pre-exposure vaccination is the **optimal method** for prevention of exposure and transmission of mumps virus

Advisory Committee on Immunization Practices (ACIP) policy for HCPs, 2006*

Routine

- All persons who work in health-care facilities should be immune to mumps
- Adequate mumps vaccination for health-care personnel born during or after 1957 consists of **2 doses of a live mumps virus vaccine**

Mumps Outbreak Control

- An effective routine MMR vaccination program for health-care personnel is the best approach to prevent nosocomial transmission
- Should strongly consider recommending **2 doses of a live mumps virus vaccine** to unvaccinated workers born before 1957 who do not have evidence of mumps immunity

* <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5522a4.htm>

Conclusions and Recommendations

Conclusions and Rationale for Proposed Change in Isolation and Precaution Guidelines

- Not a particularly severe disease even in immunocompromised patients
- Low contagiousness with maximum viral shedding before symptom onset
- Not described as a nosocomial disease problem
- Isolation has not been an effective tool for preventing transmission in hospital settings
- Low risk of transmission after 5 days
 - UK*: isolation and precautions for 5 days – no documented problem with healthcare associated mumps infections

de Boer, A W. de Vaan, G A. Eur J Pediatr, 1989; 148(7):618-9

*http://www.hpa.org.uk/infections/topics_az/mumps/mumps_faq.htm

Proposed Changes in Guidelines for Isolation and Precautions

	Previous	Current	Proposed
Case isolation/exclusion community	9 days	5 days CDC and AAP	5 days CDC and AAP
Case isolation health care setting	9 days	9 days	5 days
HCP work exclusion ambulatory care	9 days	5 days*	5 days*
HCP work exclusion in patient care	9 days	9 days	5 days
Droplet precautions	9 days	9 days	5 days

Rationale for Proposed Changes in Isolation and Precautions Guidelines from 9 to 5 days

- **Anticipated difficulty of having different isolation guidelines for community and health care inpatient and outpatient settings**
- **State epidemiologists and health departments have expressed concern about different standards for these different settings**
- **A common isolation guideline would be preferable and less confusing to implement**