2014-2015 CA Measles Outbreak; Lessons Learned from Los Angeles County

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Presentation Objectives

Use the 2015 California Measles Outbreak to:

• Briefly Discuss Measles Disease
• Describe criteria for identifying a vaccine-preventable disease (VPD) outbreak
• Discuss outbreak control measures including case and contact investigation, quarantine and isolation, and post-exposure prophylaxes
• Discuss the role of public health messaging in containing outbreaks
• Share lessons-learned and promising Public Health approaches
## Reportable Vaccine-Preventable Diseases

Los Angeles County

<table>
<thead>
<tr>
<th>Disease</th>
<th>Disease</th>
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<tbody>
<tr>
<td>Diphtheria*</td>
<td>Poliovirus Infections*</td>
</tr>
<tr>
<td>Hib (invasive)*</td>
<td>Rabies</td>
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<tr>
<td>Hepatitis A</td>
<td>Rubella*</td>
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<tr>
<td>Influenza (deaths)</td>
<td>Congenital Rubella Syndrome*</td>
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<tr>
<td><strong>Measles</strong>*</td>
<td>Smallpox</td>
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<tr>
<td>Meningococcal Infection</td>
<td>Pneumococcus (invasive)</td>
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<tr>
<td>Mumps*</td>
<td>Tetanus*</td>
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<tr>
<td>Pertussis*</td>
<td>Varicella (Fatal, Hospitalizations)*</td>
</tr>
<tr>
<td>Perinatal Hepatitis B*</td>
<td>Yellow Fever</td>
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</tbody>
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* Reportable to the Immunization Program
Measles Overview

• Highly contagious viral illness
  – Spreads easily through the air through coughs and sneezes
  – Can stay in the air and live on surfaces for hours (2)
  – 90% chance of becoming infected if not vaccinated

• Near universal infection in childhood in pre-vaccination era (before 1957)

• Common and often fatal in developing countries
Measles Overview cont.

• 1963 - U.S. measles vaccination program started
  • Prior to vaccination era, ~ 3-4 million measles cases a year in the U.S
  • 400-500 deaths
  • 48,000 hospitalized
  • 4,000 suffered encephalitis (brain swelling) due to measles.

• Widespread use of measles vaccine has led to a greater than 99% reduction in measles cases in the United States compared with the pre-vaccine era

• As a result of a successful vaccination program, endemic circulation was eliminated from the Americas in 2000 (elimination is defined as the interruption of continuous measles transmission lasting more than 12 months).
Measles Symptoms and Complications

Symptoms
• High Fever (over 101°)
• Cough
• Red watery eyes
• Rash that starts on the face and spreads to the rest of the body

Complications
• Ear infections
• Diarrhea
• Pneumonia
• Encephalitis
• Death

Treatment
• Management of symptoms and complications
Measles Vaccinations

Two doses of the measles-mumps-rubella (MMR) vaccine is the best way to prevent measles

**Children**
- First dose: At 12-15 months
- Second dose:
  - As early as 28 days after first dose
  - Usually between 4-6 years old

**Teens and Adults Born After 1956**
- If no history of measles or previous receipt of 2 vaccine doses
Is the MMR vaccine effective?

Not immunized

1 dose

2 doses

90 out of 100 people get sick

2 out of 100 people get sick

1 out of 100 people get sick
IF VACCINATED = 99% REDUCTION IN DISEASE...

WHY ALL THE CASES?

Visitors to the US and Unvaccinated US Travelers returning from other countries can unknowingly bring (import) measles into the US.
Other Contributing Factors...

• **Growing trend of Personal Beliefs Exemption to Vaccination**
  (most of LAC hovers around 2% PBE but there are some pockets in LAC where PBEs are as high as 10%)

• **MMR vaccine** has one of the lowest vaccination coverage rates of all recommended (and required for school) childhood IZs

• **Storage and Handling** of MMR Vaccine may contribute to ineffective vaccine being administered
Risk for Spread of Vaccine-Preventable Diseases

- **Record Number of Measles Cases in the U.S. in 2014**
  - Highest number of cases since measles elimination was documented in the U.S.
  - Majority of cases were unvaccinated, primarily due to beliefs that are contrary to vaccination

- **Followed by multistate outbreak linked to Disney theme parks in 2015**
Measles Spread

2015 Measles Cases in the U.S.
January 1 to March 27, 2015

- 178 cases reported in 17 states and D.C.
- 74% are linked to the Disney outbreak

Source: Centers for Disease Control and Prevention: http://www.cdc.gov/measles/cases-outbreaks.html
2015 Measles Outbreak

On January 7, 2015, the California Department of Public Health released a Health Advisory announcing the outbreak

- Measles had been confirmed in 7 California and 2 Utah residents
- All cases had visited Disneyland or California Adventure between December 17 and 20, 2014
- Additional residents who visited Disneyland during this period were being tested for measles

Providers encouraged to suspect measles when evaluating patients of any age with a fever and rash
Disneyland measles outbreak linked to low vaccine rate

Measles outbreak: How bad is it?

By Mariano Castillo, CNN

Updated 10:14 PM ET, Mon February 2, 2015

Measles outbreak spreads to three more states and Washington DC; 121 people now affected
Confirmed Measles Cases (LA County)

- Exposed at Disney: 12
- Spread Cases (2\textsuperscript{nd} & 3\textsuperscript{rd}): 10
- Spread Cases Unknown: 6

Total: 28
Key Characteristics

Male: 14  
Female: 14

Key Stats
- 14% of cases were hospitalized
- 11% of cases were healthcare personnel
- 54% of cases were *unvaccinated
- Mean age 22 yrs.

Reports Received Since January 1, 2015: **470**
Total Contacts Identified: **3,374**

1.*Unvaccinated as per PBE (8) Age less than 12 months (5) Other Reason (2) -- All others had either self reported or documented 1 or more vaccination (only 2 cases had documentation of 2 MMR vaccinations)
LAC DPH Role in the 2014-2015 CA Measles Outbreak
Controlling the Outbreak in LAC

• **Intensive & Timely Case Investigation**
  – Coordination with Community Health Services to confirm cases and identify contacts
  – Voluntary quarantine
  – Vaccination and prophylaxis

• **Awareness and Outreach**
  – Health Updates
  – Grand Rounds, Clinician Webinar, and Phone Consults
  – New webpage and educational materials
  – School outreach
  – Media Outreach
  – Speakers’ Bureau
10 Steps of an Outbreak Investigation

1. Identify investigation team and resources
2. Establish existence of an outbreak
3. Verify the diagnosis
4. Construct case definition
5. Find cases systematically and develop line listing
6. Perform descriptive epidemiology/develop hypotheses
7. Evaluate hypotheses/perform additional studies as necessary
8. Implement control measures
9. Communicate findings
10. Maintain surveillance
After 3 weeks of the LAC DPH Immunization Program conducting all aspects of the Measles Outbreak Investigation, the Health Officer made the decision to activate the Incident Command Structure (ICS)
Epi Curve for 2015 Measles Outbreak – Los Angeles County

Day of rash onset from earliest Disneyland exposure date (Day 0 - 12/17/2014)

*Primary cases include 6 cases with an unknown source of exposure
HEALTH Alerts, Advisories and Updates (LA HAN)

**Alert**: Conveys the highest level of importance; warrants immediate action or attention.

**Advisory**: Provides important information for specific incident or situation; may not require immediate action.

**Update**: Provides updated information regarding an incident or situation; unlikely to require immediate action.
Number of Days between Rash Onset and Report to LA County DPH

Mean # of Days to report: 6.2

Case Number, by Report Date
Outbreak Investigation Resources/Partners

- **Local Health Department** (LAC DPH)
  - Immunization Program - Epi team/Nurses/Ops/Health Ed
  - Community Health Services
  - Health Education Administration
  - EPRP etc.

- **State** (Very Close Collaboration)
  - IZ/CD Branch epidemiologists / subject matter experts – Nurse Consultants – Disease Investigation Specialists (DIS)

- **Other** – Epi-Aid – CDC
Outreach to Stakeholders

- Schools/School Superintendents – DPH Health Officer held an **Informational Briefing teleconference for LAC School Superintendents and School staff** (nearly 200 attendees)

- LAC DPH Coordinated a **Measles Webinar** (co-lead by IP Medical Director and UCLA ID Specialist) for Healthcare Providers – Over 500 attendees, several out of state and out of jurisdiction
Identifying Contacts &
Determining Immunity Status of Contacts

Acceptable evidence of immunity against measles includes at least one of the following:

- written documentation of past vaccination:
  - with one or more doses of measles-containing vaccine administered on or after the first birthday for adults not at high risk
  - with two doses of measles-containing vaccine for adults at high risk, including college students in post-high school institutions, healthcare personnel, and international travelers
- blood tests that show they are immune to measles, mumps, and rubella
- laboratory confirmation that they had measles, mumps, and rubella
- birth before 1957 (presumed immune by age)
Measles Contacts Identified in LAC

• Total Contacts: **3,374***
  - of which 472 deemed non-susceptible (64% had 2 documented doses of MMR Vaccine, 18% IgG positive, 5% born before 1957, and 13% Other)

• Hospital/Clinic: **2219** (66%)***

• Non-Hospital/Non-Clinic: **1155** (34%)***

*As of June 23, 2015 based on 28 cases and includes 1,753 LAC contacts exposed to Out of Jurisdiction cases.
**As of June 23, 2015 includes 1,344 LAC contacts exposed to Out of Jurisdiction cases
*** As of June 23, 2015 includes 409 LAC contacts exposed to Out of Jurisdiction cases.
Treatments/Actions for Susceptible Contact

A Susceptible contact is someone who has been exposed and does not have measles immunity

• **Immunoglobulin G (IgG)** – donor plasma that provides immediate short term protection against measles - ideally should be given within 72 hours but can be given within 6 days.

• **Measles containing vaccination** (MMR or MMRV)

May also necessitate:

• **Isolation** (voluntary limited contact)

• **Quarantine** (legal order)
Susceptible Contacts (*Non-Hospital/Non-Clinic*+)

RISK GROUPS POST-EXPOSURE PROPHYLAXIS MONITORING

- Ineligible: **615** (90.0%)
- Pregnant: **3** (5.4%)
- Passive: **573** (83.9%)
- Unknown: **88** (12.9%)
- Health Care Worker (HCW): **14** (25.0%)
- IG: **9** (69.2%)
- Non-HCW in Regular Contact with Infant(s): **37** (66.1%)
- Non-HCW in Regular Contact with Immuno-compromised: **1** (1.8%)
- Non-HCW with Unknown Contact with Risk Groups: **1** (1.8%)
How do we become aware of suspect (or confirmed) cases?
Visual Confidentiality Morbidity Report (vCMR)

WebvCMR is an electronic reporting system for communicable diseases.

• It's main purpose is to make disease reporting, investigation, and tracking more efficient for Disease Control Programs in Los Angeles County.

• **Direct phone calls from HC Providers** (we often facilitate specimen collection)

• **Positive specimen (lab) reports**
  – ALL Labs are sent to the State IZ Branch
Notification of Exposure Sites

- Restaurants
- Healthcare settings
- Worksites
- Public Transportation
- Schools or Childcare Centers
- Public Venues (e.g. gym, hotel, indoor sporting events)
- Airlines* - Require special circumstances
Lessons Learned and Promising PH Approaches

• Lessons Learned:
  
  – Perhaps go into ICS earlier
  – Have staff at the ready for quick onboarding for purposes of ramping up surveillance and contact investigation activities
  – Have translators readily available for contact investigation
  – Data “needs” established and vetted prior to outbreak
Promising PH Approaches:

– Excellent Collaboration with the State Branch and neighboring counties
– Effective implementation of ICS (and intra-departmental coordination)
– Communication with Media facilitated/managed by proactively producing Fact Sheets/FAQs and updating website with pertinent materials etc.
– Distribution of Provider Fact Sheets and Health Alerts
– Use of a comprehensive Daily Dashboard containing all relevant information (e.g. case and contact counts, epi curve, exposure sites)
– Highly Effective interfacing with Schools, Healthcare Providers, Hospitals and Urgent Care Centers
– Highly Effective collaboration with neighboring Counties
– Effective Collaborations with Public Exposure Sites
Thank you!

Thank you for this opportunity to talk about the Measles outbreak today!

I would like to acknowledge my talented and dedicated colleagues at LA County DPH and particularly my incredible staff at the Immunization Program.

I would also like to thank our IZ colleagues throughout CA, and up at the State IZ Branch for your outstanding collaboration on this effort!
Questions
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