Measles Community Response: Preparing Your Office and Hospital

A multidisciplinary panel of experts from:

Seattle Children's
HOSPITAL • RESEARCH • FOUNDATION

Public Health
Seattle & King County

Allegro
PEDIATRICS

NORTHWEST HEALTHCARE
Response Network

Today's Speakers

Seattle Children's

- **Danielle Zerr, MD**, **MPH** Division Head, Infectious Diseases; Medical Director Infection Prevention
- **Thérèse "Tee" Mirisola, MSN, RN, CIC**, Director, Infection Prevention
- **Adrienne D'Alo, PMP**, Special Pathogens Program Manager
- **Brianna Enriquez, MD**, Medical Director, Emergency Management

Allegro Pediatrics

- **Amy Carter, MD, FAAP**, Chief Medical Officer

Public Health – Seattle & King County

- **Eileen Benoliel, RN, BSN**, Vaccine Preventable Disease Program Manager
- **Libby Page, MPH**, Immunization Program Manager

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Additional Panelists

Seattle Children's

- **Caitlin McGrath, MD, MS**, Associate Medical Director, Infection Prevention
- **Yasaman Fatemi, MD, MSHP**, Associate Medical Director, Infection Prevention

Northwest Healthcare Response Network

- **Vicki Sakata, MD, FAAEM, FAAP**, Senior Medical Advisor

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Seattle Children's Infection Prevention Perspective

Danielle Zerr, MD, MPH Division Head, Infectious Diseases; Medical Director, Infection Prevention
Thérèse "Tee" Mirisola, MSN, RN, CIC, Director, Infection Prevention
Adrienne D'Alo, PMP, Special Pathogens Program Manager

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Case

- **Jan-Feb 2025**: Infant travels internationally to a country with endemic measles
- **Feb. 25 2025:**
  - Presents to Children's (SCH) with signs and symptoms of measles
  - Testing obtained and ultimately positive for measles
- SCH and PH identified multiple exposure points – most during period with nonspecific symptoms

Date	Time	Location
2/20/25	6:00 pm- 9:00 pm	Apple Store at Bellevue Square 213 Bellevue Square, Bellevue, WA 98004
2/21/25 – 2/22/25	10:30 pm – 2:15 am	Seattle Children's Hospital Emergency Department 4800 Sand Point Way NE, Seattle, WA 98105
2/24/25	1:00 pm – 4:15 pm	Allegro Pediatrics – Bothell 11724 NE 195th St, Ste 100, Bothell, WA 98011
2/25/25	1:00 pm – 4:00 pm	Northwest Asthma & Allergy Center 8301 161st Ave NE, Ste 308, Redmond, WA 98052
2/25/25	2:30 pm – 5:30 pm	Seattle Children's Hospital Emergency Department 4800 Sand Point Way NE, Seattle, WA 98105

- Hundreds exposed. To date: 5 symptomatic children tested with negative results

Key Features of Measles Epidemiology

- Highly transmissible: R0 12–18
- Incubation period:
  - Avg. 11-12 days from exposure to onset of prodromal symptoms
  - Avg. 14 days (range 7-21) exposure to rash
- Contagion period
  - 4 days prior to rash through 4th day of rash
- Symptoms:
  - Non-specific prodrome: fever, conjunctivitis, coryza, cough (3C's)
  - Rash




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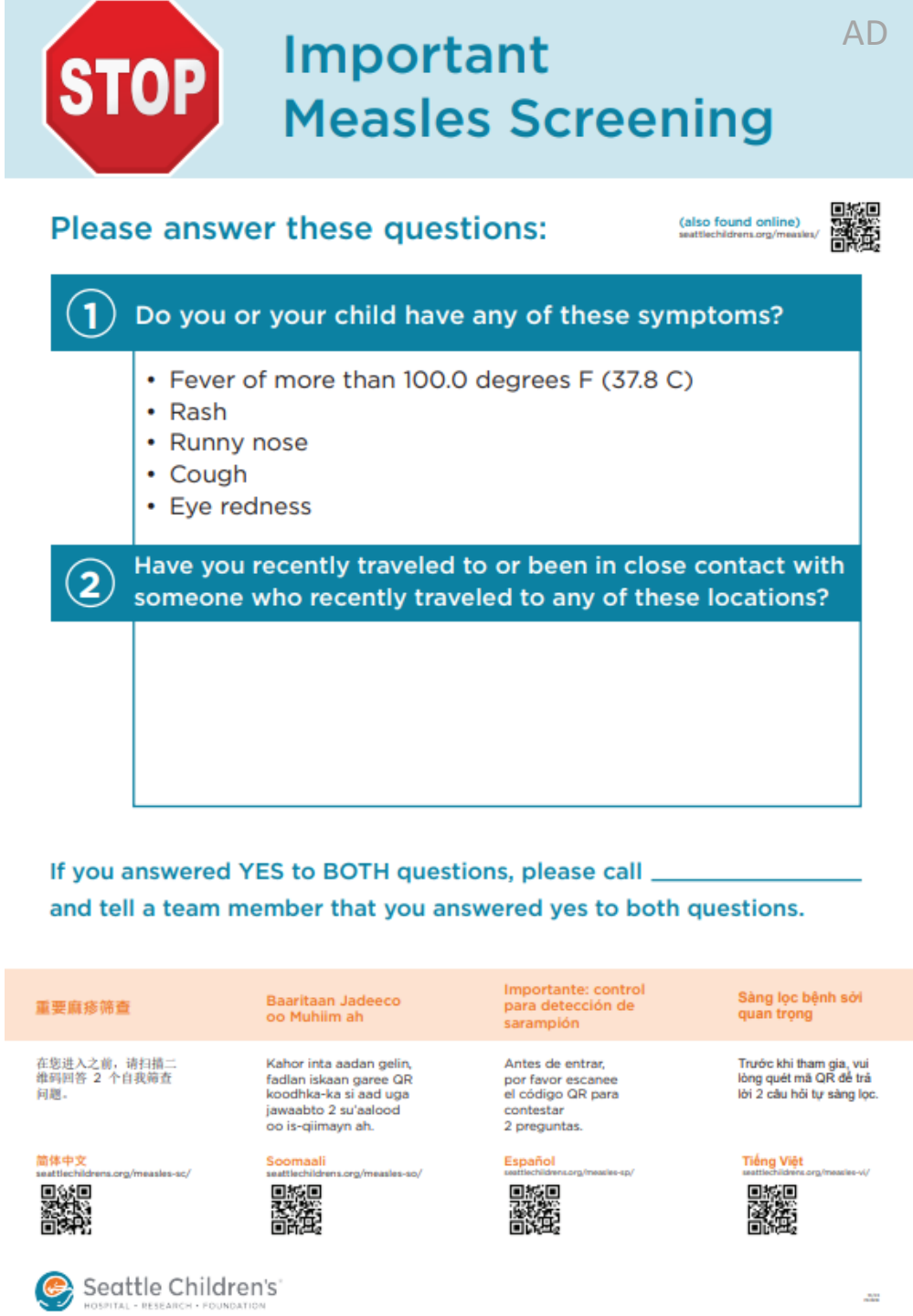
Outcomes (Why We Worry)

- Common complications
  - Otitis media, pneumonia, diarrhea
- Severe complications
  - Encephalitis: 1 of every 1,000 measles cases (often w/ permanent brain damage)
  - Mortality: 1-3 of every 1,000 children will die
  - Subacute sclerosing panencephalitis (SSPE):
    - Rare, fatal degenerative brain disease
    - Generally develops 7 to 10 years after measles infection.
- People at high risk for complications:
  - Infants and children aged <5 years
  - Adults aged >20 years
  - Pregnant people
  - People with compromised immune systems (leukemia, HIV infection, etc.)

Preventing Exposures at Children's Locations

- When there is a local case or a large outbreak somewhere else:
  - Use Public Health notices as a trigger
  - Content on public-facing website
  - Erect signs at all entrances
  - +/- Screener at ED entrance
- If we have a large local exposure or local transmission
  - All of the above
  - Screener at the ED entrance



We have a case; Now what?

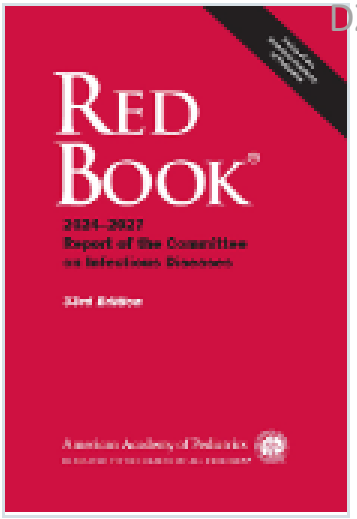
- Contact Tracing *(exposed: shared air space + 2hrs after index case leaves)*
  - Notify Occupational Health to confirm staff immunity
  - Patient line list with age, immunity, immunocompromised?
    - 28/54 exposed patients at SCH were up-to-date on MMR vaccine
    - 5 received secondary testing at SCH
- Flag EHR with isolation status
  - Isolate anyone without two vaccinations starting day 5
- Notify **all** families and give instructions specific to immune status
  - Encourage families to utilize their PCP as primary contact for follow-up questions

Photo Credit: HealthyChildren.org

Post-Exposure Prophylaxis (aka PEP)

- Planning for PEP:
  - Work with pharmacy & sourcing to validate supplies
  - Work with operations to plan for staff and space for administration
    - MMR to be given by 72 hours post-exposure
    - IM/IVIG to be given by 6 days post-exposure
- Administer PEP:
  - Strategy:
    - Maintain ED capacity by utilizing UC and PCP office when possible
    - Optimize efficiency through nurse-initiated standing orders for MMR and IMIG
  - Location of PEP administration at SCH:
    - MMR Vaccine: any Seattle Children's Urgent Care (primarily rely on PCP office for MMR)
    - IMIG: Seattle Children's Urgent Care – Main Campus
    - IVIG: Seattle Children's Emergency Department

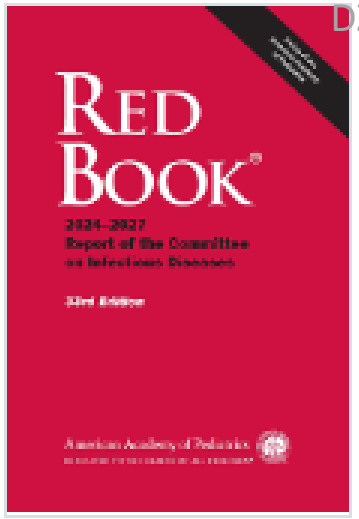
PEP: Not Immunocompromised



Age Range	Measles Immune Status[a]	PEP Type Depending on Time After Initial Exposure		
		≤3 days (≤72 hours)	4–6 days	>6 days
All ages (≥6 mo)	Immune	•PEP not indicated. Exposed person has documented immunity.		
<6 mo	Nonimmune (because of age[b])	•Administer immune globulin intramuscular (IGIM)[c] •Home quarantine[d]		•PEP not indicated (too late). •Home quarantine[d]
6–11 mo	Nonimmune	•Administer MMR vaccine (MMR vaccine preferred over immune globulin [IG]) •No quarantine needed.[e]	•Administer IGIM[c] •Home quarantine[d]	•PEP not indicated (too late). •Home quarantine[d]
≥12 mo	Nonimmune	•Administer MMR vaccine •No quarantine needed[e]	•IG PEP usually not administered[f] •Home quarantine,[d] then administer MMR vaccine to protect from future exposures	
≥12 mo	1 dose of MMR vaccine	•Administer 2nd MMR vaccine dose if ≥28 days from the first dose •No quarantine needed (person had 1 dose when exposed)		

READ ALL THE FOOTNOTES!!

PEP: Pregnant or Immunocompromised



Category	Measles Immune Status[a]	PEP Type Depending on Time After Initial Exposure		
		≤3 days (≤72 hours)	4–6 days	>6 days
Severely immunocompromised[b]	IG recommended regardless of measles immune status	•Administer immune globulin intravenous (IGIV)[c] •Home quarantine[d]		•PEP not indicated (too late) •Home quarantine[d]
Pregnant	Immune	•PEP not indicated		
	Nonimmune	•Administer IGIV[c] •Home quarantine[d]		•PEP not indicated (too late) •Home quarantine[d]

READ ALL THE FOOTNOTES!!

WA DOH

Measles Post-Exposure Prophylaxis (PEP) for Non-Symptomatic Susceptible Contacts

Recommended Dose and Timing of Measles PEP

Risk Factor	Time from First Exposure[1]	
	<72 hours	**72 hours through day 6**
Infant less than 6 months old	Give intramuscular IG[2] (IGIM): 0.5 mL/kg[3]	Give IGIM: 0.5 mL/kg[3]
Infant age 6 through 11 months	Give IGIM[2]: 0.5 mL/kg[3] **or** Give MMR[1] vaccine	Give IGIM[2]: 0.5 mL/kg[3]
Susceptible[4] pregnant woman	Give intravenous IG[2] (IGIV): 400 mg/kg	Give IGIV[2]: 400 mg/kg
Severely immunocompromised[5]	Give IGIV[2]: 400 mg/kg	Give IGIV[2]: 400 mg/kg
Susceptible close contact over 1 year old[6]	Give MMR[2] vaccine if no contraindications	Can consider giving IGIM[2]: 0.5 mL/kg[3] to those <66 pounds

READ ALL THE FOOTNOTES!!

How SCH and Allegro Pediatrics Partnered to Manage Patients Exposed at Allegro

- Allegro:
  - Provided line list with names, DOB, caregivers' names and numbers.
  - Referred to Seattle Children's for IGIM
  - Provided MMR for PEP

- SC:
  - Provided IGIM in our UC
    - No patients required IVIG
  - Provided a site for testing symptomatic patients

Testing for Measles

- ED best setting for testing safely (negative airflow rooms)
- Provider's actions:
  - **Call ahead to ED** to inform that the patient needs testing/assessment and to plan for arrival
    - Call Transfer Center at 206-987-8899
  - Give patient instructions on how to avoid exposures
- In the ED:
  - Automatic IP page when measles test is ordered
  - PH must be involved to approve testing at DOH

Who to test?

- WA DOH Tool for Assessing for Measles Testing

Report all SUSPECT measles cases immediately to your local health department.
www.doh.wa.gov/ForPublicHealthandHealthcareProviders/NotifiableConditions/Measles

DZ

✓ **Consider measles in the differential diagnosis of patients with fever and rash:**

	Yes	No	Comments
A) What is the highest temperature recorded?		°F	Fever onset date: ____/____/_____
B) Does the rash have any of the following characteristics?			Rash onset date: ____/____/_____
Was the rash preceded by one of the symptoms listed in (C) by 2-4 days?			Measles rashes are red, maculopapular rashes that may become confluent – they typically start at hairline, then face, and spreads rapidly down body.
Did fever overlap rash?			
Did rash start on head or face?			
C) Does the patient have any of the following?			Rash onset typically occurs 2-4 days after first symptoms of fever (≥101°F) and one or more of the 3 C's (cough, conjunctivitis, or coryza).
Cough			
Runny nose (coryza)			
Red eyes (conjunctivitis)			
D) Unimmunized or unknown immune status?			Dates of measles vaccine: #1 ____/____/_____ #2 ____/____/_____
E) Exposure to a known measles case?			Date and place of exposure:
F) Travel, visit to health care facility, or other known high-risk exposure in past 21 days?			See local health department for potential exposure sites.

✓ **Measles should be highly suspected if you answered YES to at least one item in B and C, PLUS a YES in D or E or F. IMMEDIATELY:**
- ❑ Mask and Isolate the patient (in negative air pressure room when possible) AND
- ❑ Call your local health department to arrange testing at the WA State Public Health Laboratories (WAPHL). All health care providers must receive approval from [name of local health jurisdiction] prior to submission.
  - **[LHJ phone number] during normal business hours**
  - **[after hours phone number] after hours (duty officer)**

✓ **Collect specimens:** *see algorithm for specimen collection timing according to rash onset*
- ❑ **Preferred: Nasopharyngeal (NP) or throat swab for rubeola PCR and culture**
  - Most accurate day 0 – 5 after rash onset
- ❑ **Urine for measles PCR and culture**
  - Urine PCR test is most sensitive between ≥72 hours and 10 days after rash onset and may not be positive until >4 days after symptom onset
- ❑ **Acceptable: Serum for measles IgM and IgG testing**
  - IgM is most accurate greater than 72 hours after rash onset
  - **NOTE:** *neither IgM nor IgG antibody responses can distinguish measles disease from the response to vaccination in a patient with suspected measles that has been vaccinated 6–45 days prior to blood collection.*

If you have questions about this assessment or collection and transport of specimens, call your local health department.

DZ

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If you have questions about this assessment or collection and transport of specimens, call your local health department.

DOH 348-490 May 2024

To request this document in another format, call 1-800-525-0127. Deaf or hard of hearing customers, please call 711 (Washington Relay) or email doh.information@doh.wa.gov.

The Good News

- Highly effective vaccine:
  - 95% VE after 1 dose
  - 97% VE after 2 doses
- An opportunity to bring people up to date
- Consider vaccination pre-travel
- Confirm staff are up to date

Seattle Children's – Emergency Management

Bri Enriquez, MD, Medical Director Emergency Management

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Seattle Children's – Activation of Incident Command

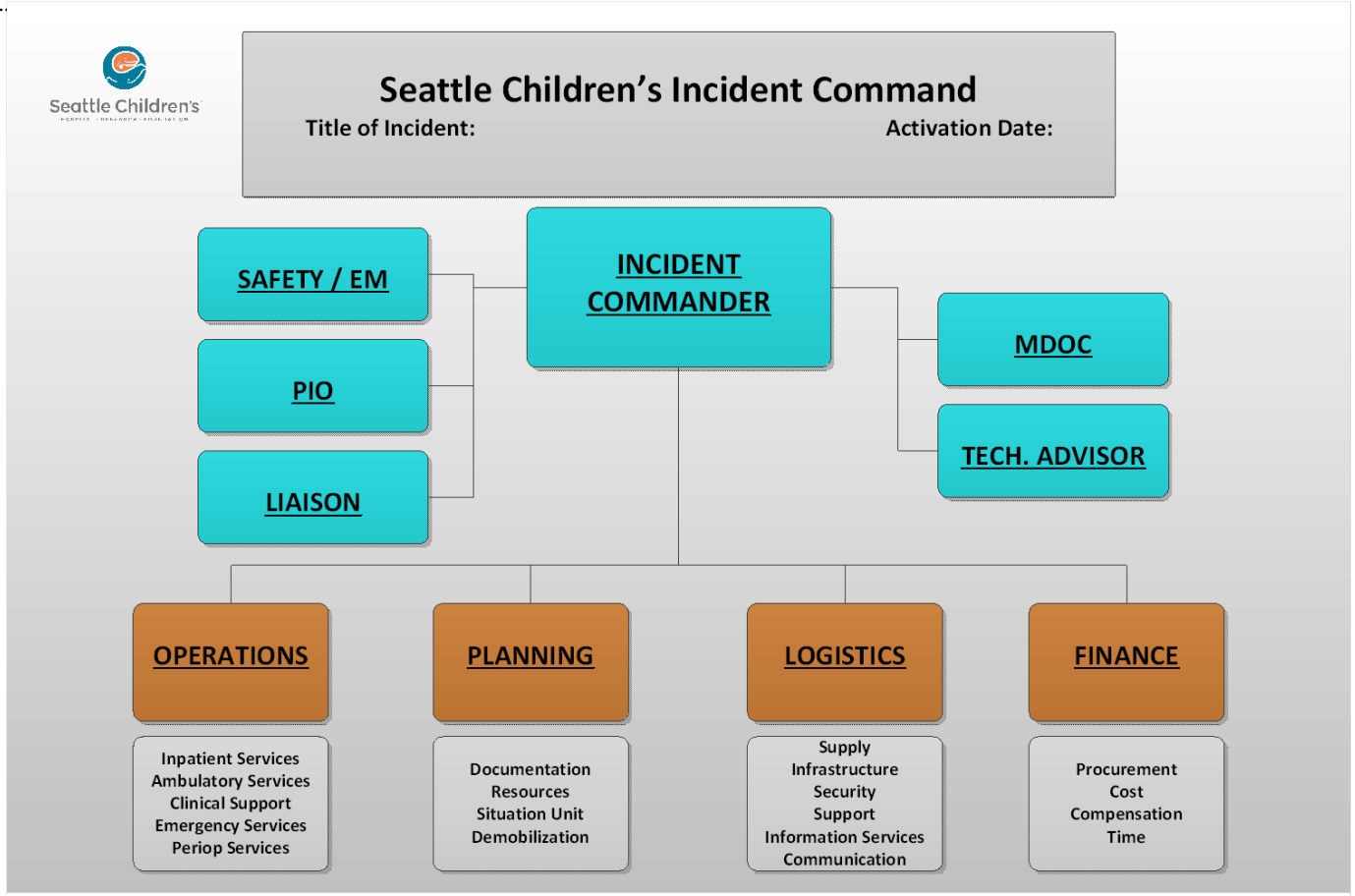
Consider activation for any incident that requires rapid:

- Assessment
- Communication
- Decisions/action

Seattle Children's – Activation of Incident Command

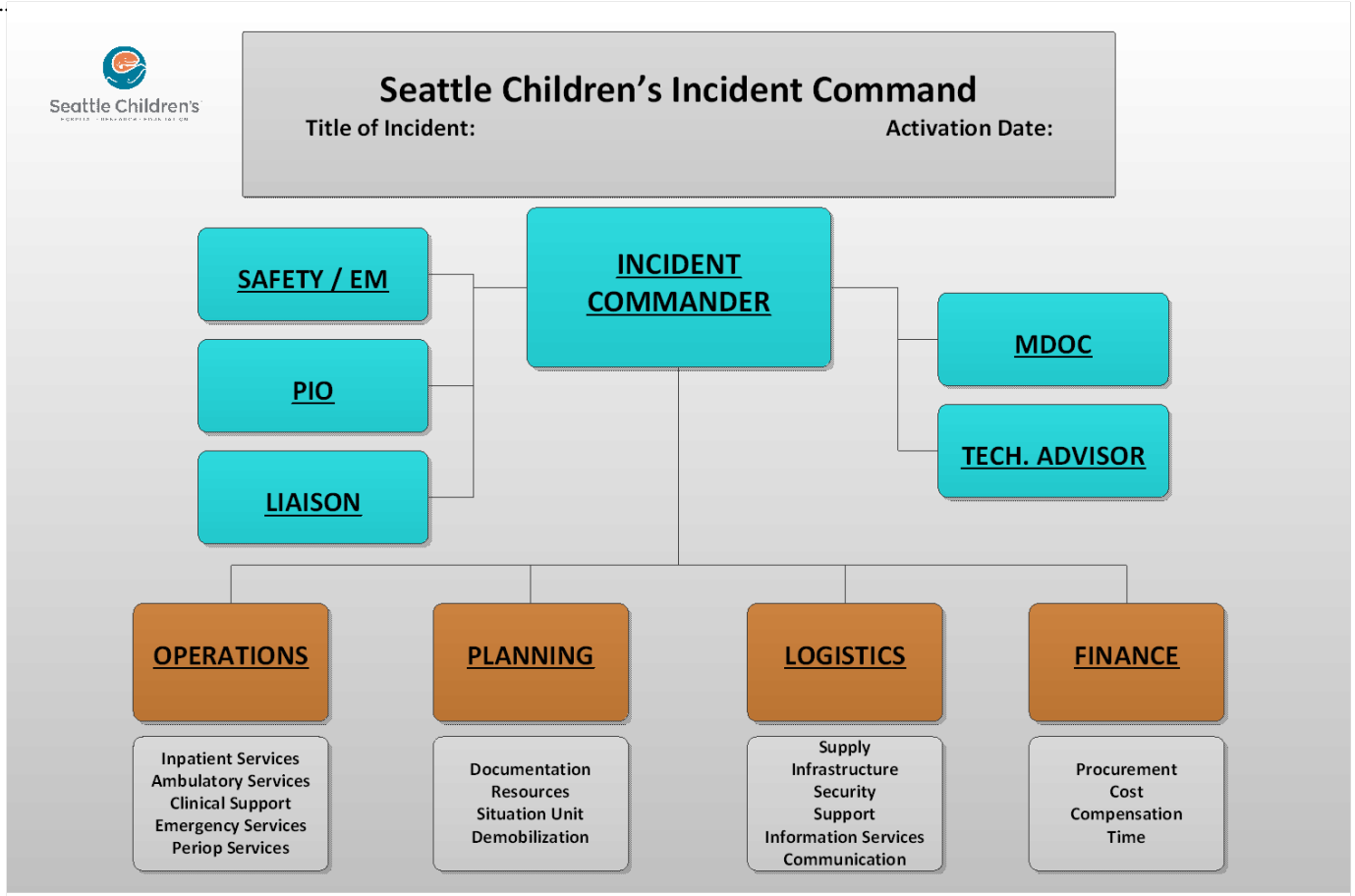
- Clear decision making
- Team alignment/prioritization

- Ensure content experts can focus on their tasks
  - Set up huddles – we had 4 in first 24 hours
  - Operations lead to enact plans



Seattle Children's – Activation of Incident Command

- Communications team
  - Internal
  - Patient/Families
  - Referring providers
  - Social media/websites
- Planning and Logistics leads
- Liaison
  - Public health
  - Healthcare network (NWHRN)



Seattle Children's HOSPITAL • RESEARCH • FOUNDATION | UW Medicine SCHOOL OF MEDICINE

Community Clinic Perspective

Amy Carter, MD, Chief Medical Officer of Allegro Pediatrics

Allegro PEDIATRICS

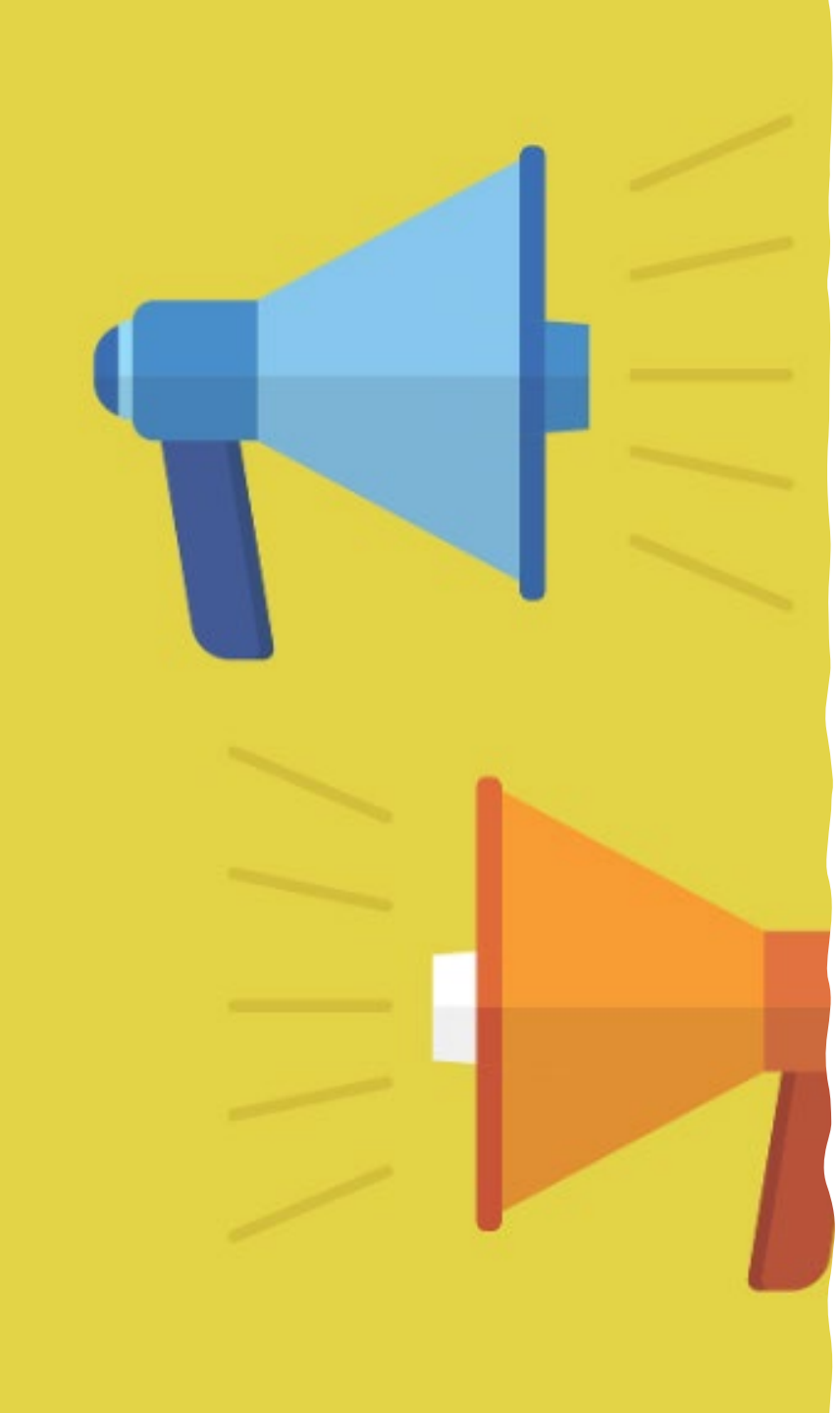
Public Health Alert Activated our Response

Public Health informed us that a patient who tested positive for measles was in our clinic during their contagious period (4 days prior to rash)

- Immediate escalation to Operational Leadership Team
  - Chart review
  - Timeline: start when patient entered the building through 2 hours after they left
  - Creation of exposure lists
    - Employees
    - Patients
  - Communication planning then execution
    - Coordination of message and timing with Public Health announcement
  - Post-exposure prophylaxis (PEP)

Contact Tracing

- **Employees**
  - Verify MMR status
- **Patients** by vaccine status
  - No MMR vaccines
    - < 6 months
    - 6-12 months with no travel prophylaxis
  - 1 MMR vaccine
    - 6-12 months with travel prophylaxis
    - 1-4 years
  - Fully vaccinated (2 MMR doses, 28+ days apart, after 12 months of age)
- Coordinate with both King and Snohomish County Public Health



Communication Plan:
set priorities, work in parallel

Patients

- **Exposed**
  - In room within 2 hours after index case
  - Eligible for MMR *(give within 72 hrs)*
  - Eligible for IMIG *(give within 6 days)*
  - Fully vaccinated
- **Not exposed**

Employees

- **Exposed**
  - Working today
  - Not working today
- **Everyone else**
  - Reminder about HIPPA

PEP & Isolation Guidance: Time is Critical

The goal is to prevent spread beyond the one index case.

- **Post-exposure prophylaxis (PEP)**
  - < 6 months: IMIG
    - Needed to coordinate with Seattle Children's to administer
  - 6-12 months: early MMR (still need 2 after 12 months)
  - 1-4 years: early 2nd MMR (will complete series)
- **Isolation**
  - All patients exposed who are not fully immunized must be isolated for 21 days (28 if they receive IMIG)

Education

Prepare for the wave of anxiety

- **Clinical Staff**
  - Email briefing:
    - Reminder of clinical presentation
    - Testing guidelines
    - Operational workflows
- **Patient Families**
  - Updated measles blog
  - Nurse advice line
  - Portal messages
  - Telehealth visits

Do What We Can to Prepare for an Outbreak

Outreach to patients due for MMR

- Overdue for MMR
- Due for MMR and well-child visit
- Educate families traveling internationally (+some areas of TX, NM)

Ensure staffing to allow scheduling in a timely manner

Protect employees

Work with Employee Health (office manager for small clinics) to review MMR status

Ensure telehealth access

Message patients to NOT come into clinic if exposed (through travel or any other sites) but to call or schedule telehealth if develop symptoms

Advocacy

Pediatricians are natural child advocates at the local, state and federal levels

- Engage parents in advocacy

Public Health Perspective

Eileen Benoliel, RN, BSN, Vaccine Preventable Disease Program Manager

Libby Page, MPH, Immunization Program Manager

Public Health – Seattle & King County

Public Health
Seattle & King County

Coordination with Clinicians - *Isolate*

- Have a planned triage process for patients with fever and rash so these patients are not waiting in common areas with other people.
- Patients with rash and fever should not stay in waiting rooms or other common areas.
- Immediately isolate patients with suspected measles in an airborne infection isolation room (AIIR) or a private room with a closed door.
- Follow standard and airborne precautions when evaluating suspected cases, regardless of vaccination status.
- **After patient is discharged, do not use or have staff enter the room for 2 hours.**

Coordination with Clinicians - *Notify*

- **Report suspected measles cases to your state or local health department immediately AND before discharging or transferring patients.**
- Public Health will ensure appropriate, rapid testing and investigation.

Coordination with Clinicians - *Test*

- **Collect the following specimens on patients with suspected measles:**
  1. Nasopharyngeal swab placed in viral transport media
  2. Urine, minimum 20mL, in sterile leak proof container
  3. Serum, minimum 1mL, in red top or red-grey top tube
- Public Health will facilitate diagnostic testing with WAPHL

Coordination with Clinicians - *Manage*

- Identify potentially exposed persons at the facility: patients, visitors, staff, volunteers
- Public Health will identify close contacts and recommend post-exposure prophylaxis (PEP) for eligible people

Presumptive Evidence of Immunity

- Written documentation of ≥1 doses measles-containing vaccine administered on or after the first birthday for preschool-age children and adults not considered high risk
- Written documentation of 2 doses measles-containing vaccine for school-age children and adults at high risk:
    - Healthcare personnel
    - International travelers
    - Students at post-high school educational institutions
- Laboratory evidence of immunity
- Laboratory confirmation of disease
- Birth before 1957

Vaccine Recommendations & Best Practices

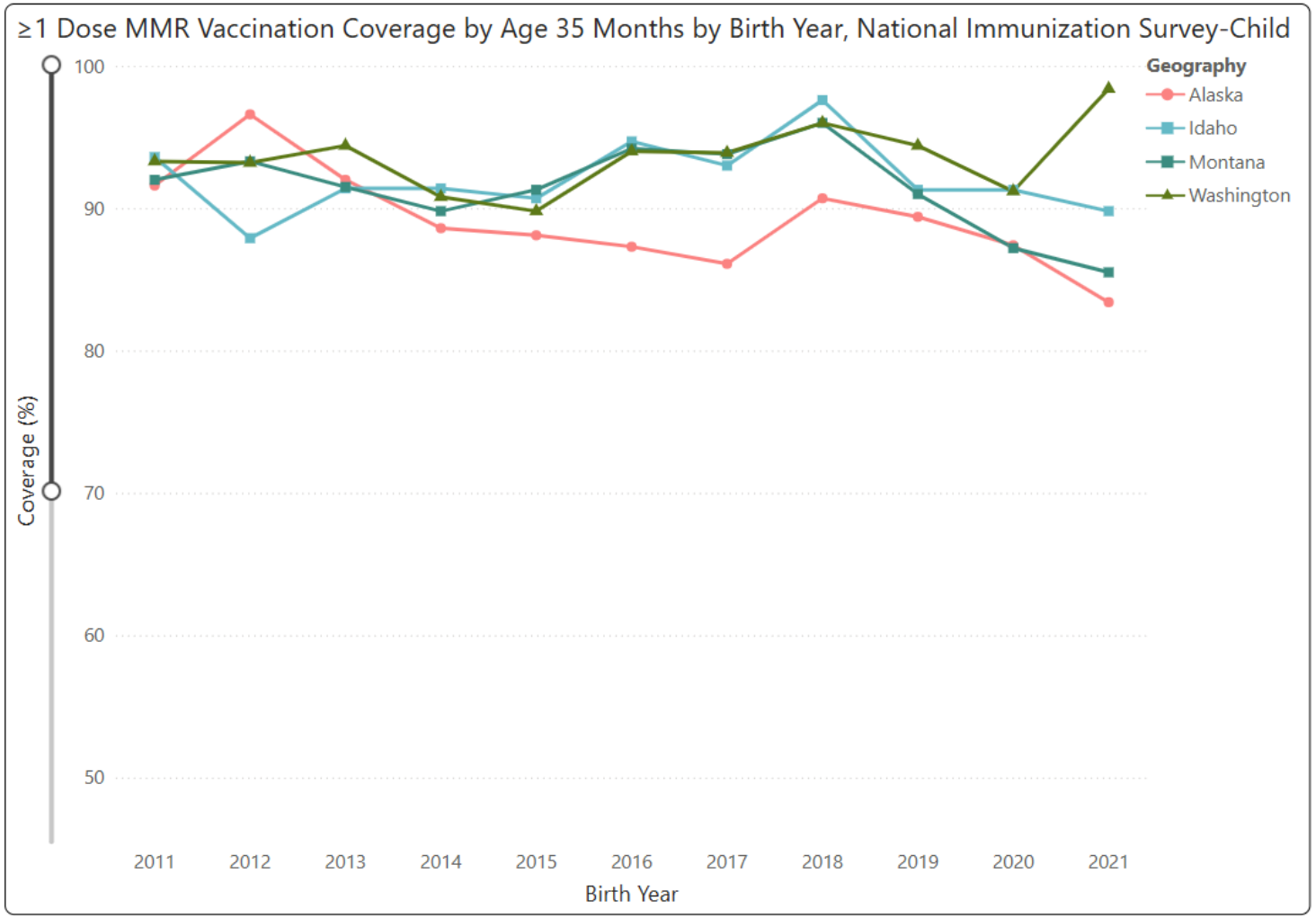
- **Assess** patient immunization status at every visit, including sports physicals and routine care.
- **Strongly recommend** MMR vaccination based on the recommended schedule, health condition, occupation, and other risk factors.
- Ask patients about upcoming **international travel** and recommend MMR vaccination based on recommended schedule; vaccinate at least 2 weeks before travel. Under-immunized patients should still receive MMR vaccination if their departure is sooner.
- Make sure patients **understand the risks** of not getting vaccinated. Let patients know that if exposed to measles, they will need to isolate for 21 days. Explain potential complications from measles, like pneumonia, hearing loss, intellectual disability, and death.

Vaccine Recommendations & Best Practices

- **Use Reminder / Recall** systems (letters, postcards, telephone, emails, texts) to ensure that patients who are due or overdue for MMR vaccinations are notified.
- **Track immunity status** of staff and volunteers.
    - Encourage staff and volunteers to provide documentation of measles vaccination or laboratory evidence of disease or immunity (IgG).
    - Store the records securely and maintain confidentiality.
- Consider **mandatory vaccination** (except for medical exemptions) or presumptive evidence of immunity for healthcare workers.

https://www.immunize.org/wp-content/uploads/catg.d/p2017.pdf

MMR Vaccination Coverage Trends



https://www.cdc.gov/childvaxview/about/interactive-reports.html

Public Health
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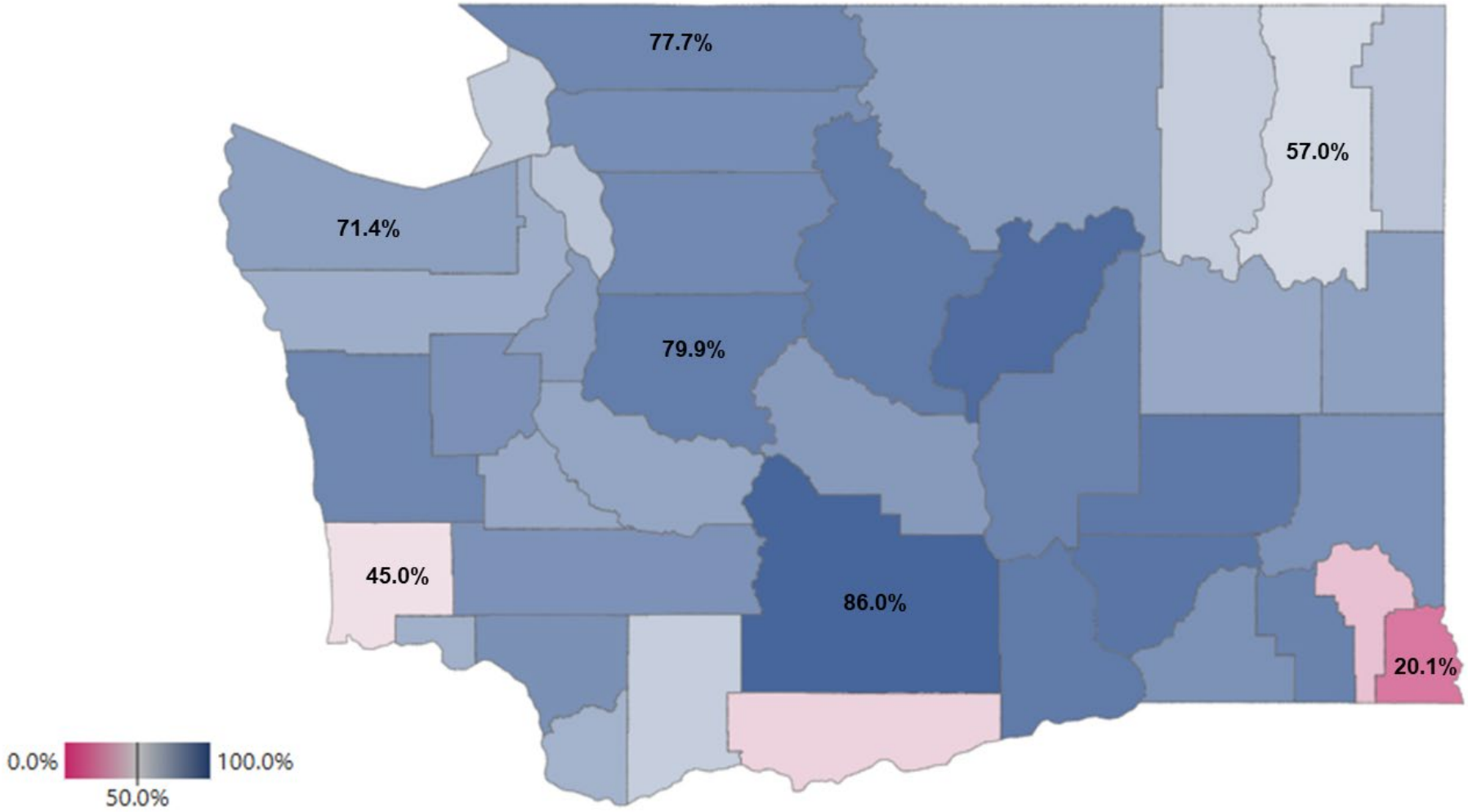
MMR Immunization Coverage by County

19-35 month olds with ≥1 dose, 2023



https://doh.wa.gov/data-and-statistical-reports/washington-tracking-network-wtn/immunization-data/county-public-health-measures-dashboard

Public Health
Seattle & King County

Resources for Healthcare Providers

- Measles One-Pager for Healthcare Providers – Project Firstline and AAP
- Measles - For Healthcare Professionals – CDC
- Measles Specimen Collection Instructions for RT-PCR – WA DOH
- Measles Specimen Collection Instructions for Serology – WA DOH
- Immunization Schedules – CDC
- Safety Information for Measles, Mumps, Rubella (MMR) Vaccines – CDC

Additional Resources

For Infection Preventionists

- Interim Measles Infection Prevention Recommendations in Healthcare Settings – CDC
- Measles Playbook – APIC Emerging Infectious Diseases Task Force

For Laboratories

- Public Health Laboratories Lab Test Menu – WA DOH
- Measles Specimen Shipping Guide – WA DOH

For the General Public and International Travelers

- Measles Resources – PHSKC
- Plan for Travel – Measles – CDC

Resources

- Red Book
- CDC
  - Clinical Overview of Measles | Measles (Rubeola) | CDC
- Washington State DOH
  - Measles | Washington State Department of Health
  - 348-490-MeaslesAssessmentQuicksheetProviders.docx
  - Measles Post-Exposure Prophylaxis (PEP) for Non-Symptomatic Susceptible Contacts
- PPN
  - EMS250221_MeaslesPosterUpdate_250221v2.pdf
  - Recognizing Measles in Your Patients | Pediatric Pandemic Network
  - Measles FAQ for Families & Caregivers | Pediatric Pandemic Network