

THE REEMERGENCE OF "FIRST DISEASE"

On the 4th of June [1846], a boat with 10 men from Tjørnevig had taken part in a catch of [fish] at Vestmannhavn; and on the 18th of June, precisely the fourteenth day following, the measles exanthem had broken out on all 10 men, after they had been feeling ill from two to four days, and had been suffering with cough and smarting of the eyes. The 10 men had not been together at all except at the...catch referred to, and none of them had been at any place where they could have happened to be exposed in the remotest way to the infection, which they dreaded and shunned.... From 12 to 16 days after these ten men had taken measles (counting from the appearance of the rash), the exanthem broke out on nearly all the other inhabitants [of Tjørnevig], except some few individuals, who were not attacked until 12 to 16 days after the first general outbreak....¹

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IN THIS THE sesquicentennial of his landmark investigation, the observations and deductions of Danish physician Peter Panum regarding epidemic measles (rubeola) among Faroe islanders have an all-too timely relevance in Oregon and Washington. Panum realized that the Faroe Islands* isolation provided a rare opportunity to study the transmission of this infection. Given the ubiquity of measles, it was normally impossible to identify unique opportunities for exposure. Studying the isolated islanders, however, Panum derived much of what we know about measles transmission, including incubation period, period of communicability, and extraordinary infectiousness of the disease.

Although 1995 saw a record low number of measles reports in the United States² (none among Oregon residents), an outbreak is now unfolding in the greater Portland area. As of May 14, 13 lab-confirmed and five presumptive cases have been identified; the majority are residents

of Clark County, Washington. (The confirmed Oregon cases are from Portland and Salem.) Other suspect cases are currently being investigated on both sides of the river. Surveillance activities have been intensified throughout the Northwest, and physicians and other health care professionals are urged to "think measles" when evaluating patients with fever, rash, and/or the "3 C's"—cough, coryza, and conjunctivitis.

Several lessons are emerging from this ongoing investigation—lessons that could have been learned much easier by reading the medical literature. Most importantly,

- sustained transmission can occur in populations with very high rates of single-dose immunization;
- misdiagnosis is common;
- patient isolation policies are often inadequate or ignored;
- reporting of suspect cases is often ignored or delayed, impairing control efforts;
- transmission in medical settings puts health care workers at risk and can readily amplify case counts once measles is introduced into a community.

MEASLES: A REFRESHER

Measles is one of the most highly communicable infections known. Viruses are shed in the nasopharyngeal secretions and other effluvia of infected persons in the days immediately preceding and following rash appearance. Viruses spread by coughing and sneezing become suspended in ambient air currents and can remain infectious for hours. The transmission rate approaches 100% amongst susceptible close contacts of an infectious case, and a significant risk of airborne transmission can persist long after a case has passed through a building or other enclosed space, depending on prevailing air currents. Transmission is commonly documented in medical office settings,³ hospital emergency rooms, schools, and anywhere infectious persons may cross the paths of susceptibles. Measles trans-

mission has even been documented across >30 m distances⁴ in a domed stadium.⁴

Clinically, measles usually begins with a mild to moderate fever and malaise. Within 24 hours there is conjunctivitis/photophobia, coryza, an increasingly severe cough, and often swollen lymph nodes. Koplik's spots, typically seen only for a day or two before rash onset, are bluish-white spots on a red background, appearing on the buccal mucosa. The (not surprisingly) morbilliform rash usually begins 3-4 days (range: 1-7 days) after onset of prodromal symptoms with flat, faint red eruptions on the head and neck. The rash spreads quickly over the upper arms and torso, becoming maculopapular. Lesions frequently coalesce and in severe cases may become confluent. Leukopenia is common. Severe illness is most common in adults and the very young; complications include pneumonia (primary or secondary), otitis, and encephalitis. The case fatality rate in the U.S. has been 2-3/1,000 in recent years. It is much higher in some parts of the world, particularly where malnutrition is widespread.

The diagnosis can be confirmed by demonstration of IgM antibodies, which are almost always present by 4-5 days after rash onset and are detectable for at least 3-4 weeks. Direct immunofluorescence testing of nasal exudates may be useful in outbreak situations. Paired sera can also be assayed for a change in titer.

CURRENT OUTBREAK

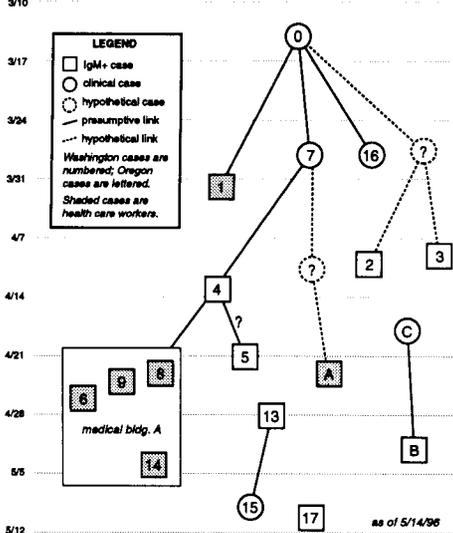
A pedigree of the present outbreak is shown in the figure (*verso*). It probably began with a foreign student (patient Zero) who visited Vancouver in March, apparently exposing at least an unimmunized ER physician, a patient passing through a medical office, and a high school student (#7*). The latter exposed an employee at the school (#4), who visited a medical office in professional building A. To date, four cases (in two generations) have been

* alternatively Faeroe, Farøe, Faerøerne, or (in Faeroese) Føroyar—in any event a group of islands in the North Atlantic somewhat under Danish control.

§ you betcha.

* NB: cases are numbered in the order identified.

1996 Washington/Oregon Measles Outbreak



confirmed among employees in different parts of that building. Epidemiological connections have not yet been identified for all cases, including the first two Oregon cases. Many of the Vancouver cases had been in Oregon, including several who came south for medical care.

Counting the putative "patient Zero," at least 5—possibly 6—generations have been confirmed so far. Although all cases sought medical care for their illness, the first patient to be correctly diagnosed was #5, in the fourth generation. Isolation procedures for patients who presented with measles-like illness were woefully inadequate. The number of infected health care workers (6/18 cases) is of note. Studies indicate that a significant minority of HCWs are susceptible to measles, including a small proportion (~5%) of those born prior to 1957.⁵

CONTROL MEASURES

Immunization is the cornerstone of measles control. The number of cases reported in Oregon (and elsewhere in the United States) has fallen over 99% since prevaccine years (see graph, *verso*). Within the past generation, however, measles has become a rarity that most American physicians will never see (and even fewer will ever diagnose). As this outbreak demonstrates, however, the potential for transmission is only a plane (or bus) ride away.

Persons born in or after 1957 without a definite history of measles should be vaccinated. While measles vaccine, typically administered in a trivalent measles-mumps-rubella (MMR) cocktail, is very safe and effective, efficacy is not 100%. An Oregon study of 679 children found that 37 (5%) of those who had been immunized with MMR between the ages of 15 and 17 months were seronegative when tested 3-5 years later.⁶ When these 37 children were reimmunized, all but one seroconverted. Of those, 33/36 developing an IgM response, suggesting that primary vaccine failure (rather than waning immunity) is the major problem with measles immunization. These and similar data have been the impetus behind the "two-dose" measles vaccine strategy. Oregon now requires two MMR's for all four-year and some two-year college students, and they are strongly recommended for all children ≥12 months old. Doses should be given at least one month apart.

Because they are at relatively high risk of exposure to patients with measles, we recommend that health care workers

without evidence of immunity—*regardless of age*—receive 2 doses of measles vaccine. Hospitals and other health care facilities should review the immunization status of their employees, and renew or adopt a policy of promptly providing respiratory isolation to patients who present with possible measles. These are not the people you want sitting in your ER or office waiting room for a couple of hours. Make arrangements to see patients who call to report suspicious illness without bringing them in the front door. Report possible cases immediately to your local health department. Do not wait for laboratory confirmation to report suspicious illnesses.

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