Public Health and Preventive Medicine

Measles Transmission in Medical Facilities

LORING G. DALES, MD, *Berkeley, California, and* KENNETH W. KIZER, MD, MPH, *Sacramento, California*

One of a series of articles from western state public health departments.

In 1983 a measles (rubeola) outbreak in a central California county totaled at least 70 confirmed cases, continuing through ten generations of transmission before terminating. The initial two cases recognized in the outbreak infected a total of seven persons in various hospital emergency rooms and medical offices while seeking treatment. Had these transmissions been prevented, the outbreak might have been aborted and thus its most tragic consequence, a teenaged boy whose illness was complicated by encepalopathy with major long-term sequelae, might have been averted.

In all, 31 (44%) of the patients were preschoolers, 14 (20%) were of school age and 25 (36%) were aged 19 years or older. The vast majority of the non-school-age patients had not previously been immunized against measles. At least 20 of the patients probably or certainly acquired their infection in medical facilities. Typically, a person would arrive at an emergency room or medical office shortly before or after rash onset, at a time when measles is extremely infectious by the airborne route, and expose many other patients and medical staff while sitting in waiting rooms, in treatment rooms or in lines for x-ray or other laboratory tests. Five of the nosocomially acquired cases were in young adult medical and paramedical staff members. All of these staff members were quite ill. One of them infected four other persons while seeking treatment himself, and, when spread cases from those four contacts are considered, accounted for a total of 11 cases.

Two other states—Florida and Oklahoma—have reported that nosocomial transmission played a major role in recent measles outbreaks (state public health directors, unpublished communications). In a 1982 Michigan outbreak, airborne spread of infection was found to have continued for more than an hour after a measles patient had left a physician's office.[1] Though measles has become a relatively rare disease in the United States, outbreaks continue to occur, and transmission of the virus in medical settings appears to be a significant factor in multiple outbreaks. Nosocomial transmission is of particular concern because patients who acquire infection in this fashion tend to be very young children or adults, the age groups wherein the measles complication and case-fatality rates are highest.

The risk of nosocomial measles transmission can be reduced considerably by action in three areas:

- *Routine measles immunization of new medical facility staff members born since 1956 (the vast majority born earlier are immune to measles) who lack documentation of prior immunization or disease.* Serologic surveys in California have indicated that, currently, perhaps 10% to 15% of young adults (ages 18 to 22 years) are susceptible to measles.[2,3] Persons in this age cohort often escaped natural measles infection, which has become much less common over the past two decades, and either were not immunized or were inappropriately or inadequately immunized—that is, with killed measles vaccine (which is no longer used), with further attenuated live vaccine administered concurrently with immune globulin, with live measles vaccine that was not handled or stored properly or at younger than 12 months of age (persisting transplacentally derived maternal antibody can interfere with measles immunization in infants younger than age 12 months).[4] The currently used live measles vaccine is a very safe product in both adults and children. Furthermore, reimmunization of persons who are already immune by virtue of prior infection or immunization with the live vaccine poses no enhanced risk, and reimmunization of persons who have previously received only the killed measles vaccine (who are few in number) usually presents only a risk of mild local injection-site reactions.[5] Hospitals, clinics and physicians' offices should, if they do not require it, at least strongly encourage medical facility staff members born since 1956 who have contact with patients—physicians, nurses, aides, laboratory technicians, receptionists, students and the like—and who lack written documentation of prior measles immunization (such as a record showing at least the month and year the vaccine was received) or of prior physician-diagnosed measles disease, to receive measles vaccine. Many hospitals require rubella immunity of personnel, and use of the combined measles-rubella or measles-mumps-rubella vaccines in staff who need rubella immunization can further reduce the risk of measles infection.
- *The Hospital Infection Control Program at the Centers for Disease Control has pointed out that nosocomial transmis-*

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Dr Dales is Medical Epidemiologist, Infectious Disease Section, California Department of Health Services, Berkeley. Dr Kizer is Deputy Director, Preventive Health Services, California Department of Health Services, Sacramento.

Reprint requests to Loring G. Dales, MD, Infectious Disease Section, California Department of Health Services, 2151 Berkeley Way, Berkeley, CA 94704.

sion possibilities should be reduced if outpatients with suspected communicable diseases, particularly those suspected of having infectious illnesses, such as measles, that can be spread by the airborne route are identified at the admission-registration desk and are promptly placed in separate rooms so that they do not sit in open waiting rooms for treatment, x-ray or other laboratory tests.[6] The physical layouts and patient loads of some medical facilities are such that routine, complete isolation of all outpatients with acute rash or febrile respiratory illnesses may be difficult. However, even in these facilities temporary use of such isolation procedures during recognized respiratory disease outbreaks is often possible. In the measles outbreak described at the beginning of this article, institution of isolation procedures in the medical facility where most of the cases were seen was followed by a sharp drop in nosocomial transmission.

• *Prompt telephone reporting of possible measles cases to health departments and cooperation with health departments in containment efforts.* Cases meeting the clinical criteria for possible measles—a temperature of 38°C (101°F) or higher; generalized rash; one or more of the following: cough, coryza or conjunctivitis, and no other established cause—should be handled as follows:

1. Keep the patient isolated in a separate room. If the patient has to be moved from the room, having him/her wear a disposable surgical mask may decrease spread of the virus.
2. Obtain during the acute phase and refrigerate a serum specimen for measles serology. The health department can often arrange for collection of a specimen during the convalescent phase.
3. Identify other clinics or locations in the medical facility that the patient may have visited.
4. Identify other patients born since 1956 who were in the same room (including waiting rooms) as the patient, as well as possibly susceptible staff who were exposed.
5. Call the health department as soon as possible; give the information obtained on the suspected measles case and on other persons possibly exposed to the disease.
6. The health department can work with the medical facility on identification and follow-up of exposed persons: ascertainment of susceptibility status, immunization, isolation and surveillance. Measles vaccine given within three days after exposure or immune globulin (0.25 ml per kg, or 0.11 ml per lb, intramuscularly, to a maximum of 15 ml) given within six days after exposure, can prevent illness or reduce severity of symptoms.

Inpatients with known or suspected measles disease should be kept in respiratory isolation (private room with door closed, staff use of masks, respiratory secretion precautions) for four days after rash onset. Only immune staff should attend these patients. Possibly susceptible inpatients exposed to measles cases should be cohorted for at least 15 days after exposure unless they can be discharged earlier.

Prompt action can avert or curtail measles outbreaks, thereby avoiding the tragic consequences that can accompany this preventable disease.

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