Measles — Continued

Although indigenous transmission of measles is at a historic low, sustained efforts are necessary to further reduce the number of cases. These levels must include assuring uniformly high levels of vaccination coverage among preschool-aged children, particularly in medically underserved urban areas, and improving the sensitivity of surveillance by conducting active case detection at sentinel sites in areas at high risk for measles transmission and measles importation. Recent advances in molecular epidemiology have enabled rapid identification of the source of wild-type measles virus, underscoring the importance of collecting virus isolates from as many cases as possible to improve characterization of patterns of transmission and determine international sources for measles infections in the United States. The continued importations of cases from other countries underscore the needs to support elimination of measles in the Western Hemisphere and to improve global efforts to control measles.

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Fatalities Associated with Improper Hitching to Farm Tractors — New York, 1991–1995

Approximately half of all injury-related fatalities in the agricultural industry are associated with farm tractors (*1*). Since April 1991, the New York State Department of Health's Occupational Health Nurses in Agricultural Communities (OHNAC) program* has investigated 27 incidents of sudden rear rollover of farm tractors (i.e., incidents in which the tractor flips backward, rotating around its rear axle [Figure 1]); these incidents resulted in 15 fatalities. This report describes four of these incidents, summarizes the characteristics of the 16 incidents that involved improper hitching, and outlines strategies for reducing the risk for their occurrence.

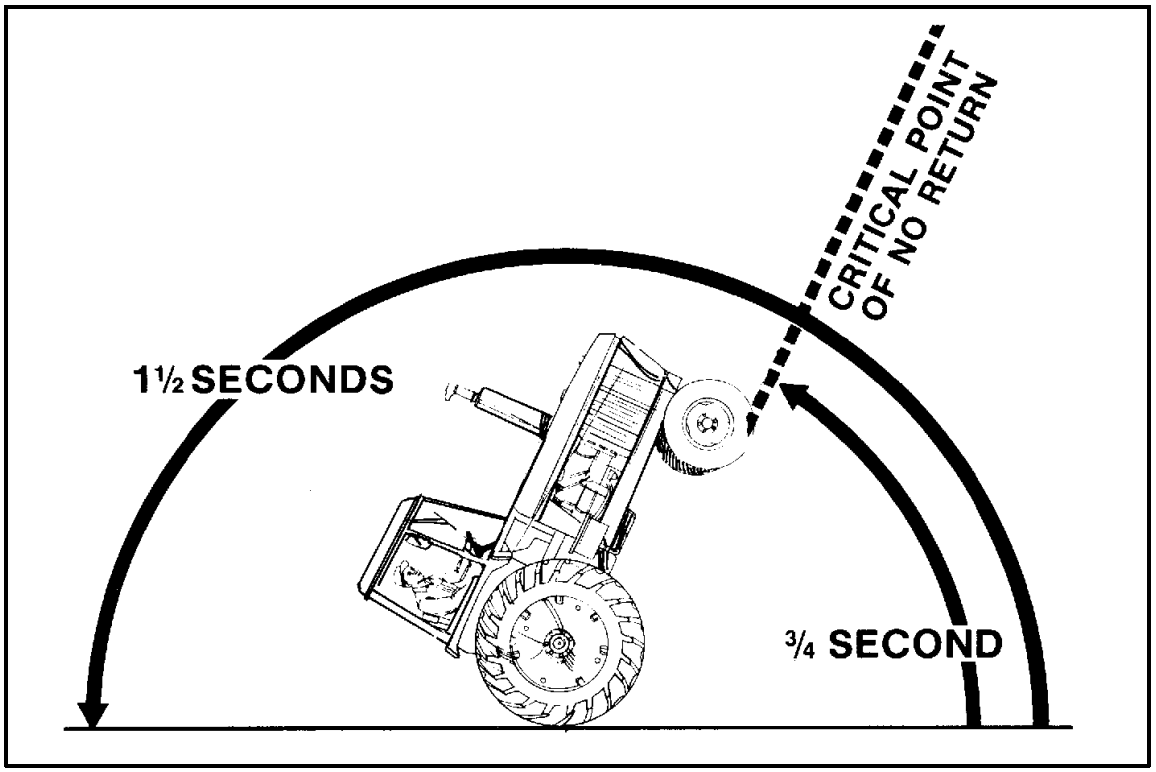
On notification of tractor-associated rear rollovers†, a nurse from an OHNAC regional office and, when possible, an agricultural engineer (supported by the Northeast Center of Agricultural and Occupational Health, Cooperstown, New York) travel to the site of the incident. Both obtain information from witnesses and emergency medical technicians who attended the victim.

*OHNAC, a project supported by CDC's National Institute for Occupational Safety and Health, is based in 10 states and conducts community-based surveillance and intervention efforts to prevent serious farming-related illnesses and injuries.

†In New York, information about incidents was obtained from health-care providers, local extension agents, and the news media.

Improper Hitching to Farm Tractors — Continued

FIGURE 1. Timing of events during rear rollovers of farm tractors*



*Reproduced with permission from Deere & Company, ©1994 Deere & Company. All rights reserved (*2*). Use of trade names and commercial sources is for identification only and does not imply endorsement by the Public Health Service or the U.S. Department of Health and Human Services.

Case Reports

Case 1. On September 3, 1991, a 71-year-old male part-time farmer was fatally injured when his 1950-model tractor overturned to the rear while pulling a downed tree. He suffered multiple trauma with a fractured neck and jaw. The tow chain used to pull the tree had been hitched above the drawbar[§] of the tractor. The tractor was not equipped with a rollover protective structure (ROPS).

Case 2. On December 3, 1991, a 33-year-old male farm worker died as a result of multiple head and torso injuries sustained during a rear rollover of the 1958-model tractor he was using to pull a pickup truck filled with wood. The tow chain had been hitched high on the back of the tractor. The tractor did not have a ROPS.

Case 3. On January 3, 1994, a 42-year-old female farmer died from chest trauma when a 1970-model tractor she was using to pull a loaded pickup truck out of snow overturned to the rear. The tow chain had been attached at the top link connection of the tractor's three-point hitch[¶]. The tractor did not have a ROPS.

[§]A drawbar is a solid metal bar that is attached under the tractor frame 14–17 inches above ground and that projects behind the rear wheels for towing.

[¶]A three-point hitch is used for attaching and towing farm implements; it is located above the drawbar and consists of two adjustable lower attachment points and a centered upper attachment point.

Improper Hitching to Farm Tractors — Continued

Case 4. On October 29, 1994, a 13-year-old boy sustained fatal massive head trauma when the 1953-model tractor he was using overturned to the rear while pulling a felled 18-inch-diameter tree that was still partially attached at the stump. The tow chain had been hooked directly around the rear axle. The tractor did not have a ROPS.

Results of Epidemiologic Investigations

In 16 (59%) of the 27 reported incidents, improper hitching of equipment or material for towing was believed to be the primary cause of the rollover; 10 (63%) of these 16 rollovers resulted in fatalities. The remaining 11 rollovers were associated with various factors, including ensnaring the towed item on a stump, imbalance resulting from pulling an excessively heavy load, or ascending a steep incline in forward gear rather than backing up the hill; five of these incidents resulted in fatalities.

In each of the 16 rear rollovers attributed to improper hitching, attachment of the tow chain to a point above the drawbar was the principal cause of the rollover. Six incidents occurred while the operators were pulling logs, four while removing stumps, and six while pulling vehicles or implements. Only one of these 16 tractors had been equipped with a ROPS; the operator of this tractor had not been wearing a safety belt and had sustained fractures of the clavicle and humerus after being thrown from the tractor.

Of the 16 injured persons, 13 were male. One was aged 13 years; three, 20–40 years; seven, 40–60 years; and five, >70 years. All 10 persons with fatal injuries had sustained massive chest and/or head injuries; in comparison, five (83%) of the six persons with nonfatal injuries had sustained pelvic and/or limb injuries. Of the six persons with nonfatal injuries, two were able to return to work within 2 weeks of injury; both had been protected from crushing, one by a ROPS and one when, by chance, the towed vehicle supported the overturned tractor. One person was able to return to part-time work after 5 months, and three were unable to work 11–15 months after their injuries.

Environmental circumstances that may have contributed to eight incidents included muddy conditions (three incidents); wet ground (two); and snow-covered, hilly, or uneven terrain (one each). Two injuries occurred during January–March, five during April–June, four during July–September, and five during October–December.

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Editorial Note: Rear rollovers of tractors are sudden events: following onset of rotation, the tractor may reach the point of no recovery in a period of 0.75 seconds (Figure 1) (*3*)—a duration often shorter than that required by the operator to react and attempt to correct the rearward rotation (*4*). In this report, more than half (16 [59%]) of the reported rear rollovers involved improper hitching of a load.

A rollover will occur when a tractor's center of gravity shifts beyond the rear stability baseline (the line connecting the rear-tire contact points) (*4*). For example, when a tractor is used to tow a heavy load, the rear tires may be pressed against the ground with increased force. An excessive load that is correctly attached to a drawbar set at the recommended height will cause slipping of the rear wheels or stalling of the tractor's engine before a rollover is induced (*2*). However, when a load is hitched high on the tractor or attached directly to the rear axle, less power is required to lift the front

Improper Hitching to Farm Tractors — Continued

end of the tractor than to move the load or slip the wheels, which may result in a rollover through rearward rotation.

Although the association between rear rollovers and improper hitching has been recognized since the 1920s (*5*), severe injuries continue to occur because of the use of incorrect hitching techniques. The use of ROPS, in conjunction with safety belts, is an engineering strategy that protects tractor operators during rollovers (*6*). With the exception of use in special situations (e.g., limited vertical clearances), all employee-operated tractors manufactured after October 25, 1976, are required by the Occupational Safety and Health Administration (OSHA) to be equipped with ROPS (*7*)**. However, of the approximately 4.5 million tractors used in production agriculture in 1992, only an estimated 1.3 million (29%) were equipped with ROPS (*8*). For some farm operators, retrofitting a tractor with a ROPS may be a substantial expense (*9*): in 1993, costs for retrofits ranged from $250 to $2200 (*8*).

Public health officials and the news media can assist in dissemination of information to tractor operators on strategies to minimize the risk for rear rollover. In addition to installation of a ROPS and use of safety belts, careful selection of the hitching point is critical. For proper hitching to a tractor, the drawbar on a tractor should not be altered by raising or shortening it, and the load should never be attached directly to the axle (*2*); a two- or three-point hitch should never be used as a single-point hitch instead of the drawbar (*10*); and loads that attach by a single point should attach only to the drawbar. Other strategies for preventing injuries from rear rollovers include 1) ensuring operator familiarity with the safe use of the equipment; 2) selecting a strong tow chain with a length sufficient to allow adequate stopping distance between the towed object and the towing vehicle to avoid collision and potential rollover; 3) using front-end weights, which counteract lifting of the tractor front end; 4) using a slow, steady pull; 5) maintaining a clear work area to allow sufficient room for maneuvering; and 6) operating the tractor slowly and deliberately. Farm tractors are not designed for logging and other nonfarming activities; therefore, it is particularly important to observe these prevention strategies during such activities. Finally, when a tractor is used to free and tow a stuck vehicle, the operator should hitch the vehicles front-to-front and drive the towing tractor in reverse, which minimizes the risk for rollover by transmitting all the engine power of the towing vehicle through the chain to the other vehicle.

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** This OSHA regulation is not actively enforced on farms that employ <11 employees, and family farms without other employees are exempt from OSHA regulation; combined, these categories represent most U.S. farms. However, in accordance with a voluntary agreement by tractor manufacturers, virtually all new farm tractors sold after 1985 have come equipped with ROPS.

Improper Hitching to Farm Tractors — Continued

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Helmet Use Among Adolescent Motorcycle and Moped Riders — Rome, Italy, 1994

In Italy, motor-vehicle crashes are the leading cause of death among persons aged 15–20 years, and motorcycles account for a substantial proportion of traffic-related fatalities: in 1993, of the 6349 traffic-related deaths reported in Italy, 1342 (21.1%) occurred among motorcycle and moped users, and 261 (19.4%) of these deaths were among persons aged 15–20 years. Because of the risks for head injury and death, in 1986 a national law was enacted requiring operators of motorcycles or mopeds to use helmets under specified conditions. To assess compliance with this law and factors associated with helmet use among adolescents in a metropolitan area, in October 1994 the National Institute for Health conducted a survey of a sample of high school students in Rome. This report presents findings of this survey, which indicate that helmet use was low, particularly among moped users and among passengers.

In Italy, motor-powered cycles are classified by engine size. Motorcycles with engines 50–125 cc may be operated by persons aged ≥16 years; persons must be aged ≥18 years to operate motorcycles with engines >125 cc. For both, drivers' education and a license are required. Mopeds (vehicles with engines ≤50 cc)—which are designed for use in urban areas and are smaller than motorcycles—may be operated by anyone aged ≥14 years; neither a license nor drivers' training is required. Carrying passengers on mopeds is prohibited regardless of the age of the driver. A 1986 law mandated helmet use for all moped drivers aged <18 years; for those aged ≥18 years, helmet use is required only when mopeds are operated outside urban centers. The 1986 law also mandated helmet use by both drivers and passengers of motorcycles, regardless of the operator's age and location of motorcycle use.

The survey was conducted in October 1994 at six public schools located in central Rome, representing the three types of high schools in Italy (classical, scientific, and technical). All students in the first, third, and fifth years (mean ages: 14, 16, and 18 years, respectively) who were present on the day of the survey were asked to complete an anonymous self-administered questionnaire regarding sociodemographic characteristics, motorcycle and/or moped use and use of helmets during the previous year, and attitudes about helmet use.

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Measles — United States, 1995

As of March 20, 1996, local and state health departments had reported a provisional total of 301 confirmed measles cases to CDC for 1995. This represents the lowest number of cases ever reported in 1 year since measles first became notifiable in 1912 and a 69% decrease from the 963 cases reported for 1994. This report summarizes the epidemiologic characteristics of measles cases reported in the United States in 1995, and documents important epidemiologic trends, including a shift in age distribution and the continued occurrence of international importations.

Age. Of the 285 measles patients for whom age was known, 109 (38%) were aged <5 years, including 39 (36%) aged <12 months and 34 (31%) aged 12–15 months. A total of 64 (22%) measles patients were aged 5–19 years, and 112 (39%) were aged ≥20 years. Of the 33 measles patients with internationally imported cases, eight (24%) were aged <5 years, 14 (42%) aged 5–19 years, and 11 (33%) aged ≥20 years.

Vaccination Status. Vaccination status was reported for 219 (73%) measles patients. Among the 96 (44%) who were not vaccinated, 56 (58%) were eligible to be vaccinated (i.e., aged >12 months and born after 1956). Vaccination status varied by age group: 29 (55%) patients aged 1–4 years were unvaccinated, compared with 12 (26%) aged 5–19 years and 28 (32%) aged ≥20 years. Of 62 measles patients for whom data were available about dates of vaccination, 55 (89%) had received at least one dose of measles-containing vaccine (MCV) on or after their first birthday and ≥14 days before onset of symptoms; seven (11%) were considered to be unvaccinated or inadequately vaccinated; three (5%) received their first dose of measles-containing vaccine (MCV) <14 days before onset of symptoms; and four (6%) had received one dose of MCV before their first birthday. Five (8%) cases were reported among persons who had received two doses of MCV after their first birthday.

Case Classification. Among the 301 reported cases, 268 (89%) were indigenous to the United States, including 259 cases (86%) acquired in the state reporting the case and nine (3%) resulting from spread from another state. International importations accounted for 33 cases (11%), and an additional 11 cases were epidemiologically linked to imported cases of measles. Importations originated from or occurred among persons who had traveled in Germany (10), Canada (three), Italy (three), Pakistan (three), China (two), France (two), Malaysia (two), Austria (one), Belgium (one), Costa Rica (one), Egypt (one), Japan (one), and the Philippines (one). For two of the imported