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Worker Fatalities due to Motor Vehicle Collisions with Railroad Trains

Company policies should be established regarding railroad crossing safety for working drivers

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Introduction

The Kentucky Fatality Assessment and Control Evaluation (FACE) program is one of nine state programs funded by the National Institute for Occupational Safety and Health (NIOSH) to conduct surveillance of fatal occupational injuries that occur in Kentucky and to perform on-site investigations of worker fatalities in priority areas. NIOSH priority areas include the investigation of deaths involving machinery, youths, immigrant workers, and highway work zones. Based on the elevated numbers of cases recorded here in Kentucky, the Kentucky FACE program also performs on-site investigations of worker deaths in the construction and transportation industries, including occupational motor vehicle collisions. Fatality reports produced by FACE program investigations include recommendations for prevention to be used by companies in similar industries and occupations for safety training purposes to prevent future occupational injuries.

In 2006, there were 54 workers killed in train collisions with other vehicles in the U.S. Kentucky ranks eleventh in the nation for highway-rail grade crossing crashes. There are over 4,875 public and private railroad crossings in Kentucky, and Kentucky ranks seventh for the number of rail carloads hauled.

Between the years 2000-2006, there were 470 train collisions in Kentucky. Of the 470 collisions, 103 involved working drivers. The train was cited as the vehicle at fault in 14 collisions, and another type of occupational vehicle was determined to be at fault in 86 of the occupational collisions with trains. Forty of the train-vehicle collisions involved semi-trucks (Figure 1, page 2). Almost one-third of the train-vehicle collisions occurred on local streets (Figure 2, page 2), and motor vehicle-train collisions happened more often on Saturdays (Figure 3, page 3) than other days of the week.

Eleven workers were killed in Kentucky by trains between January 2000-July 2007. Eight of the workers were between the ages of 33-48 years. Ten of the workers who were killed by trains were male and all were Kentucky residents. The decedents killed by trains were employed primarily in the transportation and public services industry (Figure 4, page 3). Eight of the workers involved in fatal motor vehicle vs. train collisions were employed in the transportation/ material moving occupational class. Warning systems used in the railroad crossings where the motor vehicle-train collisions occurred were known for eight of the eleven fatalities. Of the eight worker fatalities, five of the crossings had warning lights only and three had white bars. None of the railroad crossings had crossing gates.

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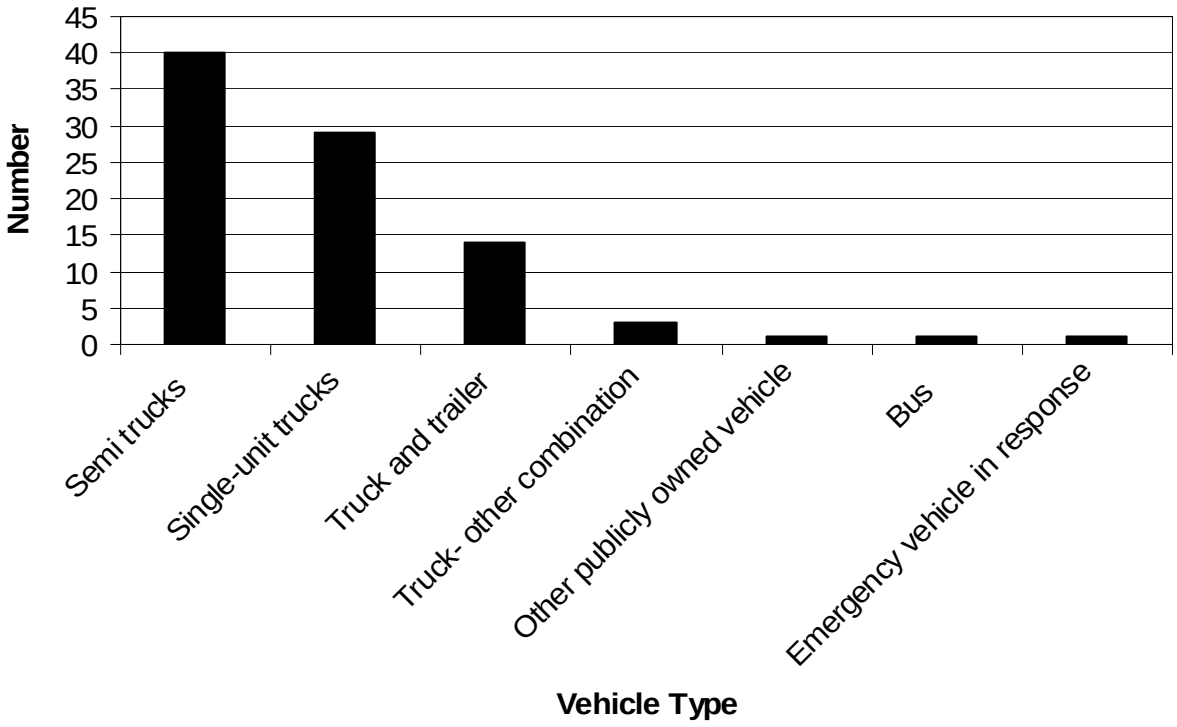
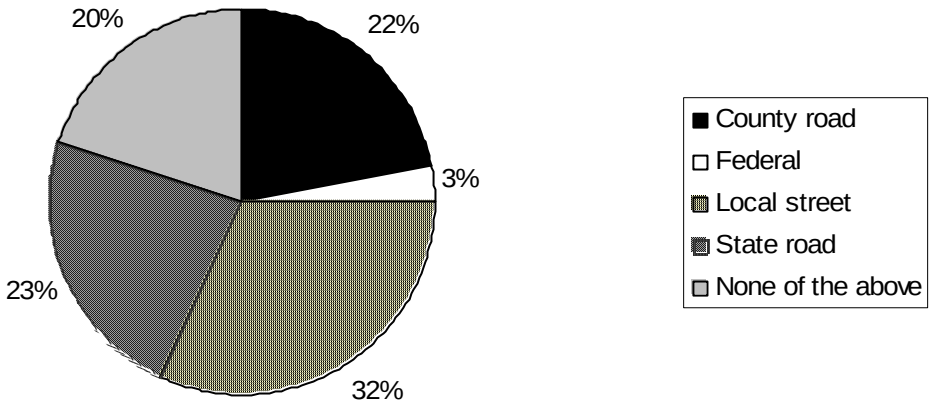
Figure 1. Occupational Motor Vehicle-Train Collisions by Vehicle Type, 2000-2006.



Data Source: Kentucky Collision Reporting Analysis for Safer Highways (CRASH) data

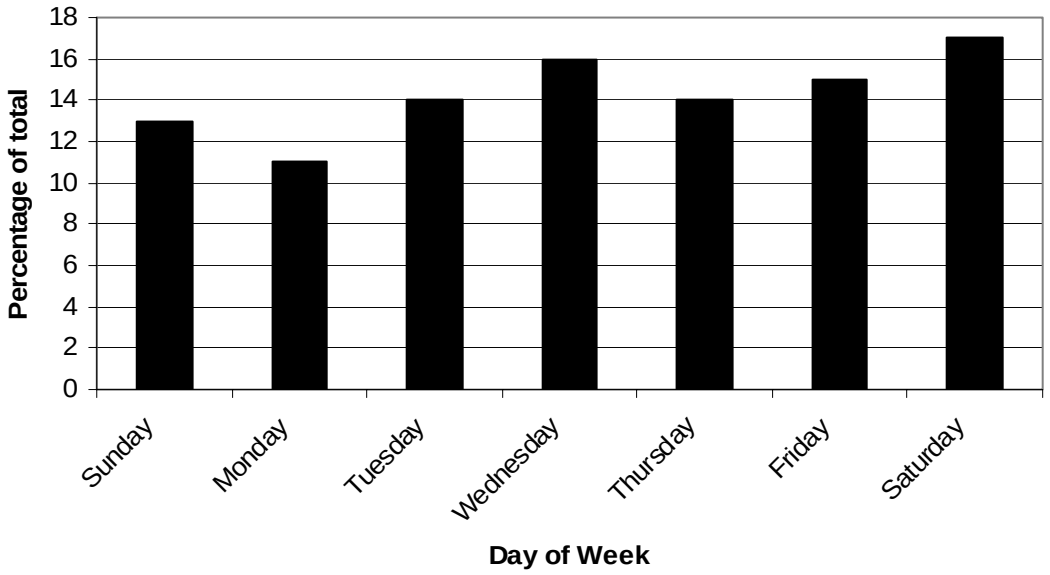
Figure 2. Occupational Motor Vehicle-Train Collisions by Roadway Type, 2000-2006.



Data Source: Kentucky CRASH data

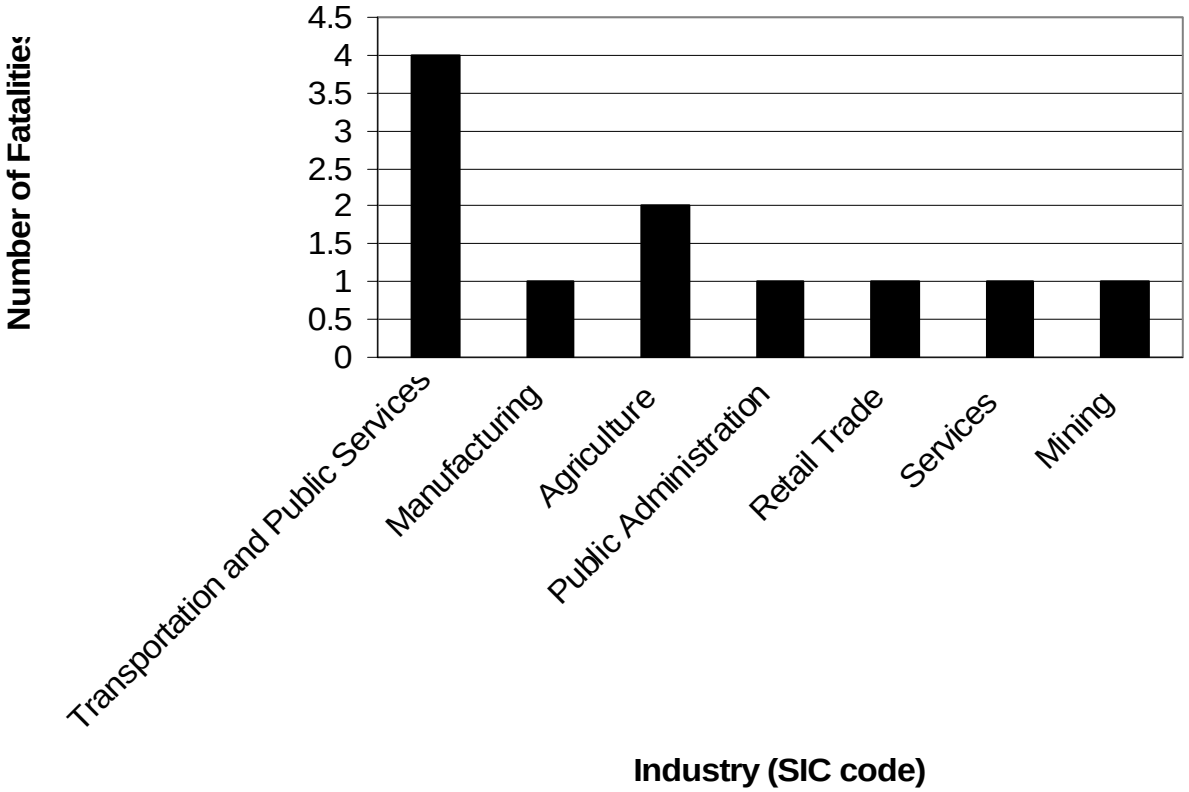
(Continued on Page 3)

Figure 3. Occupational Motor Vehicle-Train Collisions by Day of Week, 2000-2006.



Data Source: Kentucky CRASH data

Figure 4. Kentucky Workers in Fatal Motor Vehicle/ Train Collisions by Industry (January 2000-July 2007).



Data Source: Kentucky CRASH data

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Discussion

Railroad train-motor vehicle collisions are of major concern in Kentucky. Employee driver training should include standard company procedures regarding the crossing of railroad tracks. A hazard assessment should be performed by the worker each time before crossing railroad tracks. When crossing railroad tracks, a commercial vehicle driver should stop within 50 feet of the track, but not closer than 15 feet, look in both directions, and listen to ensure that no train is approaching. If the crossing is determined to be clear, the driver may then cross the tracks.

All employees should be required to wear safety belts while operating a company-owned vehicle or while on company business. Five of the drivers in the motor vehicle-train fatalities were not wearing their safety belts when their vehicles were hit by the train. This company policy should apply to both drivers and passengers in the vehicle. There should be strict enforcement of this policy and strict consequences if this policy is not followed. Seat belt use is mandatory for all drivers in Kentucky, and Kentucky has recently become a primary enforcement state, meaning that all drivers can be legally stopped for not wearing their safety belts.

At least four of the drivers' vehicles were stalled or stopped on the railroad tracks when the fatal motor vehicle-train collision occurred, and two drivers could not stop their trucks when descending down a mountain. A driver should never stop on the tracks and should only cross the railroad tracks if there is adequate clearance on both sides. If a driver becomes stuck on railroad tracks, the driver should exit the vehicle as soon as possible, move as far away from the crossing as possible, and call 911 to alert both the railroad and police. A braking mechanism performance check and maintenance of the vehicle should be performed on the vehicle before entering the roadway to ensure that brakes are functioning properly.

A cell phone was in use by one of the drivers who was communicating with the employer when the driver's vehicle was struck by a train. Cell phones should not be utilized while driving. The use of electronic devices such as cell phones, global positioning system (GPS) receivers, or computers by working drivers should be prohibited while driving. A company policy should be established that mandates drivers to pull over to the roadside to receive and make phone calls.

These fatalities demonstrate the need for worker safety training and the establishment of company policies regarding railroad crossing safety. Additional analysis and case investigations will be performed in this area to further identify and elucidate the risk factors for an occupational motor vehicle collision with a train.

Acknowledgments

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References

References are available and will be furnished upon request.

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Noroviruses

Advanced laboratory diagnostics have led to earlier detection, containment of outbreaks

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Noroviruses are a group of viruses that are often found as the cause of infection when an individual complains of having the "stomach flu". Previously termed Norwalk-like viruses or small round structured viruses, they are genetically diverse single-stranded RNA viruses. Other terms used to describe this virus are "winter vomiting disease", Desert Shield Virus and the Cruise Ship Virus. The name *Noro* comes from Norwalk, Ohio where an Acute Gastroenteritis Outbreak (AGE) was investigated involving 252 college students, 50% of whom experienced GI illness. Though it has long been recognized as a major public health concern, it has been extremely difficult to detect nonbacterial gastroenteritis due to limits in laboratory detection. The previous methods used to detect enteric viruses involved electron microscopy (EM), which was tedious and insensitive. In addition, due to the antigenic diversity and inability to culture in cell lines, it was difficult to develop assays with acceptable sensitivity rates. With the advent of the molecular age in laboratory diagnostics, including RT-PCR (reverse transcriptase polymerase chain reaction), it has been possible to demonstrate that noroviruses are thought to cause at least 50% of all foodborne gastroenteritis (CDC Norovirus Technical Fact Sheet). There are five genotypes of noroviruses classified as GI, GII, GIII, GIV, and GV. Only types I, II, and IV have been demonstrated in humans. The most common strain found in Kentucky is genotype II.

Symptoms of the disease include nausea, vomiting, diarrhea, and stomach cramping. Less often seen symptoms are low-grade fever, chills, headache, muscle aches, and tiredness. In general, the acute phase of the illness begins suddenly and the patient quickly begins to feel very sick. Children are more likely to experience vomiting than adults, though the majority of people with the virus will experience both vomiting and diarrhea. Up to 30% of affected individuals may be asymptomatic. The incubation period for norovirus is usually between 24-72 hours, though some individuals may be affected in as little as 12 hours. The duration of illness is 1-2 days and is usually self-limiting with no long-term sequelae. Rare complications involving dehydration can occur which can be fatal, particularly in older people with underlying health conditions.

Transmission of noroviruses is typically via the fecal-oral route due to consumption of contaminated food and water or direct person-to-person contact. Only 10 viral particles are sufficient to cause disease. Cruise ships, nursing homes, schools, and restaurants have all been well documented as environments where infection has occurred. These viruses are extremely stable in the environment and have shown resistance to low pH and bleach up to 10 parts per million (ppm). There may be presymptomatic viral shedding, though it usually begins with the onset of symptoms and may last for up to two weeks after recovery. The genetic diversity of noroviruses can also cause difficulties in building resistance within the host. Immunity appears to be strain-specific, lasting only a few months. This allows the virus to repeatedly attack the same individuals and explains the high attack rates for all ages during outbreaks.

The impact of norovirus infections can be seen in Table 1 (page 6). A disproportionate number of foodborne-related illnesses can be contributed to this virus. Often times it is spread rapidly on a wide-scale due to contamination by a food handler. This is particularly troubling when seen in nursing homes and schools, as additional infections could occur rapidly in these settings.

The Kentucky Department for Public Health now has the capability to offer this testing at our State Public Health Laboratory. In recent years the state lab relied on sending specimens to an alternate testing site, which made it difficult to trace and characterize outbreaks, as there were often lengthy delays in receiving results. The state lab can now perform the testing with results completed 1-2 days from receipt of the specimen. The optimal sample for testing is 5 grams of stool collected in the acute phase (48-72 hours of onset) shipped as Biological

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Substance, Category B at 4 degrees Celsius. It is best to collect samples from 3-7 patients, but no more than 10. In June 2007, the state lab received 8 samples from Daviess County related to a nursing home outbreak, which were identified as Genotype II. Confirmed patients should be managed with Standard Precautions, but Contact Precautions are recommended in certain situations (e.g., facility outbreaks, incontinent persons, etc.). More information for submission of norovirus samples and collection kits can be ordered from the state lab Web site at http://chfs.ky.gov/dph/info/lab/.

Norovirus outbreaks and infections are much more common than once thought. With the availability of more sensitive assays and thorough epidemiological investigations, norovirus outbreaks are now easier to pinpoint and contain. While there may be little success in completely preventing these types of outbreaks, advanced laboratory diagnostics and increased knowledge will aid in earlier containment of the virus.

Agent	Illnesses	Hospitalizations	Deaths
Noroviruses	9,000,000	20,000	124
Campylobacter sp.	1,963,141	10,539	99
Salmonella	1,342,532	16,102	556
Clostridium perfringes	248,520	41	7
Staph Enterotoxins	185,060	1,753	2
Escherichia coli	173,107	2,785	78

Data Source: Mead PS, Slutsker L, Dietz V, McCaig LF, Bresee JS, Shapiro C, Griffin PM, Tauxe, RV. Food-Related Illness and Death in the United States. Emerg Infect Dis 1999;5:5.