



## Pathology & Biology Section – 2008

### G14 Subway Train Related Fatalities in New York City: Accident vs. Suicide

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This study aims to describe the characteristics of subway train-related fatalities, including scene investigation, police investigation, autopsy, medical and psychiatric history, and toxicology studies.

This presentation will impact the forensic science community by contributing to literature by attempting to identify factors which will be helpful in differentiating accidental from suicidal deaths.

Determination of the cause of death in subway train-related fatalities usually is obvious. However, determination of the manner of death can be challenging. A common dilemma is the differentiation between accidental and suicidal death. In order to accurately determine the manner of death, all relevant factors must be considered, including: eyewitness accounts, physical injuries, medical and psychiatric history, scene investigation, and toxicology results. The characteristics of subway train-related fatalities were examined in order to determine which factors may be helpful in differentiating accident from suicide. Subway train-related deaths with homicide and undetermined manners also are included.

A computerized search of all medical examiner death certificates issued between January 1, 2003 and May 31, 2007 was performed for the words "subway", "train", or "tracks" to identify all subway train-related fatalities. The autopsy data, scene investigation report, police report, toxicology results, and other relevant documents in the OCME file were reviewed for each case.

Two-hundred and eleven (211) consecutive subway train-related fatalities were investigated by the Office of Chief Medical Examiner of the City of New York during the study period (approximately 1 per week). Of these 211 deaths, 175 underwent autopsy and 36 were examined only externally. External examination without full autopsy usually was done pursuant to a religious objection which must be honored under New York law unless there is a suspicion of homicide or an imminent threat to public health. The distribution of deaths by manner was: suicide (111), accident (76), undetermined (20), and homicide (4). The causes of death were either blunt trauma (206) or electrocution (5). The average age was 44 years with a range of 14 to 85, and a male to female ratio of approximately 5 to 1.

Witness accounts were available in 66% of the accidental deaths and 95% of the suicidal deaths. Ethanol was detected in 42% of the accidental deaths with an average blood alcohol concentration of 0.20 gm%, compared to 14% of suicides with an average blood alcohol concentration of 0.16 gm%. Antidepressant medications were detected in 8% of the accidental deaths compared to 21% of the suicides. Cocaine and/or benzoylcegonine were detected in 25% of the accidental deaths, compared to 3% of the suicides. Head, torso, and extremity injuries occurred in 84%, 70%, and 62% of accidental deaths compared to 90%, 80%, and 77% of suicides, respectively. There were skull fractures in 53% of accidental deaths compared to 65% of suicides. Decapitation and torso transection occurred in 1% and 3% of accidental deaths compared to 7% and 8% of suicides, respectively.

There were 20 deaths with an undetermined manner; all due to blunt trauma. Only 35% of the undetermined deaths were witnessed. There were four homicides of which two victims were pushed into the path of a subway train. In one homicide, the victim was chased into a tunnel and subsequently struck by a train. The remaining homicide involved an un-witnessed assault followed by a fall onto the subway tracks and electrocution by contact with the third rail.

Eyewitness accounts are the most helpful factor for determining the manner of these deaths. The finding that suicides have a higher rate of eyewitness accounts than accidents may be a reflection of the requirement to demonstrate intent in order to certify a death as a suicide. Without evidence of clear suicide intent, these deaths typically would be certified as accidents or undetermined manners. A suicide note, prior expression of intent, and prior suicide attempt are other helpful factors. Physical injuries and toxicology findings are, by themselves, non-specific, but in conjunction with other factors, may be helpful. Torso transection and extremity amputation were more frequent in suicides, but occurred in accidental deaths as well. Antidepressant medications were more frequently detected in suicides, whereas cocaine and ethanol were more frequent in accidents. These factors should not be interpreted in isolation when determining the manner of death. Although there is no pathognomonic autopsy finding that determines the definitive manner of these deaths, these results may be weighed in the context of the entire evaluation along with other circumstantial and investigative findings. In un-witnessed deaths where additional information is unavailable or discrepant, the most appropriate manner of death usually is undetermined.

#### **Subway, Accident, Suicide**