



## Pathology/Biology Section - 2016

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### H101 Heroin and Asthma Deaths in Cook County, Illinois — A Two-Year Review

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After attending this presentation, attendees will better understand the incidence, including seasonal trends, demographics, associated drugs, and significance of asthma history of heroin deaths.

This presentation will impact the forensic science community by providing data on heroin deaths in Cook County and a comparison of the demographics, autopsy, and histological findings of heroin users who had a history of asthma to those with did not.

According to the National Survey on Drug Use and Health (NSDUH), in 2012 approximately 669,000 Americans reported using heroin in the past year. The National Institute on Drug Abuse showed that in 2013 more than 8,000 deaths from heroin occurred in the United States.

Asthma is a chronic inflammatory disorder of the airways characterized by hyper reactivity, with reversible airflow obstruction, and respiratory symptoms of an attack that can include shortness of breath or respiratory distress even until death. Asthma is a commonly encountered disease in the United States, with an estimated 25.5 million people afflicted in 2012.

Although studies have shown a link between asthma deaths and heroin abuse, the process in which opiates exacerbate asthma is still unclear. Heroin may impair judgement during an acute asthma attack leading to inadequate treatment and late arrival for care. Alterations in mental status may increase aspiration risk and predispose to aspiration-induced bronchospasm. Some studies have demonstrated that opioid-induced bronchoconstriction is mediated by histamine release and that heroin itself can degranulate mast cells and release pre-formed mediators of inflammation.

The files of the Cook County Medical Examiner's Office in Chicago, IL, were searched for cases involving heroin as a primary or contributory cause of death from January 2013 to December 2014. Cases were reviewed for age, sex, race, cause and manner of death, gross and microscopic autopsy findings, and toxicology results. The route of administration of the drug was reported if determined during the death investigations.

Six hundred ninety-six cases were identified that met the criteria: 149 female and 547 male. The ages ranged from 17 years to 68 years of age. The race distribution was: 435 Caucasian, 257 African-American, 1 Oriental, and 3 Hispanic. The manner of death was determined to be accident in 681 cases, suicide in 5, natural in 5, homicide in 2, and undetermined in 3.

Of these cases, 662 listed heroin as the primary cause of death: 142 female and 520 male. In this group, the age range was the same as above. The smallest number of cases occurred in the month of January 2013 (17), while the greatest number occurred in September 2014 (37). Regarding seasonal distribution, it was found that in the spring (March-May of both years) the smallest number of deaths (154) occurred, whereas in the fall (September-November of both years) the greatest number (180) of deaths occurred.

In 34 cases, heroin was a contributory cause of death. In this subset, the age range was 20 years to 64 years old. Seven were female and twenty-seven were male. Regarding the seasonal distribution, in spring (March-May of both years), the greatest number of deaths (15) occurred, whereas in fall (September-November of both years) the smallest number (5) of deaths occurred. In this group, six cases died of "bronchial asthma."

In both of the groups, "heroin as primary cause of death" and "heroin as a contributory cause of death," this study found a history of asthma in 58 cases. In this subset, the age range was 19 years to 64 years old. Twenty-one were female and thirty-seven were male. Regarding the seasonal distribution, in the winter (January, February, December of both years), the greatest number of deaths (21) occurred, whereas in summer (June-July of both years) the smallest number (10) of deaths occurred.

Whenever lung slides were available, they were reviewed and graded for asthma changes.

This work supports the hypothesis that a history of asthma is frequently seen in heroin deaths. In these cases, deaths usually occur in the coolest months, perhaps because cold air acts as a trigger for exacerbations of asthma.

Even though there are a number of limitations (route of administration not always known, small number of cases, etc.), this study provides a review of heroin deaths in a large county in the United States.

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#### Heroin, Asthma, Death

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