Embargoed until Monday, April 24th at 1:30pm ET

Deaths Associated with Opioid Use and Possible Infectious Disease Etiologies Among Persons in the Unexplained Death (UNEX) Surveillance System — Minnesota, 2006–2015

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Background: During 2006–2015, the Minnesota Department of Health (MDH) identified 2,253 opioid toxicity deaths in Minnesota through death certificate surveillance using *International Classification of Diseases*, Tenth Edition codes (ICD-10). Research has shown opioid users are at increased risk for pneumonia. MDH's Unexplained Death surveillance system (UNEX) identifies unexplained deaths with possible infectious cause for additional pathogen testing. We described UNEX-identified deaths with toxic opioid levels found at autopsy during 2006–2015.

Methods: UNEX-identified deaths among Minnesota residents aged >12 years during 2006–2015 were reviewed for opioid toxicity identified by postmortem toxicological screening. Cause of death, clinical signs, preexisting conditions, and toxicology results were extracted from autopsy reports. Deaths with hospitalization >24 hours antemortem and those without autopsy reports were excluded.

Results: Fifty-nine (3.5%) of 1,676 UNEX deaths had evidence of opioid use. Median age was 43 years (range: 16–82 years); 31 (53%) were female. Twenty-two deaths involved toxic opioid levels, but lacked correct ICD-10 codes to be reported by statewide opioid death surveillance. Thirty-two (54%) of 59 UNEX deaths with opioid use had pneumonia. A pathogen was identified in 20 (63%) pneumonia cases, including *Streptococcus pneumoniae* (n = 6), *Haemophilus influenza* (n = 3), and influenza A (n = 2). Of 20 pneumonia cases, 9 (45%) had a drug abuse history, 6 (30%) had chronic pain, and 1 (5%) was receiving methadone drug therapy.

Conclusion: UNEX identified deaths missed by opioid death surveillance, indicating that the total burden of opioid-associated deaths was underestimated in Minnesota. The contributions of opioid toxicity, infectious disease, or their interactions to death are challenging to disentangle; understanding these interactions might inform future opioid-related mortality prevention efforts.