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Outbreaks of Infections Associated With Drug Diversion by US Health Care Personnel

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Abstract

Objective: To summarize available information about outbreaks of infections stemming from drug diversion in US health care settings and describe recommended protocols and public health actions.

Patients and Methods: We reviewed records at the Centers for Disease Control and Prevention related to outbreaks of infections from drug diversion by health care personnel in US health care settings from January 1, 2000, through December 31, 2013. Searches of the medical literature published during the same period were also conducted using PubMed. Information compiled included health care setting(s), infection type(s), specialty of the implicated health care professional, implicated medication(s), mechanism(s) of diversion, number of infected patients, number of patients with potential exposure to bloodborne pathogens, and resolution of the investigation.

Results: We identified 6 outbreaks over a 10-year period beginning in 2004; all occurred in hospital settings. Implicated health care professionals included 3 technicians and 3 nurses, one of whom was a nurse anesthetist. The mechanism by which infections were spread was tampering with injectable controlled substances. Two outbreaks involved tampering with opioids administered via patient-controlled analgesia pumps and resulted in gram-negative bacteremia in 34 patients. The remaining 4 outbreaks involved tampering with syringes or vials containing fentanyl; hepatitis C virus infection was transmitted to 84 patients. In each of these outbreaks, the implicated health care professional was infected with hepatitis C virus and served as the source; nearly 30,000 patients were potentially exposed to bloodborne pathogens and targeted for notification advising testing.

Conclusion: These outbreaks revealed gaps in prevention, detection, and response to drug diversion in US health care facilities. Drug diversion is best prevented by health care facilities having strong narcotics security measures and active monitoring systems. Appropriate response includes assessment of harm to patients, consultation with public health officials when tampering with injectable medication is suspected, and prompt reporting to enforcement agencies.

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In May 2012, the New Hampshire Department of Health and Human Services began investigating a cluster of hepatitis C virus (HCV) infections at a single hospital.[1] This investigation uncovered a large HCV outbreak spanning several years, involving more than a dozen hospitals, and impacting thousands of patients in 8 states. This outbreak was caused by an HCV-infected traveling radiology technician who, in August 2013, admitted to having been addicted to narcotics and diverting medications such as fentanyl from patients.[2] The mechanism of diversion used by the technician involved a form of tampering that exposed patients to his blood. This outbreak has resulted in multiple lawsuits involving the staffing agencies and institutions that employed the technician.[3] This multistate outbreak and others like it have revealed multiple gaps in prevention, detection, and response to drug diversion in US health care facilities.[4-6]

The National Association of Drug Diversion Investigators defines drug diversion as

> any criminal act or deviation that removes a prescription drug from its intended path from the manufacturer to the patient. This can include the outright theft of the drugs, or it can take the form of a variety of deceptions such as doctor shopping, forged prescriptions, counterfeit drugs and international smuggling.[7]

Diversion by health care personnel represents one facet of drug diversion that is gaining recognition as a ubiquitous and poorly controlled patient safety risk.[8] Mechanisms

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of diversion by health care personnel can include documentation of a medication dose not actually administered to the patient but saved for use by the health care professional, theft by scavenging of wasted medication (eg, removal of residual medication from used syringes), and theft by tampering (eg, removal of medication from a medication container or syringe and replacement with saline or other similar-appearing solution that may be administered to patients). Patient safety is compromised whenever diversion by health care personnel occurs. Harms can include patients not obtaining adequate pain management, exposure to substandard care from an impaired health care professional, and exposure to life-threatening infections.[8] However, when diversion is suspected or identified, the potential for patient harm may be overlooked.

In light of the multistate outbreak of HCV infections identified in New Hampshire and the gaps it highlighted, we reviewed reported outbreaks of infections resulting from drug diversion by health care personnel in US health care settings. In this article, we offer a summary of available information about the types of infections, drugs, mechanisms of diversion, and health care personnel that have been associated with outbreaks stemming from this activity. We conclude with a summary of recommended standard protocols and public health actions that should be considered when diversion by health care personnel is suspected or identified.

PATIENTS AND METHODS

The Division of Healthcare Quality Promotion at the Centers for Disease Control and Prevention (CDC) frequently assists health departments and institutions with investigations of outbreaks involving health care exposures, including drug diversion. We reviewed our internal records and CDC-authored reports related to US outbreaks from drug diversion by health care personnel for the 14-year period extending from January 1, 2000, through December 31, 2013. A PubMed search was conducted for outbreak investigations occurring during the same time period using combinations of key words including *outbreak*, *diversion*, and *narcotics*. We also examined reference lists from selected publications seeking to identify additional outbreaks meeting our inclusion criteria.

For the purposes of this review, an *outbreak* was defined as a health care–associated infection occurring in 2 or more patients in whom disease transmission likely resulted from drug diversion by health care personnel in a US health care facility. We excluded outbreaks occurring prior to January 1, 2000, outbreaks occurring in health care settings outside the United States, as well as reports of drug diversion in which no resulting patients infections were documented.

We compiled the following information for each outbreak identified: year investigated, state(s), health care setting(s), specialty of the implicated health care professional, implicated medication(s), infection type(s), number of patients with documented or suspected infection, mechanism(s) of diversion, and resolution of the investigation. We relied on case definitions developed by investigators for each specific outbreak when enumerating the number of infected patients. Typically, case definitions were based on results of laboratory testing and temporal associations between health care exposures and symptom or infection onset among affected patients.

Patient notification, with recommendations for blood-borne pathogen testing, is often performed when health care–associated viral hepatitis transmission risks are identified.[9] For outbreaks of HCV infection, we compiled information about the number of facilities performing notification and the number of potentially exposed patients, using information from media reports and other sources that were available online or in our files.

RESULTS

We identified 6 outbreaks of infections that resulted from drug diversion by health care personnel in US health care settings in the past 10 years. Two outbreaks resulted in gram-negative bacteremia in 34 patients; the remaining 4 outbreaks resulted in HCV infection in 84 patients. All of the outbreaks occurred in one or more hospitals; these facilities were located in 8 states. Tampering with injectable controlled substances was documented or suspected in all of the outbreaks; fentanyl was diverted in at least 4 of these events.

Implicated health care professionals included 3 technicians and 3 nurses (including 1 certified registered nurse anesthetist [CRNA]); 2 of the health care professionals were

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