**Problem**

A 36-year-old hospital care aide (nursing assistant) who had been diverting discarded drugs died after self-administering what she may have thought was an opioid but was actually a neuromuscular blocking agent.\(^1\)\(^2\) Kerry O’Keefe had found an unlabeled syringe containing a clear solution in a biohazard box, injected the solution, and suffered immediate paralysis, respiratory arrest, and then death. Although this happened in Vancouver, Canada, it’s a sad and cautionary story that should serve as a wake-up call to all U.S. hospitals to take the necessary steps to prevent and detect the theft and use of controlled substances.

**The Story**

According to news reports,\(^3\) Kerri had worked in the emergency department (ED) for about 15 years. By all accounts, she loved her job and was extremely well-liked and respected by her colleagues. She had a long history of drug and alcohol dependence and had been placed on leave twice before, but was allowed to return to work after stints in rehab. However, she concealed the breadth and depth of her addiction from both her family and her colleagues and friends at work. When Kerri did not show up for a planned family event, her mother went to her apartment, it appears Kerri would have arrived soon. Upon entering the apartment, Kerri was shocked to find her daughter dead and her apartment littered with an arsenal of used syringes, vials, needles, and tourniquets. Many of the syringes included patients’ names and dates. Investigators also found stolen urine samples from patients in the refrigerator, presumably to use if she was asked to provide a sample for drug testing.

The hospital had numerous physical controls in place to prevent unauthorized access to controlled substances in automated dispensing cabinets (ADCs), locked cabinets, and pharmacy vaults. The hospital also required periodic counts of controlled substances, and documentation when removing them from storage locations. Kerri was able to gain access to drugs despite the existing safeguards because she stole discarded syringes, vials, and patches that contained leftover drugs from biohazard boxes. Most boxes were attached to the outside of locked cabinets but could be removed easily.

Based on the drug supplies found in her apartment, it appears Kerri would collect a stockpile of medications, especially leftover morphine and fentanyl, then secretly inject them at home. It appears she also self-injected drugs in unlabeled syringes, perhaps hoping the drugs were opioids, but on the day of her death, the drug was rocuronium. The unused syringe containing the neuromuscular blocking agent had been discarded in a biohazard box after a planned intubation in the ED was cancelled. According to investigators, Kerri had been stealing entire biohazard boxes or emptying them into a backpack or a small, wheeled suitcase that she routinely took to work.\(^1\)\(^3\) Despite the presence of security cameras, her actions were never discovered prior to her death.

**Alarming Statistics**

Drug overdoses are the leading cause of accidental death in the U.S., and opioid addiction is driving this epidemic,\(^4\) with more than 18,893 overdose deaths in 2014. Of the 21.5 million Americans aged 12 or older who had a substance use disorder in 2014, 1.9 million were using prescription pain relievers, which is far fewer than the number who were abusing heroin, for example.\(^5\) The latest data from the U.S. Substance Abuse and Mental Health Services Administration shows that about one in every 10 health care professionals is struggling with addiction or abusing drugs not prescribed for them.\(^6\) Very few health care workers who are diverting and abusing drugs are ever caught, often despite clear signs in their physical appearance, thoughts and behavior, and performance. Among practicing nurses, rates of substance misuse, abuse, and addiction are thought to be as high as 20%.\(^7\) These incidence rates mirror the general population, meaning that health care workers are not at a higher risk of drug abuse than the general population. However, the overall pattern of drug abuse and dependency among health care professionals is unique.\(^8\)

**Unique Dependency Pattern**

Studies have shown that among health care workers there is a disproportionate misuse of prescription drugs compared to street drugs, primarily because they can access prescription medications easily and often.\(^9\) Another pattern that is evident is that abuse tendencies arise based on whatever drugs are readily available to the worker.\(^10\) In addition to personal or family stress, having to deal with patient illness, harm, or death, an unpredictable work pace, heavy work demands, and long hours can make stress alleviation through drug use an attractive and convenient coping mechanism.\(^10\)\(^11\) These stresses lead many health care workers to use tobacco and alcohol as a way to relax and unwind after work. However, reliance on these legal but addictive substances can be a “slippery slope” leading to prescription drug abuse and subsequent addiction.\(^10\) Although some professionals have a misconception that their knowledge of the drug will help them “control” its use,\(^12\) for many of them, it’s a very short distance between misuse and dependence.

**Risks to Patients and Workers**

Drug diversion and abuse puts patients at risk for suboptimal treatment from receiving diluted or substituted medications, serious infections caused by contaminated needles and syringes, and other errors committed by health care professionals who are working while impaired. The toll can also be brutal on...
the impaired worker who is abusing prescription drugs. Many of them feel guilt and despair, suffer from physical and mental health problems, and may be indifferent to the risk of death from an overdose.

**SAFE PRACTICE RECOMMENDATIONS**

The systems for preventing and detecting drug diversion and dealing with workers who are battling prescription drug dependency are clearly insufficient given the current scope of the problem. Inadequate monitoring systems and lax controls that lead to drug diversion also result in significant fines levied by the government. The real challenge is striking a careful balance between recognizing addiction as a disease and taking steps to prevent patient and employee harm. Without getting into the controversy surrounding the debate about whether to apply a “crime and punishment” model of accountability for drug abusers or remove the stigma of drug abuse so health care workers who need treatment will seek it, the following recommendations, while not exhaustive, can help workers begin the long journey to reducing drug diversion and abuse.

**Awareness and Recognition of the Problem**

**Expect diversion**

Given that one in 10 health care practitioners/workers will abuse drugs, take all necessary steps to prevent and detect it. No news is not good news when it comes to drug diversion and abuse.

**Watch for signs of impairment and diversion**

Educate all workers to recognize diversion and drug-impaired coworkers. Signs and symptoms include:

- Changes in behavior
  - Increasing isolation from coworkers, social avoidance at work
  - Frequent illness, accidents, emergencies, tardiness
  - Complaints from others about poor work performance
  - Moodiness, depression, irritability, suicide threats
  - Frequent trips to the bathroom or locker room, unexplained absences, long lunches
  - Illogical or sloppy charting

Physical signs
  - Shakiness, tremors, slurred speech, sweating, unkempt appearance
  - Wearing long-sleeved clothing even in warm environments

Signs of diversion
  - Frequent, incorrect controlled substance counts
  - Large or inconsistent amounts of wasted narcotics
  - Discrepancies between patient-reported pain and pain-medication administration
  - Increase in amount of drugs needed on the unit or in the pharmacy.

**Report suspicions**

Establish an organizational expectation to report suspected drug diversion and worker impairment via a confidential process (e.g., hotline).

**Educate staff about resources**

Routinely provide staff education regarding the resources available if diversion is suspected or if practitioner wants to seek treatment for addiction.

**Drug Security and Chain of Custody**

**Secure controlled substances at all times**

- Before leaving the medication preparation area, secure vials containing leftover controlled substances that are yet to be discarded. Walking away to administer a dose or attend to a pharmacy task without securing the vial can invite diversion.
- Prohibit drawing more than a single dose of a controlled substance into syringes; saving partial doses in syringes exposes the drug to possible diversion.
- Remove controlled substances from an ADC close to the time they are needed for a procedure or for administration. Avoid removing a drug “just in case” it is needed.
- Secure all controlled substance infusions in locked infusion pumps, and require a witness to observe the waste once the infusion is removed from the pump.
- Secure the patient’s home medications immediately after collection.
- Secure controlled substances in the operating room, procedural areas, and anesthesia work areas during and between surgical cases.

**Manage inventory**

Require staff to verify the dispensing and receipt of controlled substances. In areas without ADC storage, the person delivering and the person receiving controlled substances should each co-sign the appropriate record, and the drugs should be immediately secured. When using an ADC for dispensing and storing controlled substances, activities should be tracked and reconciled using data available in the vault software.

**Use the correct containers**

Know the federal, state, tribal, and local laws regarding the disposal of controlled substances, hazardous waste, and sharps; choose the most appropriate and secure containers for safe disposal.

**Secure and track sharps/pharmaceutical waste containers**

- In patient-care areas, use sharps/pharmaceutical waste containers with small openings that do not easily allow medication devices or waste to be shaken out. (Some containers [e.g., Cactus Smart Sink] render narcotics unrecoverable, non-retrievable, and unusable.)
- When larger containers must be used (e.g., in the operating room or procedural areas), use video cameras nearby and regularly observe the monitors.
- Lock sharps/pharmaceutical waste containers to the wall, or secure to other stationary equipment that cannot be easily removed from a clinical unit. Secure all keys needed to replace containers, and limit access to a few designated staff (or to an external company that can collect and replace the containers). Establish a process to track and reconcile all containers to ensure the detection of unauthorized removal (some containers have barcodes). Restrict access to the stock of empty back-up containers.
- Place containers in areas where they can be consistently observed or monitored by a video surveillance system. If a container must be removed from a secure wall unit or its usual location because it is full, establish a secure holding area while...
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awaiting proper pick-up for disposal.

Restrict access to controlled substances
- Establish strict guidelines regarding who can have access to controlled substances, including those stocked in ADCs, pharmacy vaults, treatment kits, and areas where expired drugs are stored.
- Adjust par levels of controlled substances in the pharmacy (and satellite pharmacies) and on patient care units based on usage rates, so that excess supplies are not available.
- Place each type of controlled substance (including opioid infusions) in ADCs in a separate, lidded compartment or area so access is granted only to the intended drug.
- Allow access to medications in clinical areas for current patients on that unit only.
- Limit the number of people who can add new patient profiles to the ADC software.

Reduce waste
Provide controlled substances in dose sizes that eliminate or minimize waste (e.g., provide a 2-mg or 5-mg syringe of morphine instead of a 10-mg or 15-mg syringe).

Monitor prescription pads
Establish a process to secure, track, and reconcile all prescription pads used for controlled substances in patient care units.

Prohibit bags
Do not allow purses, backpacks, briefcases, or other personal storage cases in areas where controlled substances are stored or discarded.

Safe Drug Disposal
While following all applicable federal, state, tribal, and local laws and regulations regarding the disposal of controlled substances, consider the following recommendations:

Discard remaining controlled substances in single-use vials
With a witness present, draw remaining medication into a syringe, require the witness to verify the volume in the syringe, then squirt the medication into a pharmaceutical waste box while the witness watches. Do not discard the vial in the sharps box before removing and disposing of any leftover medication from the vial. Document the volume and dose of the pharmaceutical wastage, which should be verified and co-signed by the witness.

Discard remaining controlled substances in prefilled syringes
Require a witness to verify the volume in a prefilled syringe, then squirt the medication into the pharmaceutical waste box while the witness watches. Do not discard the syringe in the sharps box before removing and disposing of any leftover medication. Document the volume and dose of the pharmaceutical wastage, which should be verified and co-signed by the witness.

Return unused or expired controlled substances
Return the container of unused inventory to the pharmacy for disposal, using a process that verifies delivery and receipt.

Flush fentanyl transdermal patches
Current manufacturer and U.S. Food and Drug Administration (FDA) guidelines direct users to fold patches in half, sticky sides together, then flush down the toilet. If flushing is not an option, a device that deactivates any remaining drug in the patch should be used prior to disposal. Deactivation and disposal should be documented with a second witness.

Return selected high-alert medications
For selected high-alert medications (e.g., neuromuscular blocking agents, concentrated electrolytes), follow the same disposal procedures used for controlled substances. Witnessing waste may not be necessary.

Dispose of inventory
Establish a witnessed process for the disposal of controlled-substance inventory in the pharmacy by a pharmacist or an authorized third party.

Monitoring
Implement monitoring systems
- Allocate sufficient human resources for an interprofessional team to develop and oversee a controlled substance management and prevention program. Activities should include: ensuring proper documentation; conducting periodic documentation reviews and routine inventory counts; investigating all reports of potential diversion, impaired workers, and unreconciled counts or discrepancies; viewing monitor footage; and conducting observations of practices with controlled substances.
- Use surveillance cameras in high-risk areas where diversion might take place (e.g., narcotic vault, IV room, ADCs) and review monitors or footage regularly.
- Use software to monitor controlled substance movement in ADCs (e.g., Pandora) and pharmacy narcotic vaults (e.g., NarcStation, CIISafe).

Review documentation
Establish a system for periodically reviewing the documentation and use of controlled substances, paying particular attention to:
- Comparing removal of a controlled substance from an ADC or other storage location to the medication administration record;
- Comparing the time of removal of a controlled substance to the time of dispensing or administering the drug (delays could signal diversion);
- Comparing pain-medication administration time to patient-reported pain scales;
- Documented pain medication administered to an unconscious patient;
- Pain scores that are much higher when a particular staff member is on duty;
- Frequent ADC overrides by a practitioner to gain access to controlled substances; and
- Irregular usage reports from ADCs and narcotic vaults.

Observe staff
Regularly observe how staff manage controlled substances, including disposing of drugs and other security processes. Also observe staff for at-risk behaviors such as badge sharing or failing to secure drugs, and coach them
to exhibit the desired behaviors.

Investigate immediately
Start an investigation immediately upon learning that the count of controlled substances does not reconcile with the documentation. The investigation should be completed before any staff member on the unit or in the pharmacy leaves the hospital.

REFERENCES