

Commentary

Health Care Serial Murder: A Patient Safety Orphan

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Two recent instances of alleged health care serial murder (HCSM) highlight the complex issues associated with these occurrences and raise questions about the priority of efforts to address this problem and the adequacy of current health care safety systems for preventing such intentionally caused adverse events.

In April 2009, a licensed vocational nurse (Kimberly Saenz) was indicted for capital murder and aggravated assault for reportedly injecting 10 renal dialysis clinic patients with bleach; 5 of the patients died.^{1,2} Additional deaths are being investigated, and legal proceedings are ongoing in the matter. In the other case, in March 2009 an Air Force nurse (Michael Fontana) was charged with murder for reportedly injecting 3 elderly ICU patients with excessive amounts of narcotics and lorazepam.^{3,4} He was additionally charged with altering the medical records of the patients. In November 2009 he was acquitted of all charges, and at the time of this writing is awaiting a clinical competency evaluation.⁵

Since 1975, at least 35 health care workers in the United States have been formally charged with serial murder of patients.^{1-4,6} Additional persons have been investigated for such crimes but have not been prosecuted because of problems with the evidence needed for indictment and prosecution. Ironically, health care workers are overrepresented among known serial killers in general, and some of the worst serial killers of all time have been physicians.⁷⁻⁹

The Epidemiology of Health Care Serial Murder (HCSM)

Health care serial murders share common characteristics of setting, circumstance, and psychopathology that differentiate them from other homicides or serial murders,^{7,10} as follows:

1. The murders, or attempted murders, are of patients in a health care setting.
2. The perpetrator of the crime is employed by the medical facility where the incident occurs.
3. Two or more patients are affected in separate incidents

that span a period of time that is almost always longer than 30 days.

4. The malicious acts occur consequent to the health care worker's duties.

5. The perpetrator has the psychological capacity for committing additional malicious acts affecting patients, as usually determined during the investigation of a suspicious incident.

HCSM should not be confused with euthanasia, assisted suicide, the mass murder or assault of patients for political reasons, or the episodic murder of a patient as a crime of passion or in the course of carrying out another crime.

Multiple instances of HCSM have been reported on,¹¹⁻²¹ but few reports have tried to collate data about these occurrences.^{6,22,23} Studying HCSM is especially difficult because the events are rare, there is no disease classification code or other specific method to identify such deaths, the events are not generally required to be reported to public health agencies, and there is no centralized source of information about such occurrences. Law enforcement statistics are not helpful because they do not routinely distinguish murder victims at health care facilities according to whether they are patients, staff or visitors.

A review of 90 health care professionals prosecuted for HCSM between 1970 and 2006 identified more than 100 instances of suspicious deaths.⁶ Reported instances were from 21 countries and 22 states in the U.S., with the latter accounting for 40% of the incidents and Texas having the most of any American state. Multiple additional instances have been reported in the media from several countries since this study was published. Two recently reported instances in the U.S. occurred in Texas. Whether HCSM is truly more common in the U.S. than in other developed countries, or in Texas compared with other states, cannot be determined from current data.

More than 1,050 suspicious deaths have been linked to persons charged with HCSM in the U.S. since 1975, for an average of 30 such deaths per year. However, the circumstances of many of the convicted health care serial murderers suggest that additional killers have not been recognized,^{6,7} so the actual

number of patients harmed by these acts may be higher.

The number of health care workers charged with HCSM has increased in each of the past four decades, with more than four times as many such occurrences being reported worldwide during 2000–2009 than 1970–1979.⁶ The number of such instances reported in the U.S. suggests an increase, but the trend is less clear than for the number of such occurrences worldwide.

Most reported instances of apparent HCSM have occurred in countries having technologically advanced health care and generally in health care settings employing sophisticated technology.⁶ These events most often have occurred in acute care hospitals (70%), followed by nursing homes (20%) and outpatient settings (10%), with the perpetrator often murdering in more than one health care setting and/or in multiple geographic locations.^{6,10,19} The types of health care workers involved have included nurses (68%), nursing aides (18%), physicians (12%), and allied health professionals (2%).⁶ Physicians have been involved with a relatively small percentage of the incidents but have accounted for a disproportionately large number of deaths.^{6,8,9}

The most common method of HCSM has been intravenous injection of a noncontrolled medication such as epinephrine, succinylcholine, concentrated potassium chloride, digoxin, or insulin.⁶ Narcotics are rarely used by health care serial killers in the U.S. (in contrast to assisted suicide or euthanasia), and then mostly by physicians. Other methods have included suffocation (for example, smothering with a pillow), drowning (for example, by pouring large quantities of water into a patient's mouth), intravenous injection of air (air embolus), and tampering with medical equipment.

The Difficulty of Investigating and Prosecuting HCSM

When considering the mortality attributable to health care serial killers and the number of persons prosecuted for these crimes, it should be recognized that modern health care provides many nearly ideal settings and circumstances for committing murder without being detected or held accountable.²⁴ Patients are often disoriented, sedated, or not aware of their surroundings or what is being done to them. They may be severely weakened and unable to defend themselves. Caregivers often work alone and in private and have ready access to multiple potentially lethal agents, the use of which may not be attributable. Care may involve numerous types of technology used by, or invasive interventions performed by, persons unknown to the patient or other caregivers. In addition, death is a relatively frequent occurrence in health care facilities, so a

patient's death initially may not be suspected of being due to a criminal act even when it is unexpected.

Law enforcement officials have repeatedly noted that the investigation and prosecution of suspicious health care deaths is exceptionally complicated and is often confounded by routine health care practices that result in potential evidence of wrongdoing being destroyed or not safeguarded in a manner that it can be used for forensic purposes. For example, bodies are customarily moved from the site of death and the site is cleaned soon after the patient's demise, thereby precluding crime scene investigation. Resuscitation efforts may destroy the crime scene. Bodies may be cremated before foul play is suspected, or bodies may be embalmed and buried, complicating use of toxicological evidence because of problems interpreting data from exhumed bodies. Drugs used to commit the murder may have been used therapeutically, also complicating toxicological findings. Physician orders and hospital protocols may be vague or ambiguous in specific patient care situations. Medical records may be incomplete, unclear, or even contradictory. Further, information about the death may not be readily shared because of patient privacy reasons, causing delays in recognizing foul play.

Evidence problems have been a repeated issue in obtaining indictments or when prosecuting suspected health care serial killers because "proof beyond a reasonable doubt" is necessary in criminal cases. Evidence problems have often forced plea bargains for crimes less serious than murder or have precluded prosecution altogether despite compelling epidemiologic evidence. Even in successfully prosecuted cases, problems with evidence have resulted in most health care serial murderers being prosecuted for only a small fraction of the actual number of patients murdered. For example, the British general practitioner Harold Shipman was convicted of murdering 15 patients but was positively linked to 218 additional unexpected deaths and was suspected of murdering yet another 62 patients.^{18,20} Charles Cullen was convicted of 11 murders but confessed to killing more than 40 patients.²¹ Kristen Gilbert was suspected of killing as many as 50 patients but was convicted of only 4 murders and 2 attempted murders.²¹ Kimberly Saenz has been charged with murdering 5 patients and with assaulting 5 others in attempts to kill them, but 19 deaths were reported at the dialysis clinic where she worked in the five months before she was fired, far more than the state's average death rate at dialysis clinics.¹

Is HCSM a Significant Health Care Problem?

On the basis of the relatively small number of deaths known to be caused by HCSM, one might reasonably conclude that it is

not a significant health care problem compared with many others—which probably explains why so little has been done to address the problem. However, these efforts contrast sharply with what has been done to understand and prevent other similarly rare safety-related causes of death. For example, about 15 deaths from dog bites occur each year in the U.S.^{25,26} In contrast to HCSM, however, information about fatal dog bites can be readily obtained from multiple databases, such incidents have been widely discussed in public forums and have resulted in hundreds of local ordinances and state laws, and numerous studies have been conducted to understand their causes and prevent further occurrences. Even much rarer animal-related trauma such as shark attacks and deaths caused by cows are regularly tracked in various databases and have received much greater attention by public health agencies and health care professionals than HCSM. Similar contrasts could be made for many other rare safety-related causes of death, including scuba diving or mountaineering accidents and subway accidents, to name a few.

In comparing the burden of harm caused by HCSM with that of dog bites or other similarly rare causes of death, one might argue that these other safety problems have received more attention because the events generally do not result in death but instead cause less serious morbidity in a substantial number of people. Although this may be true, it must be remembered that HCSM by definition includes only deaths and that it is only one of several types of intentionally caused health care harm. To truly compare the burden of harm caused by these different types of conditions would require including sexual assault, verbal and physical abuse, theft of a patient's personal property, medical identity theft, intentional unauthorized disclosure of protected health information, kidnapping of infants or elderly persons, intentional withholding of necessary care or performance of unnecessary medical interventions for financial or other nonmedical reasons, and the illegal harvesting of body parts, among other things, along with HCSM deaths. These other forms of intentional harm also occur infrequently, although some of them are known to be increasing and to affect substantial numbers of people.^{27–30} None of these intentionally harmful health care problems have been well studied, and neither health care nor law enforcement have established infrastructures to track and analyze these adverse events to understand their causes. This is analogous to the “orphan” status that a number of rare conditions have for drug treatment or vaccine development. In contrast to HCSM and other types of intentional health care harm, however, “orphan drugs” have been the subject of much study and policy debate.

Episodes of HCSM have often spanned prolonged periods

of time (sometimes decades), involved large numbers of victims before being recognized, were perpetrated by the same individual in multiple settings and/or geographic locations, and were suspected by co-workers long before any formal investigation was undertaken. These characteristics highlight significant vulnerabilities in health care safety systems, including problems in sharing information about potentially problematic health care workers, delayed recognition and inadequate investigation of suspicious incidents, inconsistent or ineffective methods of monitoring and evaluating important care-related adverse events, and an incomplete understanding of the causes of these occurrences. HCSM is similar to other patient safety problems in some of these ways. The root causes of these vulnerabilities have not been specifically studied but appear to include a number of interrelated reasons, including the rarity of such events, the view that such occurrences are a law enforcement problem, a reluctance to investigate suspicious incidents for fear of drawing attention to them, professional defensiveness and protectionism and the belief that such occurrences are not a sufficiently important health care problem to warrant attention in the context of many other pressing health care concerns and threats to patient safety.

Although HCSM, *per se*, is not specifically mentioned, murder and other assaults on patients, whether by health care workers or others, are identified by the National Quality Forum (NQF) as a “serious reportable event” or, as they are more commonly known, a “never event.”^{31,32} These rare adverse events, which should never occur in health care, were culled from the many unusual or rare untoward clinical events known to happen because they are serious, adverse and largely preventable; because they indicate systemic problems in health care safety that are significantly influenced by policies and procedures; and because they are important for public credibility and public accountability, among other reasons.³¹ Although only a few states require that some or all of the NQF's 28 never events be reported, most do not.

HCSM Raises Challenging Questions

Although infrequent, malicious acts affecting patients certainly occur, and the occurrence of at least some types of these intentionally harmful acts appears to be increasing (for example, HCSM). This raises challenging questions about the appropriate priority of addressing these adverse events and prudent strategies for doing so, as well as health care's obligation for public accountability about such matters.

After a patient death is suspected of being due to a criminal act, law enforcement personnel clearly must become involved,

but what is health care's responsibility for preventing such occurrences? Murdering a patient egregiously violates the core values and ethical tenants of all the health care professions. Even though such events occur rarely, should the egregious nature of such acts be sufficient reason for HCSM to be a priority among the multitude of other health care problems needing attention and resources? Because society places extraordinary trust in health care workers and expects health care facilities to be safe havens for the ill and injured, does health care as an enterprise have an obligation to make extraordinary efforts to ensure that health care workers do not breach the public's trust? Given the intrinsic nature of modern health care and the frailties of human beings, does more need to be done to ensure that health care workers do not have psychological conditions that might make them potentially dangerous? Must an increased risk of HCSM be accepted as a side effect of the many technologies now used to treat disease, or does modern health care have an obligation to make every reasonable effort to prevent the intentional misuse of these technologies? Reducing harm resulting from medical errors and other unintentional causes of health care harm has proven to be quite difficult. Would strategies to address HCSM conflict with those needed to prevent more frequent unintentionally caused adverse events and thereby confound efforts to prevent these threats to patient safety?

Possible Strategies to Understand and Prevent HCSM

We believe that greater efforts should be made to build a capacity to understand the causes of HCSM and to strengthen the weaknesses in health care safety systems revealed by these occurrences. On the basis of our experience dealing with other patient safety and public safety problems, as well as direct experience managing incidents of HCSM, we believe that several actions would be reasonable first steps toward this end.

First, we believe that health care professional organizations, accrediting bodies, and licensing agencies should do more to increase awareness of HCSM among health care professionals. Granted, it is disturbing to think that physicians, nurses, or other health care workers might intentionally kill or seriously harm patients entrusted to their care, and there is a fine line between acknowledging the problem and inappropriately frightening patients and undermining public confidence in hospitals and other health care facilities, but the first step in addressing any problem is acknowledging that it exists. Management of other safety problems suggests that transparency is critically important despite the challenges that such open-

ness may initially present.³³ Conceptually, this is not unlike what has been done to increase awareness about other patient safety problems, although communications about HCSM would need to be crafted especially carefully.

Second, because no professional health care organization, public health agency, or law enforcement entity currently maintains data about or otherwise has specific responsibility for addressing HCSM, an appropriate U.S. federal agency should be designated and empowered to collect and analyze data about these occurrences and to maintain a clearinghouse of information on the subject. The ownership of this problem could be given to a number of existing entities whose mission includes analyzing and being an authoritative resource about unusual occurrences, such as the Agency for Health Care Research and Quality, the Centers for Disease Control and Prevention, or the Federal Bureau of Investigation.

Third, the effectiveness of current methods for determining the training, experience, qualifications, and performance of health care workers and for communicating complete and timely information about these things should be assessed. This should include an evaluation of peer review, licensure, adverse event reporting, and the National Practitioner Data Bank (<http://www.npdb-hipdb.hrsa.gov/>). This assessment would need to be conducted by an independent entity experienced in evaluating complex and sensitive issues—for example, the Institute of Medicine of the National Academy of Sciences or the National Academy of Public Administration.

Little comparative information about employment screening practices across the health care professions is available. For example, an assessment of the U.S. Department of Veterans Affairs facilities judged these practices to be adequate for physicians but deficient for other types of practitioners.³⁴ Data communicated about a former employee to a prospective employer usually includes just the dates of employment. Meaningful information about a worker's performance is not routinely shared. Lack of communication about a health care worker's past performance has been repeatedly identified as a problem in cases of convicted health care serial killers. In response to criticism in this regard, hospitals have often cited fear about being sued for defamation if they report concerns about a former employee's past performance to prospective new employers. Whether such fears are well founded should be assessed, as well as the options for mitigating them if so. In the aftermath of the Charles Cullen murders, Pennsylvania and New Jersey enacted laws to protect hospitals from lawsuits for providing honest job evaluations and work histories to prospective new employers, but such laws are rare. Good Samaritan-type federal legislation

to protect individuals and institutions from liability for good-faith reporting of truthful information about a health care worker's performance might be an effective way to remedy this systemic vulnerability. This strategy should be evaluated. Federal legislation would be needed to provide consistent protection across states.

Peer review and professional licensure are the primary processes used to ensure the competence and integrity of health care workers; however, investigations into reported occurrences of HCSM have repeatedly raised questions about why these processes did not cull out the problematic worker. The reasons for this need to be fully evaluated. Concerns about the adequacy of these processes also have been raised by recent reviews that were performed for reasons unrelated to HCSM,^{28,35–37} as well as by some recent legal cases.^{38,39}

The effectiveness of fingerprinting and criminal background investigations as strategies for protecting patients from malicious harm by health care workers also needs to be assessed. For reasons unrelated to HCSM, a number of states have recently imposed requirements for health care workers to be fingerprinted and undergo criminal background investigations in the belief that such interventions will identify persons more likely to commit malicious acts, although there is little empirical or other data to support such strategies. Of interest in this regard, it appears that a history of a health care worker falsifying his or her background appears to correlate more closely with later murdering patients than does a past history of a criminal act.^{6,10}

Fourth, because specific methods are needed to properly manage situations suspected of being due to intentionally caused harm, and because most clinicians and health care administrators are unlikely to be familiar with these methods, consensus guidelines for managing suspicious situations would likely be helpful. In many of the cases of convicted health care serial killers, concerns about the worker arose long before any action was taken, and when action was finally taken it often consisted of simply terminating the worker, after which he or she went to work at another health care facility and committed additional patient murders.^{6,10,19} Guidelines should address the circumstances that should prompt consideration of an event being intentionally harmful, and should specify reasons for reporting suspicious circumstances to public health and law enforcement authorities, and procedures for collecting and safeguarding potential evidence and documentation that may be later needed for forensic purposes. Such guidelines could be developed by the NQF as part of its ongoing work identifying evidence-based safe practices⁴⁰ or by the Institute of Medicine or various other entities.

Fifth, current strategies for addressing unintentional patient safety problems should be reviewed for ways that they might be augmented or enhanced to better protect patients from HCSM. Policies and procedures for use of high-alert medications should be particularly reviewed because administration of non-narcotic medications has been the primary weapon used by health care serial killers in the U.S. It also would be helpful to know whether the use of automated drug dispensing technologies that have become widely used in hospitals in recent years has changed this pattern. Similarly, processes used for monitoring and evaluating sentinel events in health care facilities should be specifically assessed because in most known instances of HCSM suspicion of a malicious act arose because co-workers of the perpetrator observed an increased frequency of deaths or cardiac arrests associated with a particular care unit, work shift, and/or caregiver. Whether unusual situations needing detailed investigation could be better identified by routinely monitoring monthly mortality and cardiac arrest rates by time of day, unit of care, primary diagnosis, and cause of death—or whether it would be practical to do so—should be assessed. This review could be conducted by the Institute of Medicine, NQF, Agency for Healthcare Research and Quality, or other entities.

Conclusion

The importance of integrated safety systems in health care is now well recognized, and widespread efforts to strengthen health care safety systems have been made in the last decade. These efforts to improve patient safety have not included strategies aimed at preventing HCSM. Although instances of HCSM are rare, they appear to be occurring more frequently. These occurrences have repeatedly highlighted significant vulnerabilities in health care safety systems and have raised challenging questions about the public accountability of health care as an enterprise. We believe that more should be done to build a capacity to understand the causes of and to prevent HCSM, and we recommend that several actions be taken toward this end. ■

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