

## Product Tampering Crime: A Review

---

**REFERENCE:** Logan, B., "Product Tampering Crime: A Review," *Journal of Forensic Sciences*, JFSCA, Vol. 38, No. 4, July 1993, pp. 918–927.

**ABSTRACT:** Product tampering crime has become more common over the last ten years, with a single documented event often triggering an avalanche of false alarms, copycat cases, tampering threats, and falsified reports of suspected tampering. Cyanide has seen widespread use as the toxic agent in many instances of product tampering, and is potentially the most lethal of all agents used. Ingestion of cyanide through tampered food, drink or drug has resulted in the deaths of at least 14 people in the last ten years. This paper reviews prominent tampering incidents, examines their common features, notes the propensity for copycat cases, and discusses apparent motives for product tampering, threats of tampering and falsified incidents. The identification of three prominent cyanide tampering incidents (two in Seattle, one in Chicago) is discussed, and the importance of requesting appropriate toxicological tests is discussed. Potential motives include terrorism, sabotage, homicide, insurance fraud, malicious mischief, and attention seeking. The limitations of tamper-evident packaging are noted.

**KEYWORDS:** toxicology, poisoning, cyanide, product tampering, homicide, terrorism, food, drink

Although the administration of poisons in food and drink has been known throughout history [1–3], the crime of product tampering has come into its own in the last decade. It can be committed for a variety of motives including financial gain, revenge, publicity for radical political causes, as a cover for a single homicide, or as a random sociopathic act. As all members of the public are potential victims of this crime, public concern is great, and the impatience of the public to delays in detection, investigation, and apprehension of the culprit is understandable.

Product tampering, however, can be committed without an apparent motive, on a victim unknown to the perpetrator, without any direct contact between the tamperer and the victim, and with the possibility of the poison, if used, not being suspected or tested for. All of these factors can make this a formidable crime to detect and solve.

As a result of federal legislation passed in the United States in 1983, product tampering convictions can result in three years in prison and a \$10,000 fine, rising to \$100,000 and 20 years if serious injury occurs as a result. Life imprisonment is possible in the event of a death. Furthermore, threats of tampering can result in a fine of \$25,000 and five years in prison. In spite of these sanctions, hundreds of tampering incidents and threats have occurred over the last ten years, and these are discussed.

Many agents have been used as adulterants including insecticides, pesticides, strychnine, arsenic, hydrochloric acid, mercury, mercuric chloride, and fecal matter. Foreign objects have also been inserted in food, notably the insertion of straight pins, staples

Received for publication 27 July, 1992; revised manuscript received 5 Oct. and 25 Nov. 1992; accepted for publication 30 Nov. 1992.

<sup>1</sup>Washington State Toxicologist, Washington State Toxicology Laboratory, Department of Laboratory Medicine, University of Washington, Seattle, WA.

and glass in Halloween candy, cookies, and fruit. Cyanide has been a favorite poison for tamperers and other homicidal poisoners. Most known deaths arising from ingestion of deliberately tainted food, drink or drugs have resulted from the use of cyanide. The familiarity of the public with this poison and its ready availability makes it a natural and popular choice in this type of crime.

This paper reviews major known incidents of tainting of food, drink and drugs, examines the apparent motives, and discusses some aspects of investigating product tampering crime. The cases described herein were all reported in wire service reports, newspapers, news magazines or have been the subject of television news or current events programming. They were retrieved in the Nexis database (Mead Data Central) using a variety of search terms. Literature searches of the medical, social sciences, and psychological literature failed to identify an objective review of this type of crime.

Although specific products and their manufacturers are named in this review, there is no implication that these products were or are any more susceptible to tampering than others. Also noted is the importance and limitations of "tamper evident" packaging. Most companies whose products have been the subject of tampering have subsequently made increased efforts where possible to make their packaging materials more tamper-evident for the protection of their customers. The protections employed include tamper-evident features such as factory-formed paper, plastic, metal, foil, or gelatin seals that must be broken in order to open a food, drink or drug container. A selection of tamper-evident protections recognized by the United States Food and Drug Administration (FDA) primarily for use with over-the-counter drugs is shown in Table 1 [4]. Deaths occurring through product tampering since 1990, when these protections became mandatory, illustrate their limitations in providing protection to the public from adulterated goods, even when the tampering has been clumsy.

### Cyanide and Tampering

Although a number of toxic agents have been used as adulterants in product tampering cases, the most common fatally effective agent in the cases discussed herein has been cyanide. The public is very familiar with cyanide as a poison, and commonly associate it with homicide. Anecdotal experience among forensic toxicologists suggests however that cyanide-caused deaths are more commonly accidental, suicidal, or associated with fire gases. Definitive statistics from the National Center for Health Statistics show that of 443 cyanide-related deaths between 1984 and 1988, 81% have been suicidal, 7%

TABLE 1—*Packaging methods recognized by the Food and Drug Administration. Each provides a barrier to entry or leaves an indicator when opened.*

---

FILM WRAPPER: Transparent film with distinctive design wrapped around product or container; must be breached, cut or torn off to gain access.
BLISTER OR STRIP PACK: Single doses are sealed in plastic or foil that must be cut or torn.
BUBBLE SEAL: Product or container sealed in plastic and mounted to display card. Product is "popped" out.
SHRINK SEALS and BAND: Plastic with distinctive design or printing; must be cut or torn.
FOIL, PAPER or PLASTIC POUCH: for individual products, must be torn or broken.
BOTTLE SEAL: Paper or foil with distinctive design or printing sealed over mouth of container; must be cut.
TAPE SEAL: Distinctively designed paper or foil that is sealed over carton flaps or bottle cap and is torn off.
BREAKABLE CAP: The cap either breaks away or leaves a portion attached to container.
SEALED TUBE: Mouth of tube is sealed with metal and must be punctured.
SEALED CARTON: Flaps are securely sealed, and carton must be damaged or destroyed to remove product.

---

accidental, 5% undetermined, 4% homicidal, and 1% natural [5]. On this basis, cyanide is involved in approximately 0.005% of all deaths in the United States on an annual basis.

Homicidal poisoning with cyanide is a genuine concern however, because of the widespread availability of cyanide products in industry [electroplating, chemical synthesis], educational chemistry laboratories, and even domestic products [jewelry cleaning, rodent control] [6], and the coincidence that the 200 to 300 mg fatal dose of cyanide salt in adults, is the same as the capacity of the typical gelatin capsule used in many over-the-counter medications [7]. This has been borne out by the several independent episodes of actual or threatened product tampering involving cyanide and the public food, drug and drink supply discussed as follows. Furthermore, cyanide is an inorganic anion and consequently will not be detected as part of a routine drug screen. The most common test for cyanide currently used in toxicology laboratories is a multiple step, wet chemistry/spectroscopic method involving release and trapping of HCN gas, reaction with chloramine-T to form cyanogen chloride, and further reaction with a pyridine/barbituric acid solution to form a violet colored adjunct, which is measured spectroscopically [8]. This test is generally available; however, as cyanide is an issue in such a small percentage of deaths, cyanide testing does not form part of a routine drug screen in most toxicology laboratories. If cyanide is suspected in an unexplained death, a specific request for a cyanide test must therefore be made to the toxicologist by the investigating agency, before cyanide can be excluded as a toxic agent.

### Recent History of Product Tampering Crime

Product tampering reports in the media often inspire copycat cases or threats of tampering. In this way, a single episode of tampering can become an epidemic. Revenge and mercenary magazines and manuals often advocate the placing of poisons or irritants in food for revenge, murder or mischief, as noted by Dietz in his extensive review of the genre [9]. Without other suspicious circumstances, a fatal poisoning may never even be associated with tampered food or drink, and it has to be conceded that the following cases that gained media attention, probably represent not all incidents where tampering has occurred, but only those instances in which it was detected and investigated.

What became the most widely known product tampering incident occurred in Chicago in 1982, where seven people died after ingesting Tylenol® capsules whose contents had been replaced with cyanide [10]. This incident was identified serendipitously by off-duty firemen listening to police scanners at their homes. They noticed a number of unexplained deaths occurring over a short period of time. Later, on being able to check the ambulance records they noted that all the victims had consumed Tylenol shortly before collapsing, and notified the authorities. Subsequently, toxicology tests confirmed the presence of cyanide. No arrests were ever made for the tampering itself, however in 1983 an Illinois man was sentenced to 20 years in prison for extortion attempts related to the poisonings. Although he was a suspect in the poisonings he was never actually charged with that crime. Following this incident, further Tylenol capsules in California were found to be contaminated with strychnine, and there were reports of contamination of Visine® eye drops with hydrochloric acid [11]. Measures were taken by the Federal government at that time to establish regulations for tamper-evident packaging for over-the-counter drugs [4,12].

In 1984 there were reports in the national press of tampering with Girl Scout cookies. This led to an epidemic of tampering with the cookies, threatened tampering and falsified incidents. Although about 80% of the threatened tampering incidents were false alarms, tampered packages involving the insertion of pins and needles into the cookies were identified in several states [13,14]. The worst injuries were cut lips and mouths.

An awareness was beginning to develop at this time of the vulnerability of food and

drink in addition to drugs [15], but no immediate protective measures to safeguard food were proposed or adopted to counter the threat.

In 1985, eight people in Japan reportedly died after drinking fruit juice contaminated with weedkiller [16]. Also in Japan during this period a gang (called “the Man with 21 Faces”) drove several Japanese candy companies into bankruptcy by contaminating their product and attempting extortion [17].

An extensive and alarming pattern of product tampering activity began in February 1986, when a woman in New York died after ingesting a Tylenol capsule believed to contain cyanide [18]. A second bottle of cyanide-tainted Tylenol was found in a nearby supermarket [19]. Over 200 000 bottles of the drug were pulled from shelves and tested [20]. In the wake of this second incident involving Tylenol, the manufacturer, Johnson and Johnson, made a decision to switch from capsules to solid pills, in realization that in spite of tamper evident packaging, they could not guarantee the safety of their product [21]. The following month, March 1986, a series of tampering threats and some tampering with other products took place. In stores in Texas and Florida, packages of Contac®, a cold medicine, Teledrin®, an anti-allergy medicine and Dietac®, an appetite suppressant, were found to contain rat poison (strychnine) [22]. Unusual trading activity in the stocks of Smith Kline, the maker of these three products, gave officials a lead that resulted in the arrest of a stock trader [23]. In what is believed to be the first conviction for product tampering, he was subsequently sentenced to a 27 year prison term [24]. Cyanide was also implicated later in 1986 in a death of a chemistry student following ingestion of an Anacin-3® capsule. This was never confirmed to be a case of product tampering however, and none of the drug pulled from the shelves of drug stores were found to have been tampered with [25,26].

Around this time, Gerber’s® baby food was withdrawn from stores in the United States after glass was reportedly found in several hundred of its jars [27]. Further investigation of this incident suggested that while 13 very small glass fragments were identified, there was evidence that other reports were a result of hysteria or were being fabricated by members of the public who purposely put larger pieces of glass in the product [28].

In July of 1986, two people died following the ingestion of cyanide-tainted Extra Strength Excedrin® capsules in Seattle, Washington [29]. During the autopsy of the second victim, one of the autopsy room staff smelled cyanide, prompting a laboratory test. The first victim had already been buried by this point, and cyanide had not been suspected until the victim’s wife called the police and said that he had taken an extra strength Excedrin capsule shortly before collapsing, (the wife was later convicted of both homicides). Cyanide was also found in a bottle of Anacin-3 in a drug store in the same vicinity [30]. The state of Washington took the unusual step of banning the sale of all over-the-counter capsule drugs for 90 days [31]. This was an interesting and innovative approach and recognized the danger to the public of copycat cases, which typically follow widely reported tampering episodes.

Later that month, numerous callers to newspapers and police agencies around the United States made threats regarding tampering activity. Products allegedly tampered with included food seasonings, Jello, soda, toothpaste, instant pudding, milk, throat spray, oranges, and other fresh produce [32–36]. None of these threatened poisonings are believed to have taken place, but some arrests were made for extortion and related offences. During this period a case was also documented where cyanide tainted cocaine resulted in the death of a drug user, and the illness of four others [37].

The following month, a cyanide tainted Kool Aid® packet was identified in a Massachusetts store [38], and in September a New Jersey man died of cyanide poisoning after eating soup made from a powdered soup preparation [39,40]. Three out of four packets in the box were found to contain lethal amounts of cyanide. This apparently random act represents the first known case of murder by tampering with packaged food

(as opposed to drugs) in the United States, however no arrest was ever made in this case. In all, it is believed that over \$1 billion worth of goods produced was destroyed in 1986 because of claims of tampering or tainting [41].

The following year in September 1987, a graduate student from Princeton was convicted of placing a cyanide-laced teabag on a supermarket shelf although no poisoning occurred [42]. In April 1987, a Seattle woman, the wife of one of the victims, was tried and sentenced to 90 years imprisonment in the two murders from the 1986 tainted Excedrin cases [43,44]. She was found to have taken out several insurance policies on her husband's life, and was known to have checked out two library books on poisoning. A heavy concentration of her fingerprints was found on the pages concerning cyanide.

The apparent suicide of the teenage son of a biology professor in New Jersey in 1989 involved the administration of cyanide in yogurt, leading to initial suspicions about tampering, although this was subsequently downplayed [45]. Also in 1989, it was suspected that a shipment of grapes from Chile had been injected with cyanide [46,47]. Cyanide was detected only in 2 grapes out of 336 000 cases of grapes inspected, leading to doubts about the initial identification or source of the tampering. Further doubt has since been cast on this incident, since subsequent tests have shown that cyanide can be particularly unstable in grape and other fruit juices [48,49]. Later that year, a food industry crisis committee was formed to investigate the issue of food tampering, and to make recommendations on safer packaging [50].

Also, in December 1989, tampering with baby food occurred in the United Kingdom where jars were adulterated with razor blades, slivers of glass, pins and caustic soda, together with warning notes. This was coupled with extortion threats to the manufacturer [16]. The manufacturer responded by recalling their product and introducing a factory sealed tamper-evident safeguard. This was followed by a spate of around 300 copycat cases, a claims of tampered products. The worst injury was a cut lip.

The publication of an article in Readers Digest in February 1991 [51,52] about the 1986 Excedrin/cyanide cases [29–31], immediately preceded a tampering episode involving cyanide in Sudafed® 12-hour capsules, described elsewhere [52]. This incident resulted in the deaths of two people, and the poisoning of a third [53,54]. In March of 1993, the husband of the first (non-fatal) victim of the cyanide in Sudafed tampering was convicted in Seattle, WA, of that poisoning and of the tampering that led to the deaths of two other people. Much of the evidence used by the state was circumstantial, including statements made by the defendant and wiretaps, but also included handwriting evidence from a cyanide purchase transaction, and literature related to the 1986 Excedrin poisonings. The defendant, an insurance salesman, had also taken out life insurance policies on his wife for several hundred thousand dollars, which allowed for payment in case of death by poisoning as a result of product tampering. The pathologist conducting the second autopsy happened to have been involved in the 1986 investigation of the Seattle Excedrin incident and became suspicious from the autopsy findings and circumstances. He initiated a request for a cyanide test, which uncovered the episode. These poisonings were followed by a further two fatal "copycat" cyanide suicides in Washington State [55] and British Columbia, Canada.

In Australia in mid 1992, jars of baby food were contaminated with cyanide, and telephone threat messages to the media referenced a revenge motive for the alleged police beating of Rodney King in Los Angeles, although no direct connection could be made [56].

### **Motive for Tampering Crime**

Construction of a personality profile of a product tamperer is crucial in conducting an effective investigation. In the United States, product tampering and threats of tampering are federal crimes, and the Federal Bureau of Investigation (FBI), and the FDA should

be consulted immediately when product tampering is suspected. These agencies have significant expertise in this type of investigation. Also critical is the distinction between a series of related events and the inevitable false alarms, copycat events and falsified reports that follow.

Looking at motives in actual tampering cases reviewed above, the pretexts appear to be to cause diversion from a single homicide, influencing of corporate/national policy or corporate stock value, and apparently random sociopathic acts. There is one known incident of a political terrorist threat. When tampering is used to make one death seem part of a random pattern, immediate family members or persons having access to a victims food/drink/drug supply, become obvious suspects, and in at least one case have been convicted of the tampering [43,44]. In this scenario, and anecdotally where poisons are administered by stealth to a family member, recent insurance policies issued on the deceased have been a common factor.

When tampering is performed for financial or political reasons and the object is publicity, the tampering itself can accomplish that goal without causing death. An example of this occurred in 1978 in the United Kingdom where Palestinian guerillas allegedly spiked Israeli "Jaffa" oranges with mercury. In these circumstances, fairly specific warnings may be called in to the media or authorities even before any poisoning has occurred.

Random sociopathic acts however leave little to connect the perpetrator to the crime, and unless a pattern develops, or a confession is made, there is little hope of solving these episodes.

As seen in the review, threats of tampering are much more common than actual tampering, but can be just as economically devastating to a manufacturer [59]. They are perceived by the perpetrator as being much less serious than actual tampering and therefore carrying less risk, and less serious consequences if caught. This persists because although the penalties for threatened tampering are severe, they are not widely known.

Other motives for tampering threats could include malicious mischief, revenge of a disgruntled employee, former employee, or job applicant. Other identified motives have included economic terrorism with a view toward influencing stock value, either for personal or perhaps corporate gain. In the latter case, the beneficiaries, financially or in terms of redirected business may be identified from appropriate business and financial records. Recent stock trades or large investments/devestments may help indicate at least prior knowledge of the tampering or threat, if not direct involvement. This approach has assisted in solving some actual tampering cases [23,24].

Threats of tampering from the mentally ill, or as an hysterical response are common also, as are threats made out of anger, thrill-seeking or feelings of injustice, real or imagined. Hypochondria, or fears of vulnerability among the public may also prompt alarmist reports of suspected tampering, and falsified reports may be used as attention-seeking behavior by those experiencing loneliness or depression. Other pathological causes of false or hysterical reports may include Munchausen syndrome, where a patient induces or feigns a condition in order to obtain medical attention, or Munchausen syndrome by proxy, where the fabricated illness is claimed for a dependent, usually by the mother for a child [60,61].

The hysterical nature of the public response to product tampering is exemplified by the public response following a single poisoning in 1986 [14] when the FDA received more than 1900 reports of suspected tampering in the six weeks following the death, none of which was substantiated. The products most often cited in these reports were those which had been subject to tampering in the past, but about 800 calls involved other products from soft drinks to peanut butter [27].

Identifying the source of the tampering is important in establishing whether a nationally distributed product is at risk, that is, from tampering at the source of production, or if it is localized, such as at the distributor or retail level. This determination can influence

the extent of a product recall. When over-the-counter drugs are the tampered vehicle, typically the response of the manufacturer has been to order a nationwide recall, even if the poisoning incidents are localized. This provides good public relations and reduces liability concerns. Tampering at the source of production may result in more widespread geographical incidents, and may be tied to the same batch number. The lack of a widespread distribution does not rule this out however, as individual batches of product are often distributed in small geographical areas. In spite of good evidence that a tampering event is localized, manufacturers have often opted to recall a product nationwide, which is to be commended from a public safety standpoint, but also reduces liability concerns, and engenders good public relations [59].

It should be noted that on at least three occasions, baby food products have been tampered with, or threatened with tampering. Halloween candy and treats have also been frequent targets of tampering activity. This behavior is especially condemnable, as the intended victims in these cases are particularly vulnerable to injury from tampered products. They are unlikely to question the safety of the product, or to inspect it for evidence of tampering, and in the case of baby food, may be fed with the product in spite of protests. They are also more likely to receive a lethal dose of a poison from a small amount of food, making them much more susceptible as poisoning victims. Unexplained infant deaths are not uncommon, and deaths from tainted food may be ascribed to other causes unless thoroughly investigated.

### Discussion

This brief history illustrates the complex epidemiology of product tampering, the popularity of cyanide as a poison and the familiarity of the public with its toxic properties. The identified cyanide-in-drug episodes have highlighted the vulnerability of capsules, despite the four levels of protection that allow the detection of tampering. As an example, in most over the counter drugs, the drug product may consist of distinctly colored micro dosage forms, or "time pills" inside a gelatin capsule. The two halves of the gelatin capsule are sealed with a gelatin band, and placed in blister packs sealed with an aluminum foil backing. The blister pack and box are both numbered with a matched lot number, and the boxes are cellophane wrapped, or closed with a paper seal. Similar protections are present on bottles of capsules. In the 1991 Sudaferd cyanide poisonings in Washington State, the "time pills" had been replaced with an off-white powder, the gelatin band seal was missing, the blister pack had been slit open and the lot numbers of the blister pack and box did not match. In spite of this, three people ingested the capsules, two with fatal results. A possible rationale for this is that once the medication reaches the home where the history of the package is not known, apparent breaches of the tamper evident seals/ protections are likely to be attributed to other family members, and discounted as harmless. These safeguards are therefore only truly effective if the package is inspected when lifted from the supermarket shelf. It should also be remembered that the capsule packaging is properly described as 'tamper evident' rather than 'tamper proof' [57].

An additional point that can be important in detecting the insertion of cyanide salts in gelatin capsules is that the basicity of cyanide salts, and the acidity of liberated hydrogen cyanide, can both lead to yellowing and ultimately to deterioration and disintegration of the gelatin capsule over a period of time. This makes a notable difference to the appearance of the capsule, and may provide gross evidence of tampering. X-rays have been used in the examination of suspected tampered materials both for detecting foreign metallic objects in cookies and candy [13,14], and in distinguishing between gelatin capsules filled with a drug and those whose contents had been replaced with potassium cyanide [58]. This is possible since the opacity of cyanide-containing capsules to X-rays is greater than that for drug-filled capsules.

Assorted tamper evident packaging has also been adopted extensively by food packagers, including features such as “pop-up” tops on vacuum sealed beverages, paper and foil seals on powdered foods, flavorings, and seasonings, and foil, paper or plastic tape seals on preserves and condiments, but the same caveats regarding the inspection of these at the time of purchase applies.

Also worthy of consideration is the effect of product tampering on the economic viability of the company whose product has been adulterated. In addition to potential liability from the victim’s estates, the loss of public confidence in their product may jeopardize the existence of the company, or its development of new and important products. The social and economic consequences, and management of “corporate coping” following the aftermath of the 1982 Chicago Tylenol cyanide poisonings has been examined elsewhere [59].

### **Conclusions and Recommendations**

The extent of tampering crime, and the potential for its expansion, highlights the vulnerability of the food, drink, and drug supply to tampering, and the potential economic and social consequences that this crime or even its threat has. It is evident that the public has a morbid fascination with this type of public safety threat, as evidenced by the deluge of reports to the authorities following even a single documented episode of tampering. The potential for hysteria is very high and underscores the need for responsible reporting in the media and tactful handling of information by public health agencies. Manufacturers and food, drug and produce suppliers need to be keenly aware of this threat when planning marketing and packaging strategies for their products. The public needs to be educated in the importance of inspecting the tamper evident packaging at the point of sale, and prior to consuming or storing food, and to accept that part of the responsibility for protection from adulterated products is their own. The penalties for product tampering need to be more widely publicized, possibly through the use of warnings on food and drug packaging material, similar to alcohol warnings. Perversely however, heightened warnings regarding product tampering could lead to new outbreaks.

Since cooperation between state and federal agencies, law enforcement officers, health care providers, poison control centers and death investigation agencies is essential in quickly identifying and investigating this type of crime, it is highly advisable that public safety authorities on a local basis develop a plan to identify and investigate product tampering when it is suspected. It is noteworthy that cyanide testing does not form part of most routine drug screening protocols, and that in all cases identified as cyanide-related product tampering, the uncovering of the incident has been serendipitous or through the intuition of the forensic pathologist. Full information regarding the circumstances of the death, symptoms immediately preceding death, any hospital findings, and a full investigator’s report should be submitted with the sample for testing. While this is common sense and good practice in any case where toxicology results are an issue, it may be essential in ensuring detection of cyanide poisoning. Our own experience in the state of Washington, where two episodes of product tampering involving cyanide has resulted in four deaths, has led to improved communication between death investigators and toxicologists. This in turn has led to increased use of a cyanide test as part of a drug and poison screen.

### *Acknowledgments*

The assistance of Ellen Howard, Head of the K. K. Sherwood Medical Library at Harborview Medical Center, University of Washington, Seattle, for assistance with document retrieval and computer searching, is gratefully acknowledged. Many of the cases



discussed in this paper were identified through the use of the Lexis/Nexis research services operated by Mead Data Central. The assistance of Dr. Gib Parrish of the Surveillance and Programs branch of the Centers for Disease Control in Atlanta, GA, is gratefully acknowledged for provision of statistics involving cyanide-related deaths.

## References

- [1] Thorwald, J., *Century of the Detective*, Harcourt, Brace & World, Inc., New York, 1965.
- [2] Anon., "The Poysoner Self Poysoned," English pamphlet, 1679, Harvard early English documents collection.
- [3] Thomson, C. J. S., *Poisons and Poisoners. With Historical Accounts of Some Famous Mysteries in Ancient and Modern Times*, H. Shaylor, London, 1931.
- [4] Diamond, S. J., "Packages No Cure-All to Product Tampering," *Los Angeles Times*, March 8, 1991.
- [5] Parrish, G., Centers for Disease Control, Personal Communication, May 1992.
- [6] *Clinical Toxicology of Commercial Products*, 5th Edition, Gosselin, Smith and Hodge, Eds. Williams and Wilkins, Baltimore, OH 1984.
- [7] "Medical Toxicology," *Diagnosis and Treatment of Human Poisoning*, M. J. Ellenhorn and D. G. Barceleoux, Elsevier, New York, 1988.
- [8] Feldstein, M. and Klendshoj, N. C., "The Determination of Cyanide in Biologic Fluids by Microdiffusion Analysis," *Journal of Laboratory Clinical Medicine*, Vol. 44, 1954, pp. 166-170.
- [9] Dietz, P. E., "Dangerous Information: Product Tampering and Poisoning Advice in Revenge and Murder Manuals," *Journal of Forensic Sciences*, Vol. 33, No. 5, Sept. 1988, pp. 1206-1217.
- [10] "Slow Gains in Battle on Product Tampering," *Chicago Tribune*, March 31, 1986.
- [11] "Police Still Skeptical About Va. Visine Claim," *The Washington Post*, October 25, 1982.
- [12] "FDA Issues Rules Requiring Tamper-Resistant Drug Packaging," *The Washington Post*, November 5, 1982.
- [13] "X-Rays Aid Drive on Tainted Girl Scout Cookies," *The New York Times*, March 31, 1984.
- [14] "Sabotaged Cookies Found in 15 States," *The Washington Post*, March 29, 1984.
- [15] "Study Reveals Vulnerability of Packaging in Supermarkets," *The Washington Post*, May 12, 1985.
- [16] "Baby-Food Makers Confront British Contamination Scare," *The New York Times*, May 2, 1989.
- [17] Millership, P., "Modern Extortionists Resort to Product Tampering for Payoffs," Reuters News Service, May 5, 1989.
- [18] "Cyanide Laced Tylenol Kills Woman in New York," *Los Angeles Times*, February 11, 1986.
- [19] "Cyanide Found in Second Tylenol Bottle, Warning Issued," *Los Angeles Times*, February 14, 1986.
- [20] "Agencies Pursue Massive Probe of Tylenol Poisoning," *Los Angeles Times*, February 15, 1986.
- [21] "Tylenol's Maker Ends Capsule Use; Johnson & Johnson Switches to Pills for Patent Medicines," *Los Angeles Times*, February 18, 1986.
- [22] "Company Halts Capsule Sales; Poison Found," *Los Angeles Times*, March 22, 1986.
- [23] "Suspect Charged in Capsule Tampering," *Chicago Tribune*, May 31, 1986.
- [24] "27 Years in Poison Case," *The New York Times*, October 31, 1986.
- [25] "Stores Pull Anacin-3 After Cyanide Death," *Los Angeles Times*, May 29, 1986.
- [26] "Lead: Tests on All Anacin-3 Capsules . . .," *Los Angeles Times*, May 30, 1986.
- [27] "Putting a Lid on Product Tampering. FDA is Buried Under Complaints After Consumer Scares," *The Washington Post*, May 23, 1986.
- [28] "137 Reports of Glass in Gerber Jars; All American Firm Focus of Chain Reaction of Fear," *Los Angeles Times*, March 5, 1986.
- [29] "Cyanide in Pills Caused Second Death," *The New York Times*, June 20, 1986.
- [30] "Cyanide was Found. . .," *Los Angeles Times*, June 25, 1986.
- [31] "Capsule Drug Sales Banned in Poison Scare," *Los Angeles Times*, June 26, 1986.
- [32] "Jell-O Products Removed. . .," *The Washington Post*, July 12, 1986.
- [33] "Peoples Drug Stores has removed tubes of Aquafresh toothpaste. . .," *Los Angeles Times*, July 13, 1986.
- [34] "Food Tested in Bay Area After Poison Scare," *Los Angeles Times*, July 19, 1986.
- [35] "A Dairy in Paragould, Ark.. Recalled 700,000 gallons of milk. . .," *Los Angeles Times*, July 23, 1986.

- [36] "Six-Ounce Bottles of Menthol Green Chloraseptic Throat Spray. . . .," *Los Angeles Times*, July 27, 1986.
- [37] "Source of Poisoned Cocaine Sought," *Los Angeles Times*, July 11, 1986.
- [38] "Cyanide Found in Kool-Aid from Martha's Vineyard," *Los Angeles Times*, August 21, 1986.
- [39] "Jerseyan Poisoned by Cyanide in Soup; Tampering is Cited," *The New York Times*, September 4, 1986.
- [40] "Cyanide Laced Soup Called Random Poisoning; First Packaged Food Tampering Suspected," *Los Angeles Times*, September 5, 1986.
- [41] "Tampering 'Terrorism' Increasing," *Chicago Tribune*, May 21, 1987.
- [42] "Man Convicted in Tampering Case," *The New York Times*, September 25, 1987.
- [43] "Woman Guilty of Killing 2 With Poisoned Excedrin," *The Washington Post*, May 10, 1988.
- [44] "Seattle Woman Gets 90 Years for Killing Two with Tampered Pills," *Los Angeles Times*, June 17, 1988.
- [45] "Cyanide Found in Yogurt Eaten by Teenager who Fell Critically Ill," *Los Angeles Times*, January 4, 1989.
- [46] "Furor Over Fruit From Chile; A Few Bad Grapes May Spoil the Outlook for State's Importers," *Los Angeles Times*, March 15, 1989.
- [47] "Chilean Fruit Industry Halts Production to Allow Inspections," *Los Angeles Times*, March 15, 1989.
- [48] Chadha, R. K., Bryce, F., Lawrence, J. F., Conacher, H. B., and Arnold, D., "Toxicity of Potassium Cyanide Added to Fresh Fruit and Juice." *Food Chemistry Toxicology*, Vol. 29, No. 10, 1991, pp. 681-684.
- [49] Smith, R. A., "Sodium Cyanide and Its Rapid Detoxification by Grape Juice," *Vet. Hum. Toxicol.*, Vol. 31, No. 6, 1989, pp. 538-539.
- [50] "Food Industry Crisis Committee Formed to Deal with Food Tampering Crises." *Supermarket News*, Vol. 39, No. 15, April 10, 1989.
- [51] Jackson, D. D., "Who Killed Sue Snow," *Readers Digest*, February 1991.
- [52] Logan, B. K., Howard, J., Kiesel, E. L., "Poisonings Associated with Cyanide in Over the Counter Cold Medications in Washington State, 1991. *Journal of Forensic Sciences*, Vol. 38, No. 2, March 1993, pp. 472-476.
- [53] "Cyanide in a Drug Kills 2 and Forces A National Recall," *The New York Times*, March 4, 1991.
- [54] "5th Batch Found in Pill Tampering Case; Poison; Suspect Sudafed Capsules Again Turn up in Tacoma, Wash., Area. Two Have Died and a Third Made Ill From the Contaminated Medicine," *Los Angeles Times*, March 5, 1991.
- [55] "Third Cyanide Death, Sudafed Link Probed; Poisonings: A Man Who Told Paramedics He Had Taken a Cold Capsule Dies. There Are Differences Between This Case and Two Earlier Fatalities," *Los Angeles Times*, March 12, 1991.
- [56] "Heinz Pulls Baby Food in Australia After Scare," *Asian Wall Street Journal Weekly*, May 11, 1992.
- [57] "Sudafed's Recall Revives Push for a Capsule Ban," *The Boston Globe*, March 5, 1991.
- [58] Varnell, R. M., Stimac, G. K., and Fligner, C. L., "CT Diagnosis of Toxic Brain Injury in Cyanide Poisoning: Considerations for Forensic Medicine," *American Journal of Neuroradiology*, Vol. 8, No. 7, 1987, pp. 1063-1067.
- [59] *Corporate Tragedies: Product Tampering, Sabotage and Other Catastrophies*, I. Mitroff and R. Kilmann, Eds., Praeger, New York, 1984.
- [60] Mehl, A. L., Coble, L., and Johnson, S., "Munchausen Syndrome by Proxy: A Family Affair," *Child Abuse and Neglect*, Vol. 14, No. 4, 1990, pp. 577-585.
- [61] Johnson, J. E., Carpenter, B. L., Benton, J., Eaton, L. A., Jr., and Rhoads, J. M., "Hemorrhagic Colitis and Pseudomelanosis Coli in Ipecac Ingestion by Proxy," *Journal of Pediatric Gastroenterology and Nutrition*, Vol. 12, No. 4, 1990, pp. 501-506.

Address requests for reprints or additional information to  
 Barry Logan, Ph.D.  
 Washington State Toxicology Laboratory  
 Department of Laboratory Medicine  
 University of Washington  
 2203 Airport Way South #360  
 Seattle, WA 98134-2027