MASS POISONINGS

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Introduction

The term mass poisoning can be defined as poisoning – with or without a fatal outcome – of three or more victims in a single location and in a single event. When the poisoning takes place at different intervals, say over a period of months or years, it may be termed serial poisoning. Both forms will be considered together in the current discussion.

Classification

Mass poisoning can be classified as described below and is illustrated with historical examples.

Intentional

Homicidal

1. A specific victim targeted with a specific motive (e.g., Marie Besnard, who poisoned 12 of her relatives with arsenic in 1950s, so that she could inherit money)
2. No specific victim targeted (e.g., tylenol capsule murderer, who laced tylenol capsules with cyanide and caused the deaths of seven random victims in 1982)
3. Terroristic in nature, i.e., when the poisoner wants to make a political statement (e.g., Tokyo subway attack with the nerve gas sarin on March 20, 1995 by the members of the Japanese cult Aum Shinrikyo, in which 12 people were killed and 5000 injured)
4. Antiterroristic in nature, i.e., when a group or government intends to save hostages from terrorists (e.g., release of BZ gas by Russia on October 26, 2002, when Chechnyan rebels took more than 750 hostages. BZ gas killed 118 people, including mostly hostages)
5. Warfare (e.g., in the First World War (1914–1918), deliberate use of chlorine, phosgene, and mustard gas resulted in more than 100 000 deaths and 1.2 million casualties).

Suicidal Suicide pacts (e.g., the case of Jim Jones and his followers, who drank cyanide-laced grape Kool-Aid in Jonestown, Guyana, on November 14, 1978.

A total of 914 people died, including Jones. There were 638 adults and 276 children).

Unintentional

Accidental

1. Natural (e.g., eruption of Mount Vesuvius, near Pompeii, Italy, in 79 AD, releasing toxic gases. More than 2000 people were killed)
2. Caused by humans, or industrial (e.g., death of over 2000 people on December 2, 1984 in Bhopal, India, due to accidental release of methyl isocyanate from a small pesticide division of Union Carbide Company manufacturing carbaryl)
3. Related to medicinal drugs (e.g., the thalidomide, where this sedative and hypnotic drug was taken by thousands of pregnant mothers in Europe from 1958 until 1961. It only became apparent in 1961 that this drug was responsible for the congenital anomalies amelia and phocomelia; also in this category are variable responses to drugs)
4. Associated with illicit drugs (e.g., contaminated drugs used intravenously)
5. Related to food (e.g., there were several outbreaks of St. Anthony's fire in the Middle Ages due to infected rye containing ergot alkaloids)
6. Related to water (e.g., outbreaks of chronic arsenic poisoning amongst people who had been drinking ground water with very high arsenic levels. This is common in Calcutta, India, and Bangladesh)
7. Occupational (e.g., chronic lead poisoning occurring in professions dealing with lead (plumbers, potters, printers, pewters, and painters))
8. Related to poor standards of sanitation (e.g., any number of food- and water-poisoning cases occurring in various places).

History of Mass Poisoning

Criminal mass poisoning was not uncommon in Ancient Rome. Several factors accounted for this phenomenon. There was no effective law against poisoning. A reasonably vast variety of poisons were known and were easily available to all and sundry. Finally effective treatment against poisoning was not known. The first known episode of mass poisoning occurred in about 200 BC. The Roman historian Livy informs us that, after investigation, about 190 matrons, mostly of patrician birth, were finally executed for this episode.

A similar episode occurred again in Rome about two centuries later. About 150 women poisoners, again mostly patricians, were executed. But the supplier of their poisons – a woman known as Locusta – so impressed the then Emperor Nero (37–68 AD), that not only did he grant her a complete pardon, but he appointed her as a court poisoner! Nero took great interest in her poisoning activities. Nero and Locusta would often experiment on slaves together, trying out and testing their newfangled poisons.

One ally of Locusta was Queen Agrippina (16–59 AD), wife of Emperor Claudius I (10 BC–AD 54), and mother of Nero. In quest of power, she is thought to have assassinated a number of persons by poisoning, including her own husband Claudius.

The Italian School

In the Middle Ages mass poisoners returned when the ancient Roman art of mass poisoning was perfected by a Spanish family Borgias, living in Italy. (It is worth quoting Max Beerbohm: "I maintain that though you would often in the fifteenth century have heard the snobbish Roman say, in a would-be-off-hand tone, 'I am dining with the Borgias tonight,' no Roman was ever able to say, 'I dined last night with the Borgias'.") The main proponents of mass poisoning in this family were Rodrigo Lenzuoli Borgia (1431–1503), who became Pope Alexander VI in 1492, and his two illegitimate children, a son, Cesare Borgia (1476–1507) and a daughter, Lucrezia Borgia (1480–1519). Between them, they are reputed to have poisoned hundreds of political adversaries. The poison they used was a concoction known as "La Cantrella," which was believed to contain arsenic in high quantities.

"La Cantrella" was prepared elaborately. It is believed that a hog was killed with arsenic; its abdomen was opened and sprinkled with more powder, which contained more poison. Some historians think that the powder contained just arsenic, but it may have contained other poisons as well. The animal was then allowed to putrefy. The juices that trickled from the decaying corpse were collected and evaporated until only dry powder remained.

Such was the Borgias' reputation that people were afraid even to shake hands with them, as even the rings they wore were supposed to be laced with poison.

Two other Italian mass poisoners of note during this period were Heironyma Spara, an astrologer, sorceress, and a mass poisoner all combined in one, who was executed in 1659, and Madame Giulia Toffana (*c.* 1635–1719), also known simply as La Toffana.

Toffana – perhaps the most active mass poisoner of all time – was supposed to have been responsible for killing at least 600 people. Just as the Borgias' poison had a special name, Toffana's poison had one too; it was known by a number of names, such as aqua toffana, agua toffana, aquetta di Napoli, manna of St. Nicholas di Bari, or elixir of St. Nicholas of Bari, Bari being a

town whose water had healing qualities. It was supposed to be a cosmetic (to keep the law at bay, presumably), but most buyers knew why they were buying it. They were instructed about its poisonous properties and its potential as a lethal weapon! La Toffana was finally caught and executed in 1719.

The French School

The Italian school of mass poisoning flourished through the fifteenth and sixteenth centuries. In the seventeenth century, the art of mass poisoning was brought to France by Catherine de Médici (1519–1589) of Florence. She married King Henry II (1519–1559) in 1533. Her main accomplices were the Florentines René Bianco and Cosme Rugieri. Catherine poisoned many of her adversaries, principally the Queen of Navarre, Jeanne d'Albert; Duc d'Anjou; a Marshall of France, Coffe, and finally, the Cardinal of Lorraine.

The French school of mass poisoners was undoubtedly typified by Marie Madeleine, the Marquise de Brinvilliers (22 July 1630 to 16 July 1676). She married Marquis de Brinvilliers at the age of 21 (1651). In 1660, she became friendly with one Chevalier Godin de Sainte-Croix. Her father had him thrown in the Bastille, where he met an inveterate poisoner Antonio Exili. Exili taught him the art of poisoning during the 7 weeks Sainte-Croix was in jail. After his release, Sainte-Croix teamed up with his lover and unleashed an era of indiscriminate poisoning, where people were poisoned for seemingly trivial reasons; for example, a person had to die because he had spilled coffee on Brinvilliers' dress. The Marquise de Brinvilliers perfected her art of poisoning by experimenting on hospital inmates. She used to pay visits to a hospital run by the Sisters of Mercy, the Hôtel-Dieu, carrying poisoned biscuits and preserved fruits for the inmates as gifts. As they deteriorated, she used to pay courtesy visits, but in fact she was taking down copious notes about their condition.

Sainte-Croix died in July 1672, apparently poisoned by Brinvilliers herself. Her reign of indiscriminate poisoning finally ended with her decapitation on July 16, 1676.

Another French mass poisoner of note at this time was Catherine Deshayes (1638–1680), also popularly known as Catherine Montvoisin, or La Voisine. She killed over 2000 infants, many as human sacrifices in the worship of Satan. Her end came 4 years after Brinvilliers'. She was burnt at the stake on February 23, 1680.

Table 1 gives information on these and other notable mass poisoners of history.

Medical Professionals as Mass Poisoners

Medical professionals such as doctors and nurses are in a special position to be able to administer poisons on a mass scale, since their relationship with their patients is that of belief and trust.

The first known case of a medical mass murderer is that of Dr. William Palmer, also known as "the Rugeley poisoner." Palmer is supposed to have killed as many as 15 persons during 1855–1856 with antimony (Table 1). That this phenomenon has not come to an end is typified by the modern case of Dr. Harold Frederick Shipman. Born on January 14, 1946, in Nottingham, UK, Dr. Shipman killed about 220–240 of his patients during a professional life spanning 24 years (at an average of 10 patients per year) by administering lethal doses of diamorphine (pharmaceutical heroin).

Nobody knows exactly what his motive may have been. In one case, however, he had forged one of his victims' wills so he would benefit financially. Finally on January 31, 2000, he was convicted at Preston, UK, of murdering 15 of his patients. He was sentenced to 15 concurrent terms of life imprisonment and was told by the judge that in his case life imprisonment would mean that he would remain in prison until his death. Shipman committed suicide in his prison cell on January 13, 2004, a day before his 58th birthday.

Several nurses are also known to have indulged in mass poisoning. Two who stand out among them are Van der Linden of Leyden, Germany, who is supposed to have killed 27 persons between 1869 and 1885 with arsenic; and Jane Toppan, who killed 30 patients with morphine and atropine in 1902. Mass-poisoning nurses have also had a modern representative in Genene Jones, who used to kill young children with succinylcholine. She is known to have killed at least two babies, but may have killed as many as 20.

Mass Poisoner Targeting Random Victims

John Harris Trestrail III, of the Regional Poison Center, Grand Rapids, Michigan, USA, has identified two types of poisoners: type S, who select a specific victim, and type R, who select random victims. Both categories have two subgroups, a subgroup S, where the poisoning is slowly planned, with a carefully selected poison, and a subgroup Q, where the poisoning is quickly planned. There are thus four categories of poisoners: type S/S (specific/slow), type S/Q (specific/quick), type R/S (random/slow), and type R/Q (random/quick). Mass poisoners generally belong to type R. It is more difficult to apprehend them, as no specific motives can be identified; their motives appear to be to experience power

Table 1 Twenty-five most notorious mass poisoners in history, and their poisons

S. no.	*First name*	*Last name*	*Sex*	*Country*	*Year of activity/ death*[a]	*Poison used*	*No. of victims*	*Fate*
1	Locusta		F	Rome	1st Century AD (first known court poisoner, appointed by Nero)	Several including poisonous mushrooms and arsenic	Several hundred	No information about her death is available, but it is believed that she died a natural death in the court of Nero
2	Julia	Agrippina	F	Rome	(49–59 AD)	Poisonous mushrooms	Several hundred	Killed by her son Nero
3	Marie	Besnard	F	France	1947–61	Arsenic	12	Acquitted
4	Cesare	Borgia	M	Italy	15th Century	''La Cantrella,'' a secret potion containing arsenic	Several hundred	Killed in a skirmish with rebels in 1507, at the age of 32
5	Richard	Brinkley	M	UK	1907	Hydrocyanic acid	3	Hanged at Wandsworth prison on 13 August 1907
6	Marquise de	Brinvilliers	F	France	1660–76	Arsenic	100+	Decapitated
7	George	Chapman	M	UK	1897–1902	Antimony	3	Hanged on 7 April, 1903
8	Mary Ann	Cotton	F	England	1852–73	Arsenic	20	Hanged
9	Catherine	de Medici	F	France	1589	Arsenic	Many	Natural death
10	Catherine	Deshayes (La Voisin)	F	France	1680	Arsenic	+2000	Burnt at stake on 23 Feb, 1680
11	Mrs. Julius	Fazekas[b]	F	Hungary	1914–1929	Arsenic (obtained by boiling fly papers)	+100	Committed suicide
12	Johann	Hoch	M	USA	1905	Arsenic	15 (wives)	Hanged
13	Hélène	Jegado	F	France	1833–51	Arsenic	26	Guillotined
14	Genene	Jones (nurse)	F	USA	1984	Succinylcholine (Anectine)	2 children; suspected of killing at least 20 other babies in her care	sentenced to 99 years for the murder of one patient and 60 years for the attempted murder of a second
15	Christa Ambrose	Lehmann	F	Germany	1954	E–605 (Parathion)	3 (her husband, father-in-law, and the daughter of a neighbor).	Sentenced to life in prison

16	Van der	Linden (nurse)	F	Leyden, Germany	1869–85	?Arsenic	Attempted on the lives of 102 persons, of which 27 died	?Executed
17	Martha	Marek	F	Austria	1932	Thallium	3	Beheaded
18	Daisy de	Melker	F	South Africa	1932	Arsenic	3 (2 husbands and son)	Hanged
19	Dr. William	Palmer (a.k.a. The Rugeley Poisoner)	M	UK	1855–6	Antimony	15	Hanged outside Stafford Gaol on 14 June 1856. The Parliament had to pass the famous ''Palmer Act,'' perhaps the only Act to be named after a convicted criminal, so he could be tried in London instead of his place of residence Rugeley, Staffordshire, where he could not get a fair trial because of rising resentment against him
20	Dr. Harold Frederick	Shipman	M	UK	1990s–2000	Diamorphine (pharmaceutical heroin)	240	Sentenced to life. Committed suicide in the prison cell on 13 January 2004
21	Hieronyma	Spara	F	Rome, Italy	1659	''Aquetta di Perugia'' (containing arsenic)	+100	Publicly hanged
22	Giulia	Toffana	F	Italy	17th Century	Aqua Toffana (Composition unknown, but may have contained arsenic)	600	Executed in Naples
23	Jane	Toppan (nurse)	F	USA	1902	Morphine and Atropine	30 (may be as many as 100)	Sent for life to mental asylum
24	Graham	Young	M	UK	1971–2	Thallium	Several, of which two were proven.	Sentenced to life imprisonment
25	Anne Marie	Zwanziger (nurse) (‘monster’ of Bavaria)	F	Germany	1811	Arsenic	11	Beheaded

[a]In case where precise years of activities are uncertain, the year in which the poisoner was caught/died is given.
[b]She was a midwife by profession. Her cohort in crime, reputed to be a witch, was Susanna Olah, a.k.a., ''Auntie Susi.''

over helpless people. In addition, there is the curious case of a type S poisoner, who kills randomly (in addition to killing his specific target), in order to confuse the investigators. These are type S poisoners camouflaged as type R. These mass poisoners are also very difficult to apprehend.

The most typical example of a type R poisoner (or perhaps of a type S poisoner camouflaged as type R) is that of the tylenol capsule murderer, who laced tylenol capsules with cyanide and caused the deaths of seven random victims in 1982, in Chicago, Illinois, USA. No killer has ever been caught and no motive has been established. There was nothing common between the seven victims.

The series of mass poisonings started at 6 a.m. on September 29, 1982, when the first victim, a 12-year-old schoolgirl, died. Waking up with a sore throat in one of Chicago's peaceful northwestern suburbs, she had taken an analgesic at her father's suggestion before dropping lifeless to the floor. Over the next few days, until October 1, six more victims died in a similar way (Table 2).

The mass hysteria rose to such a pitch that frantic calls were being made to poison control centers from worried patients who had taken tylenol. Many people thought their toothpaste smelt oddly or their antacids tasted strangely in what pharmacists described as "over-the-counter fear" or the "tylenol syndrome." The mayor recalled all capsules, the public were warned not to inhale or even touch the capsules, the manufacturer offered refunds for the capsules and announced a $100 000 reward for any information that might solve the mystery. Investigators looked for disgruntled shop assistants, for fingerprints over the capsules, but nothing helped, and the case remains one of the biggest mysteries related to mass poisonings.

The Suicidal Mass Poisoner

Another strange case is that of a mass poisoner who instigates his followers to take poison on a mass scale. The best-known example is that of Reverend Jim Jones, who founded the commune colony of Jonestown in Guyana. About 1000 of his followers moved there from San Francisco. When there were allegations of human rights abuses at Jonestown, Congressman Leo Ryan visited the colony on November 14, 1978 on a fact-finding mission. Just as he was about to leave, with three journalists and one of Jones' followers, some of the remaining followers opened fire on them and killed them all. Soon after this, Jim Jones "ordered" his followers to drink a cyanide-laced drink. A total of 914 people died, including Jones, who was found with a bullet in his head.

Mass Poisoning as a Result of Drug Misadventure

Rarely mass poisoning may occur in drug addicts who have used adulterated drugs. Sometimes the sample received may be "purer" than the one the addicts are used to, resulting again in mass poisonings by unintentional overdose.

Investigating Mass Poisonings

Whether mass poisonings are a result of homicide, compulsive poisoning, suicide, drug misadventure, or accident, a thorough forensic investigation is a must. Among the questions to be answered are:

1. Which chemical/poison was involved and was it actually the cause of death or injury?
2. Was the incident homicidal/suicidal/accidental in nature?
3. Who were the perpetrators?
4. How many victims were involved?
5. How could such incidents be prevented in future?

The Scene of Mass Poisoning

The first step in the forensic investigation of mass poisoning is a visit to the scene. The scene of mass poisoning poses special challenges, and its examination may require special precautions. Poisons may

Table 2 Seven victims of the Tylenol Capsule mass poisonings

S. no.	*Victim*	*Sex*	*Date and time*
1	A 12 year old schoolgirl	F	29 September 1982, 6 am
2	A young Polish born post-office worker, who had taken the day off to play with his children	M	29 September 1982, few hours later
3	Above man's wife	F	29 September 1982, in the evening
4	Above man's brother	M	29 September 1982, in the evening
5	A young woman suffering from headaches	F	30 September 1982
6	A young mother who had just given birth to her third child	F	30 September 1982
7	An air stewardess	F	1 October 1982

still be lurking in the air (as in the case of subway attacks by the nerve gas sarin and in the Bhopal gas tragedy), and this may pose serious dangers to the investigators. A few rules must be followed while investigating scenes of mass poisoning. These are:

- Never smoke, eat, or drink at the scene.
- Do not dispose of anything by throwing it in water.
- Do not pour water over anything.
- Have a qualified chemist with you to assist.
- Have personnel trained to handle potential explosive material.
- Use gas masks, protective suits, overshoes, and gloves.
- Do not shut off any mechanical or electrical apparatus (heaters, stirring motors, etc.).

Securing the scene The scene of mass poisoning should immediately be cordoned off, with an inner and an outer cordon. Members of the general public should be kept outside the outer cordon. Representatives of the media and police personnel may be permitted to enter the outer cordon, but may not be allowed beyond the inner cordon. Only members of the forensic and rescue teams should be allowed to go inside the inner cordon. Appropriate clothing must be donned at the entry point of the inner cordon, and must be deposited back when coming out. This ensures that no toxicological evidence is inadvertently "carried in" or "walked out" of the scene.

Physicians accompanying the rescue teams within the inner cordon must look for signs of life in the victims lying there. If there are any signs of life, the victims should be immediately transported to the nearest hospital. Postmortem examination should be undertaken on all those who have died.

Collection of evidence Much valuable toxicological evidence lies at the scene. Urgency is important as much of it may be evanescent. Toxic gases may not be there in the environment if inordinate delays are made. If mass poisoning has occurred because of a toxic gas or vapor (e.g., industrial gas disasters, terrorist attacks with toxic gases in subways), it will be appropriate to sample the toxic gas and vapor using a portable pump, and passing the air through a suitable adsorbent material, such as charcoal. Packets of unused poison and used syringes (e.g., in case of drug misadventure) should be collected, sealed, and sent for chemical analysis.

Samples of vomited material, feces, and urine found at the scene must be lifted, as they may contain the toxic material. Clothes soiled with vomit, feces, or urine must also be collected, packed in clean paper bags, and sent for chemical analysis.

The Forensic Autopsy in Mass Poisoning

In instances of mass poisoning, there is a tendency on the part of forensic pathologists to conduct the autopsy on only a few representative cases. This practice has caused insurance problems in the past as insurance companies have contested the cause of death in those cases where a postmortem examination was not carried out. It is thus a safe practice to conduct a thorough postmortem examination in every case of death due to mass poisoning.

Standard autopsy protocols are used. Internal organs such as liver, spleen, kidneys, lungs, brain, and spinal cord are preserved for chemical analysis. Body fluids such as blood, urine, bile, cerebrospinal fluid, and vitreous humor are preserved using standard protocols.

Screening tests for common drugs and poisons are employed. The ideal screening tests for poisons are rapid (a short turnaround time), highly specific (no cross-reactions with other drugs or poisons), sensitive (capable of detecting low levels of poisons/toxins), and reliable (one laboratory would derive the same results as another). Clearly such tests are not available for all agents. In addition, a screening test should be inexpensive and easily performed technically. Confirmatory tests include gas chromatography, high-performance liquid chromatography, gas chromatography–mass spectrometry, and immunoassay techniques. Finding a common toxin/poison in all victims makes the case for mass poisoning.

See Also

History of Toxicology; **Mass Disasters:** Role of Forensic Pathologists; **Mass Murder**; **Toxicology:** Overview; Methods of Analysis, Postmortem

Further Reading

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