



Contents lists available at ScienceDirect

American Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/ajem

Selling poison by the bottle: Availability of dangerous substances found on eBay®

During the 19th century, many new poisonous substances came onto the market to aid in controlling undesirable plant life and pests, for use as cleaning agents, and for medicinal purposes [1]. Poison bottles were often made with distinctive coloring and/or patterns or marked with certain raised shapes in order to warn individuals of the contents and to make adults aware of the necessity to keep them away from children [1]. While this warning was necessary, it wasn't until the 1930s that medical and other professionals realized these attributes actually made the bottles more attractive to children, thus resulting in the adoption of utilizing less embellished, clear bottles with safer, child resistant lids [1,2]. The older bottles with unique markings and colors make these antique items desirable to modern day collectors. There are forums and websites that make these bottles easily accessible to the public and it has been previously found that these poisonous product containers are readily available [3]. Many of these bottles still hold their original contents. The common practice of selling full or partially full poison bottles places people at risk for serious poisonings following unintentional or intentional exposures [3]. Our objective was to quantify the wide variety of dangerous poisons for sale to the general public on a popular online auction Web site.

Over an 8-month period in 2018–2019, weekly listings on the online auction Web site eBay® were searched using the term “poison bottles”. Products advertised as containing any of their original contents were included. Exclusion criteria were listings in which the seller stated that the original contents would be discarded prior to shipping. Product name, toxic ingredient(s), the amount of the product in the container, and relative toxicity rating were recorded using structured abstraction forms. Toxicity ratings were based on known median oral lethal dose (LD₅₀) of each ingredient and determined by *The National Institute for Occupational Safety and Health (NIOSH) data and statistics and Clinical Toxicology of Commercial Products* [4,5]. Descriptive statistics were used to summarize the data.

A total of 283 individual products were identified during the study period; 140 (49%) were liquids, 84 (30%) were in solid/tablet form, and 59 (21%) were powders. Bottles were full for 136 items (48%) and partially full for the remaining 147. At least 31 (11%) of the containers were described by the seller as cracked or poorly sealed. Overall, 155 products (55%) contained 33 ingredients rated as “extremely toxic” (Table 1). Examples include barium, cyanide, mercury, and morphine. Eighty-one products (29%) were rated as “moderately toxic” with an LD₅₀ from 50 to 500 mg/kg. These products included digitalis, homatropine, silver nitrite, and warfarin. The remaining 47 products contained ingredients that were classified as “moderately-slightly toxic” with LD₅₀ of 500 mg/kg or greater. Examples of these include adrenalin, ammonia, and iodine.

Overall, poisons for sale included heavy metals (arsenic, mercury, lead), controlled substances (codeine, morphine), pharmaceutical

grade toxins (strychnine, pilocarpine), insecticides (nicotine), herbal extracts (henbane, hemlock) and beauty aids (belladonna, scopolamine). Sellers included both private individuals and businesses.

While the products we identified were, in most cases, advertised as being sold for the nostalgic appeal of their containers, as a previous study mentioned there is no guarantee that purchasers of these products would not irresponsibly discard the contents or use them in some way [3]. Given the results of this and other observational studies, closer scrutiny of the existing rules, protocols, and guidelines regarding the sale of poison-containing vessels via the internet is necessary [3]. The issue of accidental poisonings resulting from mishandling or misusing these products must be raised given the extremely toxic nature of some of the compounds. Accidental ingestions of one of the “super toxic” or “extremely toxic” poisons could result in fatal outcomes before an effective intervention could take place [3]. Purchasers are also at risk since many listed products may cause systemic toxicity through dermal absorption or inhalation. For those listed toxins for which an effective antidote has been established, quickly locating an obscure or uncommon antidote, or possibly large quantities of even a commonly stocked antidote could also prove challenging [3].

Large chemical supply companies certainly sell vastly more toxic chemicals than eBay®. Such firms, however, typically require consumers to demonstrate a legitimate, legal use for the goods and extensively document all transactions. Although eBay® rules prohibit the sale of “hazardous or dangerous goods” such as radioactive materials, flammable gases and toxic substances, antique apothecary bottles apparently fall outside of regulatory guidelines. Nationally, it's the responsibility of the Drug Enforcement Agency (DEA) to regulate toxic substances and investigate violations. However, multiple cases of poisoning have been reported in the literature with toxins purchased through an internet site [6–9]. Before antique bottles are purchased, it would seem prudent for the seller to carefully remove the hazardous contents and dispose of the poison in a manner that is consistent with local, state, and federal legal guidelines.

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<https://doi.org/10.1016/j.ajem.2019.09.024>

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Please cite this article as: D. Blok, L. Ambrose, L. Ouellette, et al., , American Journal of Emergency Medicine, <https://doi.org/10.1016/j.ajem.2019.09.024>

Table 1
Toxic substances found on eBay®.

<u>Extremely toxic (LD₅₀ of less than 50 mg/kg)</u>
Aconite
Ammoniated mercury
Arsenic trioxide
Arsenous Acid
Atropine
Barium carbonate
Barium sulfide
Belladonna extract
Cadmium nitrate
Colchicine root
Cyanide
Gelsemium (yellow jasmine)
Hydrastine hydrochloride
Laudanum
Lobeline
Mercury bichloride
Mercurous iodide
Monomethylhydrazine
Morphine hydrochloride
Nicotine sulphate (Tobacco dust)
Nitroglycerin
Pantopium (opiate)
Phosphorus
Physostigmine salicylate
Pilocarpine
Podophyllin
Scopolamine
Strophanthin
Strychnine sulphate
Thallium sulphate
Theobromine
Wine of antimony
Zinc phosphide
<u>Moderately toxic (LD₅₀ from 50 to 500 mg/kg)</u>
Carbolic acid
Copper sulfate
Croton oil
Digitalis
Ergot aseptic
Homatropine
Hyoscyamine
Lead arsenate, acetate
Merbromin
Methylene blue
Methyl salicylate (Wintergreen oil)
Phenacetin
Picric acid
Potassium permanganate
Silver nitrate
Sparteine Sulfate
Stramonium (Jimson weed)
Theobromine
Warfarin
<u>Slightly Toxic (LD₅₀ > 500 mg/kg)</u>
Adrenalin tablets
Agaric acid
Ammonium chloride
Ammonium oxalate
Bryonia
Caffeine salicylate
Camphor oil
Carbolic acid (Phenol)
Cascara sagrada
Chloroform elixir
Cinchophen (atrophane)
Coal tar
Codeine phosphate
Creosote oil
Ephedrine tablets
Formaldehyde/cresol
Guaiaicol
Hemlock Oil
Hyoscyamus (Henbane)
Iodine

Lead iodide
Oxalic acid
Potassium bromide
Quinidine
Squill (Sea onion)
Sodium fluoride
Strontium iodide
Zinc phenolsulfonate

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17 September 2019

Available online xxxx

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