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## Informatic: Bleach Toxicity, with a focus on *Miracle Mineral Solution (MMS)*

May 23, 2019

**Bleach** is a chemical used to whiten or sterilize materials.

- Common household laundry bleach is dilute (usually 3-8%) sodium hypochlorite (NaOCl).
- Hydrogen peroxide ( $H_2O_2$ ) is sometimes also used as a bleach.
- Many other chemicals can be used as bleach.

A bleach product, "MMS" or "Miracle Mineral Solution", has been used as a misguided treatment for autism.

The bleach in MMS is typically chlorine dioxide ( $ClO_2$ ), but it is unregulated and could be anything.

Bleach is corrosive, meaning that the chemical can destroy the structure of cells.

- At low doses it is an irritant.
- At high doses it can cause chemical burns.

### How is Drinking Bleach Helpful?

Bleach can be used to purify contaminated water.

- Chlorine dioxide tablets are sold to backpackers and international travelers.
- During environmental emergencies, unscented household bleach can be used to disinfect drinking water (usually 8 drops in a gallon, and wait 30 minutes).
- U.S. water supplies are regulated by the EPA to contain no more than 4 parts per million of chlorine.

Advocates of MMS treatment say that the bleach can kill bad germs in our bodies, but: a) we have hydrochloric acid in our stomachs naturally, and b) it probably can't kill germs if it's not killing good body tissue too.

Drinking undiluted bleach, or using it as an enema, can be very dangerous or deadly!

### How Is Bleach Dangerous to People?

- When liquid bleach contacts skin cells, lung cells, intestinal cells, or other cells it can irritate or burn them.
- When liquid bleach mixes with stomach acid it can make chlorine gas. Chlorine gas was used as a weapon in WWI and in Iraq and Syria, and can injure the eyes and lungs.
- Bleach is more dangerous when it is in higher concentration, or if the volume is very large. Some preparations of MMS are 28% chlorine dioxide.
- Toxic effects that have been reported in children given MMS treatments include:
  - Nausea and vomiting
  - Dehydration
  - Eye and skin burns
  - Bleeding from the stomach and intestine

Exposures to concentrated bleach, or to chlorine gas, can be deadly!

24-hour hotline  
1-800-222-1222

2716 South Street, 7th Floor, Philadelphia, PA 19146-2305  
Administration 215-590-2003 • Fax 215-590-4419  
[www.poisoncontrol.chop.edu](http://www.poisoncontrol.chop.edu)

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## What Should I Do If Someone Has Ingested Bleach or Gotten It In Their Eyes?

Call 911 if the person is unresponsive or having trouble breathing.

If the person is awake and breathing:

- Get everyone to a safe spot with fresh air.
- Wash bleach off the skin or eyes with clean water.
- Call the poison control center at 1-800-222-1222 – get expert advice from a specially trained nurse or pharmacist for FREE!

## Experience of the Poison Control Center at CHOP\*

Over the past five years we have received 6 calls specifically concerning Miracle Mineral Solution.

- Age range 3-48 years.
- One child had nausea and weakness after oral ingestion, one child had intestinal burns after enema.
- We got an additional call about a dog that died after ingestion.

## Pediatric “Bleach” Cases

- 274 cases of children < 6 years of age exposed to household bleach called to Poison Control Center at CHOP over the past five years
- One developed respiratory distress after exposure to fumes
- One developed bleeding from the throat after oral ingestion
- 26 abdominal pain and/or vomiting
- 26 had eye burns or irritation
- Overall, children with curiosity-driven exposures to household bleach tend to have minor injury

Purposeful ingestion of bleach, or exposure to concentrated bleach products, are much more dangerous.

\*Please note that poison center data is obtained through voluntary calls and underestimates the true scope of poisoning injury.