Recognizing and Responding to Chemical-Assisted Suicides
IAFC Webinar

• Live webinar presented by International Association of Fire Chiefs (IAFC) on March 31, 2016
• Webinar material developed by IAFC, National Library of Medicine and AlphaTRAC, Inc.
• Recorded webinar available at:
  • [https://iafcevents.webex.com/iafcevents/lsr.php?RCID=44f9aaaafcbf24c789c58785bc9f71f90](https://iafcevents.webex.com/iafcevents/lsr.php?RCID=44f9aaaafcbf24c789c58785bc9f71f90)
Get Involved

- www.iafc.org
- www.iafc.org/getinvolved
- www.iafc.org/elearning
- www.iafc.org/webinars
- www.iafc.org/conferences
The NIH CHEMMP Project

• National Library of Medicine / National Institutes of Health
• Chemical Hazards Emergency Medical Management (CHEMMP) Website
• http://chemm.nlm.nih.gov
Chemically-Assisted Suicides - Overview

• Combination of common consumer products to commit suicide through toxic exposure
  • Route of exposure may be ingestion or inhalation
  • Airborne exposure more hazardous to responders and public
  • 80% of responses result in first responder exposure
History

- First used in Japan in 2007
- Rapidly grew to 1000’s of cases
- Introduced to U.S. in 2008 through Internet
- Steadily growing incidence in U.S.
Why Is It Popular?

• Instructions are available on Internet
• Components are easily obtained
• Process is easy
Common Approaches

• Most often used in confined spaces
  – Automobiles
  – Closets
  – Bedrooms
  – Bathrooms
Usual MO

• Victim:
  – Obtains components
  – Seals confined space
  – Posts warning signs
  – May call 911
  – Mixes components
  – Expires within 5 – 10 minutes
Chemicals of Choice

- Hydrogen Sulfide
- Hydrogen Cyanide
- Carbon Monoxide
- Pesticides
- Ingested Cyanide (Sodium and Potassium Cyanide)
- Ingested Phosphide (Aluminum or Zinc Phosphide)
- Ingested Azides (Sodium Azide)
Other Chemicals (Less Likely)

• Other varieties of pesticides
• Toxic chemicals in aerosol cans
• Toxic liquids that have been attached to an airborne dispersion device (such as a sprayer)
Hydrogen Sulfide – the Most Common Chemical

• Colorless gas
• Smell of rotten eggs
• Chemical asphyxiate and chemical irritant
• Renders cells unable to use oxygen – suffocation at cellular level
<table>
<thead>
<tr>
<th>PPM</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05</td>
<td>Odor threshold</td>
</tr>
<tr>
<td>10</td>
<td>Threshold Limit Value-Ceiling (TLV-C), eye irritation</td>
</tr>
<tr>
<td>50-100</td>
<td>Respiratory irritation</td>
</tr>
<tr>
<td>100</td>
<td>Coughing, loss of sense of smell, respiratory distress, drowsiness</td>
</tr>
<tr>
<td>320-530</td>
<td>Pulmonary edema</td>
</tr>
<tr>
<td>530-1,000</td>
<td>CNS stimulation followed rapidly by CNS depression</td>
</tr>
<tr>
<td>800</td>
<td>LC\textsubscript{50}, less than five minutes (lethal concentration killed 50 percent of test animals in less than five minutes)</td>
</tr>
<tr>
<td>&gt;1,000</td>
<td>Immediate collapse with cardiopulmonary arrest, even after only a few breaths</td>
</tr>
</tbody>
</table>
High Risk to Responders!!

- H2S levels can exceed 1,000 ppm in a 4-door sedan
Examples

• 2014: H2S in barricaded room
• 2011: Mixture in car stirs up during response
• 2009 & 2011: Aluminum phosphide in Loudoun County, VA
• 2014: H2S in apartment with victim rescue
IAFC National Near Miss System

http://www.firefighternearmiss.com/

http://www.firefighternearmiss.com/Reports?id=6430
Recognizing a Potential Chemically-Assisted Suicide

• Reported symptoms
  – 911 caller
  – Bystanders

• Vehicle situation

• “Check the Well Being” situation
## Indicators: Reported Symptoms

<table>
<thead>
<tr>
<th>Exposure Levels</th>
<th>PPM</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Exposure</td>
<td>0–10</td>
<td>Caller is complaining of minor irritation in eyes, nose, and throat.</td>
</tr>
<tr>
<td>Moderate Exposure</td>
<td>10–50</td>
<td>Caller is complaining of headache, dizziness, nausea and vomiting, coughing and difficulty breathing.</td>
</tr>
<tr>
<td>High Exposure</td>
<td>50–200</td>
<td>Caller is complaining of severe respiratory irritation, eye irritation/acute conjunctivitis.  Note: This level may also cause shock and convulsions, coma and death.</td>
</tr>
</tbody>
</table>
Indicators: Vehicle Situation

- Warning sign(s) taped to the vehicle door or placed inside
- Smell of rotten egg or sulfur
- Smell of bitter or burnt almonds
Indicators: Vehicle Situation

• Unresponsive subject inside the vehicle
• Pennies in the vehicle or console area will be tarnished with residue
• Empty household cleaning containers on the floor board or seat
Indicators: Vehicle Situation

- One or more large buckets for mixing the acid base and sulfur chemical
- Vehicle’s inside door handles remove
- Yellow-green or white residue on the seats or on the dashboard
Indicators: Vehicle Situation

• Duct tape to cover air vent
• Tools to mix the chemicals
• Windows fogged or tinted with yellow/green residue
Indicators: Check Well Being Call

- Masking tape or towels sealing a door (may be on inside of door and not visible)
- Smell of rotten egg or sulfur
- Smell of bitter or burnt almonds
Indicators: Check Well Being Call

- Suicide note taped to the door or mirror
- Warning sign(s) taped to the mirror or door
Indicators: Check Well Being Call

- Empty household cleaning containers that contain acid and sulfur
- One or more large buckets to mix the chemicals
Responding to Chemical Suicide

• Treat as high hazard HAZMAT event with contaminated victim(s) requiring rescue
• Use your department protocols for this type of response
Responding – Analyze and REACT

• Look for Indicators
• Recognize potential for chemical suicide
• React immediately – your life may be at risk!
  – Back off
  – Immediately employ SCBA, turnout gear, 4-gas monitor for reconnaissance (at a minimum)
Responding – Plan

• Consider / select strategy
• Approach to vehicle will be different than approach to structure
• Call in the right team
• Select PPE
• Obtain air monitoring equipment
• Select decontamination approach(es)
Responding – Plan

• Implement agency HAZMAT protocols
• Plan for site safety
• Plan for site security
• Use risk-based response approach
• Consider confined space volume and possible contaminant concentrations
Responding – Plan

- Plan to ventilate and enter room / vehicle
- Plan to mitigate HAZMAT spread
- Plan to remove and treat victim
- Evaluate risk to public and plan for protective actions
Responding – Implement

• Secure the scene
• Use hand line as appropriate
• Ventilate / change the environment
• Conduct air monitoring
• Treat the victim (if viable)
• Transport the victim (hospital or morgue)
Responding – Implement

• Decontaminate
  – Victim
  – Responders
  – Others affected
  – Equipment
Responding – Implement

• Coordinate with Police (work out a plan beforehand)
• Treat as crime scene!
  – Minimal disturbance
  – Protect evidence
Responding – Implement

• Maintain situational awareness
  – Might be deliberate instead of suicide
  – May be additional devices
  – Re-release may reoccur
  – Off gassing will occur!
Risks to Responders

• Direct exposure to toxic gas
  – Opening space may not disperse gases!
• Off gassing from site
• Off gassing from victim
• Bodily fluids from victim
• HAZARDS MAY PERSIST FOR HOURS AFTER EVENT
IAFC Resource – San Diego HIRT

• San Diego Hazardous Incident Response Team (HIRT)
• Conducted chemical suicide study
• Goal: determine the risk to the public and first responders
• Available at: IAFC HAZMAT Fusion Center
• [www.hazmatfc.com/Resources/Training-Packages/Chemical-Suicide-Package](http://www.hazmatfc.com/Resources/Training-Packages/Chemical-Suicide-Package)
San Diego HIRT Recommendations

- Secure a perimeter of 150’
- Use fire fighter turnouts for reconnaissance and monitoring of the vehicle
- Look for secondary devices
- Look for yellow liquids and containers inside the vehicle
San Diego HIRT Recommendations

• Vehicle will not be at flammable limits and cannot catch fire
• Use the combustible gas indicator for perimeter monitoring
• Use photo ionization detector for monitoring cracks and crevices of the vehicle for higher concentrations
• Vehicle can be vented with a 150’ perimeter
• Gas will dissipate in 15 minutes
San Diego HIRT Recommendations

• Once vented ensure the Medical Examiner has provided approval to remove the chemical containers

• Moving the mixing bucket can cause lethal levels of hydrogen sulfide gas to be generated

• Mixing bucket should be handled in full Level “B” chemical protective clothing
San Diego HIRT Recommendations

• Neutralize with fast setting concrete
• Will allow the agency to treat the solidified waste as a non-hazardous waste
IAFC Chemical Suicide Response Card

- Available at: IAFC HAZMAT Fusion Center
- [www.hazmatfc.com/Resources/Training-Packages/Chemical-Suicide-Package](http://www.hazmatfc.com/Resources/Training-Packages/Chemical-Suicide-Package),

- Addresses 18 response topics for 6 chemicals
Chemicals Addressed

- Detergent (Hydrogen Sulfide)
- Hibachi (Carbon Monoxide)
- Pesticide (Based on Malathion)
- Cyanide (Sodium and Potassium Cyanide ingested)
- Phosphide (Aluminum or Zinc Phosphide ingested)
- Azides (Sodium Azide ingested)
Response Topics

- Dispatch Triage
- First Responder
- Hazmat Teams
- Indicators
- Chemical Description
- Odor
- Odor Threshold
- Evac /Isolation Distance
- Flammability

- PPE First Responders
- PPE HAZMAT Teams
- Instrumentation
- Toxicity
- Deceased Skin Color
- Molecular Weight
- Symptoms
- Emergency Decon
- Transport and ER
<table>
<thead>
<tr>
<th>Dispatch Triage</th>
<th>First Responder</th>
<th>Haz-Mat Teams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you feel ok? Back out.</td>
<td>Do you feel ok? Back out.</td>
<td>Do you feel ok? Back out.</td>
</tr>
<tr>
<td>Warning signs</td>
<td>Warning signs</td>
<td>Warning signs</td>
</tr>
<tr>
<td>Suicide note</td>
<td>Suicide note</td>
<td>Suicide note</td>
</tr>
</tbody>
</table>
| Did you see or drink alcohol? | Did you see a small BBQ or Hibachi? | Did you see any alcohol?
| Fumes or acidic fumes in the area? | Chemical burns around the mouth? | Did you see any dry powders?
| Where is this occurring? Bathroom? | Room? Small space? | Did you see any grey tablets?
| Gas cylinders in the area? | | Rodent control devices |
| | | | Pictures of gophers on containers |
| | | | Name Pesticide |

**Chemical Suicide Guidance**

<table>
<thead>
<tr>
<th>DETERGENTS</th>
<th>HIRACHI</th>
<th>PESTICIDE</th>
<th>CYANIDE</th>
<th>MEDICAL PROFESSIONALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warning signs</td>
<td>Warning signs</td>
<td>Warning signs</td>
<td>Do you have any eye irritation?</td>
<td></td>
</tr>
<tr>
<td>suicide note</td>
<td>Suicide note</td>
<td>Suicide note</td>
<td>Eye irritation</td>
<td></td>
</tr>
<tr>
<td>Did you see a small BBQ or Hibachi?</td>
<td>Did you see any alcohol?</td>
<td>Did you see any alcohol?</td>
<td>Did you see any alcohol?</td>
<td></td>
</tr>
<tr>
<td>Fumes or acidic fumes in the area?</td>
<td>Chemical burns around the mouth?</td>
<td>Chemical burns around the mouth?</td>
<td>Chemical burns around the mouth?</td>
<td></td>
</tr>
<tr>
<td>Gas cylinders in the area?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Phosphide**

<table>
<thead>
<tr>
<th>ALUMINUM OR ZINC PHOSPHIDE INGESTED</th>
<th>AZIDES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you feel ok? Back out.</td>
<td>Do you feel ok? Back out.</td>
</tr>
<tr>
<td>Eye irritation</td>
<td>Eye irritation</td>
</tr>
<tr>
<td>Warning signs</td>
<td>Warning signs</td>
</tr>
<tr>
<td>Suicide note</td>
<td>Suicide note</td>
</tr>
<tr>
<td>Did you see any alcohol?</td>
<td>Did you see any alcohol?</td>
</tr>
<tr>
<td>Scent of dead fish</td>
<td>Scent of dead fish</td>
</tr>
<tr>
<td>Did you see any grey tablets?</td>
<td>Did you see any grey tablets</td>
</tr>
<tr>
<td>Rodent control devices</td>
<td>Rodent control devices</td>
</tr>
<tr>
<td>Pictures of gophers on containers</td>
<td>Pictures of gophers on containers</td>
</tr>
<tr>
<td>Name Pesticide</td>
<td>Name Pesticide</td>
</tr>
</tbody>
</table>

**Combination**

- Look for secondary devices
- Monitor with phosphine sensor, 4-8 gas, PID (can color PID), tube/strip
- Monitor for phosphine production
- Look for yellow/green phosphine
- Begin ventilation and isolate victim
- Do not use gas powered fans as they will generate CO
- Ensure the vents are not impacting other populated areas
- Mitigate BBQ/Hibachi
- Ensure the area is safe for other personnel to enter in street clothes
- Document scene if deceased
- If victim is transported ensure they are treated outside or in negative pressure room. DO NOT bring the container into the ER.
- Document scene if deceased
- If victim is transported ensure they are treated outside or in negative pressure room. DO NOT bring the container into the ER.
- Document scene if deceased
- If victim is transported ensure they are treated outside or in negative pressure room. DO NOT bring the container into the ER.
Other Training / Information References (CHEMM)

- [Chemical Assisted Suicide: Responder Information](https://example.com) (PDF – 198 KB) (HAZMAT FC)
- [Chemical Suicides: A New Threat for Responders](https://example.com)
- [Chemical Suicides: Dangers for First Responders](https://example.com) (CBRNE Resource Network)
- [Chemical Suicides in Automobiles](https://example.com) (CDC)
- [Chemical Suicides: Identification Guide for 911 Communications](https://example.com) (PDF – 1094 KB) (CFIX)
- [Coffee Break Training – Hazardous Materials: Chemical Assisted Suicide](https://example.com) (PDF – 503 KB) (USFA, FEMA, NFA)
- [Hydrogen Cyanide](https://example.com) (OPCW)
- [Hydrogen Sulfide Suicide Trend: First Responder Safety Update](https://example.com) (PDF – 1114 KB) (CFIX)
- [The Chemical Suicide Phenomenon: Where Is It Headed?](https://example.com) (PDF – 255 KB) (NY State DHSES)
Thank You!

C. Reed Hodgin
AlphaTRAC, Inc.
rhodgin@alphatrac.com
(303) 669-2564

Joe Kratochvil
IAFC
kratochvil@iafc.org
(703) 896-4857