H-05 CORROSIVE AGENTS/ CHEMICAL BURNS	Also see *Hydrofluoric Acid [H-07]* for specific treatments with Calcium Gluconate	First Responder EMT AEMT Paramedic

Refer to the following individual guidelines regarding:

1. Skin or Mucous-Membrane Injury
2. Eye Exposure
3. Inhalation Injury
4. Ingestion

H-05 CORROSIVE AGENTS/ CHEMICAL BURNS	Also see *Hydrofluoric Acid [H-07]* for specific treatments with Calcium Gluconate	First Responder EMT AEMT Paramedic

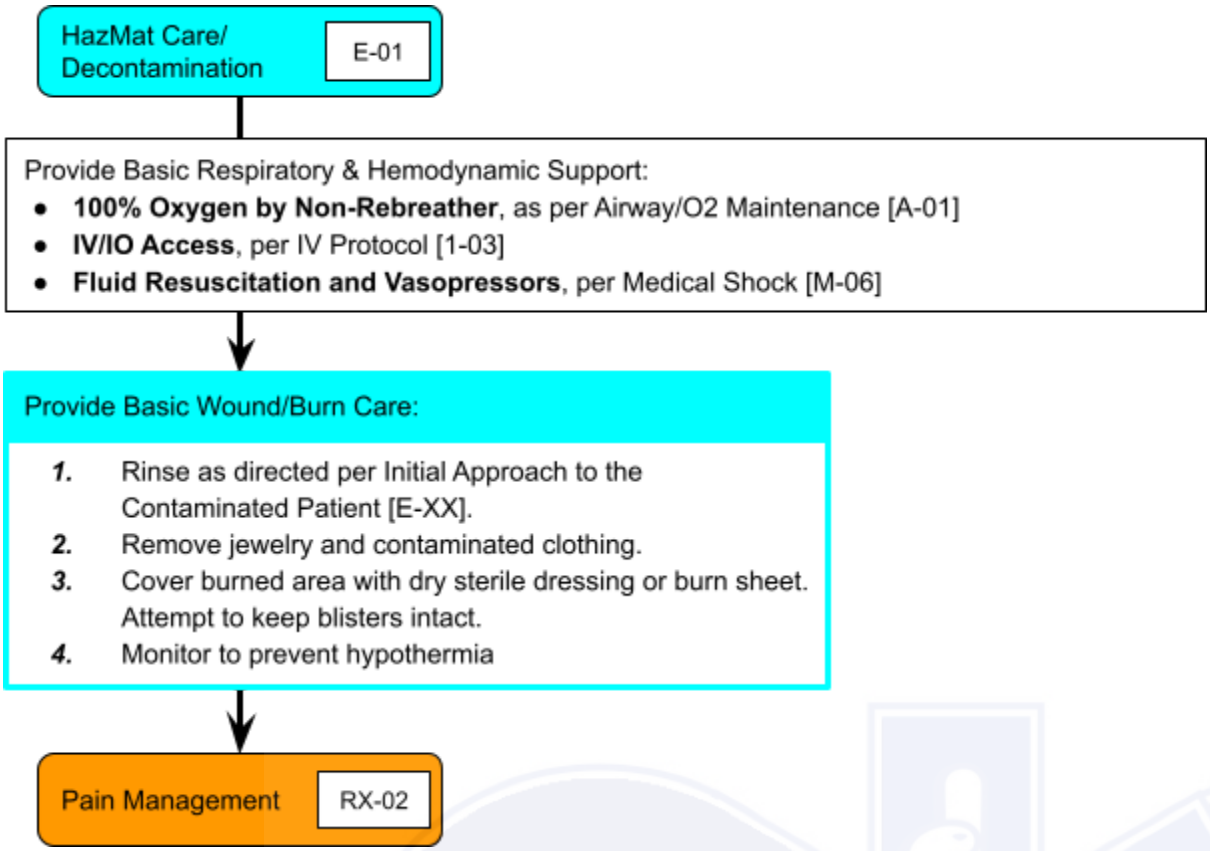
#1: SKIN or MUCOUS-MEMBRANE INJURY

Examples: Acids, Alkalis, Oxidizers, etc.

DECONTAMINATION - see Initial Approach to the Contaminated Patient [E-XX] for more details.

- Any visible solids should be brushed off the skin.
- Irrigate the skin with large volumes of water, and avoid contaminating non-exposed skin if possible.
- Eyes: see “Eye Exposure”, *below*, for specific approach).
- For large exposures, formal decontamination should be performed by a HazMat Team.

TREATMENT



H-05 CORROSIVE AGENTS/ CHEMICAL BURNS	Also see *Hydrofluoric Acid [H-07]* for specific treatments with Calcium Gluconate	First Responder EMT AEMT Paramedic

SPECIAL CIRCUMSTANCES - SKIN/MUCOUS-MEMBRANE

Hydrofluoric Acid [E-XX] → see full guideline for details

- Treatment:
  - *Dermal Injury:* **Calcium Gluconate** injected into and around the burn.
  - *Hemodynamic Instability:* **Calcium Gluconate IV/IO.**

Phenol (also known as Carbolic Acid)

- Found in many household items → commonly used as a disinfectant, germicide, antiseptic, and as a wood preservative.
- Local effects = causes a coagulating necrosis, the same as other acids.
- Systemic effects = central nervous system (CNS) depression, including respiratory arrest.

Treatment:

- Initially, decontaminate with large volumes of water, as per normal.
  - *Warning*: Small volumes of water increase absorption by expanding the surface area of exposure.
- Then, **irrigate burned area with mineral oil, olive oil, isopropyl alcohol or polyethylene glycol** (PEG, go-lytely®, colyte®) if available.
- Alternate washes of soap/water and oil (or PEG) a minimum of two times each before transport.

NOTES

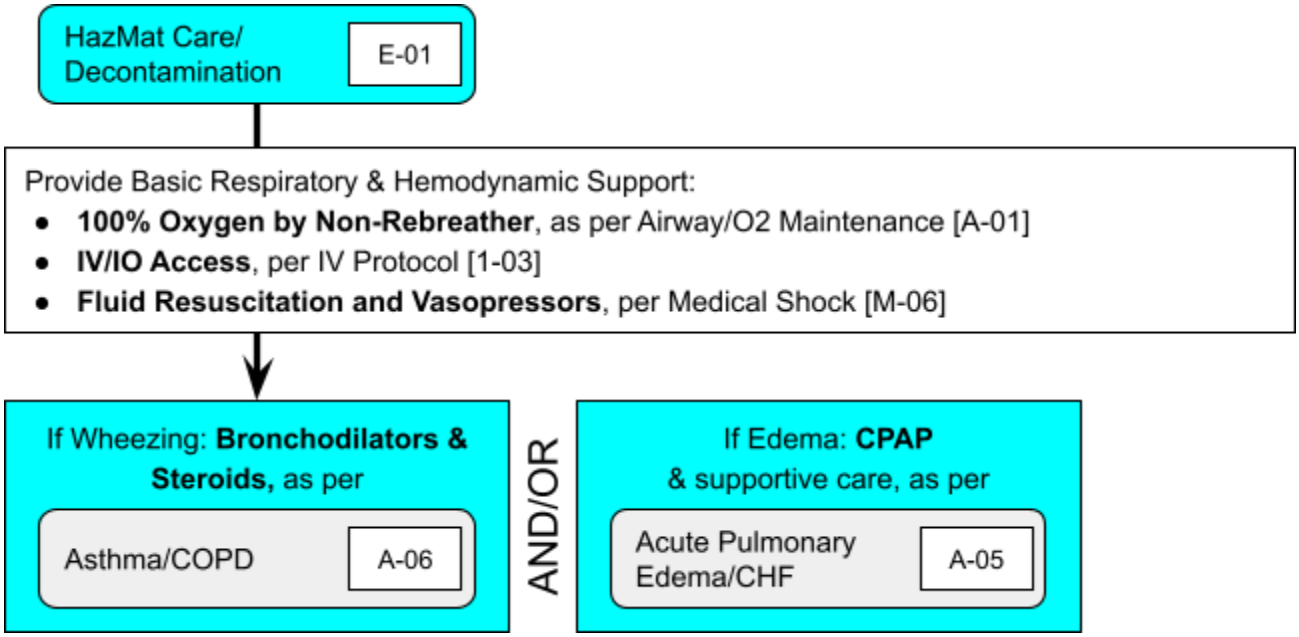
- Injury is caused by direct tissue irritation/injury–generally by denaturation of proteins.
- In general, acids cause a coagulative necrosis and alkalis cause a liquefactive necrosis. Alkalis are generally worse/deeper due to a lack of protection from further destruction by an eschar (necrotic scab).
- The degree of injury (irritation) is based on concentration of the substance and duration of exposure.

#2: INHALATION EXPOSURE

Examples:

- Acids & Alkaline compounds
- Ammonia (liquids and gases)
- Chlorine Gas
- Blister agents - sulfur mustard (HS), nitrogen mustard (HD) and lewisite (L)
- Phosgene, Isocyanate and diisocyanate compounds (Methylene biphenyl isocyanate, ethyl isocyanate, methylene diisocyanate, toluene isocyanante, TDI, MDI)

TREATMENT



H-05 CORROSIVE AGENTS/ CHEMICAL BURNS	Also see *Hydrofluoric Acid [H-07]* for specific treatments with Calcium Gluconate	First Responder EMT AEMT Paramedic

SPECIAL CIRCUMSTANCES - INHALATION

Hydrofluoric Acid [E-XX] → see specific guideline

- Decontamination: as per Initial Approach to the Contaminated Patient [E-XX]
- Treatment (see full guideline for details)
  - *Inhalation Injury:* **Nebulized Calcium Gluconate**
  - *Hemodynamic Instability:* **Calcium Gluconate IV/IO**

Chlorine and Chloramine

- Decontamination: as per Initial Approach to the Contaminated Patient [E-XX]
- Treatment:
  - Administer **5 ml of Sterile Water via Nebulizer**
  - If burning persists:
    - Administer **5 mL of HALF-STRENGTH Sodium Bicarb via Nebulizer**
    - MIX: 2.5 mL of Sodium Bicarbonate (8.4%) with 2.5 mL of NS
  - Otherwise, provide supportive care, bronchodilators and steroids as per General Inhalation Injury Guideline (*above*)
- Notes:
  - Chloramine gas is produced by the mixture of household bleach and household ammonia.
  - Chloramine and Chlorine is an irritant that converts to hydrochloric acid in the lining of upper airway.

Lacrimators - e.g. OC (Oleoresin Capsicum) pepper spray and other lacrimators

- These agents do not cause significant tissue damage.
- Treatment is aimed at relieving the pain (see “Eye Exposure”, *below*) and monitoring for any signs of anaphylaxis (Allergic Reaction [M-02]) or bronchospasm (Asthma/COPD [A-06]) potentially triggered by the irritant.

Phosgene

- An irritant gas that causes a **delayed onset of pulmonary edema** (dyspnea, tachypnea, and violent coughing).
- A mild and transient cough is the only symptom at the time of exposure to most agents.
- Severe symptoms are typically not seen for 12-24 hours (potentially up to 72 hours).
- Treatment is mostly respiratory support with CPAP/BiPAP or intubation/mechanical ventilation.

NOTES - INHALATION

- Injury is caused by direct damage/inflammation to the airways.
- A key consideration concerning the effects of respiratory irritants is water solubility.
  - Water-soluble materials (e.g acids/chlorine) tend to irritate upper airway passages resulting in cough reflex, wheezing and bronchospasm.

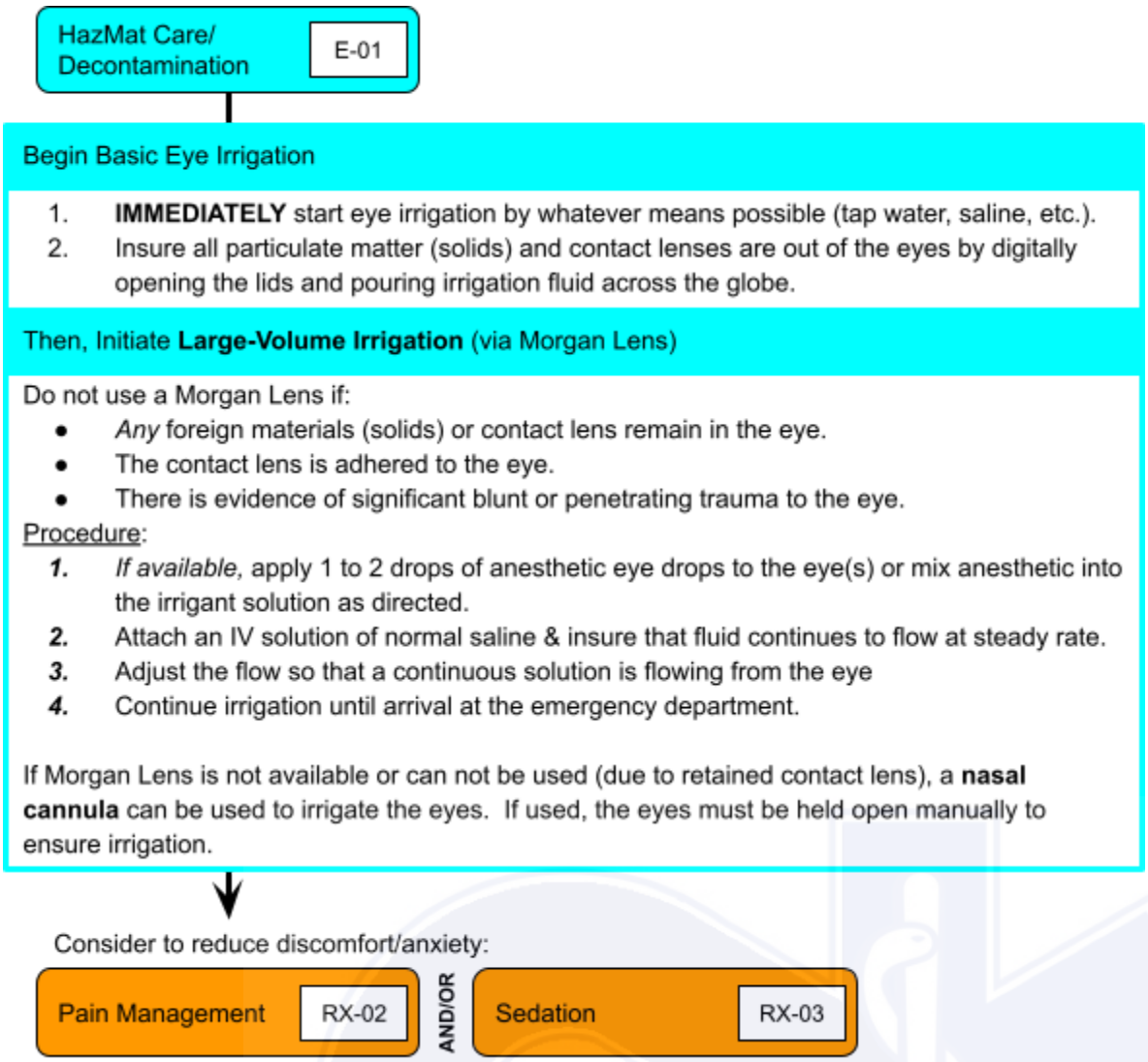
    - *Non* Water-soluble irritants (or in cases of massive exposure to water soluble irritants), generally affect the lower airways and lead to non-cardiogenic pulmonary edema. This can have a delayed onset of 6 – 10 hrs or more (e.g. Phosgene).
- Symptoms
    - Pulmonary symptoms (cough, dyspnea, etc.) are generally associated with concurrent rapid onset of eye, nose and throat (i.e. mucous membrane) irritation.
    - Symptoms from most exposures tend to improve with fresh air and good ventilation unless there is a triggering of underlying lung disease (i.e. asthma exacerbation).
    - Moderate exposure:
        - Can lead to a persistent bronchospasm and bronchial swelling/edema.
        - Similar to asthma/COPD and treated similarly with bronchodilators and steroids (antiinflammatories).
    - In severe exposure (high concentrations):
        - Severe, life-threatening non-cardiogenic pulmonary edema can occur.
        - End-stage symptoms may *resemble organophosphate poisoning* due to profound fluid involvement, however, patients will have NORMAL OR DILATED PUPILS whereas an organophosphate or nerve agent patient will pinpoint pupils.

#3: EYE EXPOSURE

Examples: This may be direct inoculation by a solid, liquid/droplet or vapor, or may be the result of mucous membrane exposure to a gas (e.g. chlorine).

TREATMENT

Focus: extensive irrigation of the eyes and pain control.



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NOTES - EYE EXPOSURE

- Watch water run off so other parts of the body do not become contaminated (especially other parts of the face, ears, and back of neck).
- Eye burns are almost always associated with contamination of other parts of the face or body.

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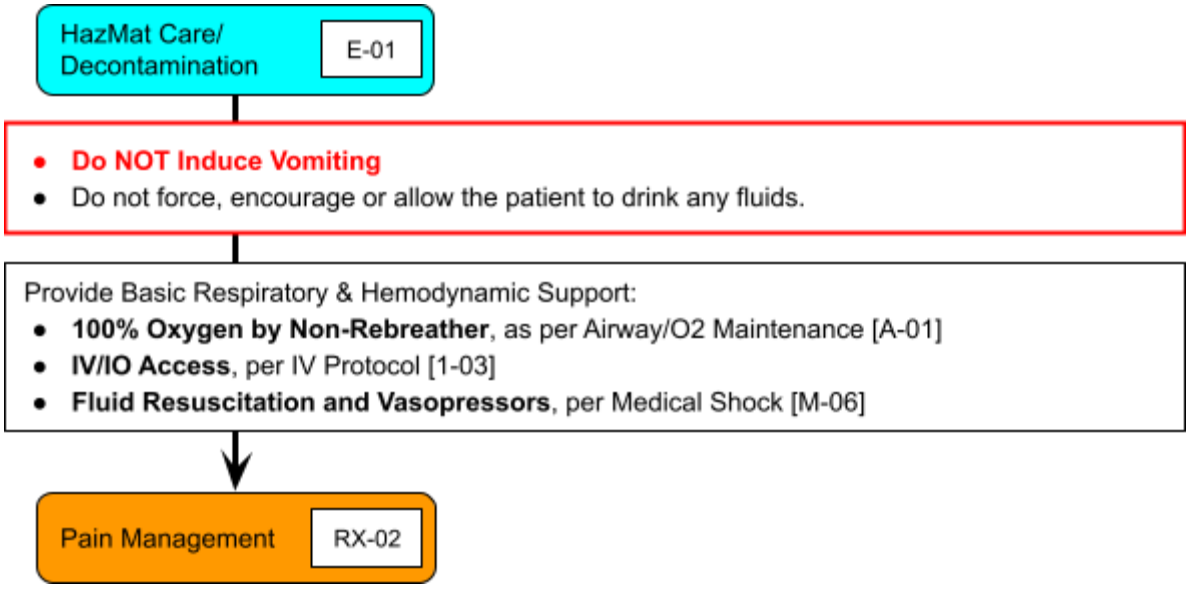
#4: INGESTION

Examples: Usually seen with intentional ingestion in adults (suicide attempt), or accidental ingestion with pediatrics.

TREATMENT

Focus: maintaining and monitoring the airway for signs of obstruction due to edema of injured tissues, and monitoring for signs of circulatory collapse.



NOTES

- Ingestion of acids and alkalis can result in severe injury to the upper airway, esophagus and stomach.
- Most care is supportive unless there are severe upper airway (pharyngeal and/or laryngeal) burns.
- Severe exposures may lead to circulatory collapse.

NOTE: Poison Control may be contacted **[1-800-222-1222]** for **INFORMATION ONLY.** Treatment modalities must utilize these guidelines, or may be received received through online Medical Control.