

# Vinyl Chloride

## Health Effects and Reducing Exposure

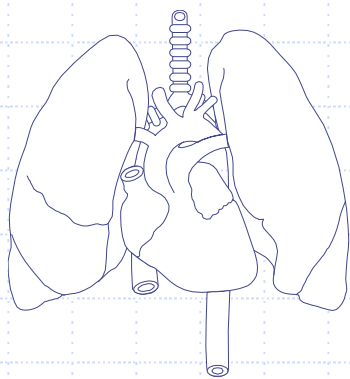
# Learning Objectives

- ◆ Identify sources of vinyl chloride
- ◆ Discuss health effects of vinyl chloride
- ◆ Determine actions for reducing exposures to vinyl chloride

# Uses and Sources

- ◆ Found at 496 National Priority List sites
- ◆ Colorless, flammable gas with a mild, sweet odor
- ◆ Used to make polyvinyl chloride (PVC)
  - Plastic pipes
  - Wire
  - Cable coatings
  - Furniture and automobile upholstery
  - Many hospital products
- ◆ Tobacco smoke

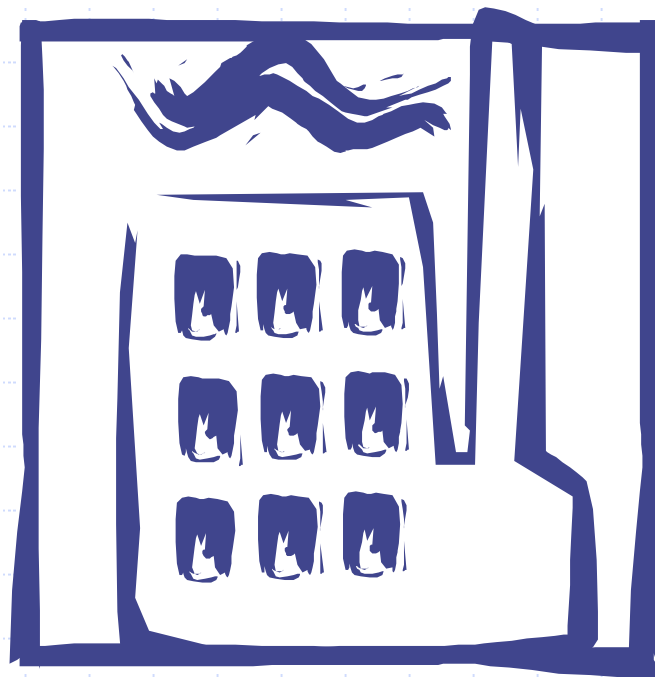
# How Are We Exposed?



- ◆ Breathing air emissions during creation of PVC, or during burning in incinerators
- ◆ Drinking water contaminated by spills or after air emissions deposit in water
- ◆ Breathing vapors while showering with contaminated water
- ◆ Inhaling tobacco smoke

# Health Effects: Inhalation

- ◆ Irritation
- ◆ Coughing
- ◆ Shortness of breath
- ◆ Headache
- ◆ Nausea/vomiting
- ◆ Dizziness and sleepy
- ◆ Loss of consciousness
- ◆ Death



# Health Effects: Organ Systems

- ◆ Liver damage and cancer
- ◆ Cancer – connective and soft tissue, brain
- ◆ Skin – numbness, redness, blisters
- ◆ Autoimmune – scleroderma, Raynaud's syndrome, arthritis
- ◆ Nerve damage
- ◆ Peripheral vascular disease
- ◆ Possible reproductive effects

# Indications of Exposure

- ◆ Tests are available but not routinely offered in regular health care provider offices
  - Breath – only good shortly after exposure
  - Urine – for breakdown product, not specific for VC and only shortly after exposure
  - Blood and tissue

# What to Do?

- ◆ Have water tested for VC if suspected contamination
- ◆ Do not burn PVC plastic or dispose of in a way that will lead to a municipal incinerator
- ◆ Work exposure
  - Ensure proper ventilation, enclosure, and protective equipment
  - Wash immediately after exposure and before going home
  - Change clothes at work, launder separately

# Policy

## ◆ EPA

- Clean Water Act Maximum Contaminant Level is 0.002 mg/L
- Clean Air Act reference concentration is 0.1 mg/cubic meter
- Spills of 1 pound or more must be reported

## ◆ OSHA

- 8-hour day/40-hour week maximum air limit is 1 part per million (ppm), measured by area air monitoring
- 15 minute maximum level is 5 ppm

## ◆ FDA

- Regulates the amount of VC in food packaging

# Resources

- ◆ ATSDR ToxFAQs  
<http://atsdr1.atsdr.cdc.gov/tfacts20.pdf>
- ◆ NJ Fact Sheet  
[www.state.nj.us/health/eoh/rtkweb/2001.pdf](http://www.state.nj.us/health/eoh/rtkweb/2001.pdf)
- ◆ EPA Water Fact Sheet  
[www.epa.gov/OGWDW/dwh/t-voc/vinylchl.html](http://www.epa.gov/OGWDW/dwh/t-voc/vinylchl.html)
- ◆ Scorecard [www.scorecard.org/chemical-profiles/summary.tcl?edf\\_substance\\_id=75%2d01%2d4](http://www.scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=75%2d01%2d4)

# In Review

- ◆ What is vinyl chloride and how are we exposed to it
- ◆ How does vinyl chloride effect our health
- ◆ How can we reduce our exposure to vinyl chloride

# References

- ◆ Agency for Toxic Substances and Disease Registry (1997). Vinyl chloride. Public Health Statement. Available on-line: <http://www.atsdr.cdc.gov/toxprofiles/phs20.html>
- ◆ Cancer Weekly (May 16, 2000). Vinyl chloride exposure changes p53 gene. 9.
- ◆ Key, S. (1999). Study finds link between cancer and vinyl chloride. Cancer Weekly Plus, 2: 16-17.

# References

- ◆ New Jersey Department of Health and Senior Services (2001). Vinyl chloride. Hazardous Substance Fact Sheet. Available on-line: <http://www.state.nj.us/health/eoh/rtkweb/2001.pdf>
- ◆ Powell, J., Van de Water, J., & Gershwin, M. (1999). Evidence for the role of environmental agents in the initiation or progression of autoimmune conditions. Environmental Health Perspectives, 107(supplement 5): 667-672.