

# Waste Anesthetic Gases (WAG)



Vail Valley Medical Center

*Extraordinary people. Extraordinary care.*

# Topics

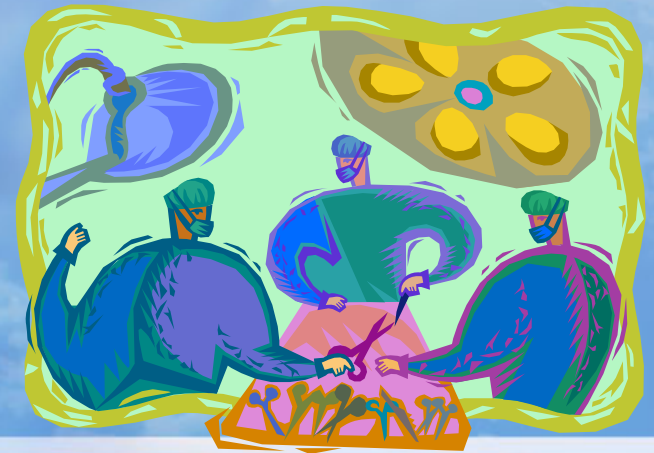
- **Introduction**
- **Types of waste anesthetic gases**
- **Potential health effects**
- **Exposure controls**

# Objectives

- Name at least two types of waste anesthetic gases
- Describe at least one potential health effect
- Describe at least one engineering control
- Describe at least one action you can take to limit your exposure
- Describe at least one Employee Health function

# Introduction

- According to a 1991 Occupational Safety and Health Administration (OSHA), at any given time more than 250,000 people who work in hospitals, operating rooms, dental offices, and veterinary clinics, might be exposed unnecessarily to harmful levels of waste anesthesia gases (WAG).



# WAG

- WAG of principal concern:
  - Nitrous oxide
  - Halogenated agents (vapors) such as:
    - Halothane
    - Enflurane
    - Methoxyflurane
    - Trichloroethylene
    - Isoflourane (currently, the most widely used)



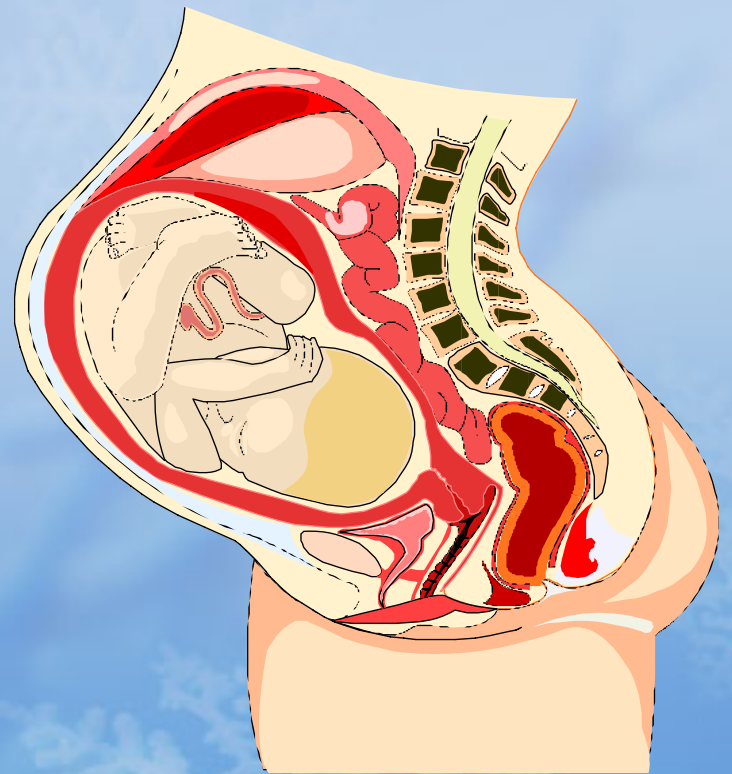
# WAG

- The principal sources of WAG are
  - Leakage from anesthetic equipment ( poor circuit connections)
  - Incorrect installation and maintenance of scavenging systems (system that vents excess gas out of area)
  - Leakage from patient's mask (poor fit)
  - Patient may exhale gas into the room (particularly in the PACU)

# Potential Health Effects

## Reproductive

- Increased incidence of spontaneous abortions
- Decreased fertility in women
- Increased risk of birth defects
- Increased cancer rates



# Potential Health Effects

## Nervous System

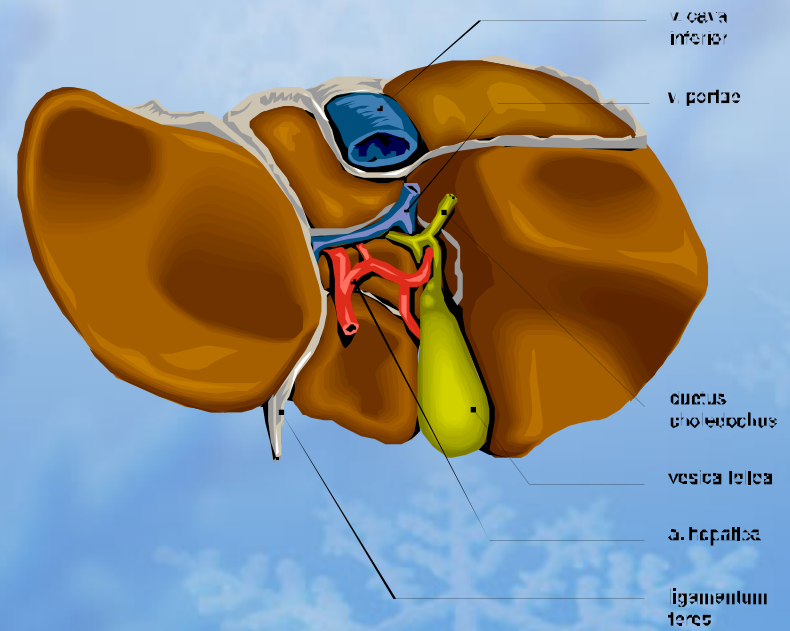
- Deficits of cognitive and motor skills observed at 50 ppm over 2-4 hour exposure, such as
  - Drowsiness, irritability, depression, headaches, nausea, coordination
- **No such effects** in subjects exposed to 25 ppm Nitrous oxide and 0.5 ppm Halothane



# Potential Health Effects

## Liver/Kidney

- Elevated incidence of liver and kidney disease



# Exposure Controls: How much?

- National Institute of Occupational Safety and Health (NIOSH) recommends:
  - 25 ppm for Nitrous Oxide (N<sub>2</sub>O)
  - 2 ppm for Halogenated gases
  - Commonly, combined use of N<sub>2</sub>O and halogenated gas, results in halogenated levels of 0.5 ppm

# Exposure Controls: Engineering

- The scavenger system is the basic engineering control for WAG.
- The scavenger collects WAG and ventilates it from the room.
- The equipment must be monitored regularly for leakage, improper design, and tubing defects.
- It also must be properly connected.

# Exposure controls: Engineering

- VVMC staff
  - can protect themselves from excess exposure by properly connecting the scavenger system or making sure that it has been properly connected.
- VVMC engineering staff
  - ensure that anesthesia machines are working properly and are properly maintained
  - conduct regularly scheduled WAG monitoring and sampling to ensure adequate ventilation

# Exposure Controls

## Work Practices

- Properly connecting the scavenger system or making sure that it has been properly connected.
- Make sure the gas is off when the breathing system is disconnected from the patient
- Ensure that all patients have properly fitting masks
- Maintain oxygen flow until the scavenging system is flushed

# Exposure Controls

## Work Practice Controls

- Personal Protective Equipment (PPE) is not needed or recommended when an adequate control program is in place.
- However, it is available in case of emergency



# Exposure Control Employee Health

- VVMC conducts preplacement and annual surveillance of employees who are subject to occupational exposure to WAG
- Employees are advised of the potential health effects of exposure to WAG
- Employees who suspect that they have been effected by WAG shall follow VVMC policy and protocol for reporting workplace injuries.

# How are we doing at VVMC?

- WAG Survey 6/21/07 OR, VVSC, L & D
  - Results
    - No leaks in anesthesia machines
    - Room airflow measurements all within recommended specifications
    - Air Exchanges above the recommended levels



# Conclusion

- It is the responsibility of everyone involved with WAG to recognize, understand, monitor, and reduce the health and safety risks of exposures to these substances.



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