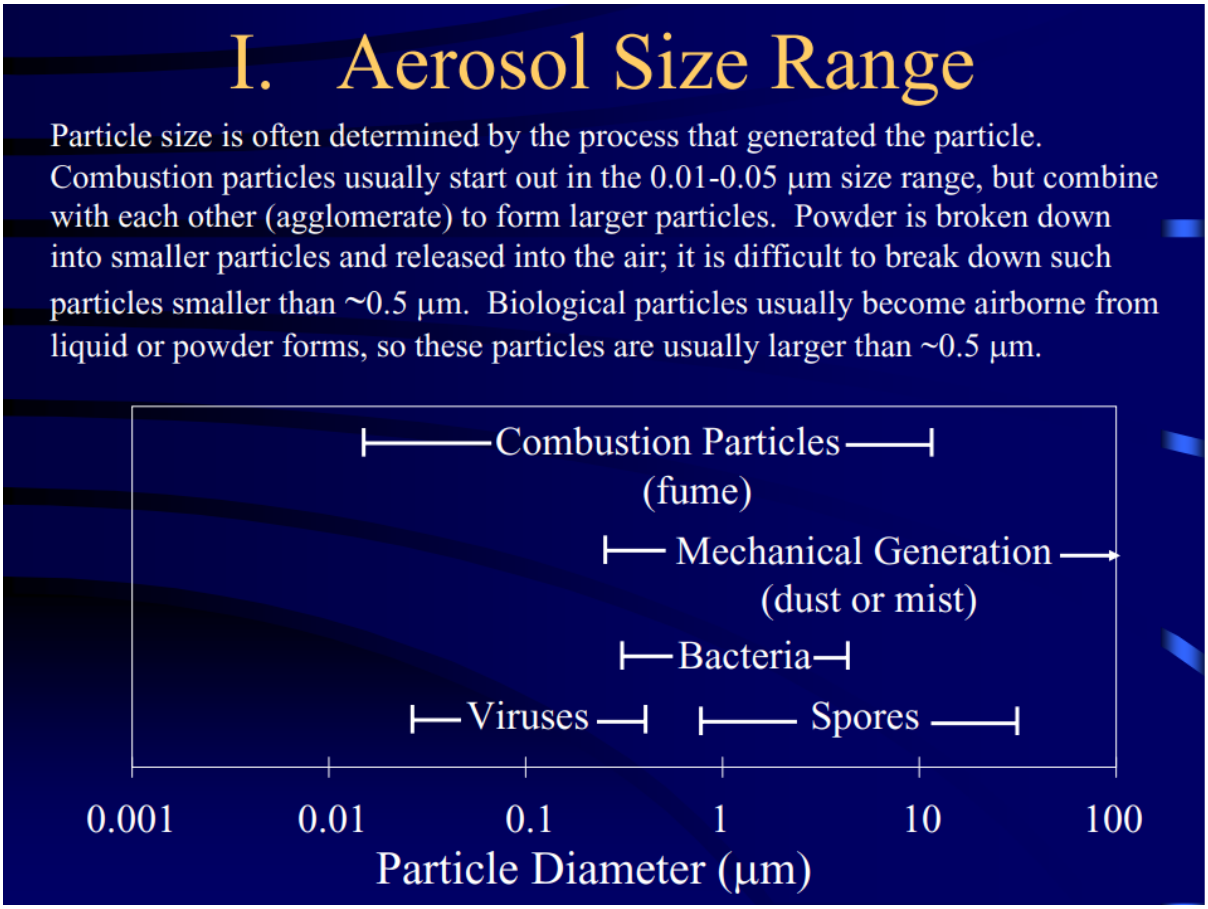
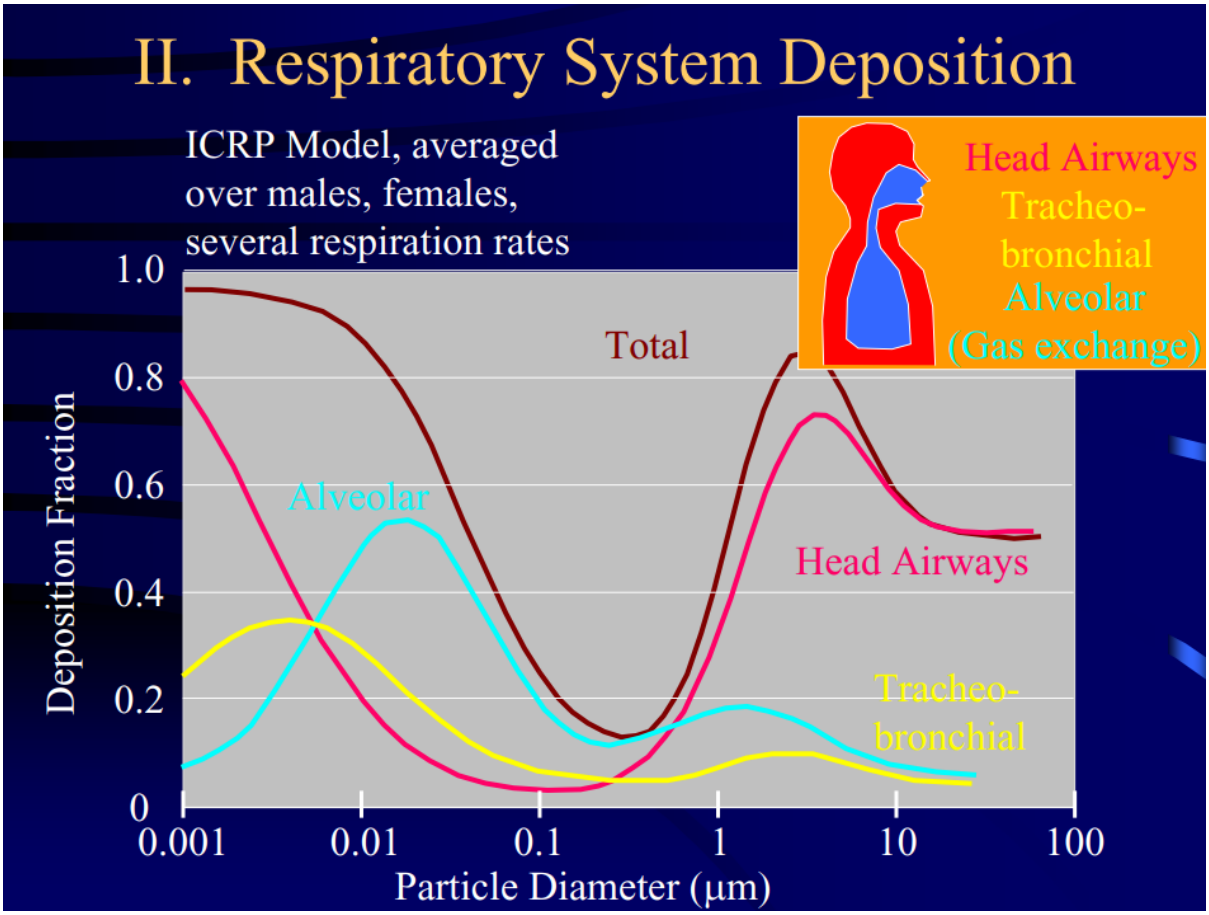
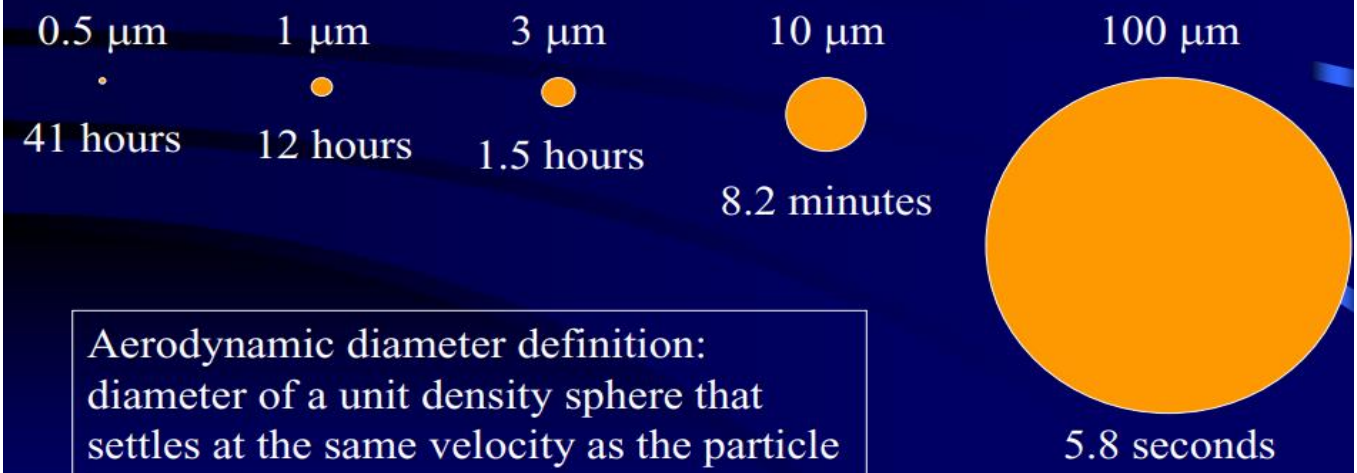
Selection of images for use in plan



# Particle Settling in Still Air

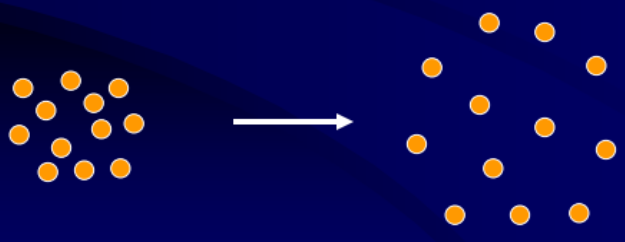
Time to settle 5 feet by unit density spheres



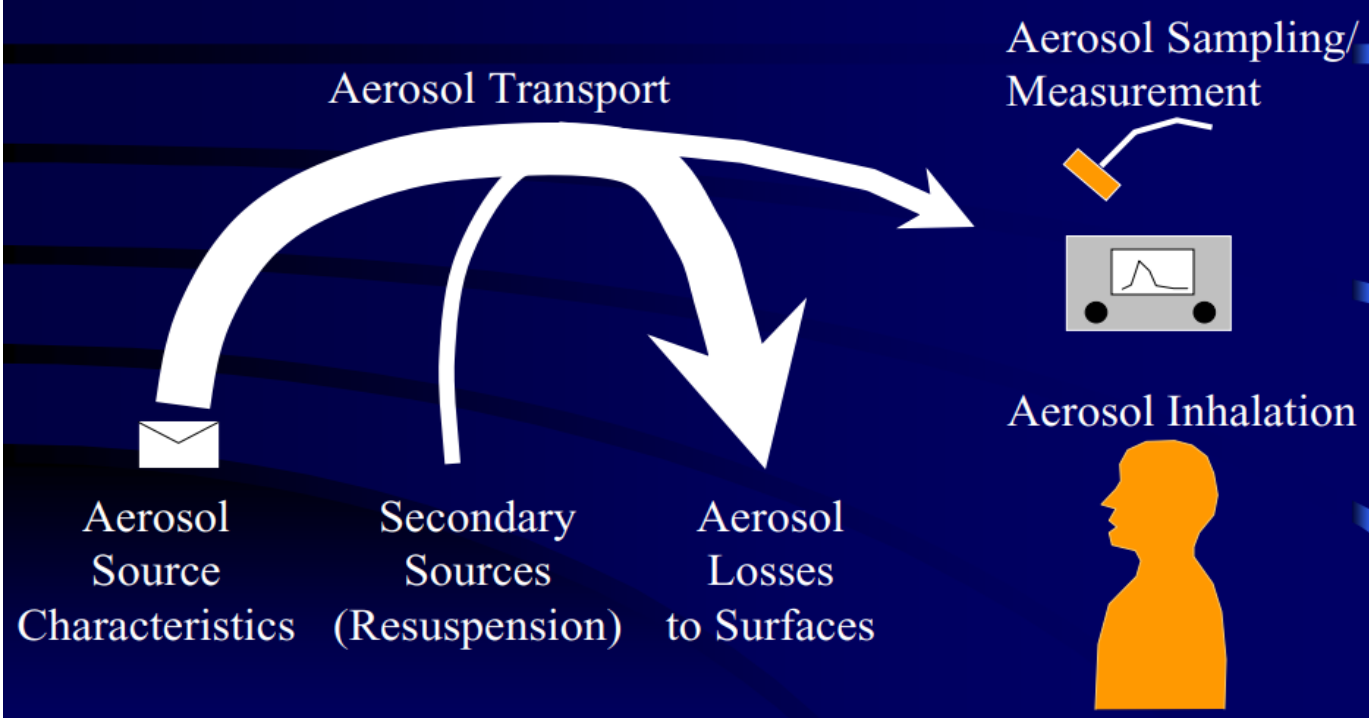

Aerodynamic diameter definition: diameter of a unit density sphere that settles at the same velocity as the particle in question

# Space Charge Expansion of Aerosol

- High aerosol concentration
- Particles are highly charged
- All particles have same polarity
- Aerosol will expand because of particle-particle repulsion



# Overall Scenario




# Direct Reading Aerosol Measurement

Optical particle counter

- Relatively inexpensive (~2K – $10K)
- Portable, battery operated
- Rapid detection
- Nonspecific for bacteria
- Toxic concentrations near or below ambient particle concentrations
- Can be used for tracer studies

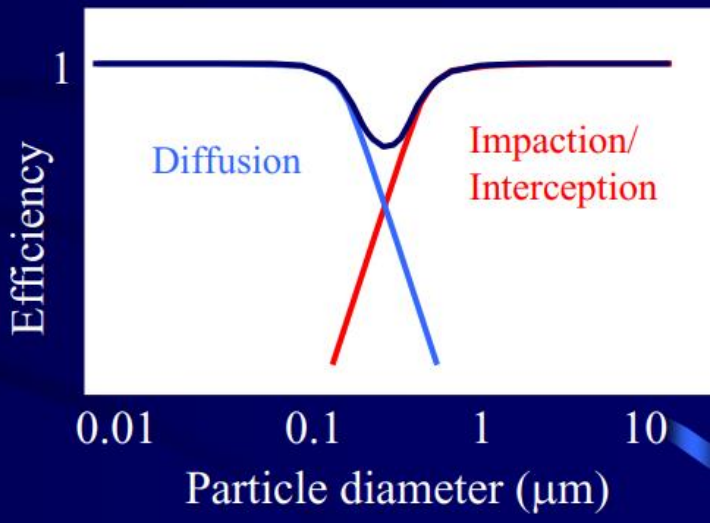
# Direct Reading Aerosol Measurement

Aerodynamic Particle Sizer

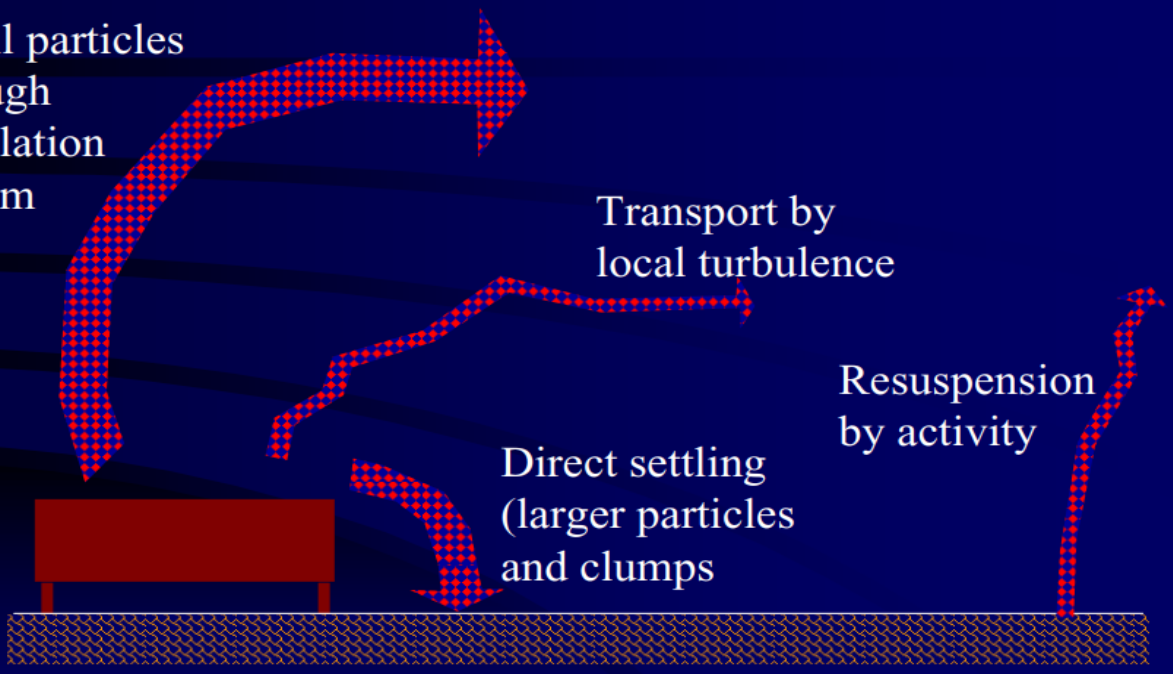
- Relatively expensive (~$40K)
- Movable, line operated
- Higher size resolution, possibly improved size distribution signature
- Fluorescent detection version
- Can be used for tracer studies

# Filtration

- Air filtration different from liquid filtration
- Pore size in air filters generally meaningless as indicator of efficiency
- Small particles collected by diffusion, large ones by impaction/interception
- Maximum penetration at about 0.3 μm
- Efficiency increases with increasing air velocity

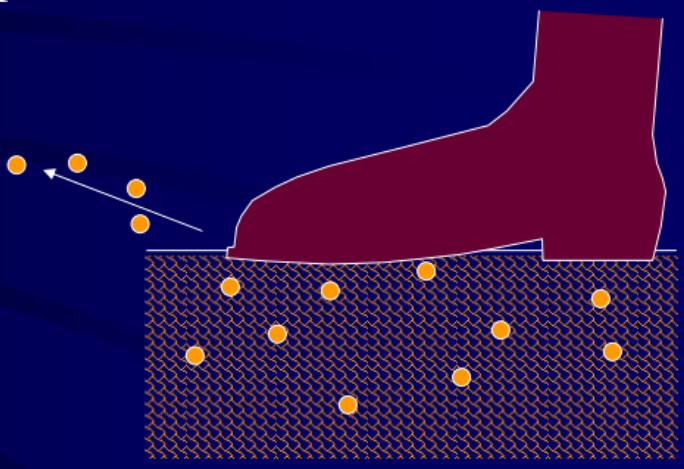


# Particle Transport from Sources




# Generation from Carpet

- Particles deposited in carpet; acts as a sink
- Footstep crushes fibers against each other
- Footstep compresses carpet, creating high velocity air flow



# Space Charge Expansion of Aerosol

- High aerosol concentration
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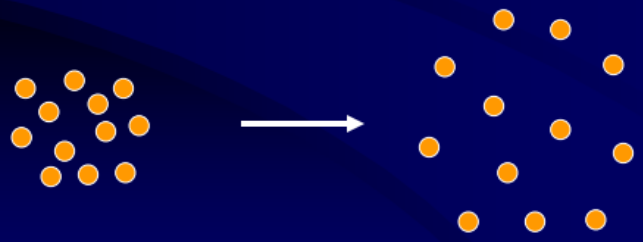
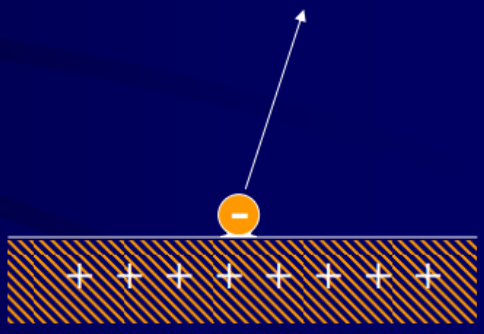


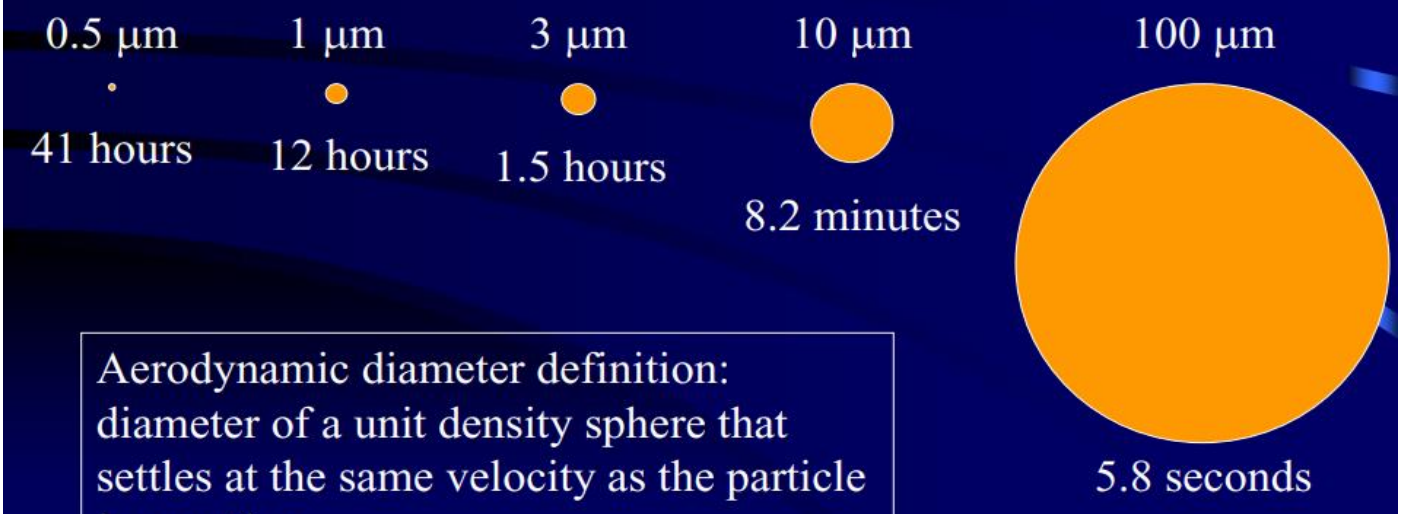
# Particle Charge Imparted During Generation—Solid Particles

- Difference in surface energy levels
- Separation energy
- Humidity creates bridge between particle and surface



# Particle Settling in Still Air

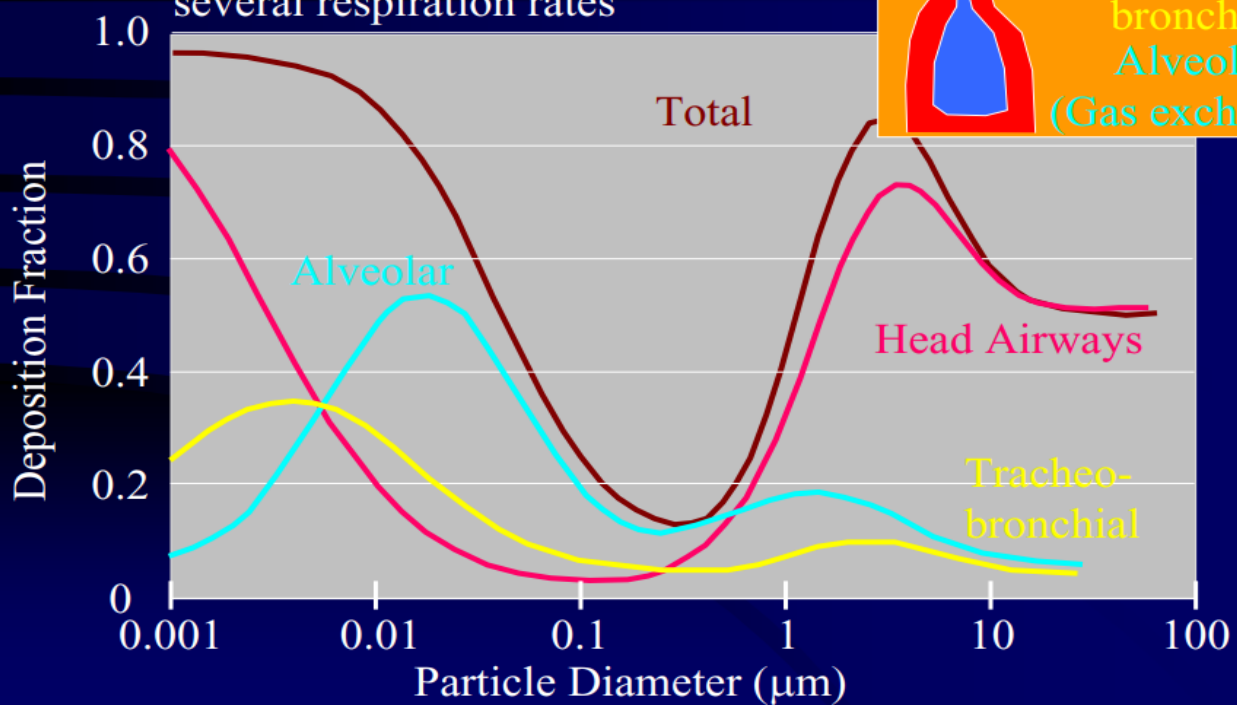
Time to settle 5 feet by unit density spheres




Aerodynamic diameter definition: diameter of a unit density sphere that settles at the same velocity as the particle in question

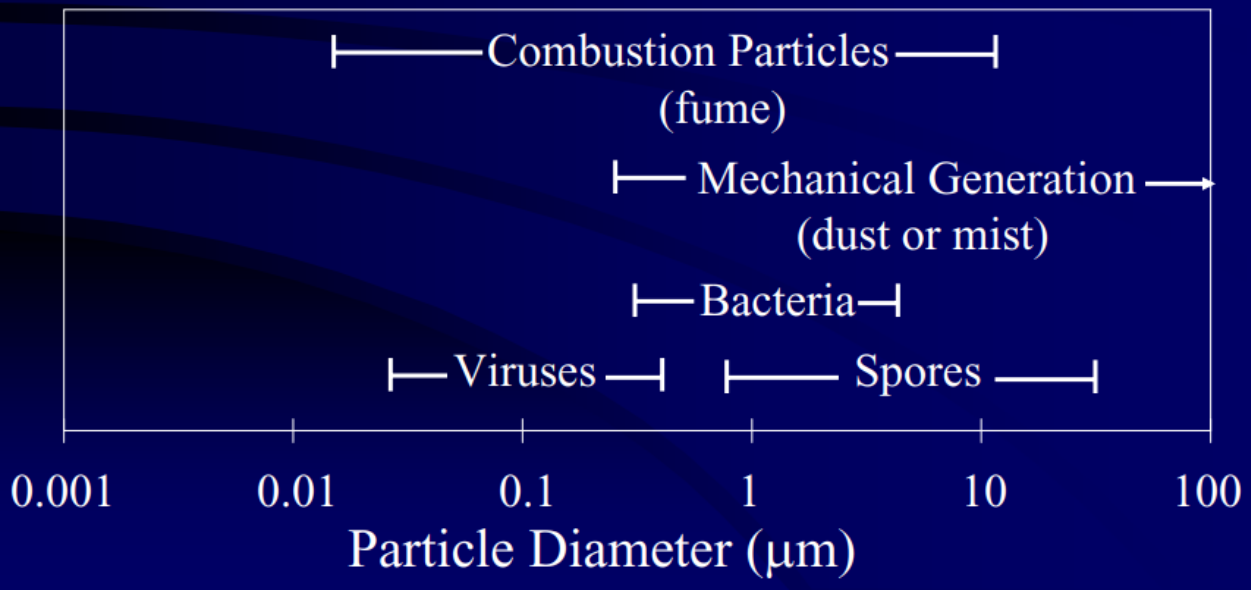
# II. Respiratory System Deposition

ICRP Model, averaged over males, females, several respiration rates

# I. Aerosol Size Range

Particle size is often determined by the process that generated the particle. Combustion particles usually start out in the 0.01-0.05 μm size range, but combine with each other (agglomerate) to form larger particles. Powder is broken down into smaller particles and released into the air; it is difficult to break down such particles smaller than ~0.5 μm. Biological particles usually become airborne from liquid or powder forms, so these particles are usually larger than ~0.5 μm.




# Toxic Aerosols!?

Our respiratory system is efficient at removing aerosols, but if they fall within particular size ranges, are highly concentrated, or toxic, they may cause adverse health effects. They may also deposit on skin or eyes, generally only causing irritation, though more toxic effects may occur. Very small particles may pass through the skin and enter the body that way. Soluble particles may dissolve and pass through the skin.