

Workshop: Understanding Indoor Air Quality

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What is Indoor Air Quality?

- ✿ Audience responses.
- ✿ Audience definitions.



Sorting Through the Complexity

- ✿ Of all the types and definitions listed how can we organize the information to make any sense of what is happening and eventually make recommendations for improvement?
- ✿ One way is to start with the obvious. Some situations are obviously bad. Others are uncertain. Some are subtle. Or they can be hidden.

Obviously Bad 1



Obviously Bad 2



Obviously Bad 3



Obviously Bad 4



Uncertain 1



Uncertain 2



Uncertain 3



Subtle 1



Subtle 2



Subtle 3



Hidden 1



Hidden 2



Hidden 3



Hidden 4



The Four P's.

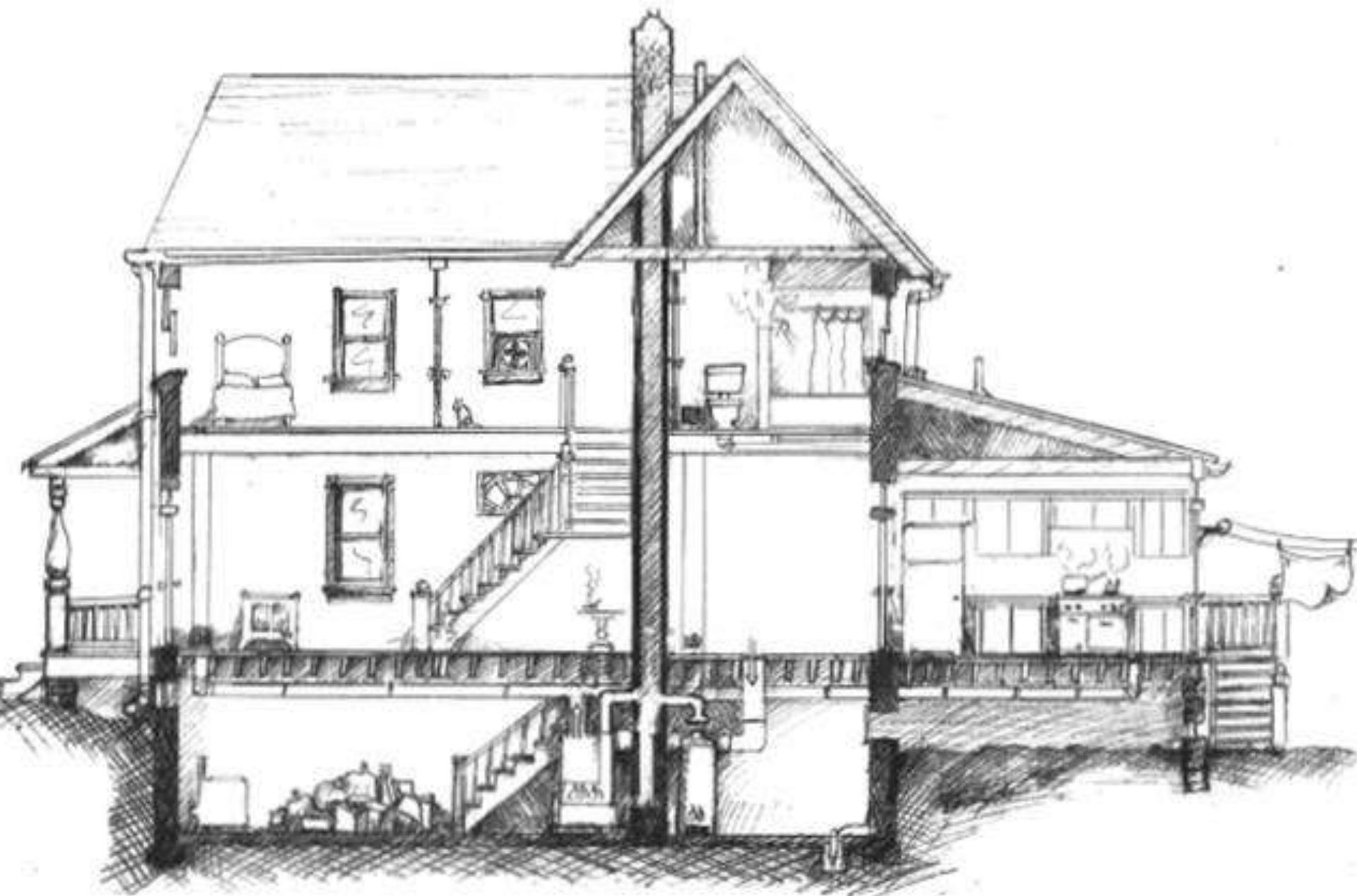
- ✱ People
- ✱ Pollutants
- ✱ Pathways
- ✱ Pressure



The Four P's.

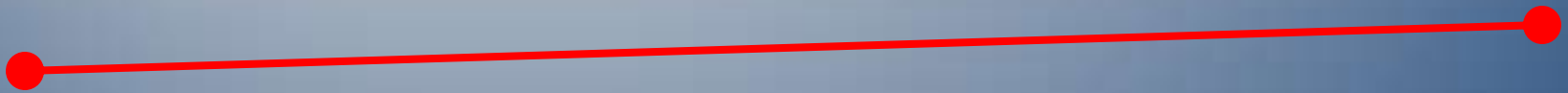
- ✿ People
- ✿ Pollutants
- ✿ Pathways
- ✿ Pressure.





Combinations of Ranges

✱ Range of Exposure Type



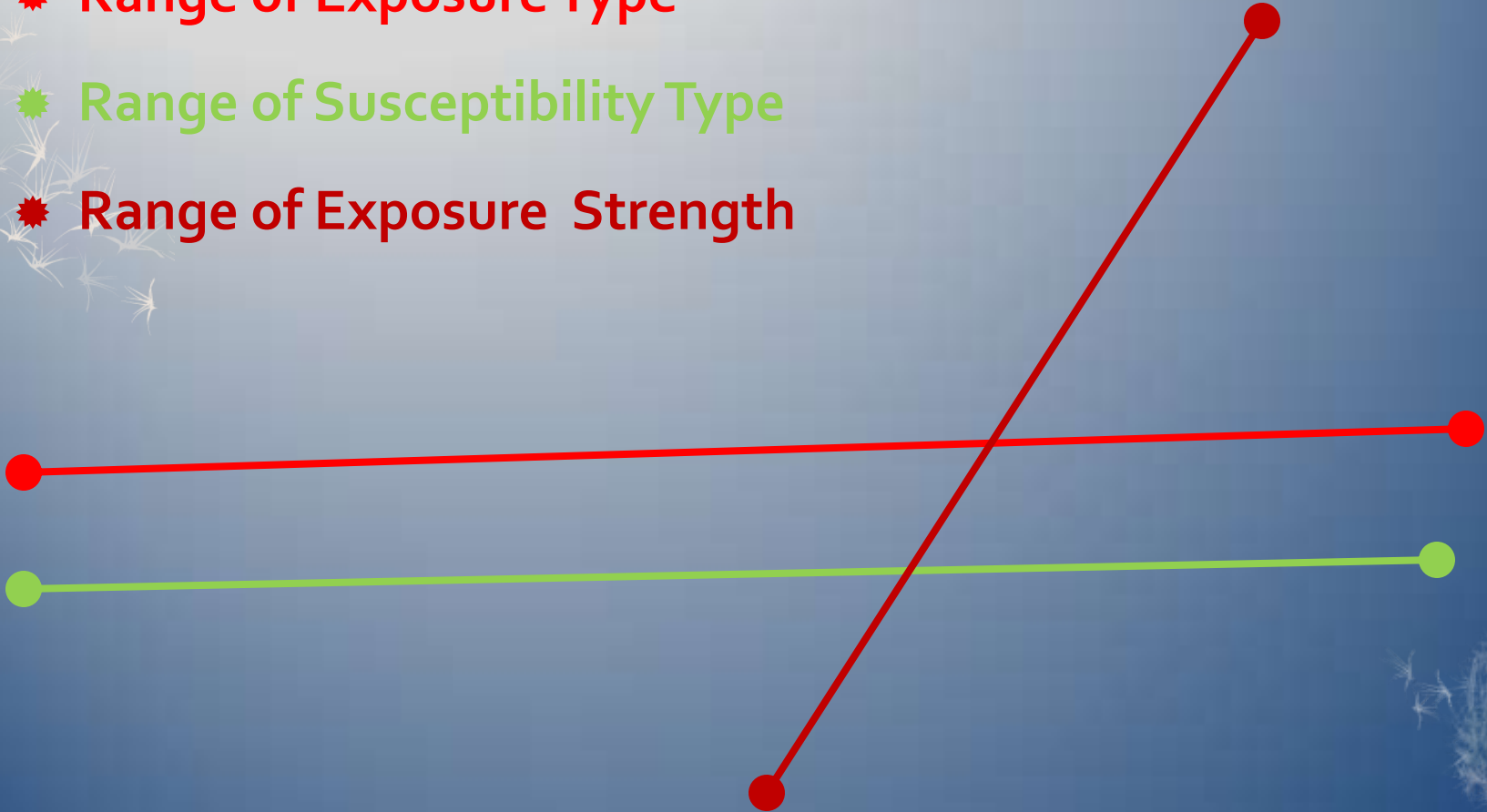
Combinations of Ranges

- ✱ Range of Exposure Type
- ✱ Range of Susceptibility Type



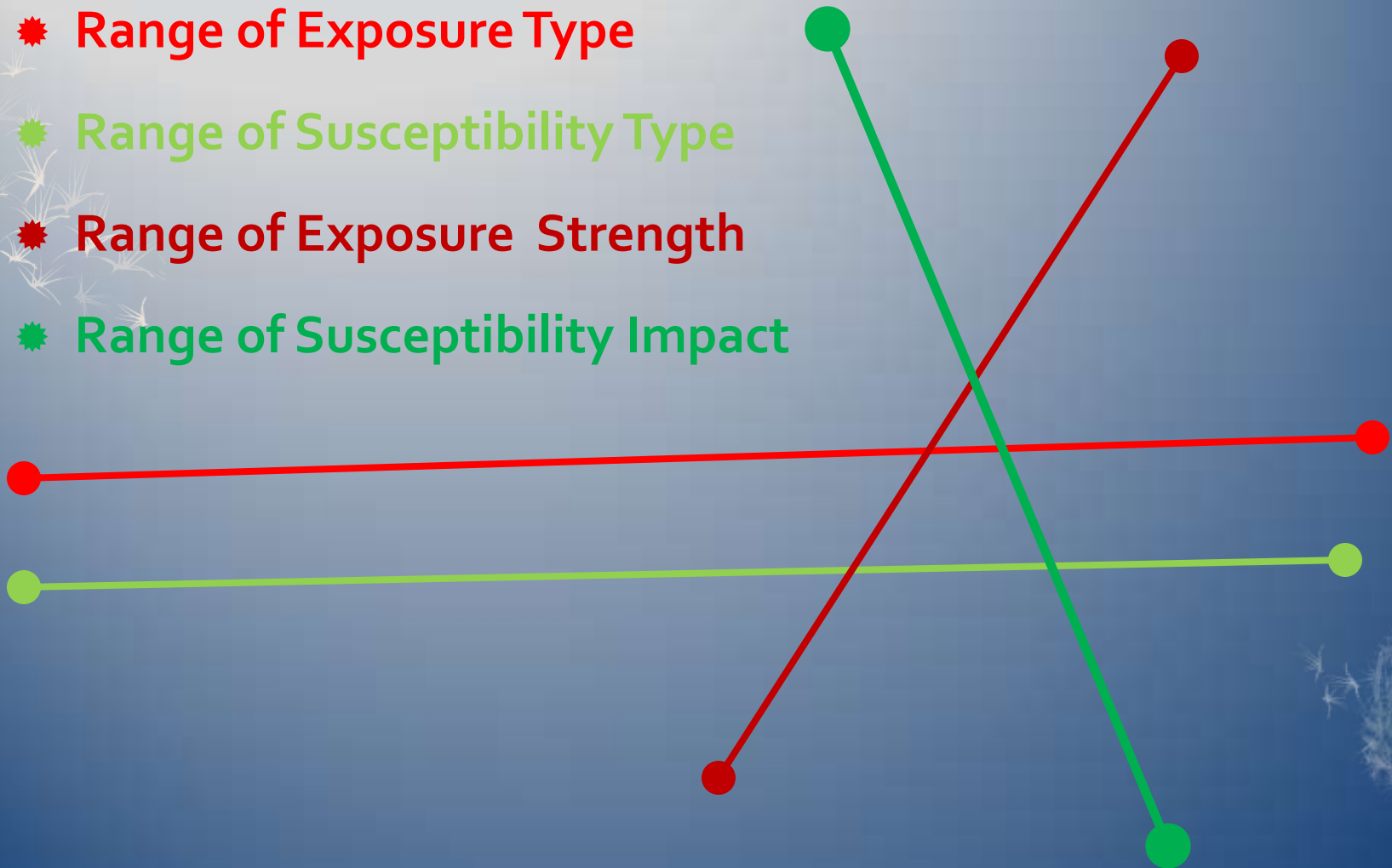
Combinations of Ranges

- ✱ Range of Exposure Type
- ✱ Range of Susceptibility Type
- ✱ Range of Exposure Strength



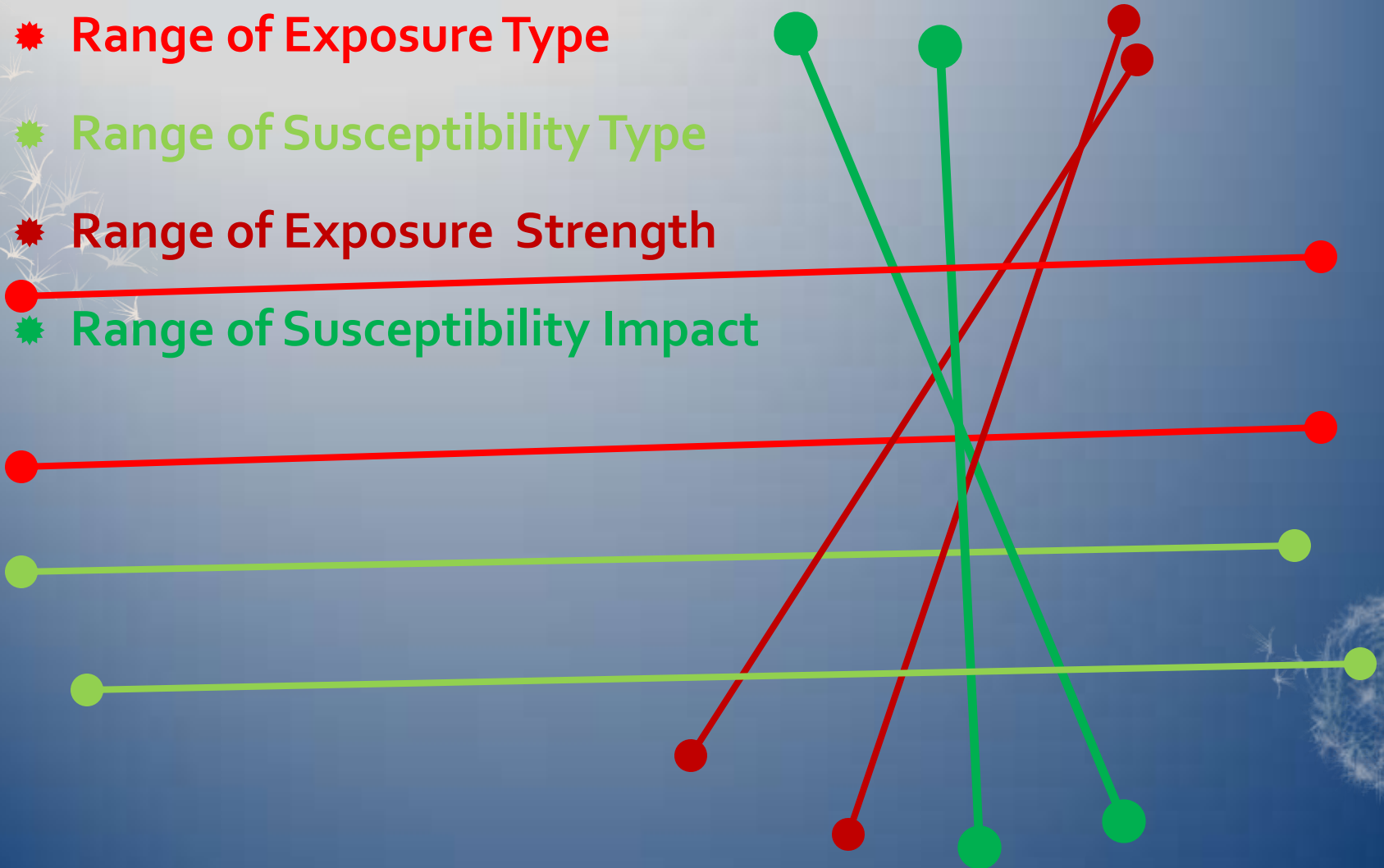
Combinations of Ranges

- ✱ Range of Exposure Type
- ✱ Range of Susceptibility Type
- ✱ Range of Exposure Strength
- ✱ Range of Susceptibility Impact

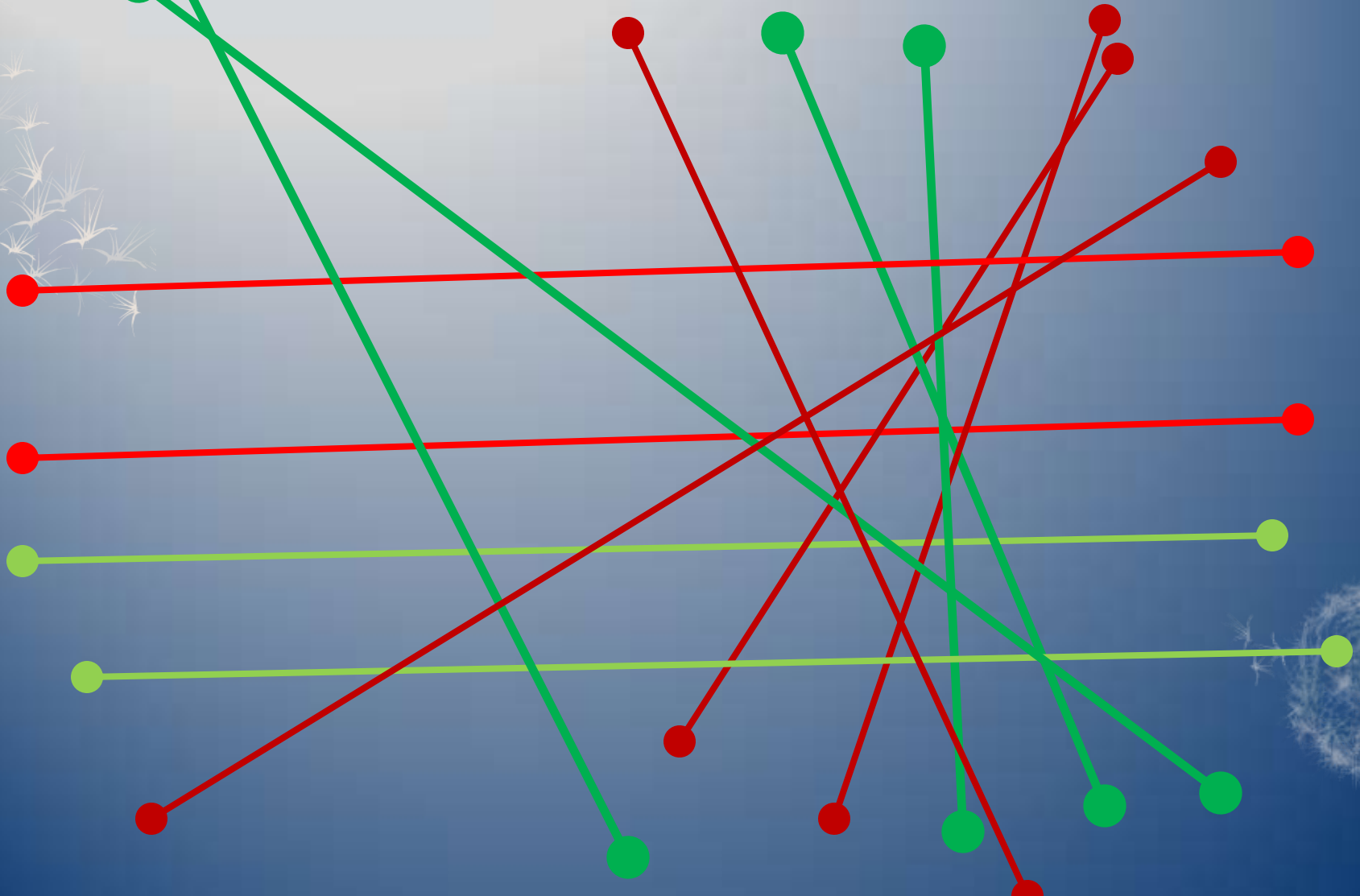


Combinations of Ranges

- ✱ Range of Exposure Type
- ✱ Range of Susceptibility Type
- ✱ Range of Exposure Strength
- ✱ Range of Susceptibility Impact



Combinations of Ranges



Pollutants by Physical Characteristics

- ✱ Particles
- ✱ Chemicals
- ✱ Biologicals (living organisms)



Particles

- House dust
- Pollen
- Pet dander



Particles

- ✱ Too small to see.
- ✱ 30,000 to 300,000 particles per cubic foot.
- ✱ Accumulate on surfaces.
- ✱ Hard to ventilate.
- ✱ Can be filtered from the air.
- ✱ Can be removed from surfaces by vacuuming, dusting, mopping.

Chemicals

- ✿ Pesticides
 - ✿ New Building Materials
 - ✿ Cleaning Products
 - ✿ Personal Care Products
- ✿ Stealth source

Chemicals

- ✱ Thousands of times smaller than particles.
- ✱ Same size range as air.
- ✱ Cannot be removed from air by filtering.
- ✱ More easily diluted by ventilation.
- ✱ Sources from open containers and “out gassing” (evaporation) from materials and contents.

Biologicals (living organisms)

- ✱ **Rodents**
- ✱ **Cockroaches**
- ✱ **Dust mites**
- ✱ **Insects**
- ✱ **Bacteria**
- ✱ **Mold (fungi)**



Biologicals (living organisms)

- ✿ They need a particular environment, or ecological system, to survive.
- ✿ If more finely tuned to their needs they will reproduce and infest.
- ✿ The primary driving force is moisture.
- ✿ People are living organisms with their own needs.
 - ✿ Problems develop when the ecology of the home shifts from what people need to what supports the thriving and infesting of pestilence .

Confusion from Overlap

- ✿ Living organisms fit all three categories.
- ✿ They are biologicals.
- ✿ They are particles.
- ✿ They generate chemicals.
 - ✿ The VOCs are the same family as found in the chemical category.
- ✿ No single test method detects all components of any sources.
 - ✿ Prevalence of false negative results.

Other Organizing Systems

✿ Routes of exposure

✿ Inhalation

✿ Dermal

✿ Ingestion



More Systems of Organizing

- ✿ Body systems affected (differs by individual).
 - ✿ Claudia Miller, MD, *Quick Environmental Exposure and Sensitivity Inventory* (QEESI). <drclaudiamiller.org>
- ✿ Functional Status – Dartmouth CO-OP Project.
 - ✿ <<http://www.dartmouthcoopproject.org/coopcharts.html>>
- ✿ Functional Capacity Scale.
 - ✿ Lynn Marshall, MD <http://tinyurl.com/3cwdyz>
- ✿ Each method sees only a part of the entire picture. No single categorization is sufficient.
- ✿ Notice I didn't include industrial hygiene testing. That *may* be appropriate later. AFTER the situation is assessed.

Review of Photos

★ Audience Responses



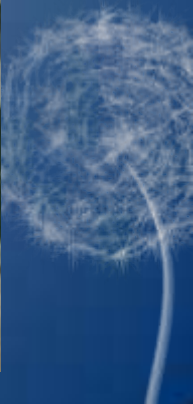
Obviously Bad 1



Obviously Bad 2



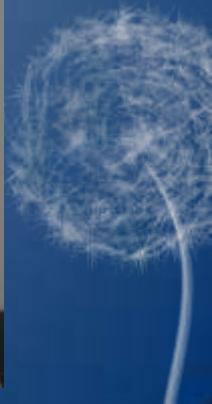
Obviously Bad 3



Uncertain 1



Uncertain 2



Uncertain 3



Subtle 1



Subtle 2



Subtle 3



Hidden 1



Hidden 2



Hidden 3



Hidden 4



Review of Topics

- ✿ Have all topics been addressed?



Definition of Indoor Air Quality

- ✿ A single, precise definition may well be impossible.
- ✿ But we can describe and make some determinations of what is better, what isn't as good, and identify factors which can shift the environment away from one extreme and toward the other.
- ✿ And perhaps Indoor Environmental Quality is a more useful label.

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