

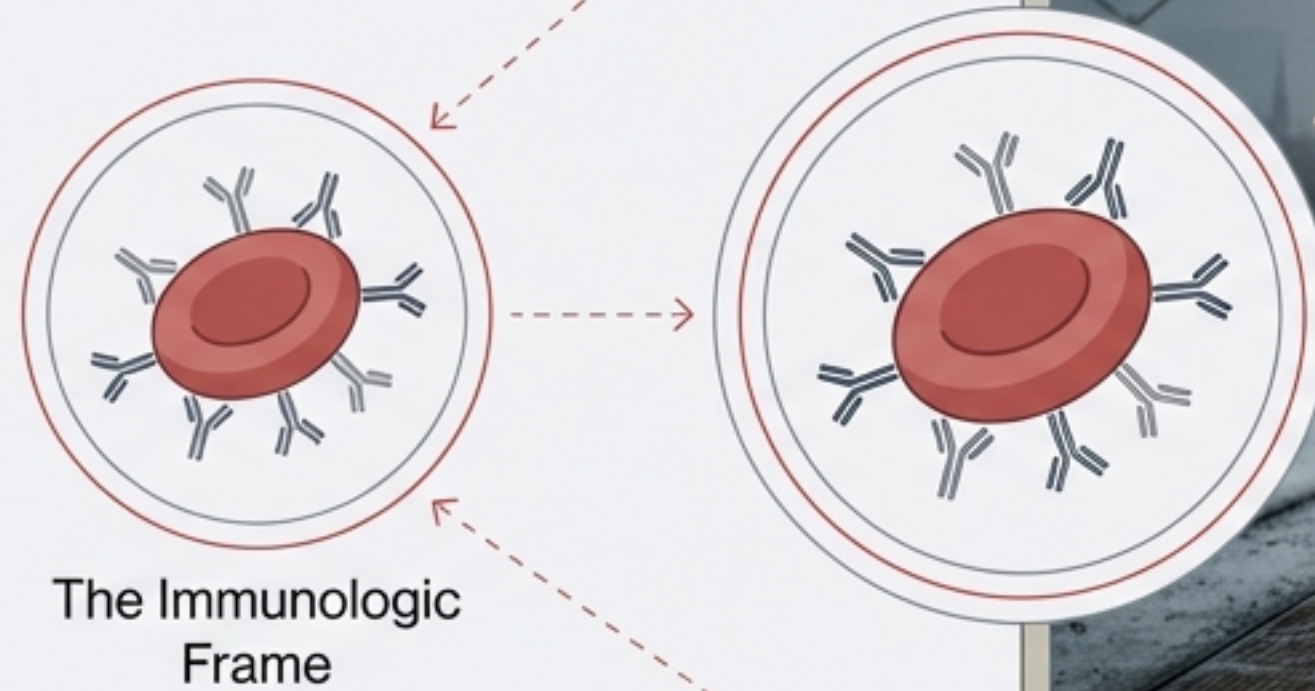
# The Thermal Divide

Cold as a Social Determinant in Cold Agglutinin Disease (CAD)

Why environment, not immunity alone, shapes who suffers most.

# CAD is biologically mediated, but environmentally distributed.

Framing Cold Agglutinin Disease solely as an immunologic problem with a thermal trigger is correct, but incomplete. Cold is not experienced equally.



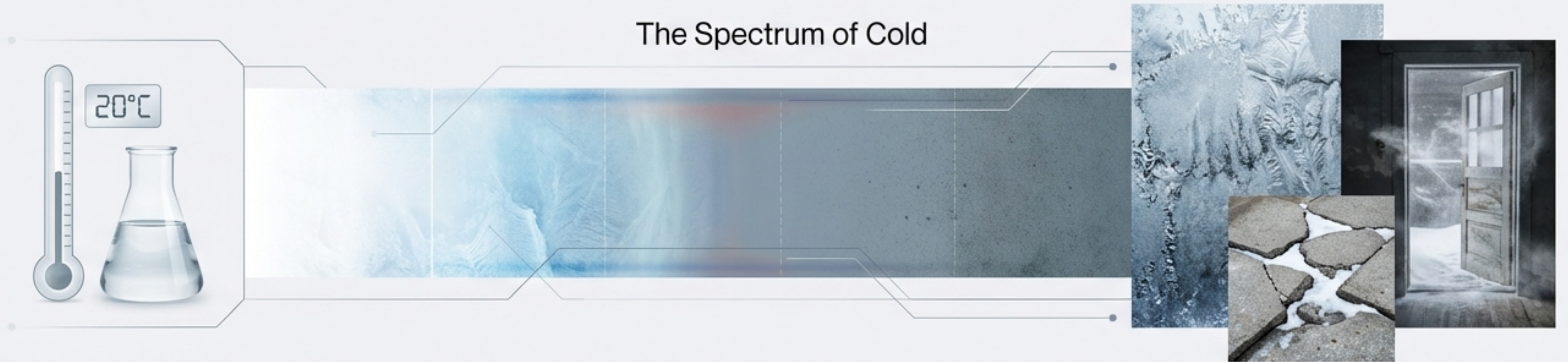
The Immunologic Frame



The Lived Reality

*“Cold functions less like a neutral weather condition and more like a social determinant of health.”*

# In the clinic, cold is a metric. In life, cold is a context.

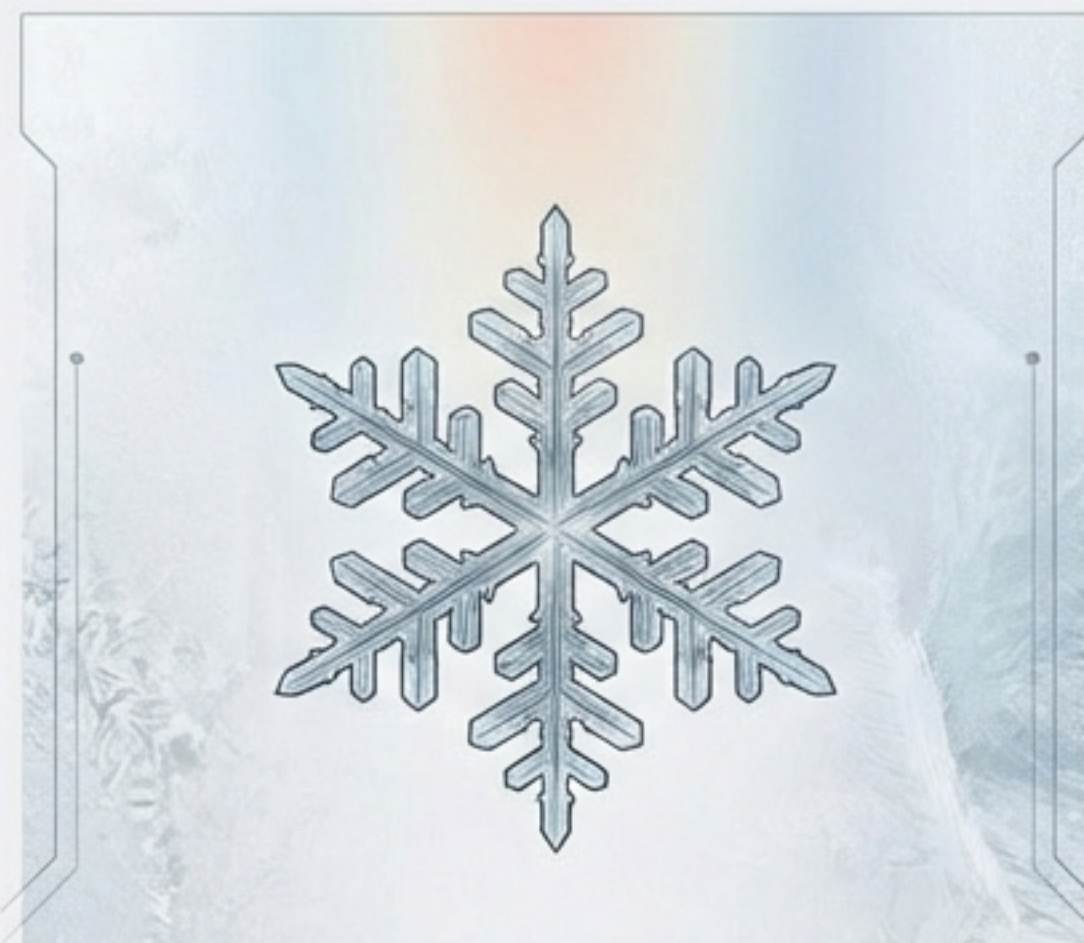


Clinical Definition  
(Metric)

Lived Definition  
(Context)

- Poorly insulated housing
- Unreliable heating
- Drafty workplaces
- Public transportation platforms
- The inability to control one's environment

# When weather becomes structural.



**Nature.**  
Winter in Minnesota.  
Unavoidable weather.



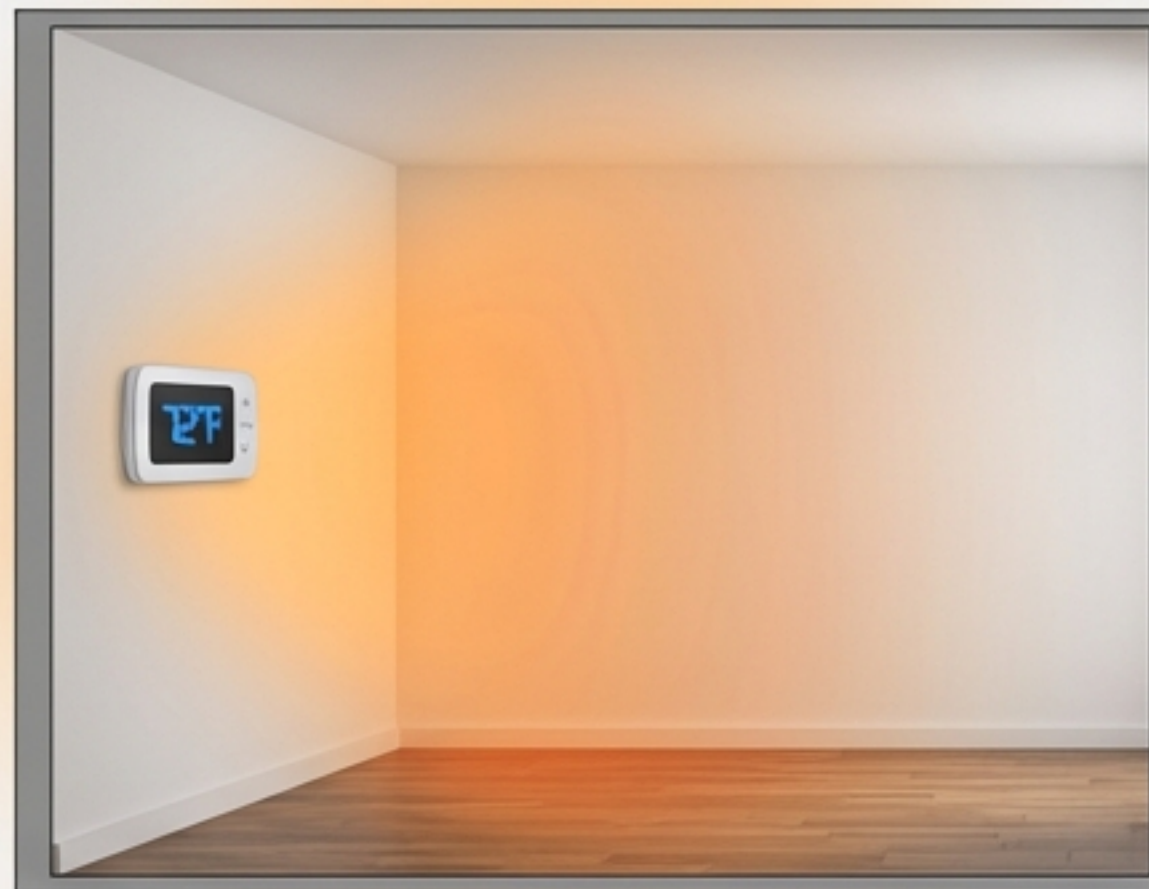
**Structure.**  
The inability to stay warm indoors.  
Housing quality.



**Economics.**  
Lack of thermal control.  
Resource constraints.

Cold becomes a determinant when avoiding it requires sacrificing housing, income, safety, or dignity.

# The ability to stay warm is unevenly distributed.



Control

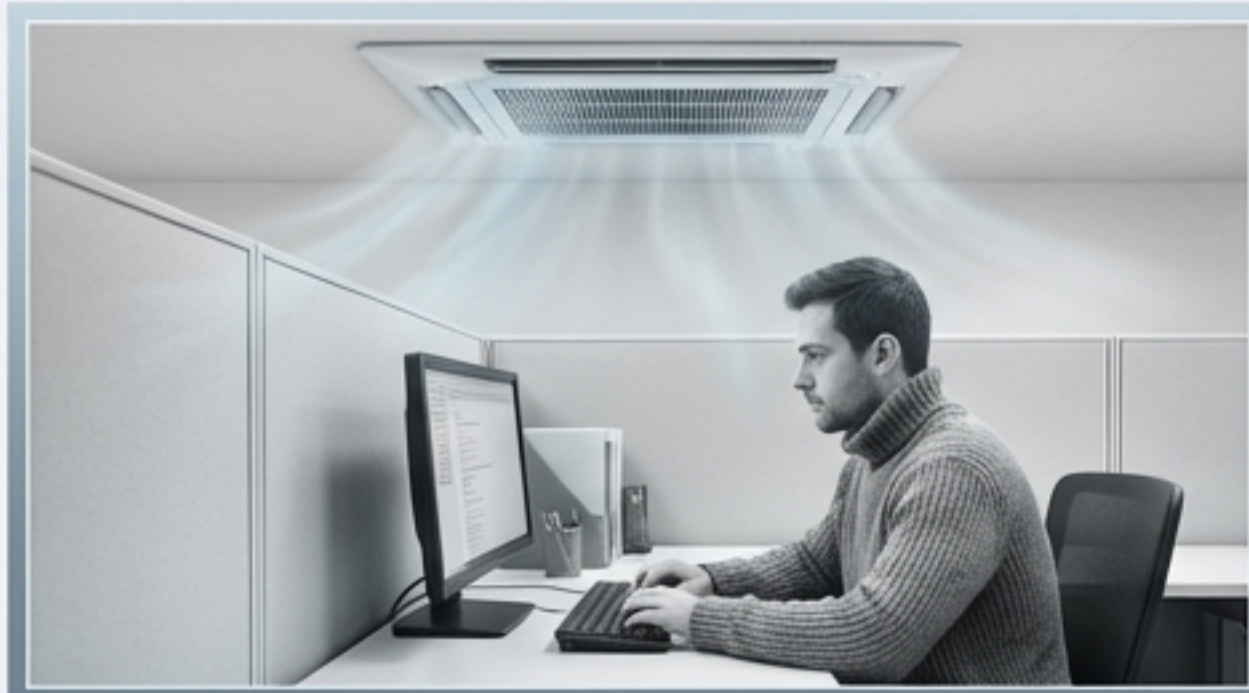


Constraint

Medical advice quietly assumes patients have control over indoor temperature. For patients in older buildings, shared housing, or energy poverty, the gap between “avoid cold” as advice and “avoid cold” as reality is wide.

**When these assumptions fail, it is not the patient who has failed—it is the care model.**

# Asking patients to avoid cold often means asking them to risk employment.



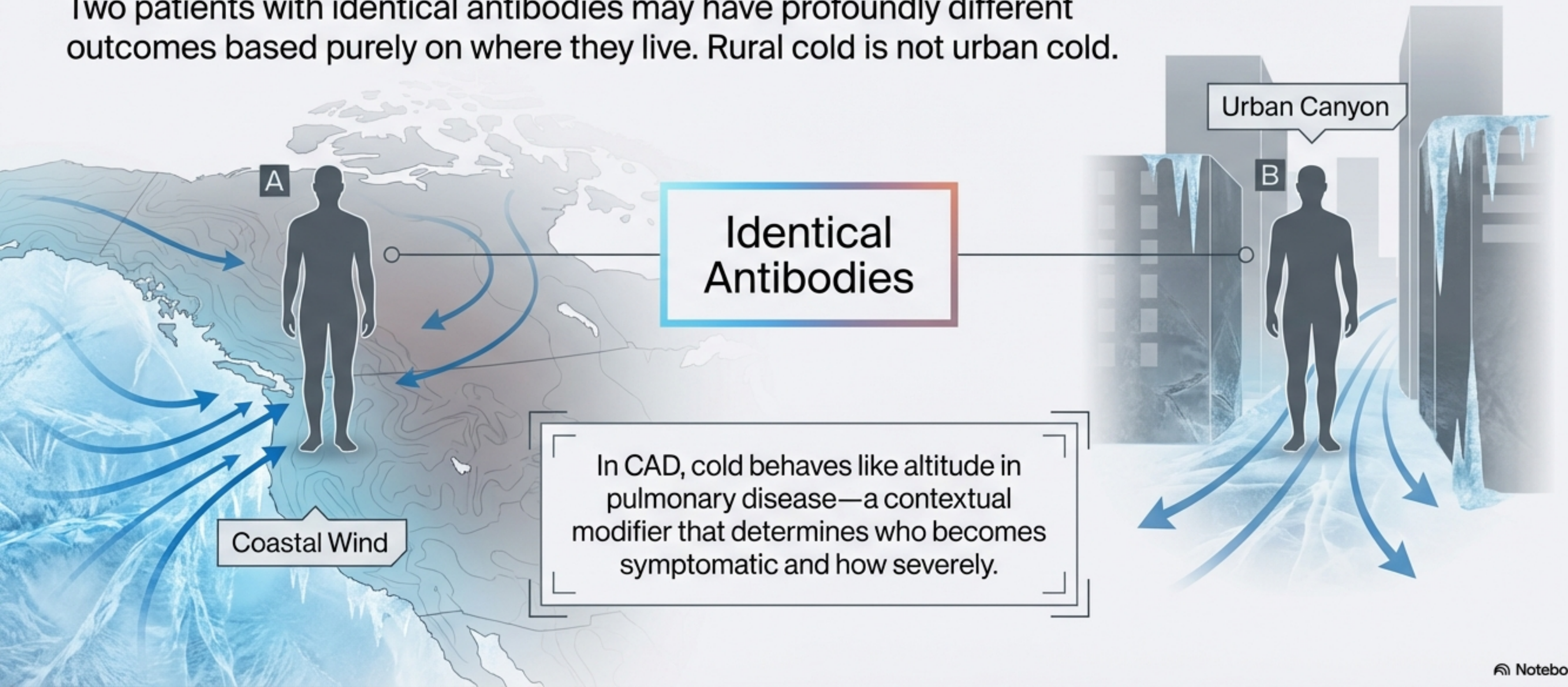
Occupational exposure is a hazard that cannot be negotiated away.

Even clinical settings can be sources of exposure patients cannot refuse.

Medicine names chemical risks comfortably; it must learn to name thermal risk.

# Geography modifies disease expression as much as biology.

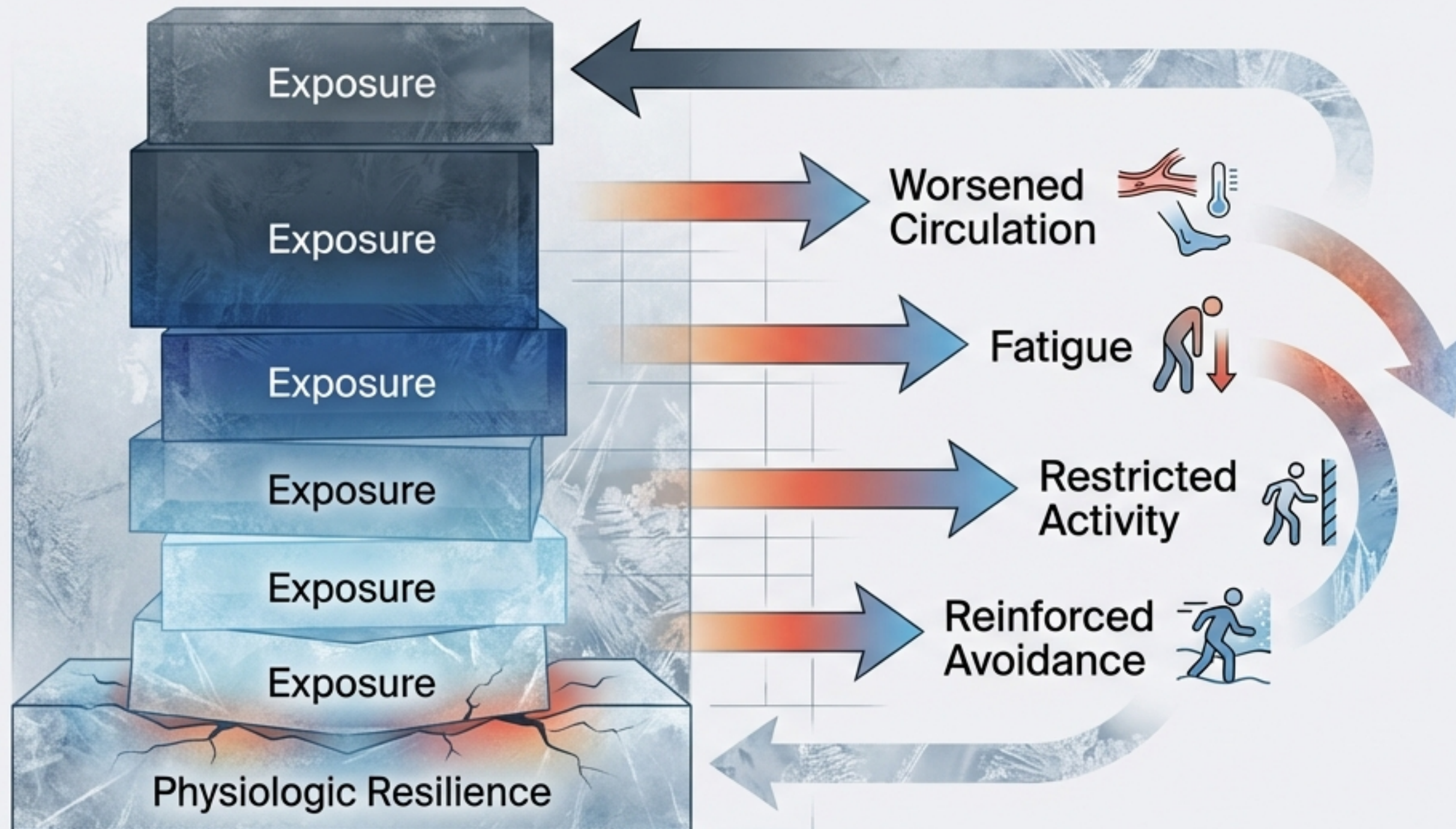
Two patients with identical antibodies may have profoundly different outcomes based purely on where they live. Rural cold is not urban cold.



# Repeated exposure is not an inconvenience; it is physiologic insult.

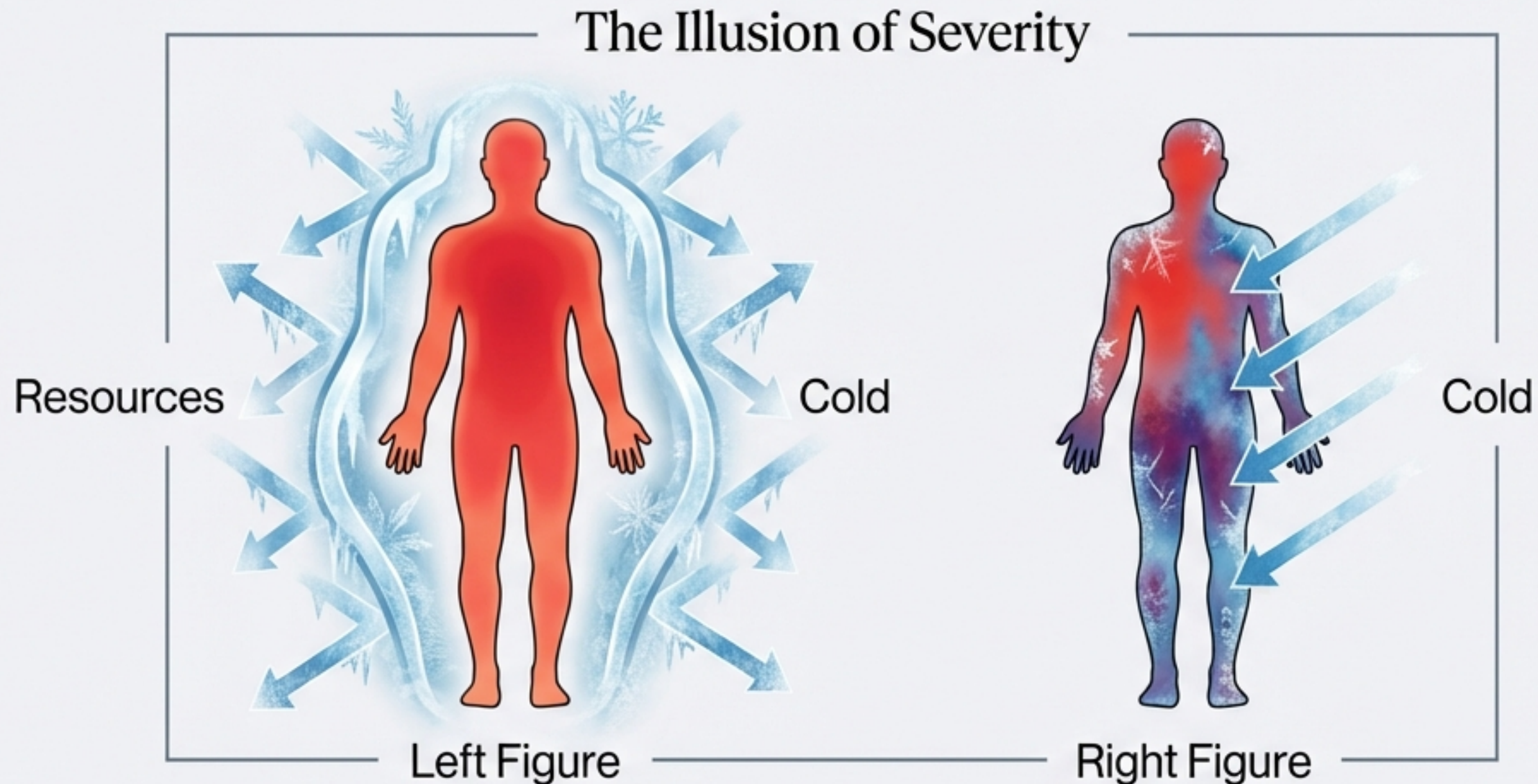
## Key Insight

Over time, cumulative limitation looks like gradual disease progression. In reality, it is repeated environmental injury.



# Inequity disguised as biology.

Patients with fewer resources appear “sicker” or “less resilient.” Those with less control over environment bear more burden. Without naming cold as a social determinant, medicine risks mistaking inequity for phenotype.



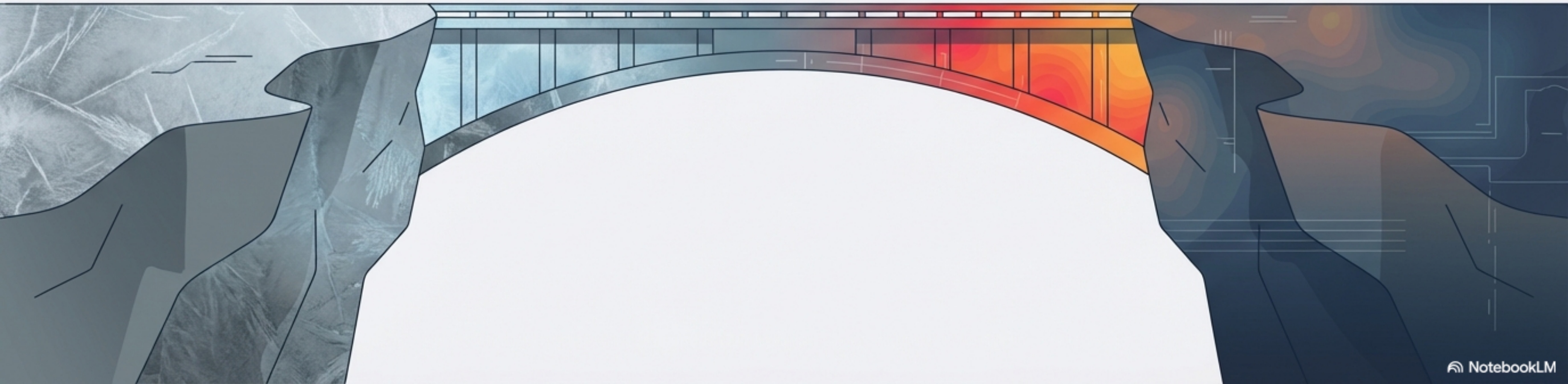
# Helping patients navigate a world not built for thermal vulnerability.

Telling patients to 'avoid cold' is easy. Ethical care lies in the space between advice and reality. Recognition does not require solving climate inequity. It requires validating the constraint.

**Clinical Advice**  
("Avoid Cold")

**Ethical Care**

**Patient Reality**  
("World built for vulnerability")



# Reframing the patient narrative.

Changing the terminology changes the intervention.  
We move from judging compliance to assessing capacity.

## Translation Table

<del>Nonadherence</del>	→	<b>CONSTRAINT</b>
<del>Progression</del>	→	<b>EXPOSURE</b>
<del>Advice</del>	→	<b>ALIGNMENT</b>

# From Advice to Alignment.

Documenting environmental risk is not administrative detail. It is clinical data.

## The New History Taking

- Don't just ask:** "Do your symptoms worsen in cold?"
- Do ask:** "Where are you exposed to cold that you cannot control?"
- Do ask:** "How are your home heating and commute affecting your symptoms?"

# Recognition is an intervention.

Documentation supports workplace accommodations, procedural modifications (warmers, timing), and realistic counseling that adjusts expectations, not just medications. It supports environmental adjustments that medication alone cannot achieve.



Workplace  
Accommodation



Procedural  
Modification



Resource  
Connection



## Clinical accuracy requires structural awareness.

Cold agglutinin disease reminds us that environment does not merely modify disease. It distributes it. Some diseases are not just carried in blood. They are carried through buildings, jobs, cities, and winters.

Recognizing this is not sociology—it is clinical accuracy.

# Summary: The Thermal Divide

- 1.** Context: Cold is a social determinant, not just weather.
- 2.** Structure: Exposure is driven by Housing, Work, and Geography.
- 3.** Diagnosis: Inequity can mimic disease severity.
- 4.** Care: Effective management requires assessing constraint, not just advising avoidance.