



©Gary V Koyen, Ph.D.

Cruxpoint Health Breakthrough, Inc.

## ***How Air Pollution Contributes to Obesity***

---

Air pollution doesn't just affect the lungs — growing research shows it can also play a meaningful role in weight gain and obesity. Here's how it happens.

### **1. Hormonal Disruption**

Pollutants such as PM2.5, nitrogen dioxide (NO<sub>2</sub>), and polycyclic aromatic hydrocarbons (PAHs) can interfere with the body's hormonal signaling.

#### **Key effects:**

- Insulin resistance: Pollutants increase inflammation in cells, making insulin less effective. This promotes fat storage.
- Disrupted appetite hormones: Air pollution can alter leptin and ghrelin — hormones that regulate hunger — leading to increased appetite.

### **2. Increased Inflammation & Oxidative Stress**

Pollution particles trigger chronic low-grade inflammation throughout the body.

#### **Why that matters for obesity:**

- Inflammation pushes the body into energy-conservation mode, encouraging fat accumulation.
- Oxidative stress hampers the function of mitochondria, reducing metabolic efficiency.
- Some pollutants activate pathways that convert precursor cells into fat cells more readily.

### **3. Effects on the Gut Microbiome**

Air pollution can alter the composition of bacteria living in the gut.

### **Consequences:**

- More bacteria that extract higher calories from the same amount of food
- Gut barrier dysfunction → leads to inflammation → increases fat storage
- Dysbiosis (imbalance) linked directly to weight gain and metabolic syndrome

### **4. Reduced Physical Activity**

High-pollution environments discourage outdoor activity.

#### **Example:**

- People walk less on high-smog days
- Children play outside less often
- Athletes reduce intensity or stay indoors

Less activity → fewer calories burned → greater risk of obesity.

### **5. Developmental Effects (Children)**

Exposure during pregnancy or early childhood has lasting metabolic effects.

#### **Studies find:**

- Prenatal exposure to PM2.5 is linked to higher childhood BMI.
- Early-life exposure affects the development of fat cells and metabolic pathways.
- Pollution can alter epigenetic markers that influence long-term weight regulation.

### **6. “Obesogens” in the Air**

Certain airborne chemicals act as obesogens — substances that promote fat storage.

#### **Examples include:**

- Endocrine-disrupting chemicals (EDCs)
- Certain VOCs (volatile organic compounds)
- Traffic-related pollutants

**In Short:** Air pollution contributes to obesity through biological, behavioral, and environmental pathways:

- ✓ Raises inflammation
- ✓ Alters hormones
- ✓ Disrupts the gut microbiome
- ✓ Lowers physical activity
- ✓ Affects metabolic programming in children
- ✓ Exposes people to obesogenic chemicals