

Is Your Child *TILT*ed?

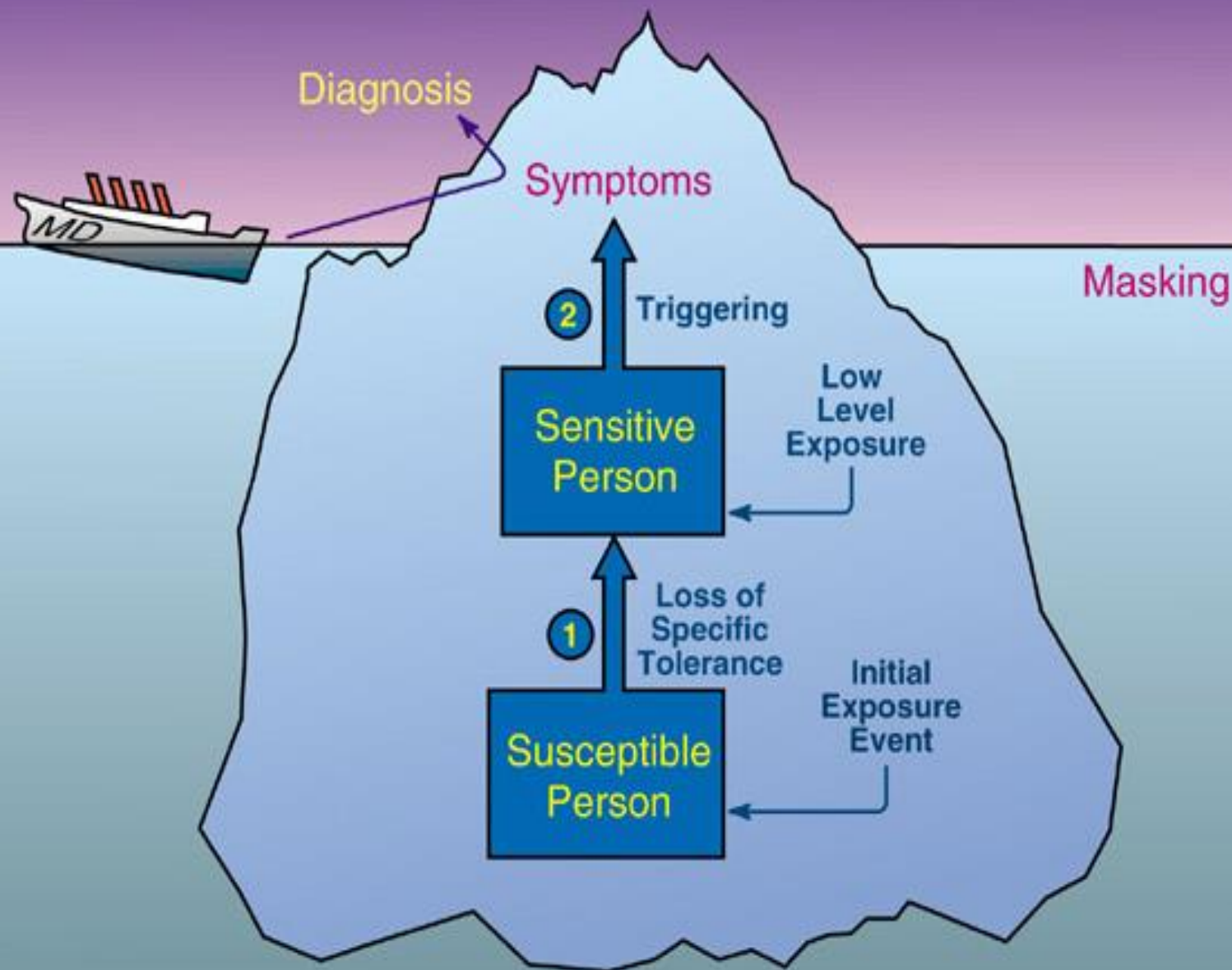
Environmental Exposures and Autism A New Link

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Toxicant-induced Loss of Tolerance



TILT and the 7 A's

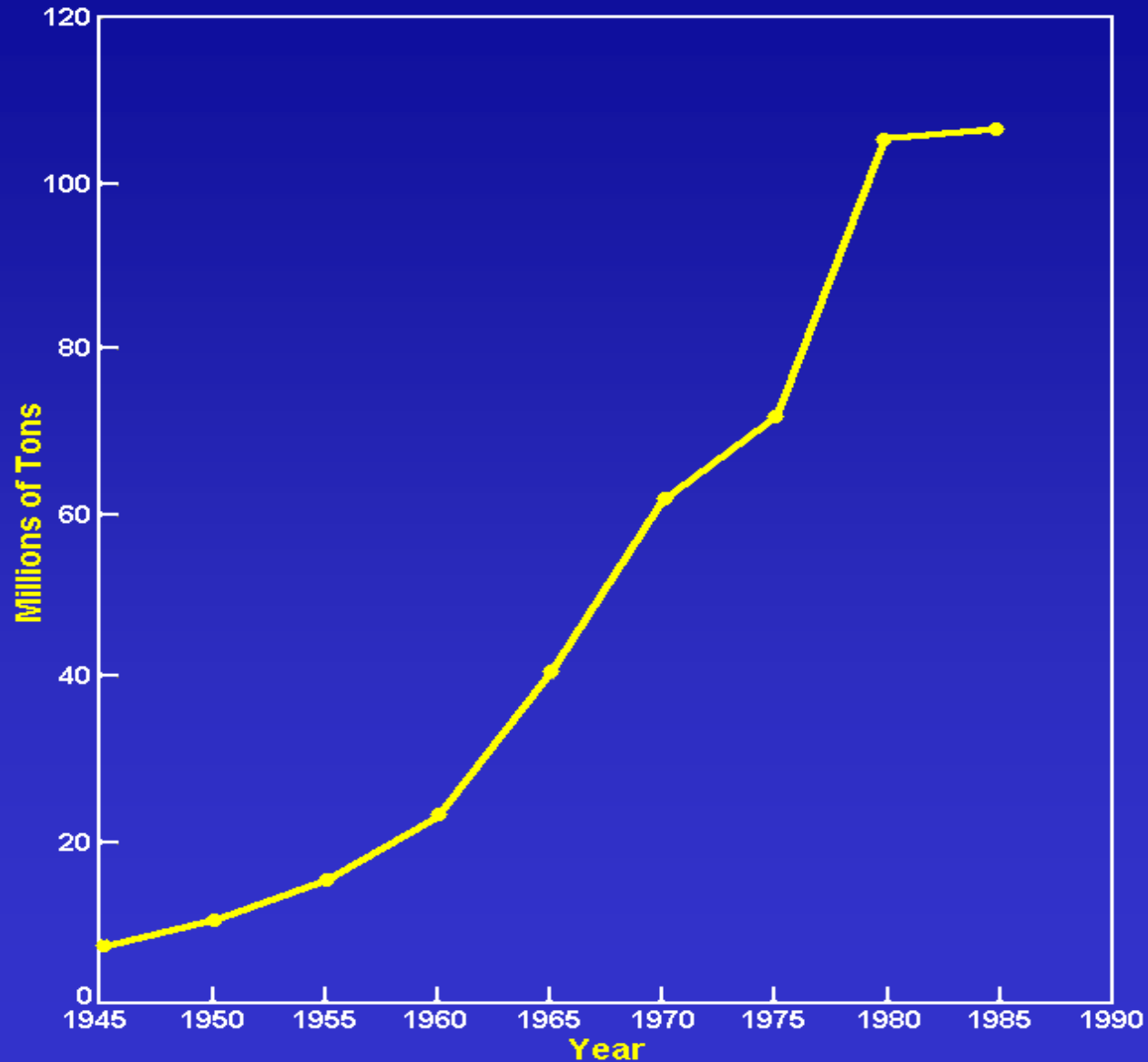
- Autism
- AD/HD
- Autoimmune Disease
- Addiction
- Asthma
- Allergies (non IgE-mediated)
- Affective (mood related) Disorders

Gene-environment interactions

- There are no genetic epidemics
- Genetics loads the gun; the environment pulls the trigger

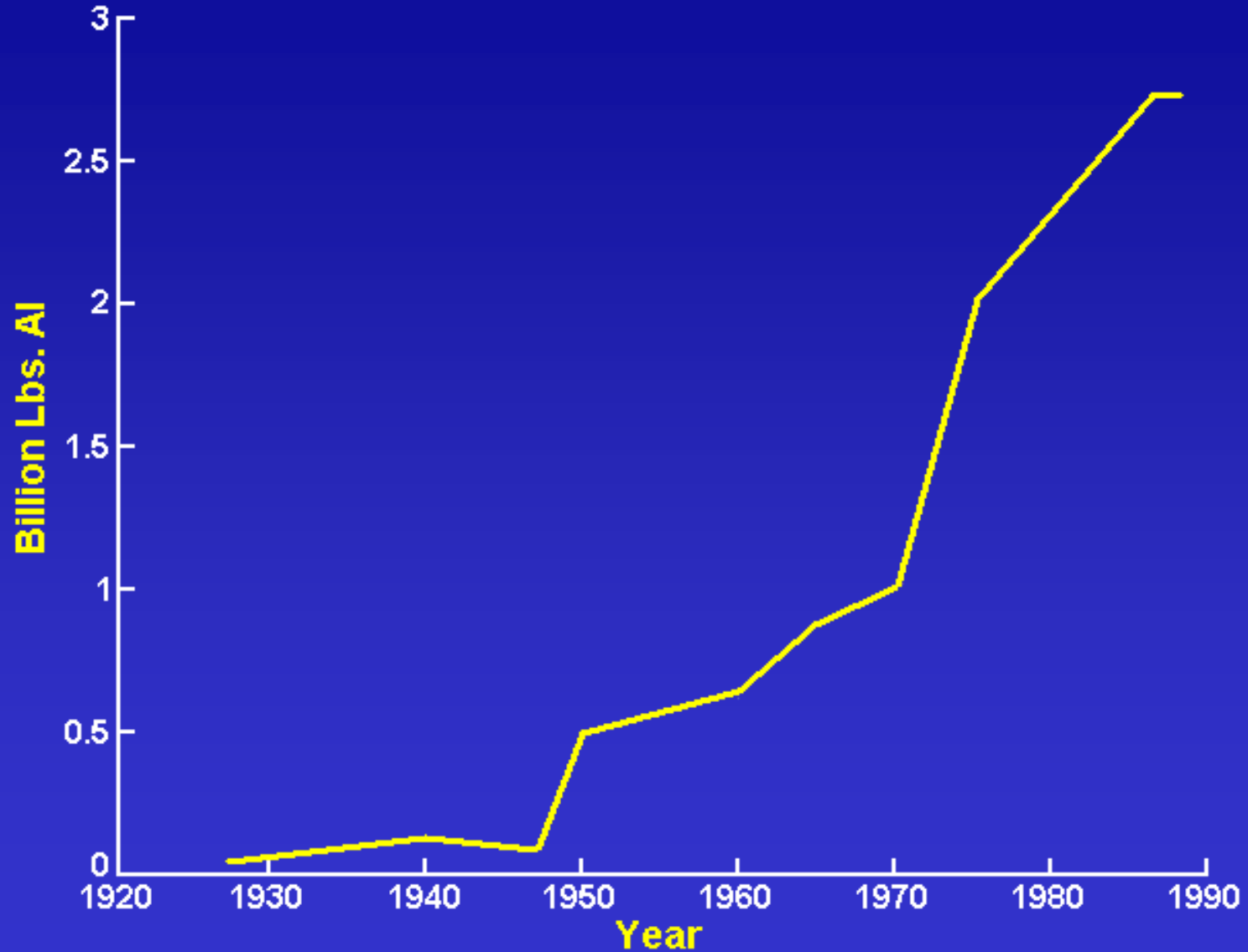
- Chemical intolerances, autism and AD/HD are growing concerns in every developed country
- Why?

Synthetic organic chemical production United States, 1945 - 1985



Source: U.S. Intern. Trade Commission

U.S. pesticide production, All types, 1927-1988



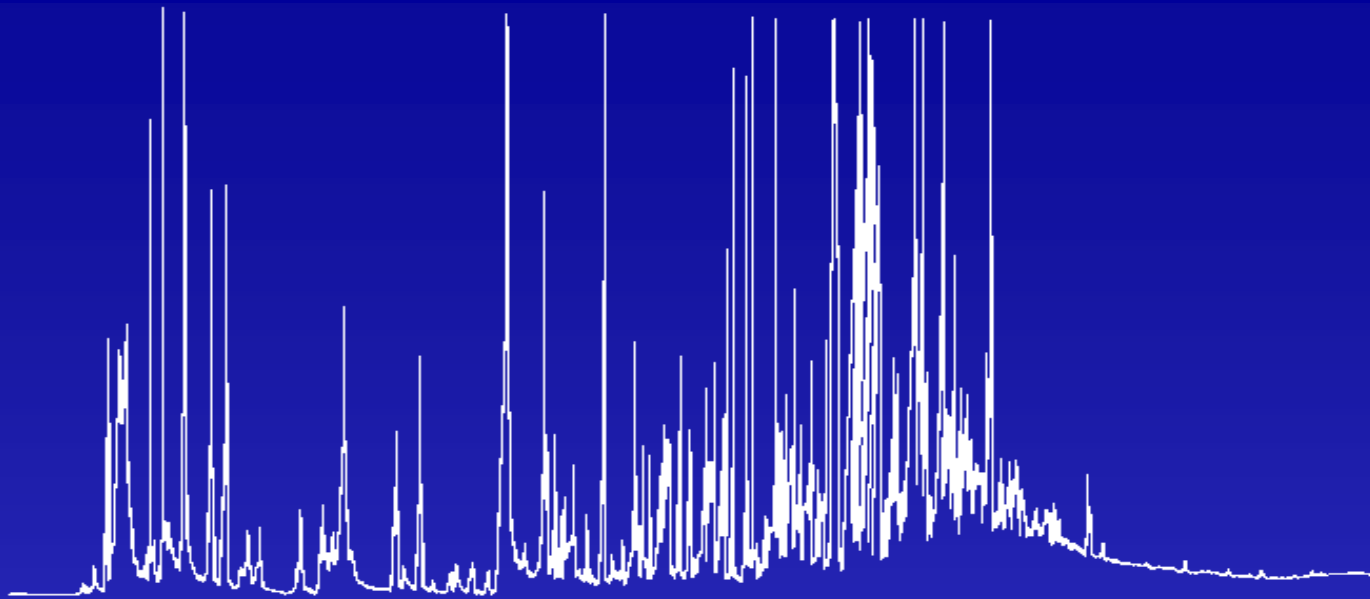
Source: EPA Market Estimates, 1986, 1988; Pimentel & Andow, 1984; Metcalf, 1980.

Indoor air is important

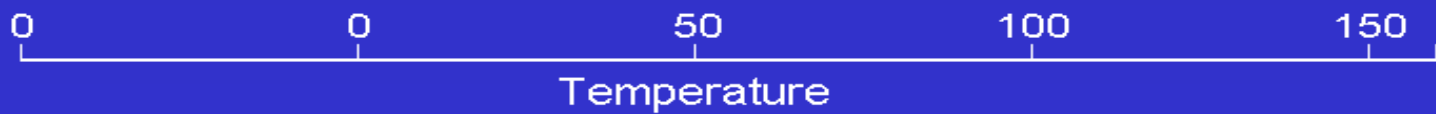
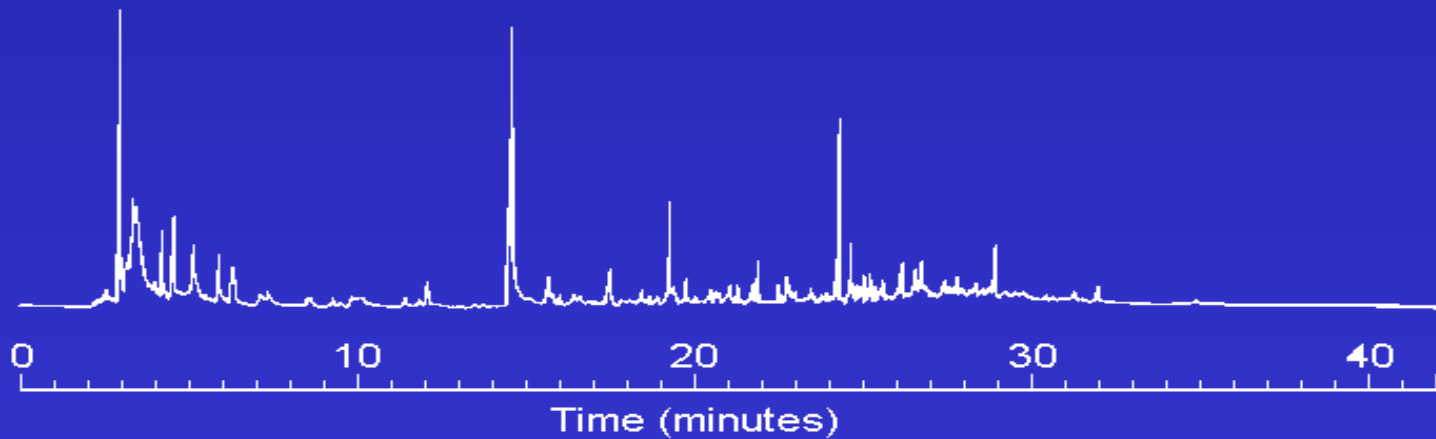
90% of Americans spend 90% of the day indoors (office, home, school, vehicle)

- Increased indoor air pollution sources
- Decreased fresh air intake
- Evolutionarily novel substances

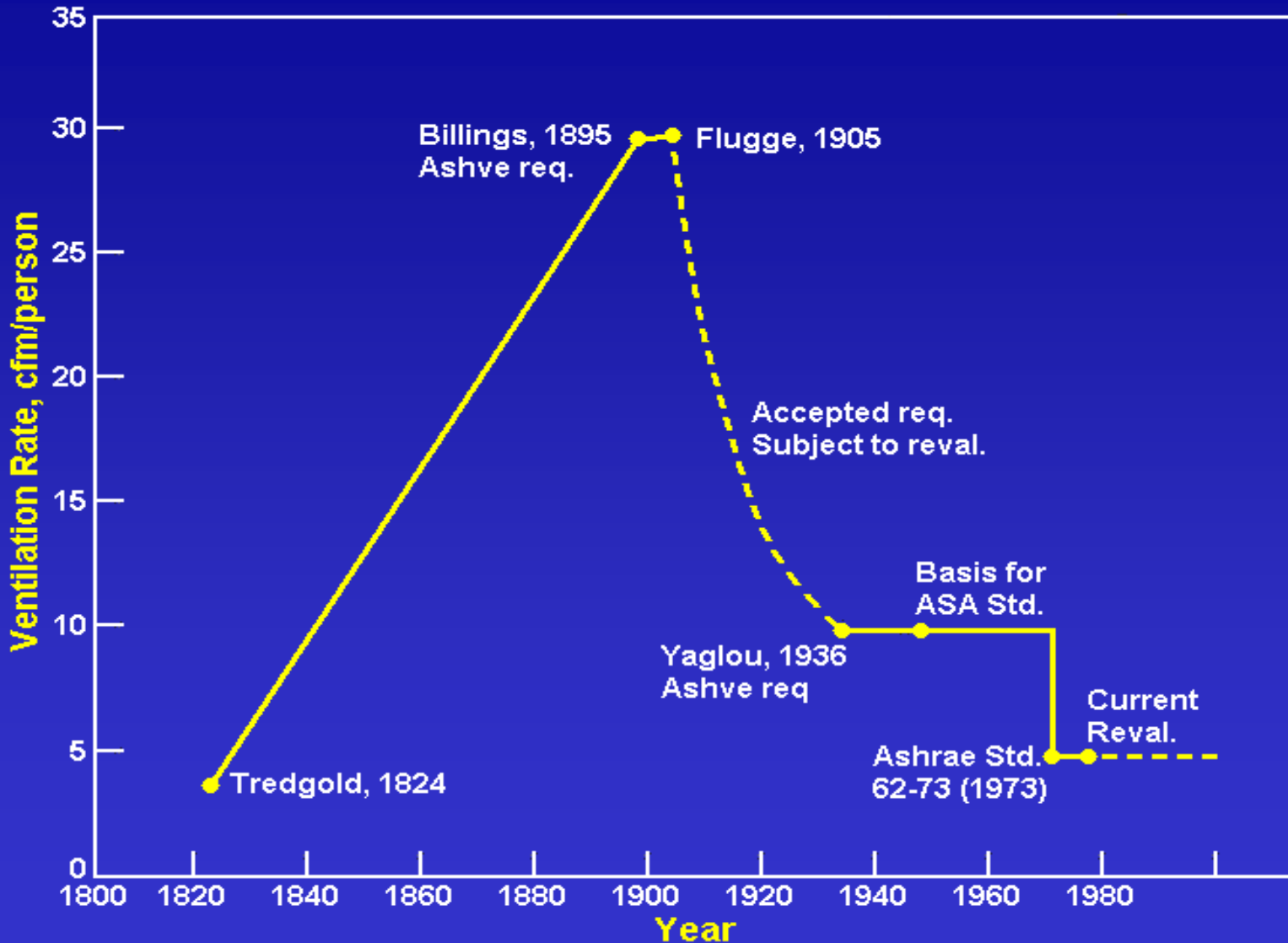
Indoor



Outdoor



Historical development of ventilation standards in the U.S.



Chemical intolerance

- About 5-15% of people report multiple chemical intolerances
- “Do you consider yourself sensitive to everyday chemicals like those in household cleaning supplies, paints, perfumes, soaps, garden sprays, or things like that?” (15%)
- Frequently, intolerances also include foods, medications, alcoholic beverages, and caffeine.

Mothers' Report of Children's Intolerances

Cases compared to controls	AD/HD OR (p-Value)	ASD OR (p-Value)
Ear infections requiring tubes	2.0 (.03)	2.1 (.02)
Multiple infections requiring prolonged use of antibiotics	3.6 (.002)	6.5 (.0001)
Reactions to vaccinations that prompted a call to the doctor	0.9 (.84)	3.1 (.02)

Mothers' Report of Children's Intolerances

Cases compared to controls	AD/HD OR (P-Value)	ASD OR (P-Value)
Sensitivity to odors such as smoke, nail polish remover, exhaust, gasoline, air fresheners, or cleaning supplies	2.6 (.02)	3.5 (.001)
Food allergies or intolerances	1.10 (.80)	3.0 (.001)
Strong food preferences/cravings	2.44 (.0004)	4.6 (.0001)
Allergies	3.3 (.001)	2.0 (.005)

How are chemical intolerances and autism alike?

Symptoms/Intolerances	CI	Autism
Multisystem symptoms, especially neurocognitive, mood, GI	X	X
Can be initiated by pesticides and other xenobiotics	X	X
Food intolerances	X	X
Food cravings	X	X
Chemical intolerances	X	X
Drug allergies/adverse drug reactions	X	X

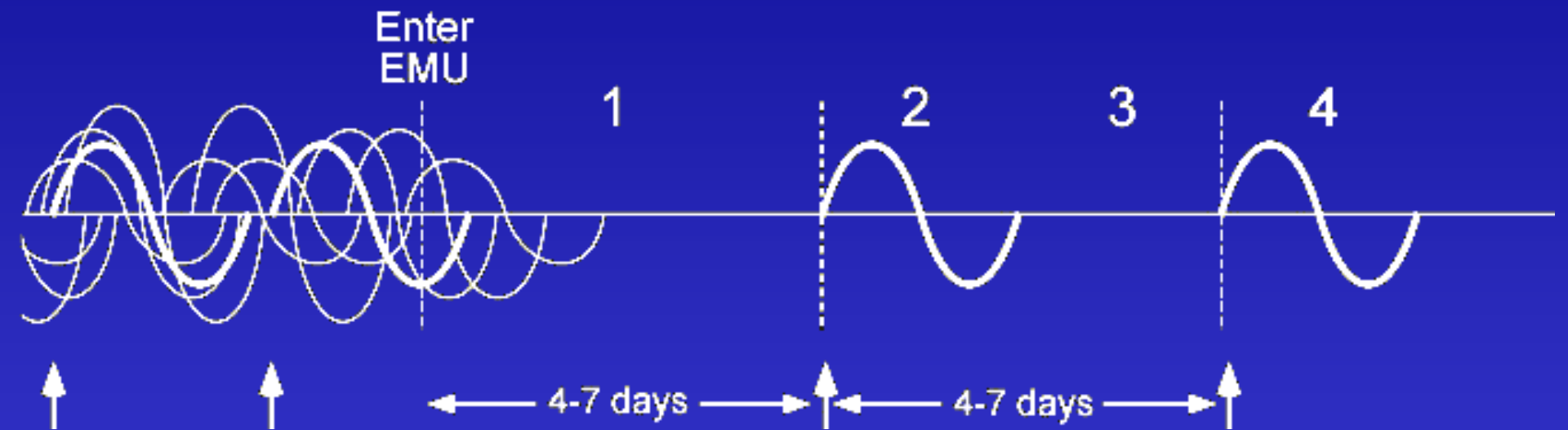
How can we determine the role of exposures in autism?

Environmental Medical Units (EMUs) are needed.

EMUs eliminate background exposures. Using an EMU, we can determine:

- Does the patient improve with avoidance of everyday exposures?
- Are symptoms triggered when common foods and everyday chemicals are reintroduced one at a time?

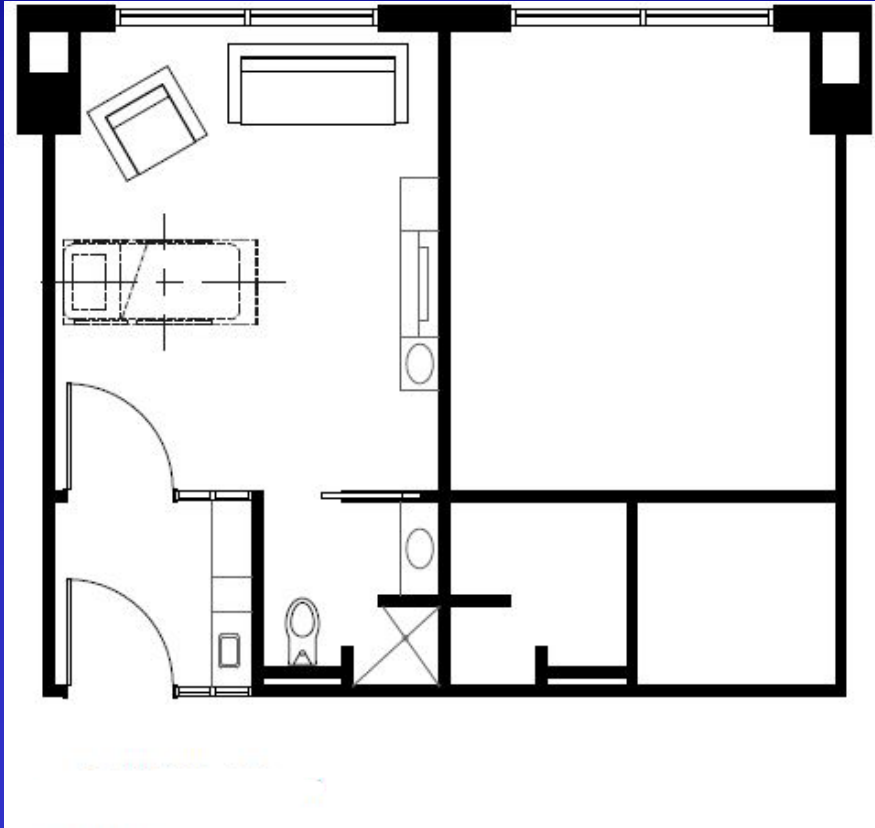
How Does an EMU Work?



The Environmental Medical Unit



Design Criteria for an EMU



- Filtered air supply and continuous air monitoring to ensure the removal of:
 - VOCs (charcoal filter)
 - Fine particles (HEPA filter)
- Positive pressure, relative to surrounding hospital areas
- Pure spring or filtered water
- Organic foods
- Non-outgassing furnishings and construction materials (no chemicals being released to the air)
- Safest possible cleaning and operational practices

Houses in Chemi-less Town

Chiba University, Chiba, Japan



Case study: Hyperactivity with autism

10-year old Paul Rossi

- Extreme hyperactivity
- Couldn't complete admission interview due to kicking, shoving, and pushing everyone around him
- Racing around exam room, overturning furniture and tearing papers

Temper tantrums began ~13 months old

- Learning well until 17 months when he began forgetting words he had learned
- Distant and unable to relate to those around him
- Transferred from one school to another
- Placed in school for problem children and tranquilized
- Occasionally in straightjacket

Treatment history

- Doctors had suggested drugs, vitamins, institutionalization
- Feingold diet removes most (not all) synthetic additives in foods
- Paul improved with Feingold diet so his mother sought personalized approach
- History of addiction led to flare-up of behavioral problems
- Susceptible to everyday environmental chemicals
- Screaming, kicking, biting (akin to seizure) after exposures to perfume, nail polish, or similar cosmetics

Intervention with EMU

- 5 days in the EMU led to improved behavior
- Corn reintroduction resulted in temper tantrum
- Reactions to apricot, raisins, grape juice, yeast, beets and beet sugar, honey, lamb, and hot dogs (corn, beef, etc.)
- Organic foods did not trigger symptoms (honey dew, broccoli, peas), but when given as conventional foods (pesticides, food coloring, etc.) did result in hyperactivity, irritability and an increase in autistic behavior

Intervention with EMU

- Paul needed truly organic food to stay well; otherwise impossible for his parents to cope with him
- Randolph: With appropriate diet, “despite the supposedly ‘incurable’ nature of his problems, specifically with autism, he is able to lead a normal life.”

Chemical intolerance vs. autism

- Children are not just little adults
- But in certain ways, children are just like adults
- Detoxification pathways determine susceptibility
- 90% of people spend 90% of day indoors
- Exposed to evolutionarily novel xenobiotics by all routes—inhalation, ingestion, skin contact

Chemical intolerance vs. autism

- Exposures in mature but chemically susceptible adults may lead to Toxicant-induced Loss of Tolerance (TILT)
- Exposures *in utero* or in children affect their developing nervous, immune, and endocrine systems causing permanent changes.

Specific effects may depend on:

1. Nature of chemicals
2. Timing of exposure
3. Dose
4. Susceptibility of the individual

The QEESI

- Validated, published questionnaire, screening tool for chemical intolerance
- 50 questions, self-administered
- 12-15 minutes to administer
- Helps people understand their symptoms and intolerances
- Differences in individual susceptibility due to:
 - Genetic predisposition, differences in detoxification ability
 - History of prior exposures

Date:

ID:

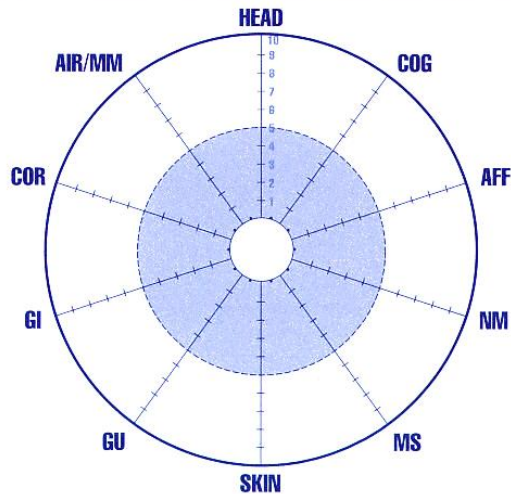
QEESI[®]

Quick Environmental Exposure and Sensitivity Inventory V-1

The purpose of this questionnaire is to help identify health problems you may be having and to understand your responses to various exposures. Complete pages 1-5, describing how you are now. Then fill in the "target" diagram below.

If your health problems began suddenly or became much worse after a particular exposure event, such as a pesticide exposure or moving to a new home or office building, then go back through pages 1-3 and indicate how you were before the exposure event. Use different colors or symbols (circles, squares) for "before" and "after."

Symptom Star

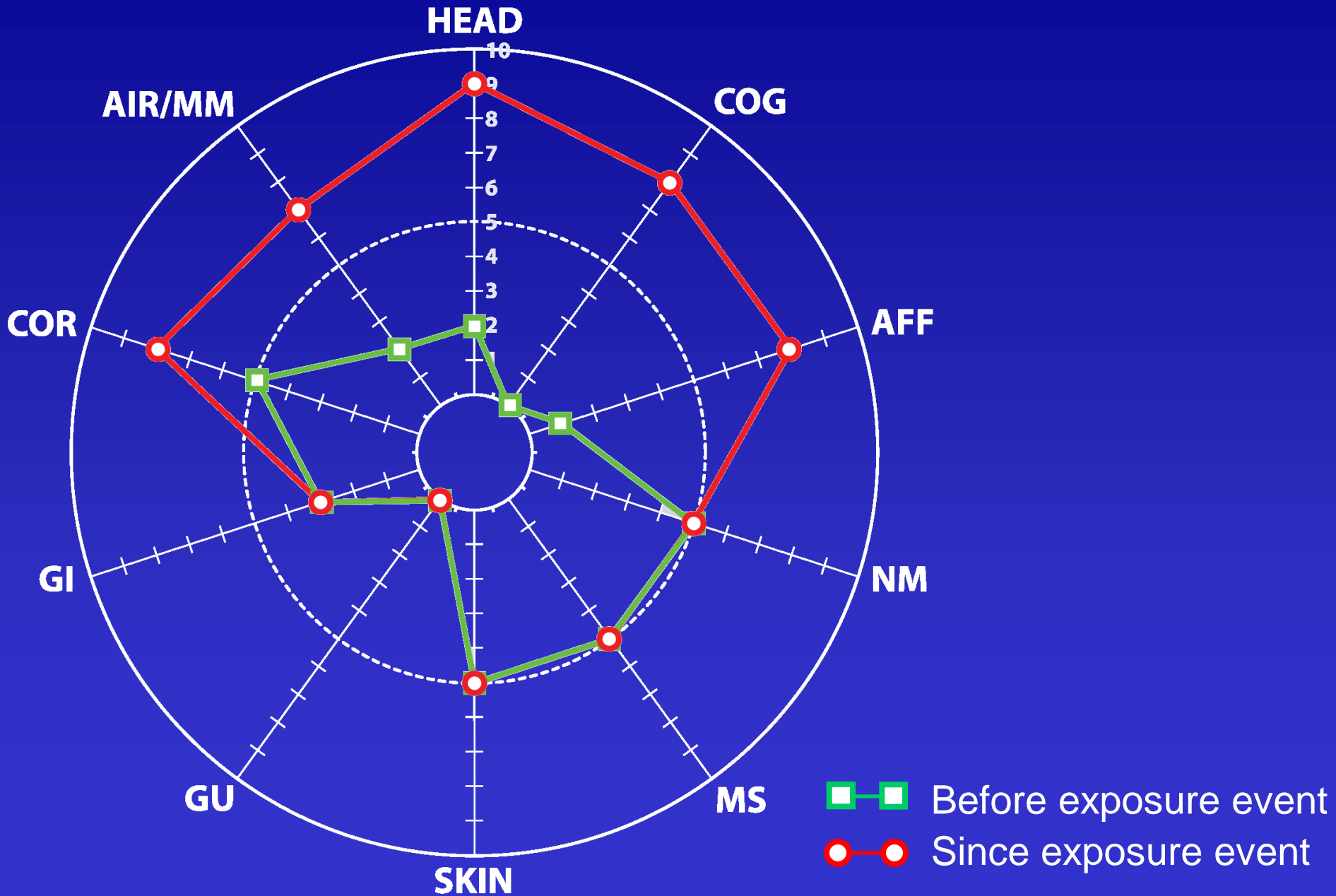


Instructions: Open page 3 so that it lies next to this page. Place a dot on the corresponding spoke for each symptom item. Connect these points. Indicate "before" and "after" scores by using different colors or dotted versus solid lines.

Available for download at:

chemicalexposures.org

QEESI Symptom Star

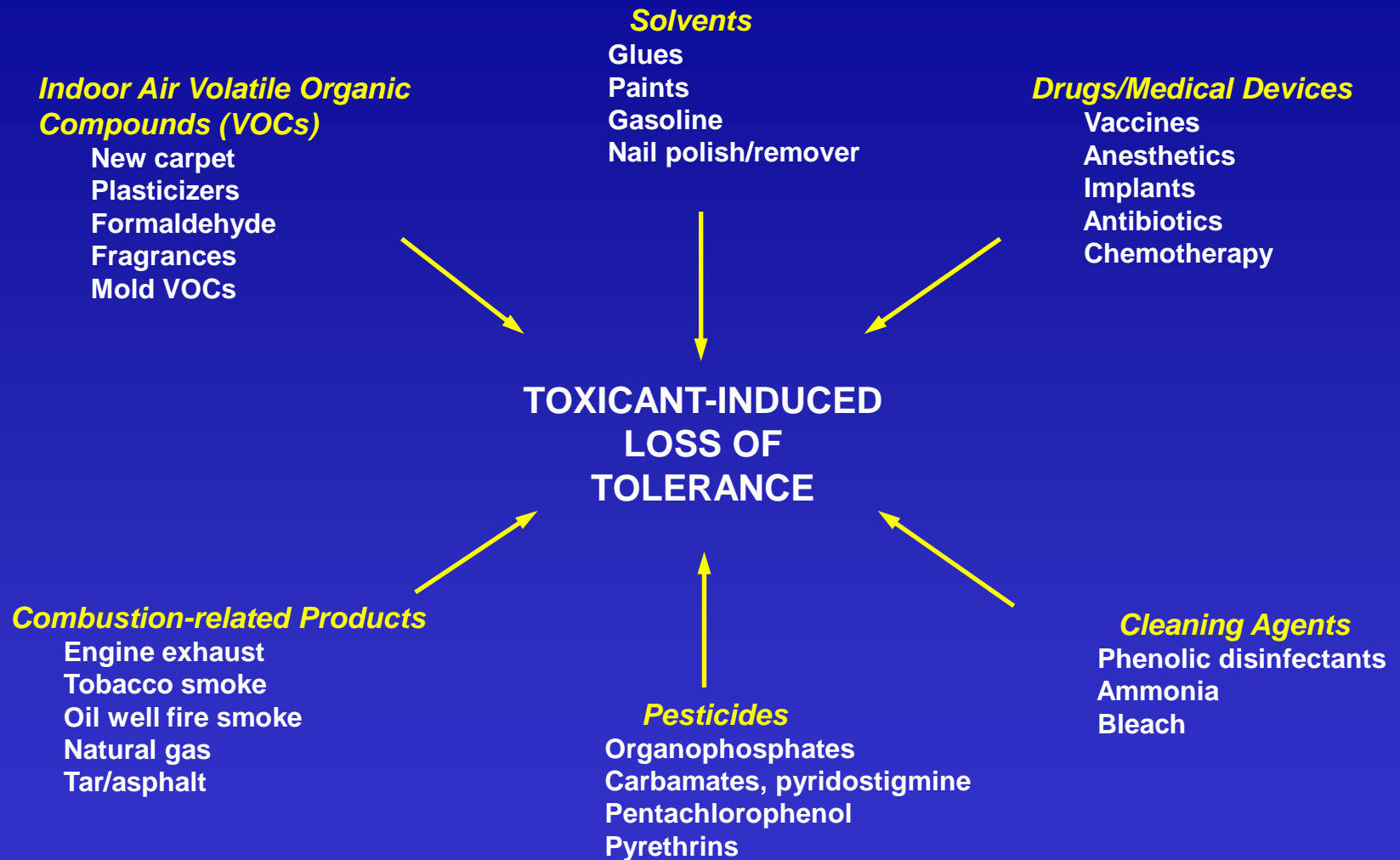


Toxicant-Induced Loss of Tolerance (TILT) involves:

- Initiating toxic exposure(s)
- Fundamental breakdown in innate tolerance
- Adverse and amplified responses to previously tolerated and structurally diverse exposures including common chemicals, foods, drugs, alcoholic beverages, caffeine

Evidence for Toxicant-Induced Loss of Tolerance

- Similar reports in different regions/countries
- Complaints of new intolerances for foods, alcoholic drinks, caffeine, and medications, *not only* chemicals = “compelling anomaly”
- Resemblance to addiction
- Plausible anatomic locus
- Recent animal models



Neuropsychological
Attention Deficit Hyperactivity Disorder (ADHD)
depression
bipolar disorder
panic disorder
migraines and other headaches
seizures
autism

Ear, Nose and Throat
sinusitis
polyps
tinnitus
recurrent otitis

Cardiovascular
arrhythmias
hypertension
hypotension
Raynaud's phenomenon

Miscellaneous Syndromes
Chronic Fatigue Syndrome
implant syndromes
"Gulf War Syndrome"
Post/other disaster syndromes

**TOXICANT-INDUCED
LOSS OF
TOLERANCE**

Respiratory
asthma
Reactive Airways Dysfunction Syndrome (RADS)
toluene diisocyanate (TDI) hypersensitivity

Skin
eczema
hives
other rashes, eruptions

Gastrointestinal
irritable bowel
reflux

Connective Tissue/Musculoskeletal
fibromyalgia
carpal tunnel syndrome
temporomandibular joint dysfunction (TMJ) syndrome
arthritis
lupus and other auto-immune diseases

Next steps?

Adopt a Personal Precautionary Principle

- TILT results from gene-environment interactions.

Construct Environmental Medical Units

- Research
- Diagnosis
- Treatment



The Precautionary Principle in Pregnancy

Instead of	Try this
Spraying pesticides	Baits, traps, and food containers
Regular paint	“No-VOC” paint
Strong cleaners	“Elbow grease,” soap and water, baking soda and vinegar
Scented products	Fragrance-free products
Particle board furnishings	Solid wood or metal furniture or items that have out-gassed (no odor)
New carpet	Wood or tile with washable rugs

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