

Perfume, Fragrance and Odor Intolerance and Other Indoor Air Quality Complaints—How Should They Be Handled?

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Introduction

Building Indoor Air Quality (IAQ) problems:

- Common and distressing to occupants
- Cause symptoms and illness in workers
- Disrupt productivity and staff morale

Dealing with IAQ problems:

- Time consuming, costly and stressful

Purpose of Presentation

- Categorize IAQ problems and complaints
- Emphasize distinction between odor effects and toxic effects of chemicals and substances
- Describe approach to evaluation and management of IAQ concerns

Indoor Environmental Quality

Function of:

- Air Quality
- Noise
- Lighting
- Comfort
- Ergonomic stressors
- Psychosocial stressors

Indoor Air Quality

IAQ refers to quality of air inside buildings and is related to:

- General ventilation
- Pollutant concentrations
- Thermal conditions (temp and humidity)

that affect health, comfort and performance of building occupants.

Indoor Air Quality

Acceptable Indoor Air Quality (IAQ)

Air in which there are no known contaminants at harmful concentrations as determined by cognizant authorities and with which a substantial majority (80% or more) of the people exposed do not express dissatisfaction.

Magnitude of IAQ Problems

NIOSH Data

- # IAQ evals of offices since late 70s = 1300
- 1980—8% of total requests
- 1990—38% (150) of all requests
- Since 1990—52% of all requests

Why IAQ Problems Increased?

- Changes in ventilation to conserve energy
- Changes in office work
 - New equipment
 - Ergonomic problems
 - Organizational stress
- Increase in number of office workers
- Enhanced awareness of IAQ problems

EPA: I-BEAM

Indoor Building Education and Assessment Model

Computer software program integrating IAQ, energy efficiency and building economics into a unique building management tool

http://www.epa.gov/iaq/largebldgs/i-beam_html

EPA/C-01-001V1.0

I-BEAM Enables You To

- Improve IAQ—within budget
- Refine maintenance program for IAQ
- Better manage housekeeping services for IAQ
- Conduct IAQ building audit
- Train management and staff in IAQ
- Provide IAQ building practice documentation
- Reduce liability for IAQ complaints
- Improve building and rental space marketability

I-BEAM Chapters

- Fundamentals of IAQ in Buildings
- HVAC
- IAQ Maintenance and Housekeeping Program
- Diagnosing and Solving Problems
- IAQ and Energy Efficiency
- Renovation and New Construction
- Managing for IAQ

Occupant Symptoms Associated with Poor IAQ

- Acute effects
- Discomfort effects
- Performance effects
- Chronic effects
- Building Associated Illnesses

Building Associated Illnesses

- Building Related Illness (BRI)
- Sick Building Syndrome (SBS)
- Idiopathic Environmental Intolerance (IEI) formerly known as Multiple Chemical Sensitivity (MCS)

Building Related Illness

Illness from known causative agent as a result of exposure to building air

- Hypersensitivity diseases—allergies
- Infectious diseases—Legionnaire's disease
- Intoxications
 - Acute—CO, metals, pesticides, VOC's
 - Chronic disease—asbestos, radon, ETS

Sick Building Syndrome

Nonspecific, largely subjective symptoms associated with building occupancy

- Headache
- Mucous membrane irritation
- Lethargy, fatigue
- Skin irritation
- Nausea and dizziness

Building Factors Affecting IAQ

Factors affecting indoor climate

- Temperature
- Relative humidity 30%-60%
- Airflow 15-20 cfm/person

Factors affecting indoor air pollution

- Building fabric, furnishings and equipment
- Occupant-generated pollution
- Mechanical systems (HVAC)
- External sources

Types of Pollutants

- Environmental Tobacco Smoke
- Combustion Products
- Biological Contaminants
- Volatile Organic Compounds
- Formaldehyde
- Soil gases
- Pesticides
- Particles and Fibers

Contaminant Sources

Indoor Sources

- Housekeeping and Maintenance
- Occupant-Related
- Building Uses as Major
- Building-Related
- HVAC System
- Moisture
- Motor Vehicle

Contaminant Sources

Outdoor Sources

- Ambient Outdoor Air
- Motor Vehicle
- Commercial/Manufacturing
- Utilities/Public Works
- Agricultural
- Construction/Demolition

Contaminant Sources

Outdoor Sources

- Building Exhaust
- Water Sources
- Birds and Rodents
- Building Operations and Maintenance
- Ground Sources

Diagnosing IAQ Problems

- General Diagnostic Process
- Characterizing Problems
- Checking Potential Causes
- Basic Measurement Techniques

Major Reasons for Poor IAQ

- Indoor air pollution sources
- Poorly designed, maintained or operated ventilation systems
- Uses of building that were unanticipated or poorly planned for during design or renovation

Terms and Definitions

- **Odor:** a smell, whether pleasant or unpleasant
- **Fragrance:** a pleasant odor
- **Exposure:** contact with a chemical agent
- **Toxicity:** ability to cause noxious effects
It is a fixed property of a chemical

Terms and Definitions

- Allergen: a substance capable of provoking an immune-mediated response
- Irritant: a substance capable of causing tissue inflammation
- Adverse Health Effect: any abnormal, harmful or undesirable effect on the well-being of a person that results from an exposure
- Hypersensitivity: any allergic response

Key Concepts

- Some chemicals have no odor or toxicity
example: nitrogen gas
- Some chemicals have an odor but no toxicity
example: skunk musk
- Some chemicals have toxicity but no odor
example: carbon monoxide
- Some chemicals have both an odor and toxicity
example: hydrogen sulfide

Key Concepts

- Working with or around a product, substance or chemical does not necessarily mean a person has been “exposed” to it.
- Even when someone has been exposed to a chemical, the exposure may not be biologically significant, i.e. no toxicity occurs.

Key Concepts

- For toxicity to occur, a chemical has to be present at the biologic site of action in a sufficient concentration for a sufficient period of time.
- Most chemicals have an odor threshold hundreds of times lower than the level necessary for toxicity, i.e., smelling an odor does not equate to biologically significant exposure.

Scented Products

- Personal Products

perfumes, colognes, cosmetics, lotions,
soaps, deodorants, hairspray

- Commercial Products

cleaners, air fresheners, bleach, laundry
detergent, candles, advertising inserts

Chemical Sensitivity Prevalence

16% report allergy or unusual sensitivity to everyday chemicals

6% report doctor diagnosed multiple chemical sensitivity (MCS)

80% of the above say that fragrance is bothersome

California Behavior Risk Factor Survey, 1995

Adverse Reactions to Fragrances

- Skin
- Mucous membrane
- Respiratory
- Gastrointestinal
- Central nervous system
- Other

Idiopathic Environmental Intolerances (IEI)

- Formerly known as MCS
- Proposed as new disease in 1950's
- Adverse reactions from exposure to compounds under ordinary conditions
- Compounds: fragrances, detergents, soaps, pesticides, paints, dusts, drugs, etc.
- Symptoms: fatigue, headache, concentration problems + memory problems, nose + throat irritation, cough

Epidemiology of IEI

- Age 40-50 yrs old
- Gender 80% female
- Education average 14 yrs
- Onset 1/3 cannot recall initiating agent
- Symptoms
CNS 90%
GI 12-83%
CVS 28-83%
Endo 22%

Fiedler: Env Health Perspect 1997;105(S2):409-415

Theories Regarding IEI

- Physical illness from toxic exposure
- Psychological illness from toxic exposure
- Misdiagnosed psychological illness
- Culturally shaped illness behavior

IEI Prognosis and Disability

- Symptoms distressing and often functionally disabling
- Large numbers of claims—health insurance, workers' compensation, disability
- Financial impact frequently significant
- Illness not progressive or fatal

Evaluation of IAQ Complaint

Clinical Evaluation

- History and physical examination
- Routine laboratory tests and medical imaging
- Psychosocial evaluation

Environmental Evaluation

- Building engineer inspection
- Health and safety personnel inspection
- Industrial hygiene consultation/testing

Clinical Evaluation

Environment or Work-related Disorders

- Allergic disorders
- Irritant effects
- Intoxications

Personal Health Conditions

- Metabolic-endocrine disorders
- Autoimmune diseases
- Neurological disorders

Psychosocial Factors

Confirmation of Diagnosis of Illness from Exposure to Toxic Substance

- Are the subjective and objective findings explained by the suspected exposure?
- Is the chronological sequence appropriate?
- Is there confirmation of the exposure and quantification of the dose?
- Are there any other explanations for the illness?

Management of IAQ Complaint

- Document disease
- Document exposure
- Document association (or lack of)
- Plan intervention
- Communicate
- Evaluate effectiveness
- Follow up

Suggested Management for I/EI

- Validate symptoms
- Provide appropriate treatment for organic disease
- Give physiologic explanation if possible
- Provide reassurance re diagnostic uncertainty, prognosis and disability
- Trial removal from biologically significant stressors
- Trial of cognitive behavioral therapy
- Address coexistent psychosocial problems