

A Unique Leadership Course for Hazardous Materials Workers

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Texas-Utah Consortium for Hazardous Waste Worker Training

- Partnership Established in 2010 between:
 - University of Texas School of Public Health Southwest Center for Occupational & Environmental Health
 - University of Utah Rocky Mountain Center for Occupational & Environmental Health
- Supports current, returning, and disabled Veterans and underserved minorities, especially in the emergency response, maritime, petrochemical, and mining industries
- **Acknowledgements**
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HAZWOPER Hierarchy

- **HAZWOPER:**
 - Awareness (Level 1) – 1 to 2 hours
 - First Responder Operations (Level 2) – 24 hours
 - HazMat Technician (Level 3) – 40 hours
 - Upgrade: Level 2 to Level 3 – 16 hours
 - Refresher – 8 hours
 - Supervisor – 8 hours
- **Hazardous Materials Leadership Academy**
 - Novel leadership-level course – 16 hours
 - Addresses skills commonly identified as lacking among individuals wishing to ascend to leadership positions

HMLA: Key Skill Areas

- Introduction to HAZWOPER
- Lessons from the Field Over the Past 10 Years
- HAZWOPER Performance Measures and Metrics
- Introduction to Risk Management and Insurance
- Effective Communications
- Effectively Communicating with Data
- Basic Security Concepts for HAZWOPER Operations
- Effectively Managing the “Under-Exposed”
- Small Group Problem-Based Learning Exercises
- Professional Development for HAZWOPER Personnel

Problem-Based Group Learning Exercise

A HAZWOPER-trained supervisor at a remediation site received a call about an injury and a spill near a lab trailer where samples collected from the site were being formalin fixed for analysis. A 1-liter bottle of formalin slipped out of a technician's hand and broke, spilling formalin and scattering glass across the bench-top and floor. The technician was cut. Formalin leaked out door, down the entry steps.

Traditional Questions	Non-Traditional Questions
What are the hazards/exposure pathways?	What can be added/enforced in the emergency control plan to help prevent a future event?
What are the safety and health risks?	What regulation(s) are applicable?
What are the symptoms of exposure?	What insurance considerations are present?
What should be done to secure the site?	What regulatory agent notifications are needed?

Feedback to Date

- “The course title doesn’t give an entirely accurate picture of the valuable information presented.”
- “I really enjoyed the training. I thought that the hands-on exercises were particularly useful.”
- “I really enjoyed the training and the intelligent and well-informed instruction we were given.”
- “I was pleasantly surprised at the quality of the information presented in this course.”
- “I thought it was great!”
- “The course was interesting and generally informative. It definitely fits as a leader-level course.”

What's Next?

Results of Current Research[†]:

- Need to address critical incident stress in secondary responders
 - 33%* of subjects (n=176) tested in PTSD “positive” score range
 - 31% in “probable” score range
 - 69%* tested below average for Resiliency to Stress
 - 91% of subjects supported mental health education
- Integrate PRE-deployment mental health education into the 24-hr & 40-hr HAZWOPER courses
- Integrate POST-deployment mental health education course into the HAZWOPER hierarchy

[†] Calcote, J.C. (2012). *An Assessment of Post-Disaster Psychological Stress in Hazardous Waste Operations and Emergency Response (HAZWOPER) Workers*. Dissertation. UTHSC-H School of Public Health. Pending Publication.

* As compared to general responder populations



HAZWOPER Program Measures and Metrics That Matter!

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HAZWOPER operations as Worksettings

- Very unique places of work due to the potential for simultaneous exposures to all four hazards types in routine and non-routine situations
 - Physical
 - Chemical
 - Radiological
 - Biological
- And a diverse “population at risk”
 - Employees, contractors, government officials, concerned citizens, media, SUV’s, “others”

Training Gap

- On a good day in the HAZWOPER world, “nothing happens” with regard to health and safety
- But it is often the case that HAZWOPER leadership personnel cannot successfully articulate all of the effort that went into making “nothing happen”
- In many cases, HAZWOPER professionals have not been formally trained in this area
- This lack of understanding results in a lot of frustration and confusion
- Enhanced understanding can improve services and support

DRIP

- Data Rich, Information Poor
- In HAZWOPER situations, data is often collected for regulatory compliance purposes, but not so much for management purposes
- Documentation Rich, Information Poor

Why Metrics?

“ When you measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind.”

William Thomson, Lord Kelvin

Metrics

What measures?

What units?

How often to collect the data?

How to communicate the information?

Measures versus Metrics

Metric is a unit of measurement that objectively quantifies an organization's performance

-What's measured gets managed.

Importance of Metrics

“If you can’t measure it

You can’t manage it”

Importance of Metrics cont'd

“If you aren’t measuring it,

and you’re not sharing any measures you do have with others,

Then you’re being perceived as not managing it,

and will ultimately be replaced with someone who will”

Emery

Management's Macro Indicators

Losses

Personnel

Property

Financial

Expenditures

Revenues

Compliance

External

Internal

Client Satisfaction

External

Internal

Indicators of Macro Measures

Output - workload

- number of individuals trained

- surveys or inspections completed

- violations assessed

Outcomes – does the program achieve its desired results?

- is safety training or inspections effective in reducing injury or illnesses?

What Units?

\$ (Cost)

Scope (area, square feet)

Time

Number of events

Specific Examples

Population at risk: Number of workers,
hours worked?

By type of setting, operation

Training documentation, proficiency

PPE ensemble proscribed

Usage compliance, supplies needed

Worksite surveillance

Compliance with work plan

Specific Examples cont'd

Deficiencies identified

Deficiencies resolved

Reported incidents, injuries, exposures,
near missed

Necessary responses

Waste, debris volumes

How Often?

“Smell the cheese often so you know when it is getting old.”

– Spencer Johnson

Ongoing metrics communicate the effectiveness of processes

“Every time you get the chance” – Emery

Communicating Metrics

Focus on outcome metrics not output

Select emerging issues and opportunities to communicate

Report on strategic goals

Remember to tie it to the mission of the organization

Caveat

“Not everything that can be counted counts, and not everything that counts can be counted”

- Albert Einstein



A Risk Management & Insurance Primer for HAZWOPER Professionals

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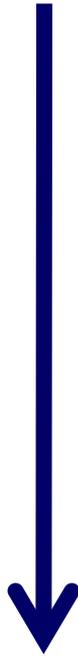
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A Changing Environment

- HAZWOPER originally conceived in 1986 primarily to protect hazardous waste site workers (the “HAZWOP” part)
- Hazardous waste site clean up largely funded through RCRA, CERCLA (Superfund), and in turn, PRP litigation
- Training is also the accepted norm for other worksettings involving hazardous materials – disasters, terroristic events, etc. (the “ER” part)
- Importance of HAZWOPER leaders understanding how such events are managed and financed

How Emergencies are Financed

Small scale

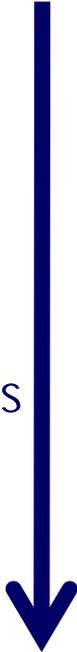


Large scale

- Unfunded, funded reserves
- Insurance (if peril covered)
- Mutual aid agreements
- Re-insurance
- State level assistance
- Federal level assistance
- International assistance

Common to all Emergency Financing

Data,
performance
measures,
metrics,
communications



- Unfunded, funded reserves
- Insurance (if peril covered)
- Mutual aid agreements
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- State level assistance
- Federal level assistance
- International assistance

So What Should We Do?

- Develop an understanding of the “risk management” concept
- Learn how the risk management process functions
- Discuss how HAZWOPER trained workers and leaders can mesh within this paradigm

Voluntary Disclosure

- Despite attempts to be objective, this presenter makes no apologies about any possible unintended biases towards the workplace safety profession!
- Also, an academic interest and the completion of some exams does not take the place of years of practical experience.
- *So caveat emptor!*

What is “Risk Management”?

- Risk management is the process of making and implementing decisions that will minimize the adverse effects of accidental and business losses on an organization.

The 2 Components of Risk Management

- Risk Financing is the process of obtaining funds to pay for or offset losses. This is traditionally what is thought of as “risk management”. Generally considered insurance.
- Risk Control is the process to minimize the frequency and/or severity of accidental loss. This includes the conventional functions of an safety program.

Important Risk Management Vernacular

- Risk: a potential variation in outcomes
 - Pure risk: outcome only negative (accidental losses)
 - Speculative risk: negative or positive outcomes (business losses or gains)
- Loss: an event that reduces an organization's financial value
- Loss exposure: anything that presents the possibility of a loss

Risk Management Involves a 5 Step Process

1. Identifying and analyzing exposures to accidental and business losses
2. Examining feasible alternative risk management techniques
3. Selecting the best alternative(s)
4. Implementing chosen alternative(s)
5. Monitoring results

Risk Identification

- What risks are present in your organization?
- How might we go about making this list?
- *or put another way.....*

What is the greatest risk here?



Examples of Organizational Risks

- Buildings, structures, and contents
- Employees, visitors, surrounding community
- Employment liability
- Benefits
- Automobile/trucks/fleet
- Sexual harassment/Discrimination
- Environmental impairment
- Theft
- Technology & Computers (e-business, intellectual property)
- Etc.

1. Identifying Exposure to Loss

- Types of Exposures

- Property
- Net income
- Liability
- Personnel

- Methods

- Standardized surveys, questionnaires
- Financial statements
- Records and files
- Flowcharts
- Personal inspections
- Expert opinions

Identifying Exposure to Loss (con't)

- Analysis – Organizational Objectives
 - Profit
 - Continuous operations
 - Stable earnings
 - Growth
 - Humanitarian concerns
 - Legal requirements
- Analysis – Significance
 - Loss frequency
 - Loss severity

Three Dimensions of a Loss Exposure

- 1. Value exposed to loss
 - Property
 - Tangible (e.g. building, contents, personal property)
 - Intangible (e.g. copyrights, patents)
 - Net Income
 - Decrease in revenue or increase in expenses
 - Liability
 - Contractual, tort, statutory law
 - Personnel
 - Death, disability, retirement, resignation

Three Dimensions of a Loss Exposure

- 2. Peril Causing the Loss
 - Natural
 - Windstorm, hail, flood, fire
 - Human
 - Actions or inactions of individuals, e.g. arson, negligence, theft, homicide

Three Dimensions of a Loss Exposure

- 3. Financial Consequences of Loss
 - Frequency and severity of occurrence
 - Typically, the more severe, the less frequent

2. Risk Management Alternatives

- Risk Control

- Exposure avoidance
- Loss prevention
- Loss reduction
- Segregation of exposures
- Separation/duplication
- Contractual transfer for risk control

- Risk Financing

- Retention
 - Current expensing of losses
 - Unfunded reserve
 - Funded reserve
 - Borrowing
 - Captive insurer
- Transfer
 - Commercial insurance
 - Contractual transfer for risk financing

Example: Need a Car?

Risk Control Options

- Exposure avoidance (makes loss impossible)
 - Don't buy a car
- Loss prevention (reduces frequency)
 - Don't drive at all, not much, or very, very carefully
- Loss reduction (makes losses smaller)
 - Get a less expensive car
- Separation/duplication
 - Own two or more cars, park in different locations
- Contractual transfer
 - Lease a car

Example: Need a Car?

Risk Financing Options

- Retention through current expensing
 - Pay for damage from income
- Retention through unfunded reserves
 - Recognize need to pay for damage if it occurs
- Retention through funded reserves
 - Set aside funds to pay for damage
- Retention through borrowing
 - Use loan or credit card to pay for damage repair
- Retention through a captive insurer
 - Form or join a captive

Example: Need a Car?

Risk Financing Options (con't)

- Contractual transfer for risk financing
 - Find a non-insurance indemnitor to pay for damages
- Commercial insurance
 - Purchase auto collision insurance
- Hedging
 - (Not applicable to accidental losses)

Reviewing a Policy: Important (and Insightful) Questions

- What losses are covered?
- What property / locations are covered?
- What people are covered?
- What perils are covered / what hazards are excluded?
- What time period is covered?
- What conditions suspend coverage?

Cautionary Note: Moral Hazard and Deductibles

- Moral hazard: when the behavior of the insured party is influenced by the presence of insurance
 - Example: availability of flood insurance in high risk flood prone areas could entice people to build there, despite known risks
- *Ex ante* moral hazard – once insured, party behaves in a more risky manner
 - Example – with auto insurance, not locking car
- *Ex post* moral hazard – after a loss occurs, asking the insurer to pay more than coverage was originally intended
 - After forgoing medical treatment because of lack of insurance, now asking insurance to cover health costs related to previous ailments

Cautionary Note: Moral Hazard and Deductibles

- Extreme example - *Wall Street Journal* 12/23/74:
 - In a small Florida town, over 50 people suffered 'accidents' involving the loss of various organs and appendages, resulting in claims of up to \$300,000 being paid out by insurers. Insurance investigators are positive the maimings are self-inflicted because many witnesses to the 'accidents' are prior claimants or relatives of the victims, and one investigator noted that 'somehow they always shoot off parts they seem to need least.'
- Deductibles exist as a means to counteract moral hazard

3. Selecting Best Alternative(s)

- Choosing selection criteria
 - Financial criteria
 - Criteria related to other objectives
- Decision rules for applying criteria
 - Risk control
 - Risk financing

Exercise #3: Cash Flow Example

- Large highway paving company exploring option to replace existing fleet of 10 roadgraders.
- Cost \$40,000 each, useful life 10 years, no salvage value
- A major advantage is unit stability – advertised to reduce frequency of rollovers by one-half
- Rollovers have been a constant problem for this company – over past ten years, average 5 injuries per month, average WCI claim \$3,000 per event

Cash Flow Example (con't)

- Annual WCI payout
 - 5 claims/month x \$3,000/claim x 12 months/yr
=\$180,000 per year, or \$18,000/yr/grader
- Company expects to earn an annual after-tax, time adjusted rate of return of at least 22% on any funds invested in new fleet
- What after-tax annual net cash flow amount must be generated by each grader to make this financial decision?

Cash Flow Example (con't)

- At 22% and 10 years the present value factor for \$1 received annually at the end of each year is 3.92 (from table)
- $(\$40,000)/(x) = 3.92$
- $x = \$10,204$
- Compare to one-half WCI payout of \$18,000 per grader, or \$9,000 in savings (slightly less than needed)
- What other sources of possible positive cash flow might stem from the purchase of these units?

Common Risk Management Critiques of Safety Programs

- Consider the big picture – business perspective
- Don't always rush to measure – try simple fixes first
- Rushing to the few highly exposed when the larger minimally exposed may be a bigger ROI
- Better utilization of insurer services
- What is the frequency and severity of the loss exposure? Is it imminent or hypothetical?
- How do your operations further the mission of the organization?
- An equally interesting question: *what are common critiques of Risk Management programs?*

Common Safety Critiques of Risk Management Programs

- Too focused on the numbers
- Paralysis by analysis
- May be the wrong numbers – compensable injuries versus first reports
- Lack of communication
- Not involved or aware of negotiations – what services will or can the insurer provide?
- Lack of awareness or full understanding of risk control issues
- Movement of problems from hypothetical to imminent (if its affecting their office)

So How Safety Might Mesh into the Risk Management Environment?

- At a minimum, use the vernacular
- Know coverages and retention levels
- Apply concepts to day-to-day activities
 - Take a particular worksetting for example: what if, instead of just looking at potential hazards, a complete risk profile was created?
 - Clarifies to supervisor what risks are retained and what are covered (and at what levels), including funding risks
 - What risk control options are available
 - The cost benefits of each
 - Used as a catalyst to enjoin lab personnel in achieving desired endpoint?
- Biggest ROI – uninsurable risks!

HAZWOPER Leadership: Effective Management of the “Underexposed”

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Consider This Paradox

- Of all the personnel monitoring you have performed in your career, for whatever potential hazard or insult

 - Chemicals
 - Radiation
 - Mold
 - Particulates

- How many results were at or above the established limit?

Are We Overlooking the Majority?

- The recurrent answer from multitudes of practicing safety professionals is 1 to 5%
- Much of our collective academic and professional preparation is focused towards the protection of this 1 to 5%
- What about the other 95 to 99%?

The “Underexposed”

- Persons exhibiting monitoring results below any required or recommended limit
- “Underexposed” is actually a misnomer, as these persons are likely exposed, but just to a lower or even trivial level
- But these persons can still hold concerns or apprehensions about their exposures, and can consume vast amounts of program energy and resources if mismanaged

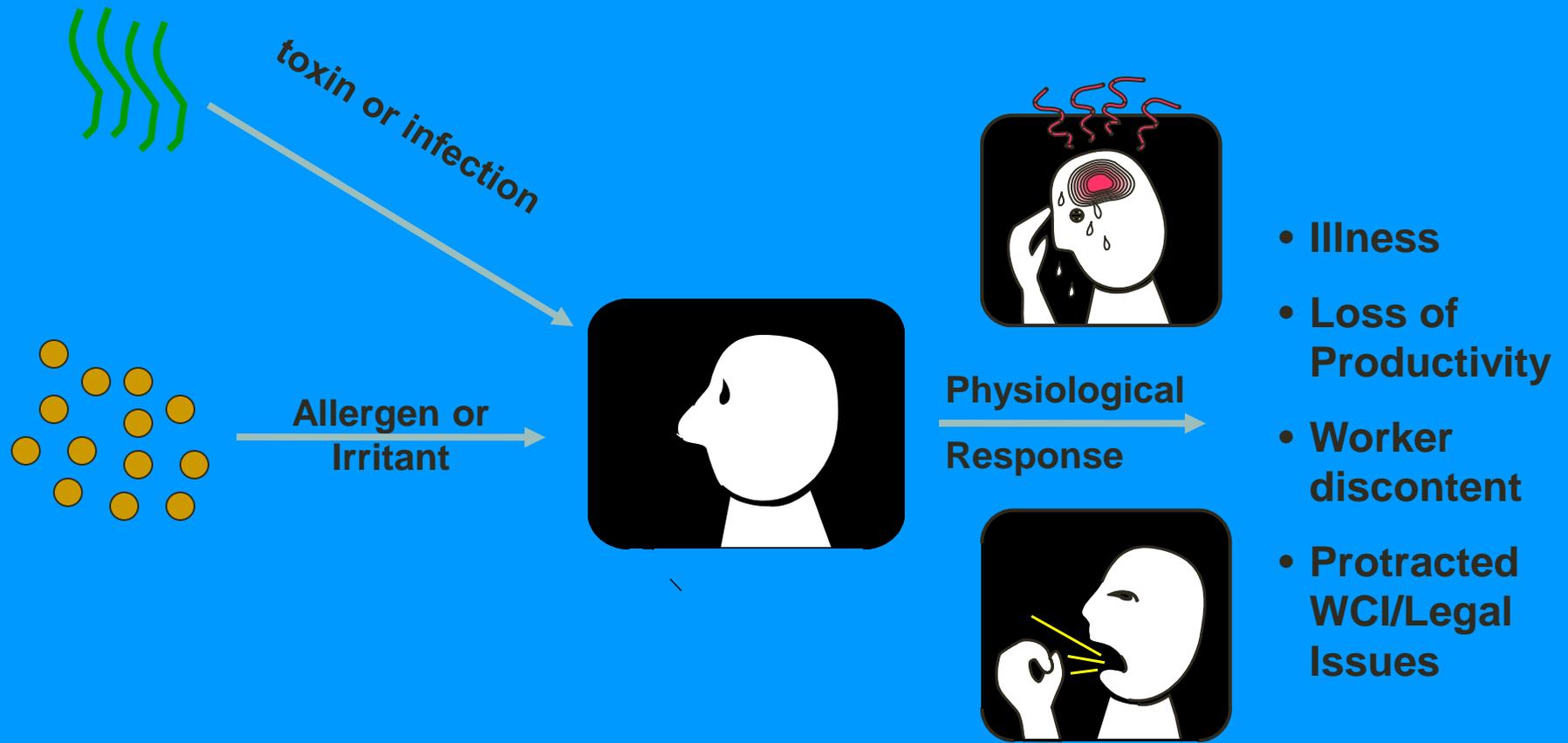
Management of the Underexposed

- Ironically, once assessed or monitored, the underexposed population of workers is either ignored or, if problematic, managed through a series of unwritten techniques
- These management techniques are developed over years of experience, and many battle scars, but are rarely documented

General Classes of the “Underexposed”

- 1. The unconcerned
- 2. The curious
- 3. The inquisitive
- 4. The concerned
- 5. The upset
- 6. The upset with symptoms
- 7. The outraged,
 - and not shy about making it known

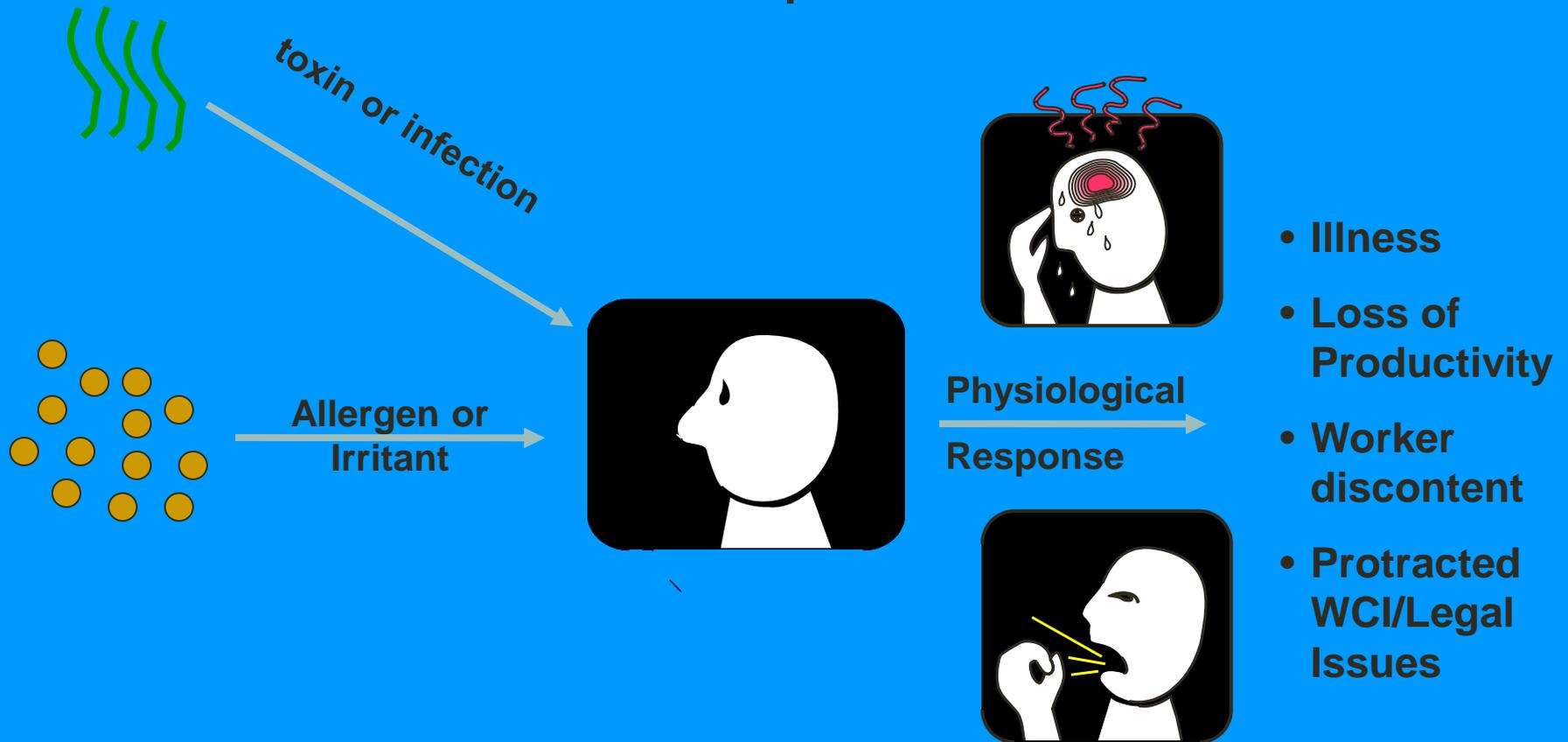
Pathways for Indoor Air Quality-related Physiological Responses



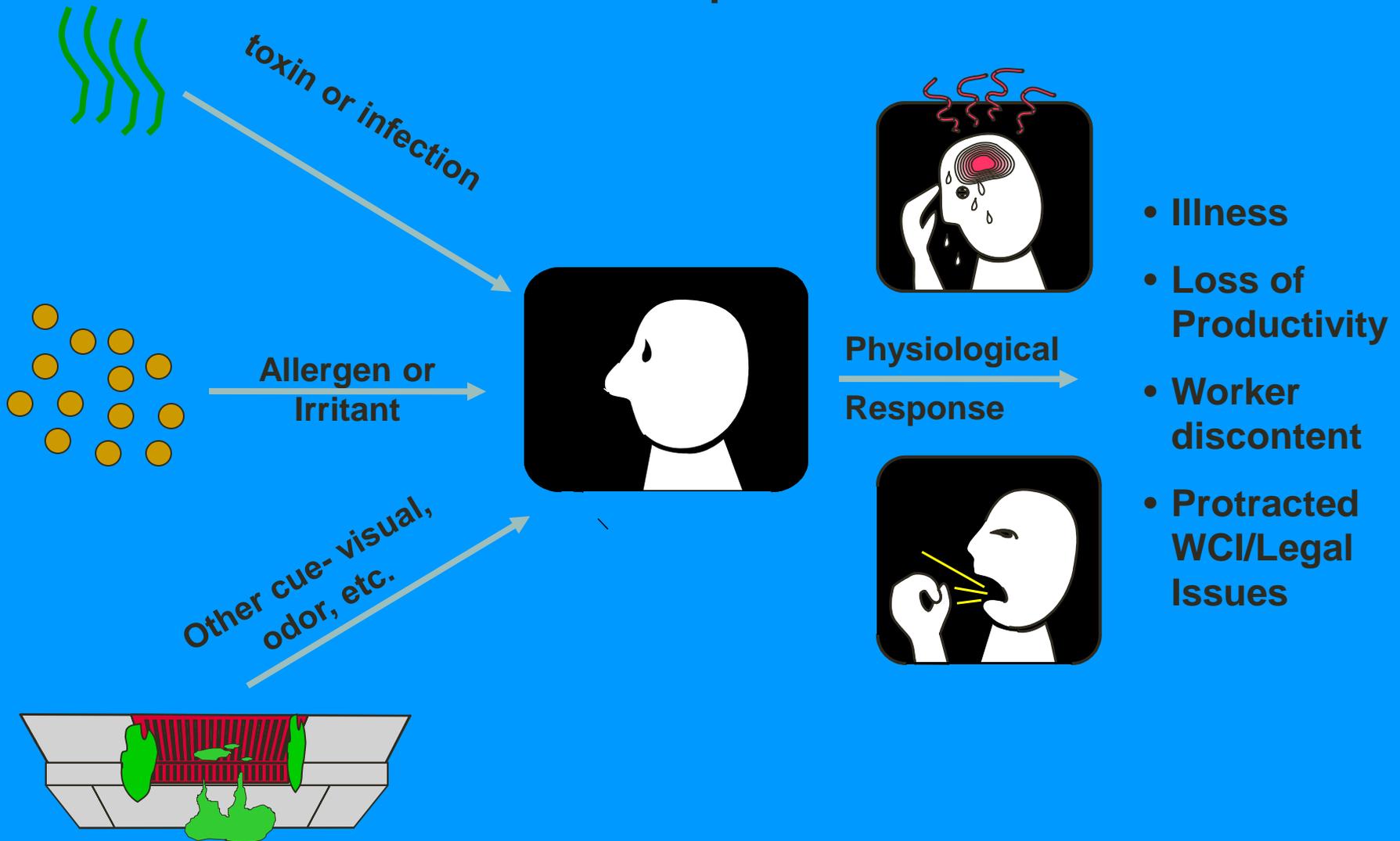
Cues

- Pavlovian Conditioning
 - Immune conditioning demonstrated in animals
 - Can produce many physiological responses
 - May also increase anxiety, fear, anger, etc. (“buttons”)
 - Conditioning stimulus can be any sense

Pathways for Indoor Air Quality-related Physiological Responses



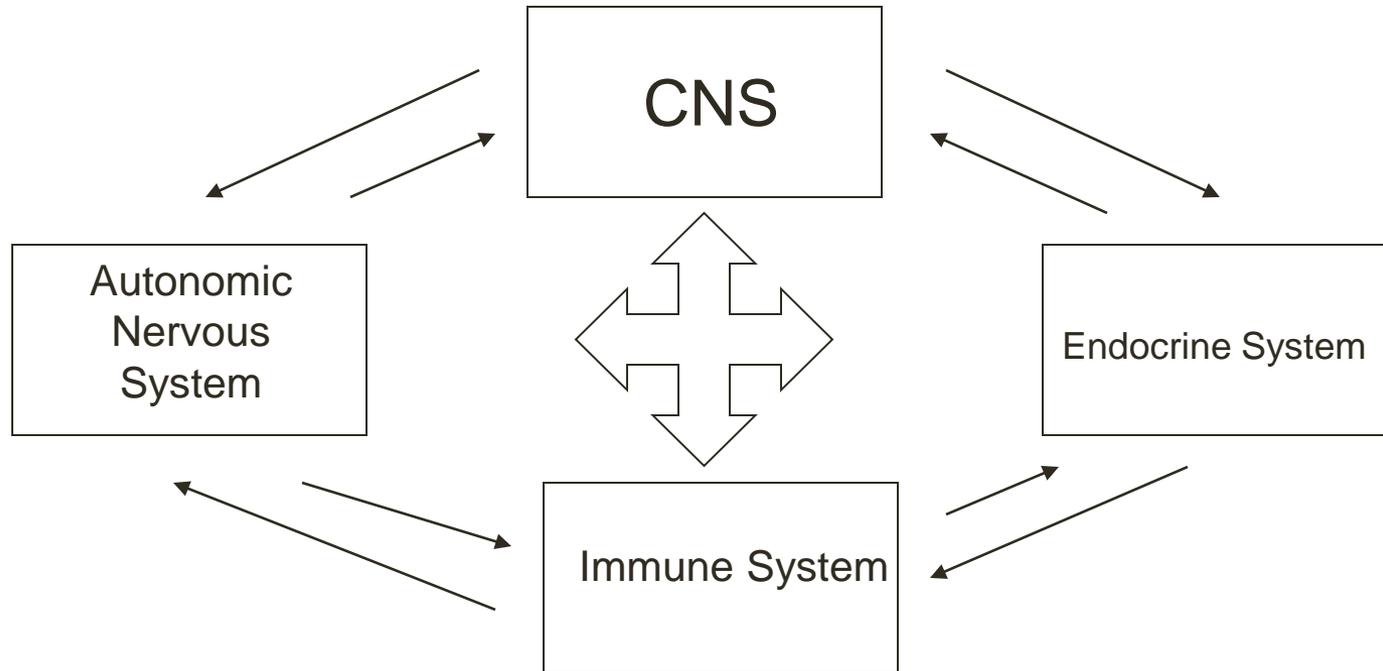
Pathways for Indoor Air Quality-related Physiological Responses



Psychogenic Model

- Produced or caused by psychic or mental factors rather than organic
 - Of psychological rather than physiological origin
 - When the mind induces the body to create or exacerbate poor health
 - Somatoform disorders
 - Compilation of illnesses unexplained by physiological symptoms
 - “Somatization”
- Source: American Psychiatric Association’s Diagnostic and Statistical Manual of Mental Disorders, 4th edition

Complex Relationships



Synonyms

- Sick building syndrome
- Building related illness
- Multiple chemical sensitivity
- Chronic fatigue syndrome
- Environmental somatization syndrome
- Total allergy syndrome
- Cacosmia
- Functional somatic syndrome
- Occupational neurosis
- Mass psychogenic illness
- Psychogenic idiopathic environmental intolerance
- 20th century disease
- Cerebral allergy
- Chemically induced immune dysregulation
- Idiopathic building intolerance
- Toxic agoraphobia

Stress Reported Associations

- Allergy/Asthma
- Autoimmune diseases
- Cardiovascular diseases
- Infectious diseases
- Malignant diseases
- Metabolic diseases

Psychogenic Illnesses

- Physiologic responses are *REAL*
- *Extremely* difficult to treat
 - Patient denial
 - Employer disdain/impatience
 - Limited response to traditional therapies
- Approach to problem is multilevel
 - Patient/doctor/employer education
 - Early/consistent involvement of environmental safety
 - Deconditioning strategies

Case Study

- Despite best planning and controls, odors from a remediation project are entering a nearby occupied building
- The odors are strong, but have been measured to be below both regulatory and recommended exposure limits
- A large population of workers ($n > 100$) exposed to odors are voicing concerns about a wide variety of responses
- What steps should be taken to address this issue?