Implementing Prevention through Design in Hospitals: Alternatives Assessment

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Pollution Prevention (P2)-Occupational Safety & Health (OSH) in Hospitals

Scope of Healthcare Design for Occupational and Environmental Health & Safety

- **Material or chemical**
  - Mercury
  - Formaldehyde
- **Product**
  - Syringes, sharp medical devices
  - Cleaning & disinfecting products
- **Production Process**
  - Histopathology
- **Built Environment**
  - Patient rooms
  - Emergency rooms

Chapter 8: Healthy Healthcare Design

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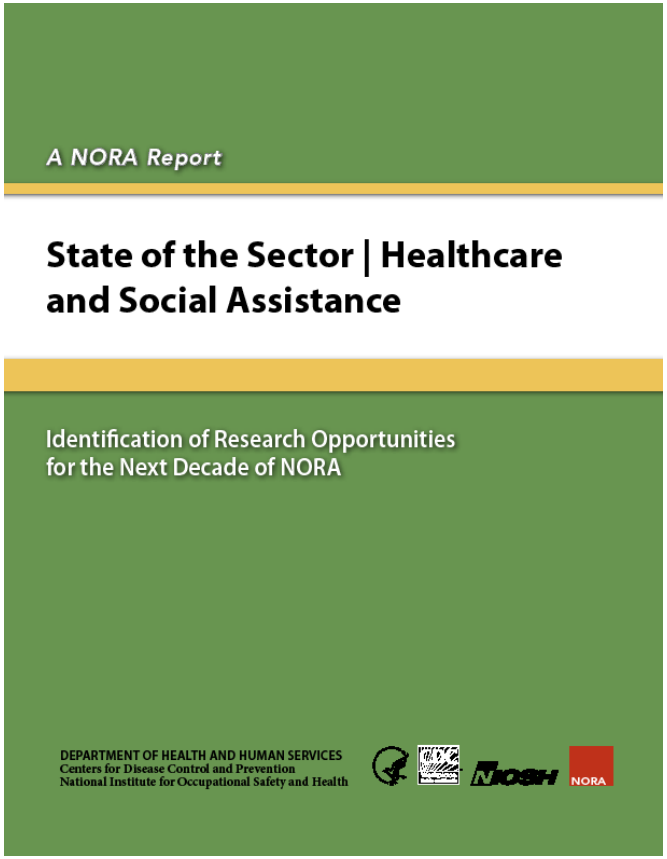
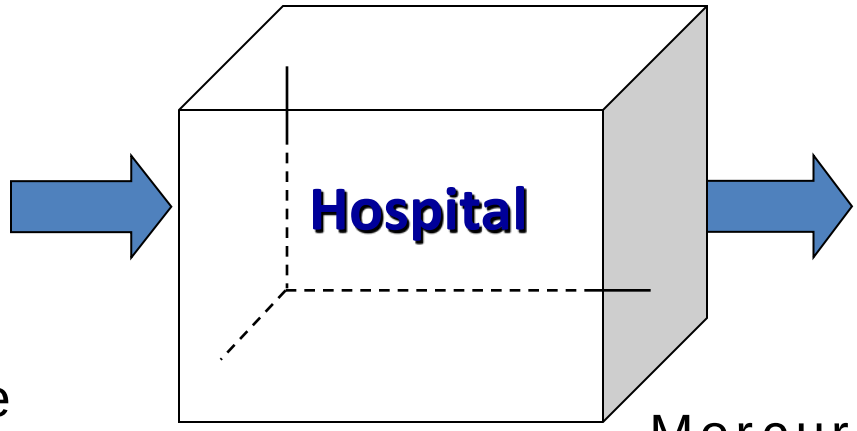


Environmental AND Occupational Health must be fully integrated for effective Pollution Prevention

Toxic Material or Product

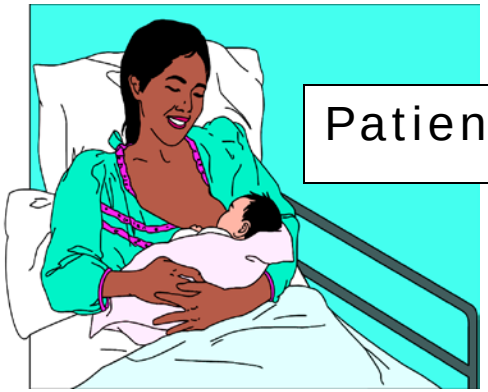


Environmental Pollution

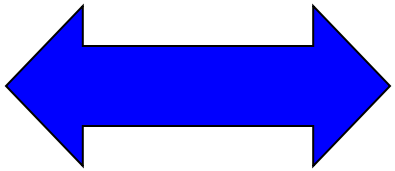
Formaldehyde
Glutaraldehyde
Xylene
Triclosan
PVC Products
Cleaning products
Mercury Containing Products

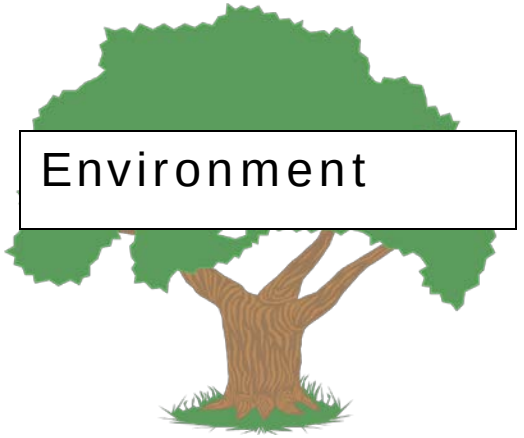
Mercury, Organic Chemicals in Air, H_2O, Soil, Solid waste

Minimum:
Prevent Risk Shifting

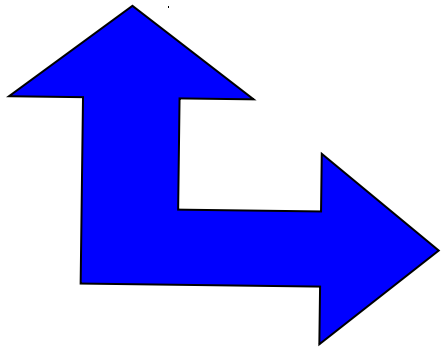


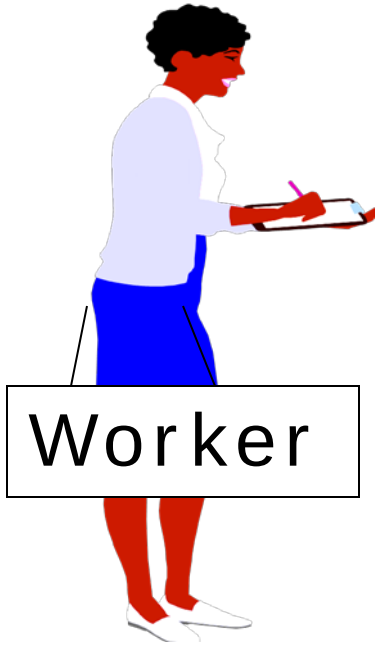
Patient



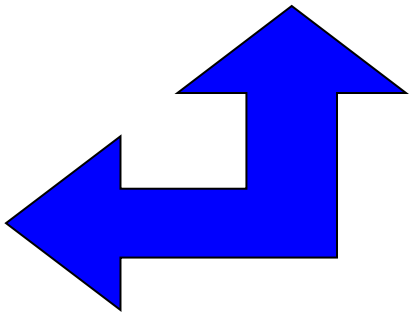


Environment





Worker



Ideally:

Design and promote more comprehensive, successful solutions

Overview

- Intro Prevention through Design (PtD) in Healthcare
- Alternatives Assessment approach in hospitals
- Examples
- Lessons Learned & Conclusions

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Pollution Prevention—Occupational Safety and Health in Hospitals: Alternatives and Interventions

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P2-OSH alternatives assessment/intervention model

Alternatives/Interventions in Hospitals

Quinn M, Fuller T, Bello A, Galligan C; JOEH, April 2006

Design Intervention	Why?	P^2 impacts	OSH impacts
Xylene → aliphatic fixative	worker irritant symptoms	↓ chemical waste	↓ odor, headaches ↓ skin irritation ↓ toxicity
Mercury reduction	water pollution	↓ water pollution	↓ spill hazards ↓ toxicity
Wet chemical film → digital imaging	new technology	↓ chemical waste ↓ water use ↓ plastic waste	↓ chemicals ↓ repetitive motions ↓ awkward postures ↓ lifting ↑ VDT hazards ↑ job loss
Formaldehyde → glyoxal	water pollution	↓ water pollution	↓ toxicity ↓ odor ↓ skin irritation
Conventional → microfiber mopping	water conservation/ mus-skel strain	↓ water use ↓ chemical use	↓ mus-skel. strain ↓ infection potential

International Partners

ECUADOR

- University of Science & Technology, Quito – Dr. Raul Harari
  - Ministry of Environment
  - Ministry of Health
  - 4 hospitals

MEXICO

- University of Sonora, Hermosillo – Dr. Clara Alvarez Chavez
  - Ministry of Environment (SEMARNAT)
  - Ministry of Health
  - 3 hospitals

In collaboration with WHO/PAHO

Example

Substituting mercury fever thermometers in pediatrics

Alternative Assessment and Implementation

1. Conduct Hg OSH and Environmental training
2. Establish Hg reduction team
3. Identify departments with Hg, conduct interviews

Alternative Assessment and Implementation

4. Conduct Hg inventory
5. Analyze purchasing information

Alternative Assessment and Implementation

6. Identify, implement & evaluate alternatives/interventions
7. Identify product or processes for re-design

Example

Substituting mercury in dental amalgam

Example

Substituting a conventional mopping system with alternative microfiber design

Conventional Cleaning: string mop & bucket

Alternative Design: Microfiber Mop

Removable pad: improved infection prevention

But OSH Evaluation indentified hazard from wringing Ergo re-design needed

Example from Kaiser Permanente:
Elimination of Anti-Bacterial Ingredient in Clinical Soap & Lotions

The design challenge:

Triclosan common in many personal care products has harmful health & env potential:

- Advisory Committee to FDA: no benefit from regular use of anti-bacterial over soap and water
- AMA: regular use of anti-bacterial agents may lead to antibiotic resistance
- Potential human health risk to thyroid function
- Harmful to aquatic systems when washed down the drain

Alternative implementation via KP team: triclosan free soaps and lotions

Impacts

- Work Environment: reduced potential for antibiotic resistant bacteria
- Ambient Environment: aquatic life protection
- Human Health: reduced potential for adverse endocrine effects
- Business: *No negative cost impact to over $3.5 million spent annually*

Conclusions: Alternatives Assessment

- No alternatives are perfect.
- Focus should be on the *process* by which an alternative is evaluated and implemented rather than on a *particular alternative*.
- Whenever a new alternative becomes available, the process to evaluate it should be repeated.

Conclusions: Alternatives Assessment

- An alternative cannot be introduced successfully without understanding:
  - its function,
  - associated job requirements and work practices, and
  - its final product or service.

- Long-term success depends on the participation of the people affected because they understand the functions and work practices best and ultimately, maintain the change.

Conclusions: Products & Materials

- Info about alternative designs is:
  - scarce
  - unavailable in a form that HC Workers can use
- HC workers & OSH Professionals not viewed as having a role in design
- OSH professionals well-positioned to participate in design teams, but need expanded training

Conclusions: Work org & policies

- Successful design & implementation is a social as well as technical process
  - Work org effects the type of design & how it will be implemented
  - Commitment needed at all levels of the HC organization
  - Easier for managers to engage in innovation & solutions, than control only

Conclusion: Innovation

Occupational Safety & Health and Environmental Protection can be drivers for innovation

Thank you!

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