Hazardous Drug Exposure in the Healthcare Environment: Developing Best Practices for Prevention

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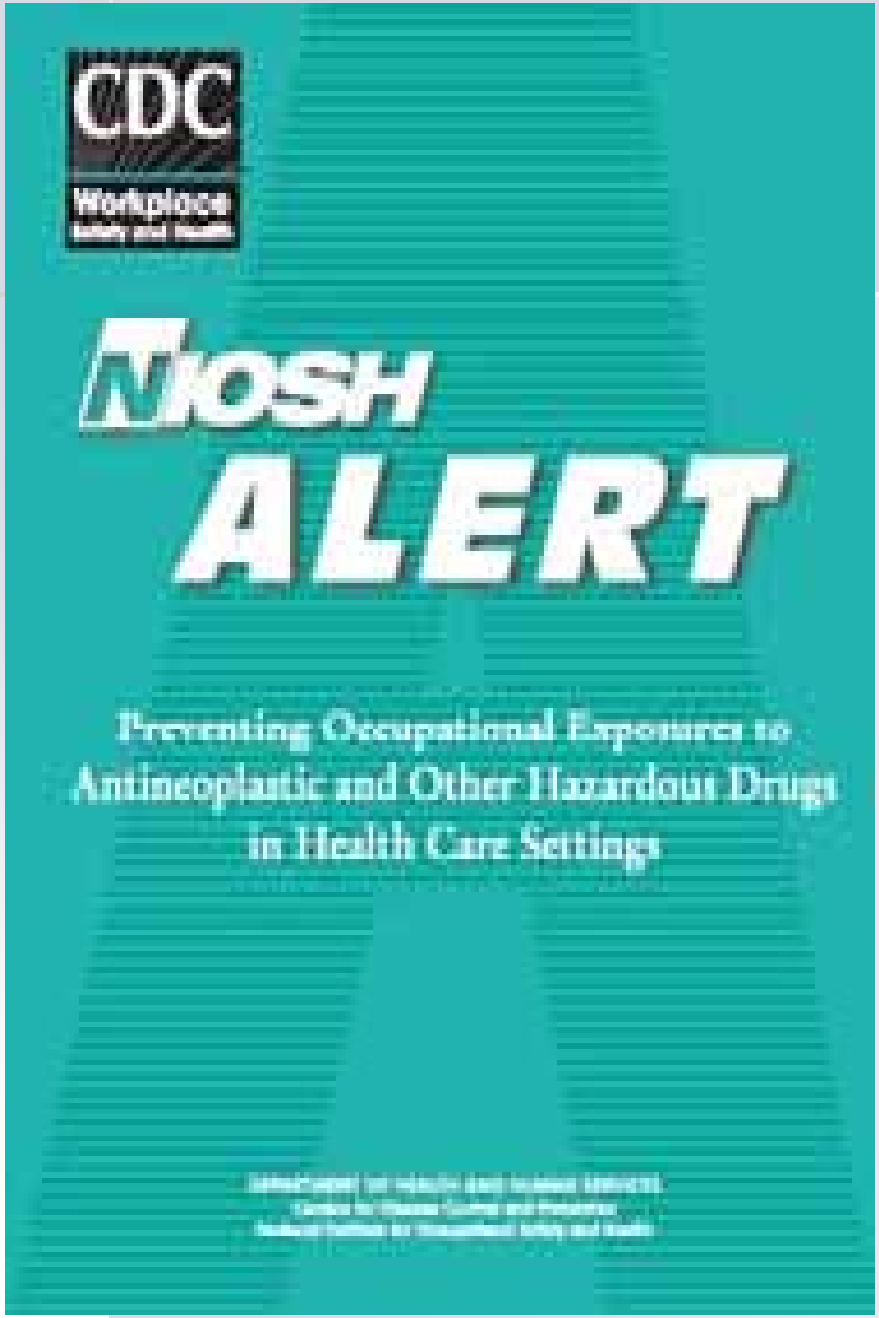


- 2004
- 5.5 million US workers potentially exposed
- 2.4 million nurses exposed
- Observed health effects and symptoms
- Elevated biological exposure indices (drugs/metabolites in worker blood)

NIOSH Alert

- Warning – Working with or near hazardous drugs in health care settings may cause skin rashes, infertility, miscarriage, birth defects and possibly leukemia or other cancers.

Workers at risk for exposure

- Nursing personnel
- Physicians
- Surgical staff
- Researchers
- Manufacturing workers
- Pharmacists/pharmacy technicians
- Environmental services personnel
- Veterinarians/Animal technicians
- Shipping and receiving personnel

Hazardous drug use factors

- Successful treatment of illness and injury
- Almost all drugs have side effects
- Exposure to very small concentrations may be hazardous
- Potential therapeutic effects may outweigh risk for patients
- Healthcare personnel risk side effects without benefits

Survey of MNA Region 3

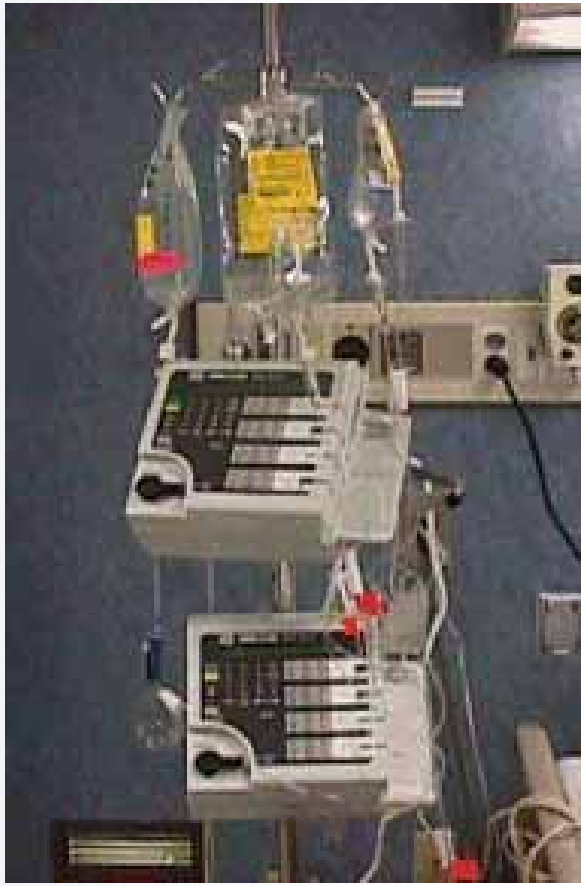
- How many of you have/are handling hazardous drugs?
- How many of you have hazardous drug exposure prevention programs at your facility?
- How many of you have read programs?
- How many of you have had classroom training?
- How many of you have received hands- on- training related to hazardous drug exposure prevention?

Survey of MNA Region 3

- How many of you know the steps to take if you have a “spill”?
- How many of you have had personal monitoring or exposure assessments of your work environment?
- How many of you know what PPE to use for administering hazardous?
- How many of you use PPE when you administer hazardous drugs? Always? Most of the time? Sometimes? Never?
- How many of you are concerned about your potential exposure to hazardous drugs and the health effects of this exposure?

Drugs considered hazardous

- Antineoplastic agents
- Vaccines
- Gonadotropins
- Estrogens
- Oxytocics
- Contraceptives
- Androgens
- Antibiotics
- Antivirals
- Progestins
- Misc. skin and mucous membrane agents



Evidence for health effects in workers

- Carcinogenicity of several antineoplastic drugs well established in animals by 1970’s
- Therapeutic use of alkylating agents in humans linked to leukemias and other cancers
- Studies indicate antineoplastic drugs may cause increased genotoxic effects in nurses and pharmacists

Developmental and reproductive effects

- Association between exposure to antineoplastic drugs and adverse reproductive effects such as:
  - increased fetal loss
  - congenital malformations
  - low birth weight
  - infertility

Adverse Effects

- The likelihood that a worker will experience adverse health effects from hazardous drugs increases with the amount and frequency of exposure and the lack of proper work practices

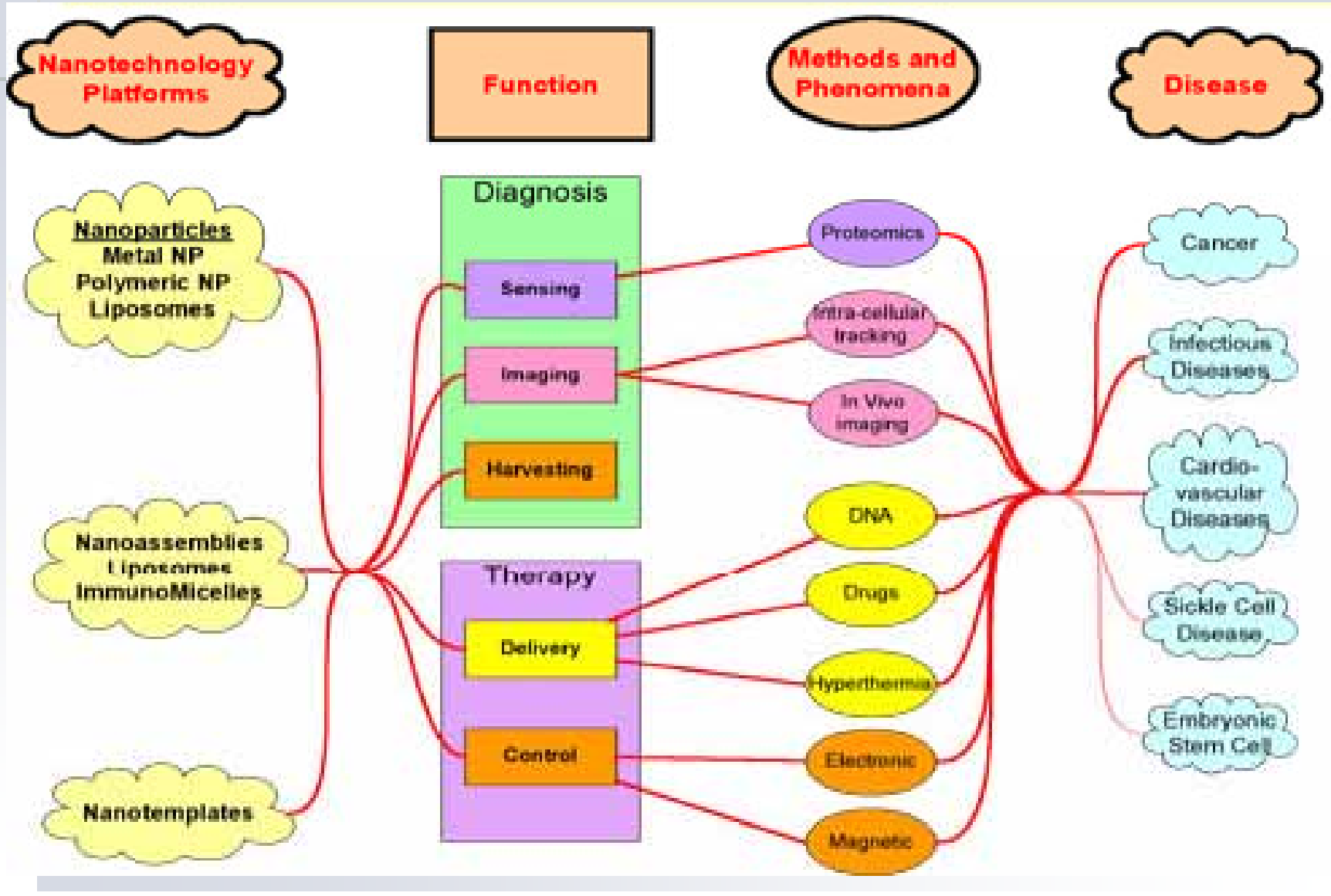
Potential for exposure growing

- Greater numbers/combinations of drugs
- More concentrated and powerful drugs
- New methods of treatment and administration to patients (aerosols, dermal patches)
- Used in medical offices, treatment centers, and home care
- Contamination is widespread

Nanotechnology

- Nanometer is one billionth of a meter
- Matter on near–atomic sized scale
- Used to produce new structures, materials and devices
- Unique properties at nanoscale level
- Affect physical, chemical and biological properties

Emerging Nanomedicine – unique properties, unknown risks, new uses, new hazards



Potential risks of nanomaterials

- Need to understand, predict and manage potential health risks
- May cause different interaction with human body
- Larger surface area of inhaled particles may increase toxicity
- Can penetrate deep into lungs and move to other areas of the body

Work activities with potential for exposure

- Preparation, administration, and/or disposal of hazardous drugs
- Handling body fluids
- Handling/transporting contaminated waste
- Decontamination and clean-up
- Removal and disposal of PPE after exposure to contaminated waste
- Performing specialized procedures (e.g. in OR, at the bedside)

Routes of exposure

- Inhalation
  - Mixing liquids, expelling air from syringes, crushing pills, spills, priming an IV
- Injection
  - Needlestick or sharps injury
- Ingestion
  - Hand to mouth contact: eating/drinking in the work environment, handling food wit hands
- Absorption (Primary Means)
  - Skin contact/absorption, handling contaminated materials

Current Safety Program Practice

- Inconsistent between institutions
- Failure to recognize drugs as hazardous
- Incomplete or inadequate
- Do not address all workers
- May not be implemented and carried out

MNA Survey 2006

- Are nurses aware of hazardous drug programs?
- Are their exposures evaluated?
- What controls do they use to minimize exposures?
- 2000 nurses surveyed at 3 facilities
- 400 responses

Survey Results

- 87% reported handling/administering hazardous drugs
- Only 54% aware of programs re: safe handling of hazardous drugs and training
- Only 30% read programs
- Only 12% had classroom training
- Only 6% had hands-on-training
- ***None*** had personal monitoring or exposure assessments

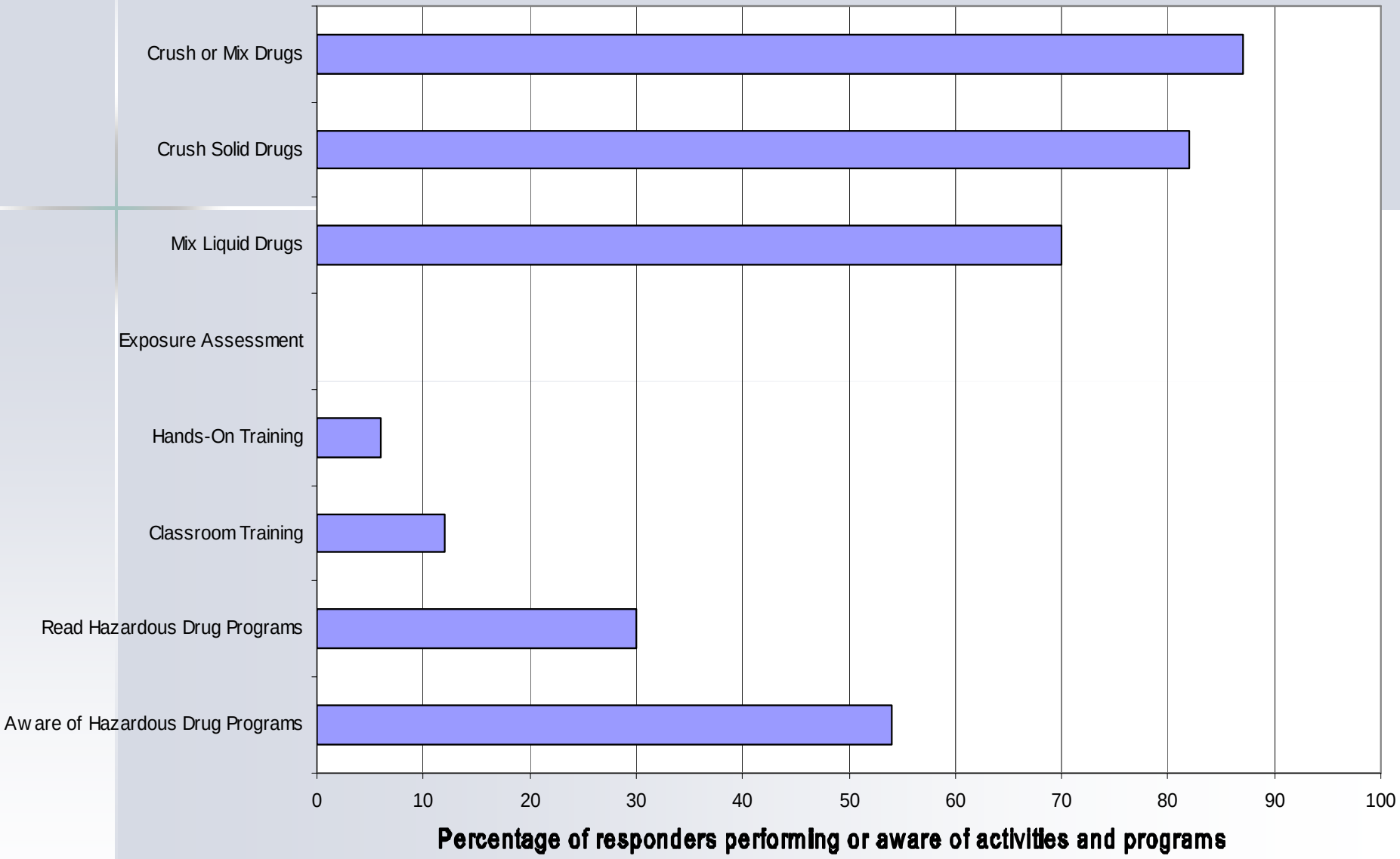


Figure 1. - Percent of Responders Performing Hazardous Drug Activities and Aware of Safety Programs

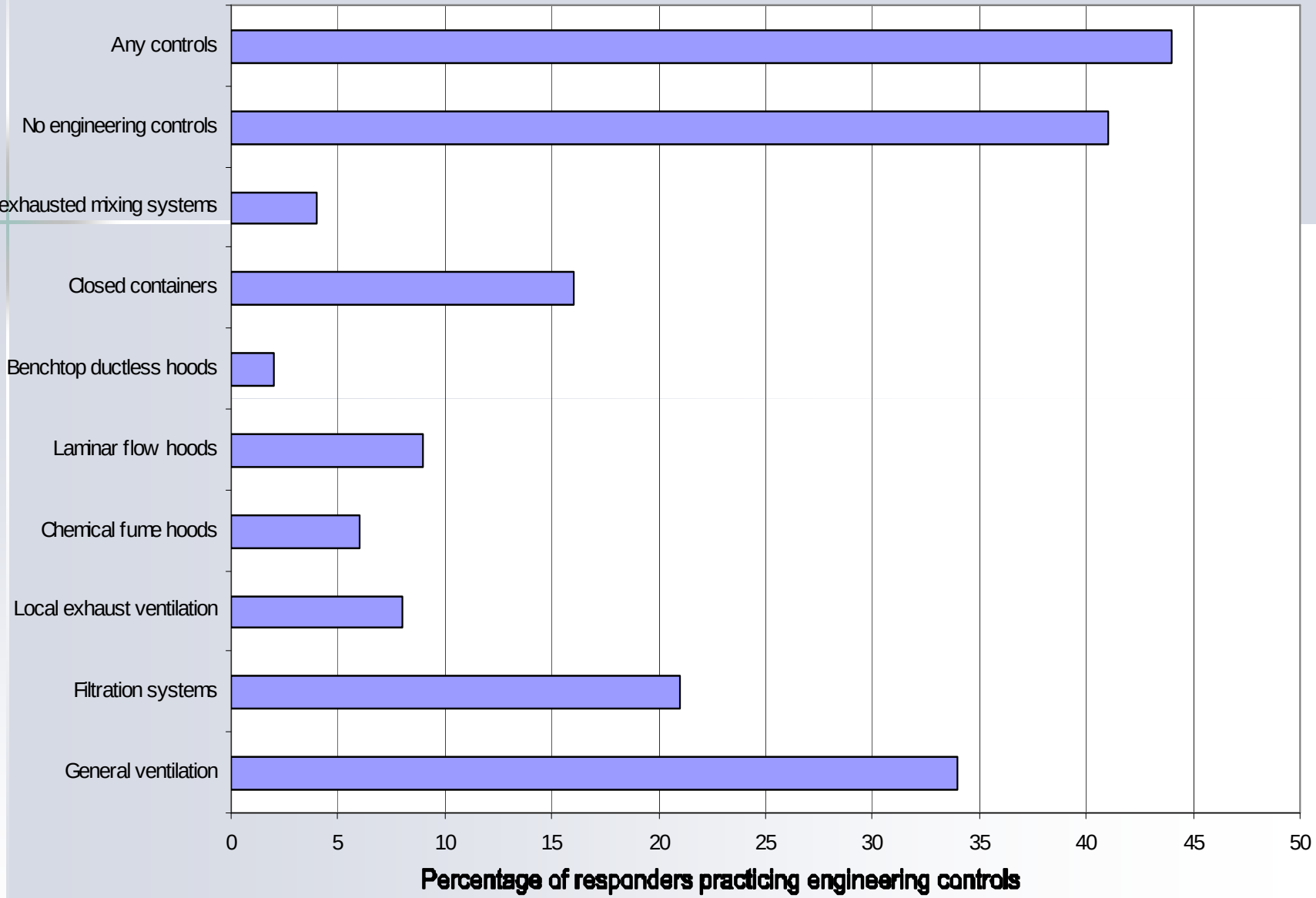


Figure 2. - Percent of Nurse Responders Practicing Engineering Controls

Survey results cont.

- Nurses do not identify many drugs they administer as hazardous
- Continue to handle in same manner
- Not aware of changes in controls
- 70% use personal protective equipment, likely gloves
- Use of face shields, and gowns or lab coats much less likely
- 10% do not use any PPE

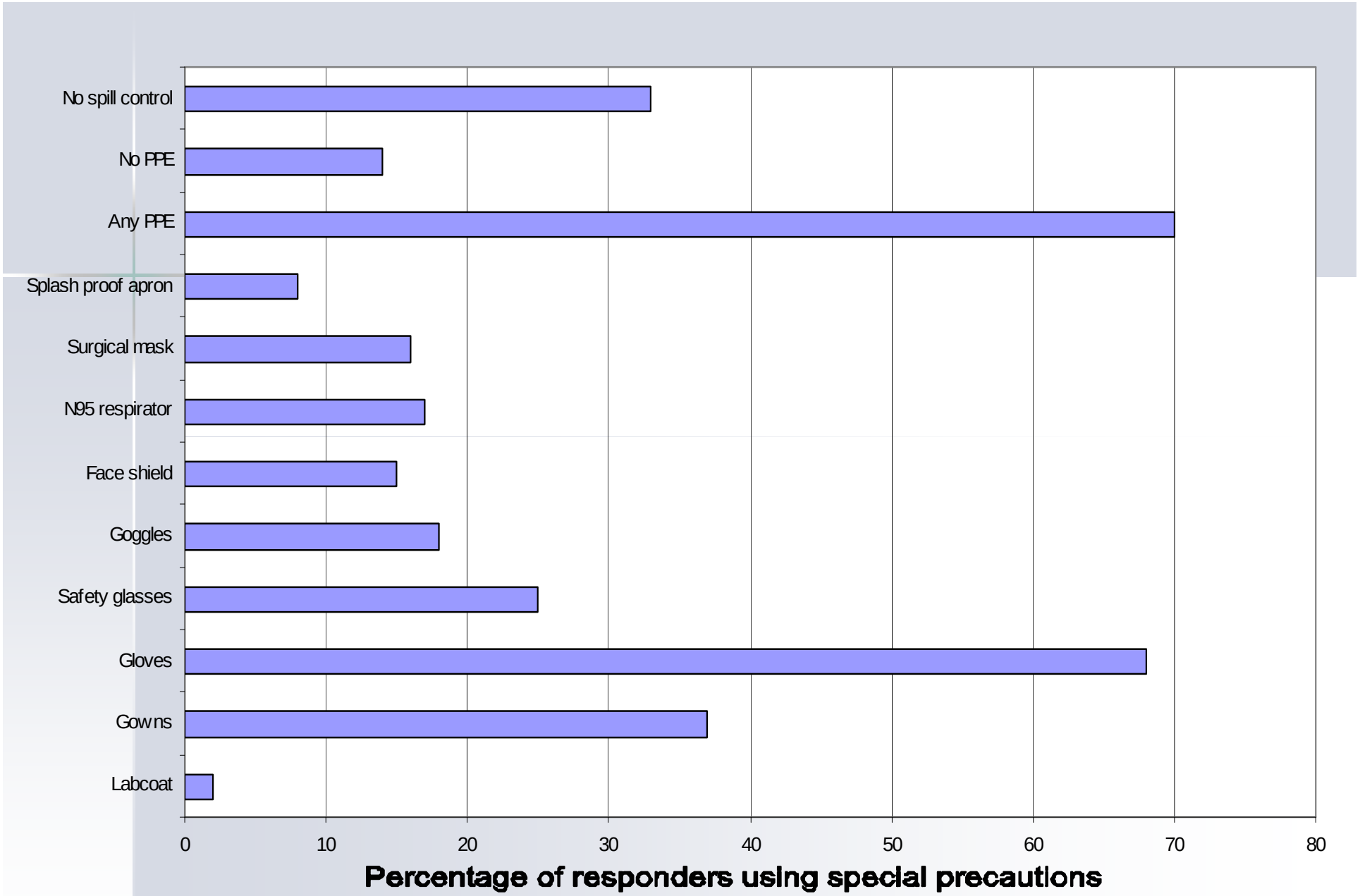


Figure 3. - Percent of Nursed That Take Special Precautions When Handling Hazardous Drugs

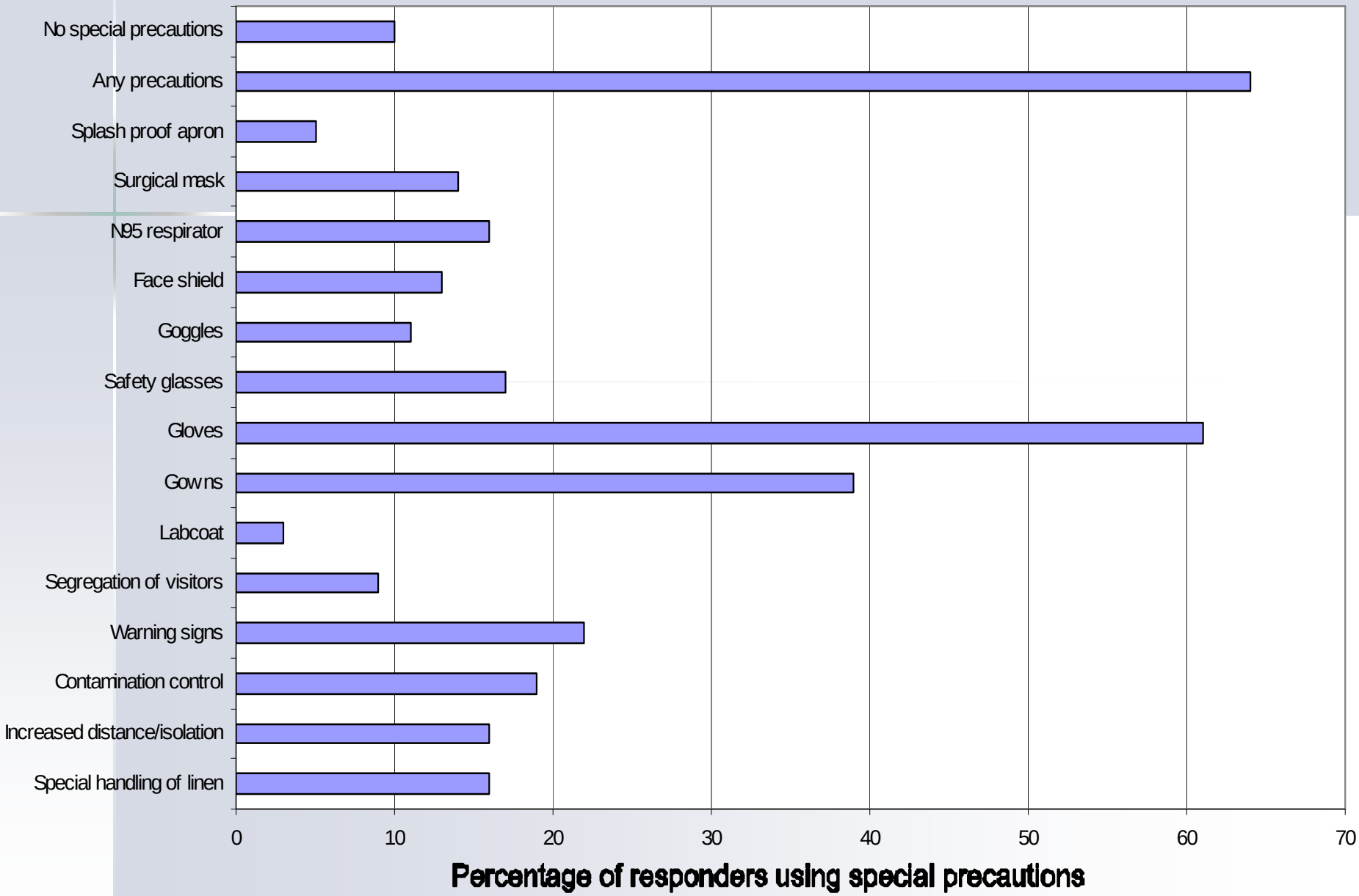


Figure 4. - Percent of Nurses Who Take Special Precautions When Working With Patients Receiving Hazardous Drugs

Some conclusions of MNA Survey

- Gap between NIOSH Alert and practice
- Many nurses are unaware of issues of hazardous drug exposure and prevention programs
- Nurses who were aware of and had read hazardous drug programs were much more likely (85.6%) to use PPE

Protecting nurses and other workers

- As required by
  - OSHA Hazard Communication Standard – 1910.1200
- Administrative controls
  - Work setting designed to protect workers
  - Programs/procedures/warning signs
  - Medical surveillance
  - Provide safe areas for staff to eat

NIOSH suggests:

- Follow recommendations that are presented in the ALERT
  - Assess hazards
  - Evaluate workplace
  - Review inventory of hazardous drugs
  - Seek input of workers with potential for exposure
  - Conduct training and evaluate practice
  - Reassess annually

Training includes:

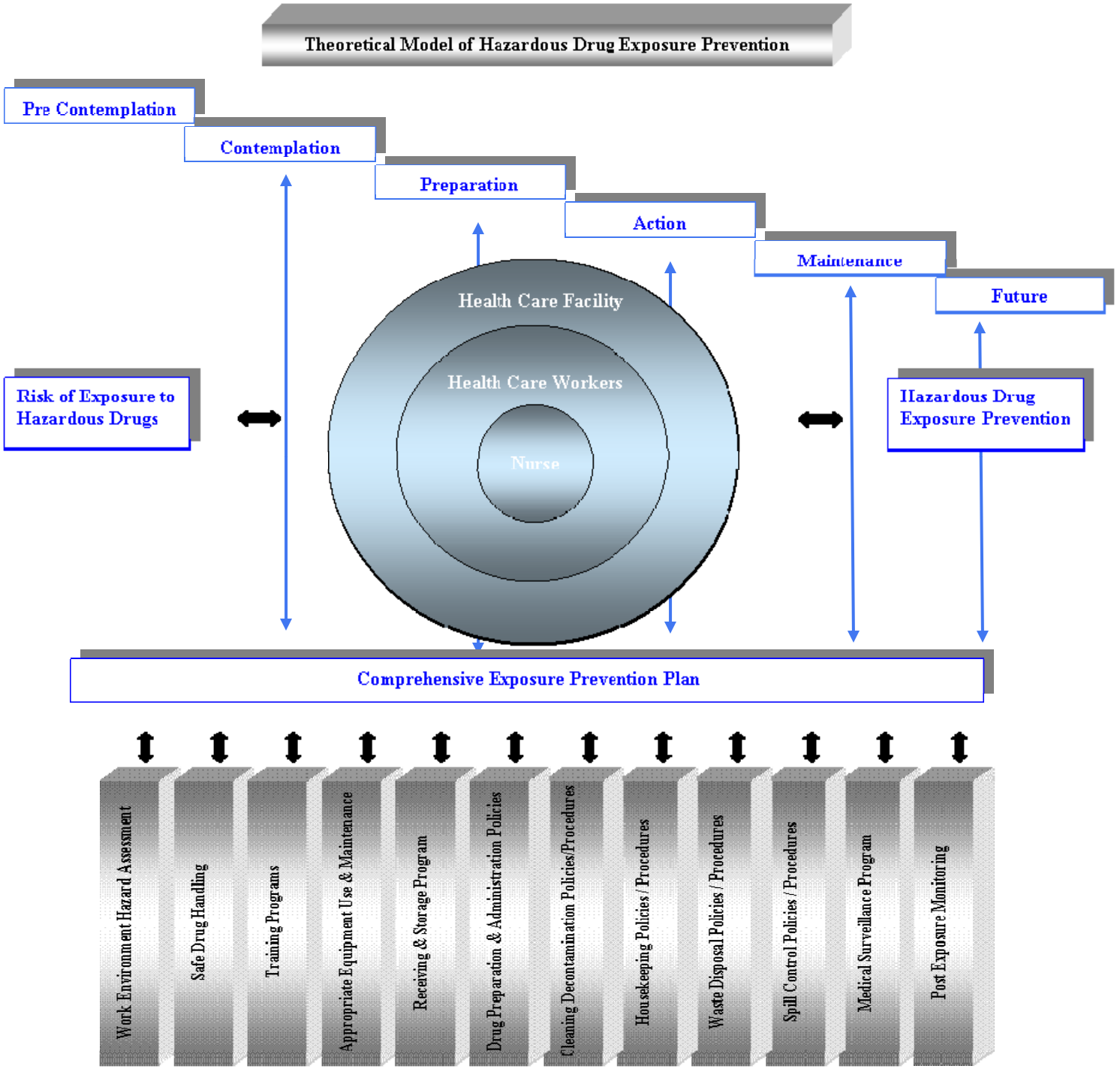
- Safe handling
- Spill procedures
- Equipment and PPE use
- Reporting spills, exposures and symptoms
  - Who, how and where
- Work practices
  - No eating or drinking in workplace
  - Product information and MSDS for the drugs that are specific to work setting
  - Recognize the sources of exposure

Medical surveillance

- Depending on exposure
  - Physical exam
  - CBC
  - Monitoring urine
    - dipstick or microscopic exam
  - Monitoring the work area
    - air and surface contamination

Exposure Assessment / *Limitations*

- Air monitoring methods
- Surface wipe sampling methods
- Marker drug selection
- Analytical capabilities of laboratories
- Knowledgeable industrial hygienists
- Standardized exposure limits


Theoretical Model of Hazardous Drug Exposure Prevention
Pre Contemplation
Contemplation
Preparation
Action
Maintenance
Future
Health Care Facility
Health Care Workers
Nurse
Risk of Exposure to Hazardous Drugs
Hazardous Drug Exposure Prevention
Comprehensive Exposure Prevention Plan
Work Environment Hazard Assessment
Safe Drug Handling
Training Programs
Appropriate Equipment Use & Maintenance
Receiving & Storage Program
Drug Preparation & Administration Policies
Cleaning Decontamination Policies/Procedures
Housekeeping Policies / Procedures
Waste Disposal Policies / Procedures
Spill Control Policies / Procedures
Medical Surveillance Program
Post Exposure Monitoring

Developing a Program for Hazardous Drug Exposure Prevention

- Identify advocates within the work setting
- Gather info on best practices
- Develop/participate in committees to advocate for change
- Encourage reporting of injuries/illness to identify the problem and support care of injured workers
- Utilize problem specific OSHA and JCAHO standards and guidelines

Conclusions

- Significant potential for exposures
- Great need for improved programs and training
- Need for scientific methods and qualified personnel.
- MNA Hazardous Drug Exposure Prevention Project
- You can make a difference!