Overview of Current NIOSH Risk Assessment and Management Activities for Chemicals

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May, 2019

Scope

- NIOSH's efforts in chemical risk assessment and management have been reviewed individually but not considered in their **entirety**.
- This presentation provides an overview of all of these efforts and solicits feedback on them.

Chemicals are one of the most significant occupational hazards

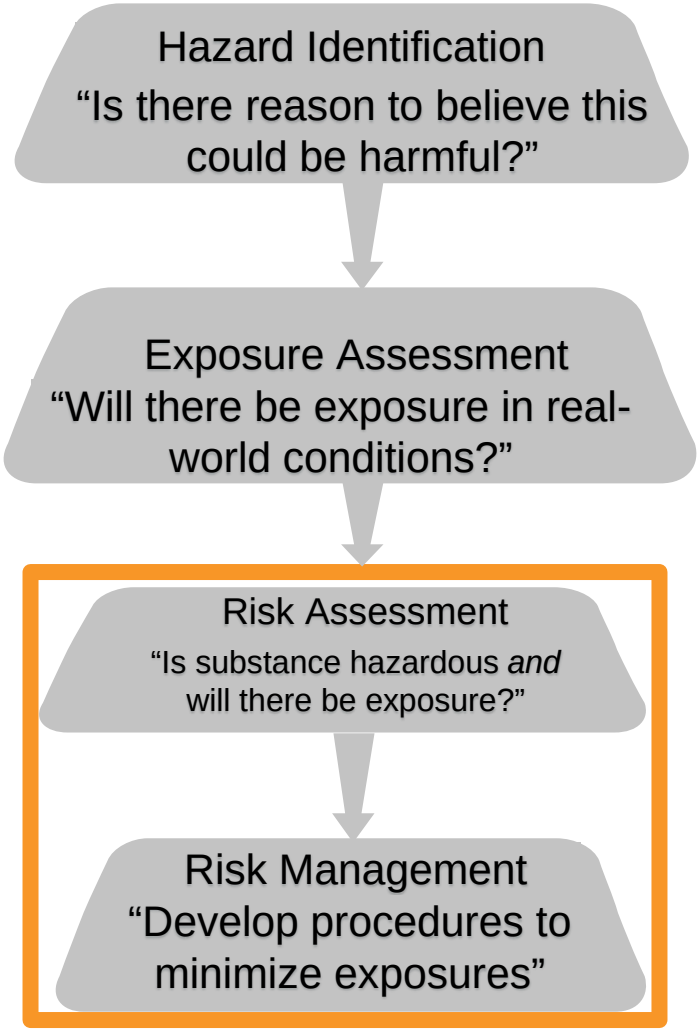
- 52.1 Million workers estimated exposed to chemicals in their work (Calvert et al 2013)
- From 2011-2015
  - 71,140 illnesses or injuries associated with chemical exposures (BLS 2011-2015)
  - 4,836 chemical-related fatalities (BLS 2011-2015)

- Difficult to estimate number of chronic diseases: cancer, pulmonary, cardiovascular, neurologic related to chemicals
  - 2–8% of cancers attributed to occupational exposures (Purdue et al 2015)
  - Severe underestimation has been identified

NIOSH conducts extensive research on chemical hazards and exposure in most every Division, Laboratory, and Office.

The focus of this presentation is on risk assessment and risk management.

Focus of the presentation: Risk Assessment and Management of Chemicals



Current NIOSH Risk Assessment and Management Activities for Chemicals

- Current Recommended Exposure Limit (REL) Development Efforts
- Chemical Carcinogen Policy
- Risk Assessment Practices
- Nanoparticles/Advanced Manufacturing
- Development of IDLH values and Skin Notation Profiles
- NIOSH Pocket Guide/Manual of Analytic Methods
- Respiratory Protective Devices
- Occupational Exposure Banding
- Prevention through Design/Green Chemistry
- Exposome/Cumulative Risk Assessment
- Collaboration on TSCA
- Hazardous Drugs List

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Direction and Authority

NIOSH is mandated by the *OSH Act* (1970)

"…to develop criteria dealing with toxic materials and harmful physical agents and substances which will ***describe exposure levels that are safe for various periods of employment****, including but not limited to the exposure levels at which no employee will suffer impaired health or functional capacities or diminished life expectancy as a result of his work experiences."*

[OSH Act, 20 USC 22 (a)(3)]

Current Recommended Exposure Limits (REL) under Development

- Glutaraldehyde—widely used
- 1-Bromopropane—replacement for ‘ozone depleters’
- Manganese—neurobehavioral effects
- Diethanolamine—widely used
- Lead—neurobehavorial effects
- Toluene diisocyanate—sensitizer
- Silver nanoparticles—high volume nanomaterials

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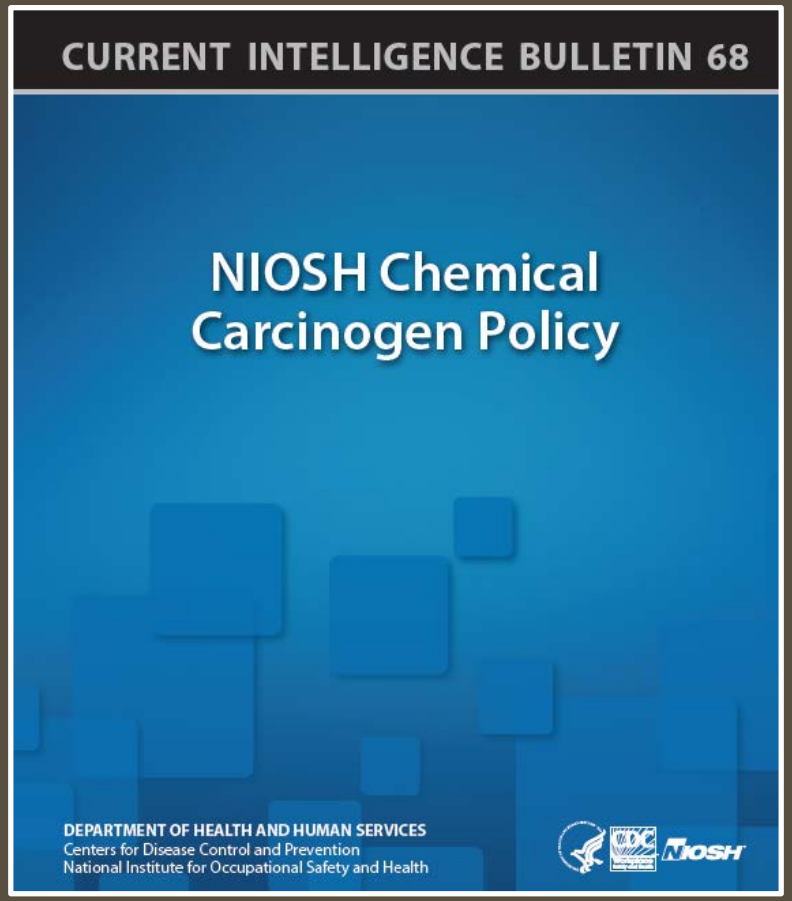
History of NIOSH Chemical Carcinogen Policy

- Prior to 2016 NIOSH labeled known carcinogens “as potential occupational carcinogens”
- Went from recommending exposure limits based on 1/1000 lifetime risk to a new approach


CURRENT INTELLIGENCE BULLETIN 68
NIOSH Chemical Carcinogen Policy
DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health
NIOSH

(2016)

Cancer Policy: Three Key Components

Carcinogen Classification

Carcinogen Risk Management Limit

Analytical feasibility

Summary

Classification

Relies on NTP, EPA, and IARC for carcinogen classification

Risk Management Limit

Sets new terminology (occupational carcinogen and RML-CA)

Risk Management Limit

Changes NIOSH policy on target risk to 1/10,000 as a starting point

Analytic Feasibility

When the LOQ or RQL > 1/10,000 risk level, LOQ or RQL = RML-CA

NTP: National Toxicology Program
EPA: Environmental Protection Agency
IARC: International Agency for Research on Cancer
RML-CA: Risk management limit for carcinogens
LOQ: Limit of quantitation
RQL: Reliable quantitation limit

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Selected History of NIOSH Quantitative Risk Assessment

Agent	Adverse Effect[1]	Dose-response assessment[2]	Risk Characterization	Reference
1,3-butadiene	leukemia	toxicologic, Weibull time-to-tumor regression model, animal to human extrapolation epidemiologic and toxicologic, literature review	extrapolation, excess lifetime risk, target risk unspecified	[Dankovic et al. 1993]
asbestos	lung cancer, asbestosis	epidemiologic, Poisson regression, additive relative rate function (cancer), power function (asbestosis)	extrapolation, excess lifetime risk, target risk unspecified	[Stayneret al. 1997]
cadmium	lung cancer	epidemiologic, Poisson and Cox PH regression, additive relative rate function	extrapolation, excess lifetime risk, target risk unspecified	[Stayneret al. 1992a; Stayneret al. 1992b]
carbon nanotubes and nanofibers	non-malignant adverse lung effects	toxicologic, NOAEL and BMD assessments	PoD/UF	[NIOSH 2013b]
coal mine dust	coal workers' pneumoconiosis, progressive massive fibrosis, pulmonary dysfunction	epidemiologic, logistic and multiple linear regression	extrapolation, excess lifetime risk, target risk unspecified	[Kuempel et al. 1997]
diacetyl and 2,3-pentanedione	pulmonary dysfunction	epidemiologic, linear extrapolation, multiple regression	extrapolation, excess lifetime risk, 10^{-3} target risk	[NIOSH 2016a]
diesel exhaust	lung cancer	toxicologic and epidemiologic (review)	extrapolation, excess lifetime risk, target risk unspecified	[Stayneret al. 1998]

History of NIOSH Quantitative Risk Assessment Continued

Agent	Adverse Effect[1]	Dose-response assessment[2]	Risk Characterization	Reference
EGME, EGEE, EGMEA, EGE	reproduction developmental, hematotoxic effects	toxicologic, NOAEL and LOAEL assessments	PoD/UF	[NIOSH 1991]
hexavalent chromium	lung cancer	epidemiologic, Poisson regression linear ERR model	extrapolation, excess lifetime risk, 10^{-3} target risk	[NIOSH 2013a; Park et al. 2004]
noise	material hearing impairment	epidemiologic, logistic regression	extrapolation, excess lifetime risk with no target risk level specified	[NIOSH 1998; Prince et al. 2003]
radon	lung cancer	epidemiologic, Cox proportional hazards regression	extrapolation, excess lifetime risk, target risk unspecified	[Hornung and Meinhardt 1987; NIOSH 1987]
silica	lung cancer	epidemiologic, Poisson regression, additive relative rate function	extrapolation, excess lifetime risk, target risk unspecified	[Rice et al. 2001]
silica	non-malignant lung disease	epidemiologic, Poisson regression, additive relative rate function	extrapolation, excess lifetime risk, target risk unspecified	[Park et al. 2002]
titanium dioxide	lung cancer	toxicologic, nonlinear extrapolation, BMD model averaging quantal endpoint	extrapolation, excess lifetime risk, 10^{-3} target risk	[NIOSH 2011]

1. Analysis may have considered multiple adverse effects. The adverse effect shown in the table was selected as the primary effect for the risk assessment.
2. The dose-response assessment refers to the primary source supporting final models and/or recommendations on risk-based exposure limits.

Abbreviations: BMD, benchmark dose; EGEE, ethylene glycol monoethyl ether; EGEEA, ethylene glycol monoethyl ether acetate; EGME, ethylene glycol monomethyl ether; EGME, ethylene glycol monomethyl ether acetate; ERR, excess relative rate; LOAEL, lowest observable adverse effect level; NOAEL, no observable adverse effect level; PH, proportional hazards; PoD, point of departure, UF, uncertainty factor.

(DRAFT) NIOSH Practices in Occupational Risk Assessment

National Institute for Occupational Safety and Health

June 6, 2018

Posted for public comment
https://www.regulations.gov
Enter CDC 2018-0060 in search field

NIOSH Practices In Occupational Risk Assessment

Contents

- Problem Formulation
- Hazard Identification
- Dose-response assessment
- Dosimetry Adjustments for Human Equivalent Concentrations
- Risk Characterization
- Appendices
  - Sources of Errors
  - Emerging Practices

May serve as a major resource for the field

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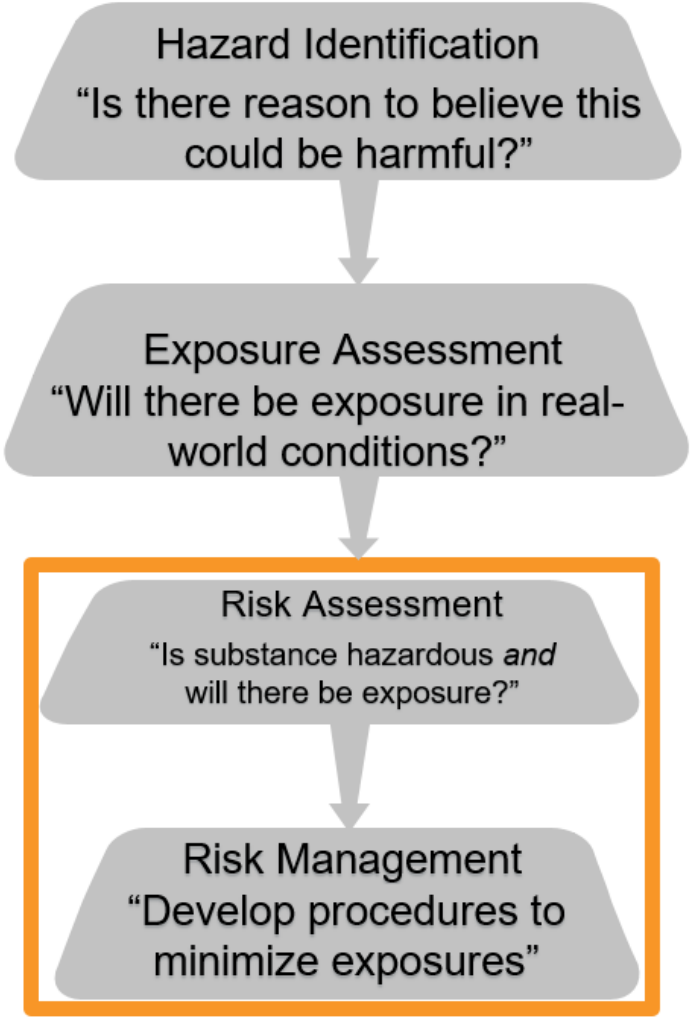
Concerns about Nanoparticles

- Small particles may be more toxic than large particles
- Vast explosion of the technology in early 2000s
- Wide use of nanomaterials in high volumes in commerce
- Many organizations worldwide issued cautionary reports
- Critical need for guidance

Key NanOEH Questions

- Are they hazardous?
- Is there exposure?
- What is the risk?
- Can they be controlled?



Approaches to Safe Nanotechnology

Managing the Health and Safety Concerns Associated with Engineered Nanomaterials

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

CURRENT STRATEGIES FOR ENGINEERING CONTROLS IN

Nanomaterial Production and Downstream Handling Processes

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

NIOSH

CDC
Workplace Safety and Health

Current Intelligence Bulletin 60

Interim Guidance for Medical Screening and Hazard Surveillance for Workers Potentially Exposed to Engineered Nanoparticles

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
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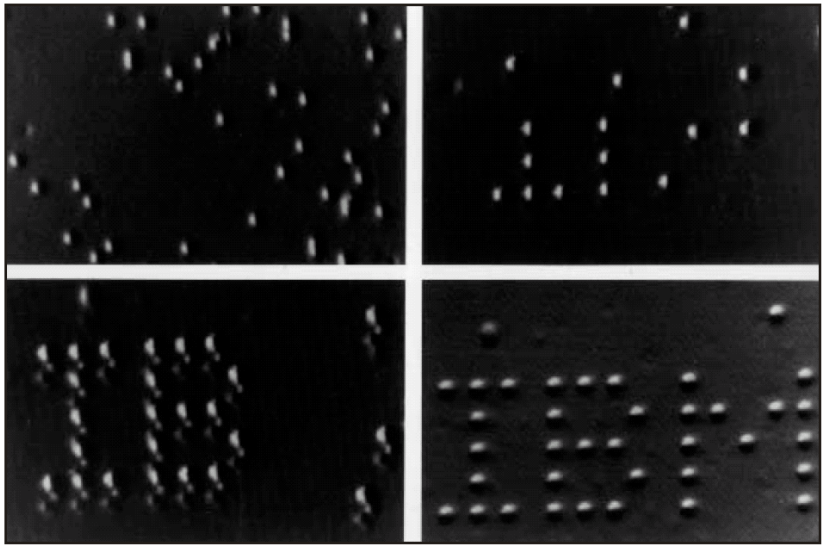
NIOSH

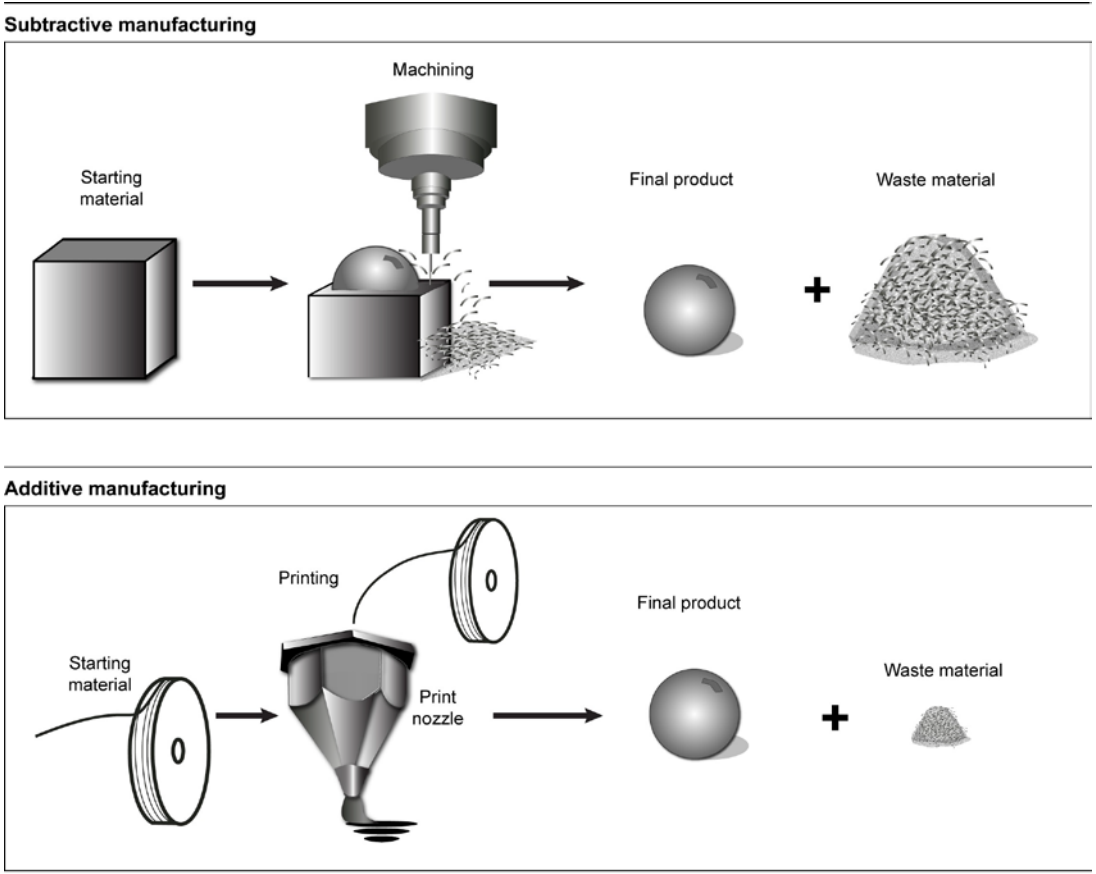
Potential Revolution in Manufacturing

- See and manipulate one atom at a time – building molecular tools
  - Using 35 Xenon atoms to spell out a logo
- Copy nature – mimic self replication



Source: IBM Research

Rapid shift in manufacturing technology



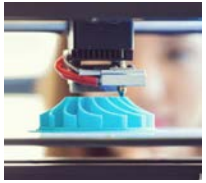
Sources: GAO (analysis); Art Explosion (images). | GAO-15-505SP

Materials and hazards in additive manufacturing

Polymers	Acrylonitrile-butadiene-styrene
	Polylactic acid
	Propylene fumarate
	Poly(vinyl alcohol)
	Polystyrene
Solvents	Dimethyl fumarate
	Isopropanol
	Acetone
	Methyl Ethyl Ketone
	2-Butanone
Metals	Ti-6Al-4V
	IN 625 & IN 718 (Ni, Cr)
	17-4 PH stainless steel
	Cobalt chromium
Nanomaterials	nFe (steel sintering)
	nAg (sintering, conductivity)
	nCB, CNT (conductivity, stiffness, tensile strength)
	$nSiO_x$ (polymer strength)

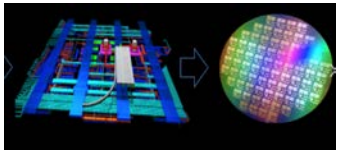
- Particle Emissions
- Outgassing/VOC Emissions
- Dermal Toxicity
- Reactivity
- Flammability
- Combustibility
- *Process-induced changes*
- *Specific formulation*

Additive Manufacturing



3D Printing

Functional Fabrics



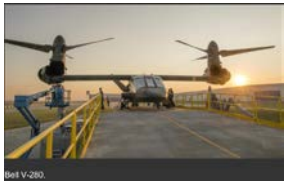
Photonics

Flexible Sensors

Advanced Manufacturing

Robotics

Light Weighting



Advanced Composites

Clean Energy

Engineered Biology

Some processes and some products.

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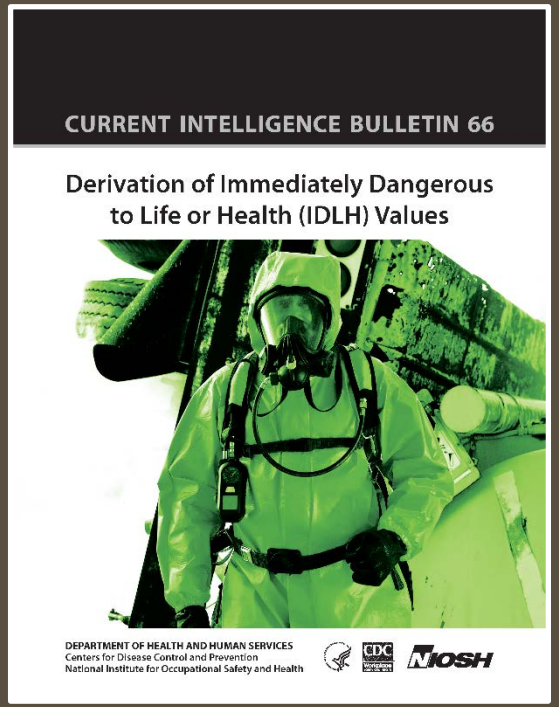
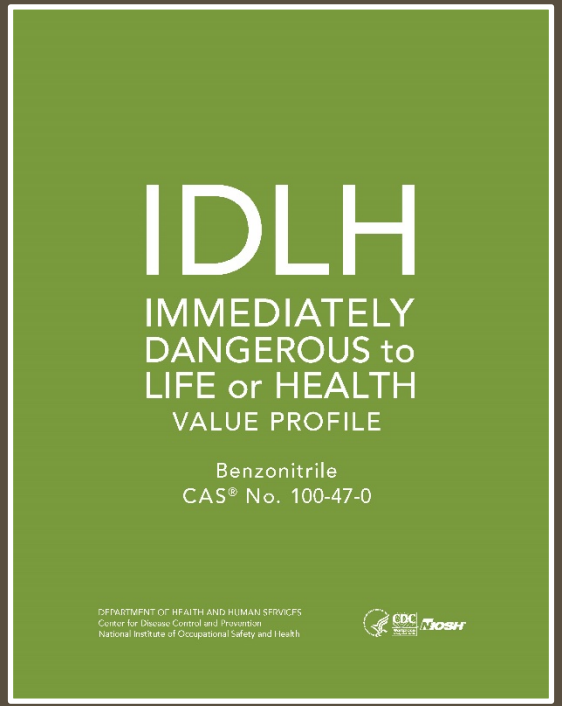
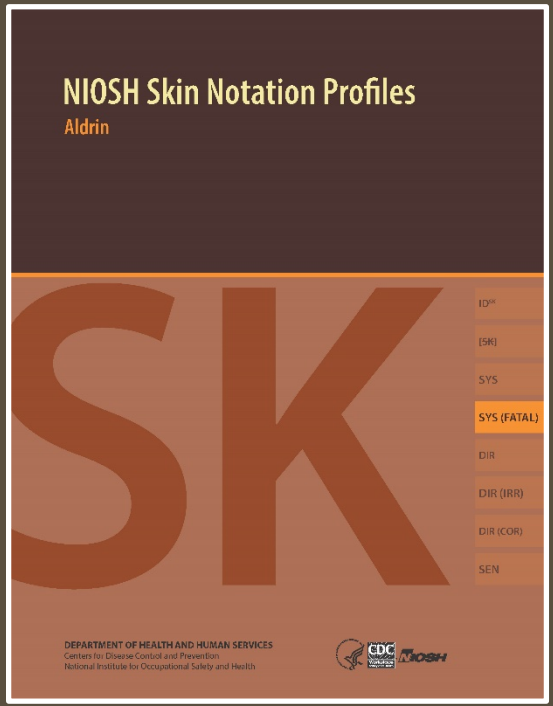
Immediately Dangerous To Life or Health (IDLH) Values/Skin Notations







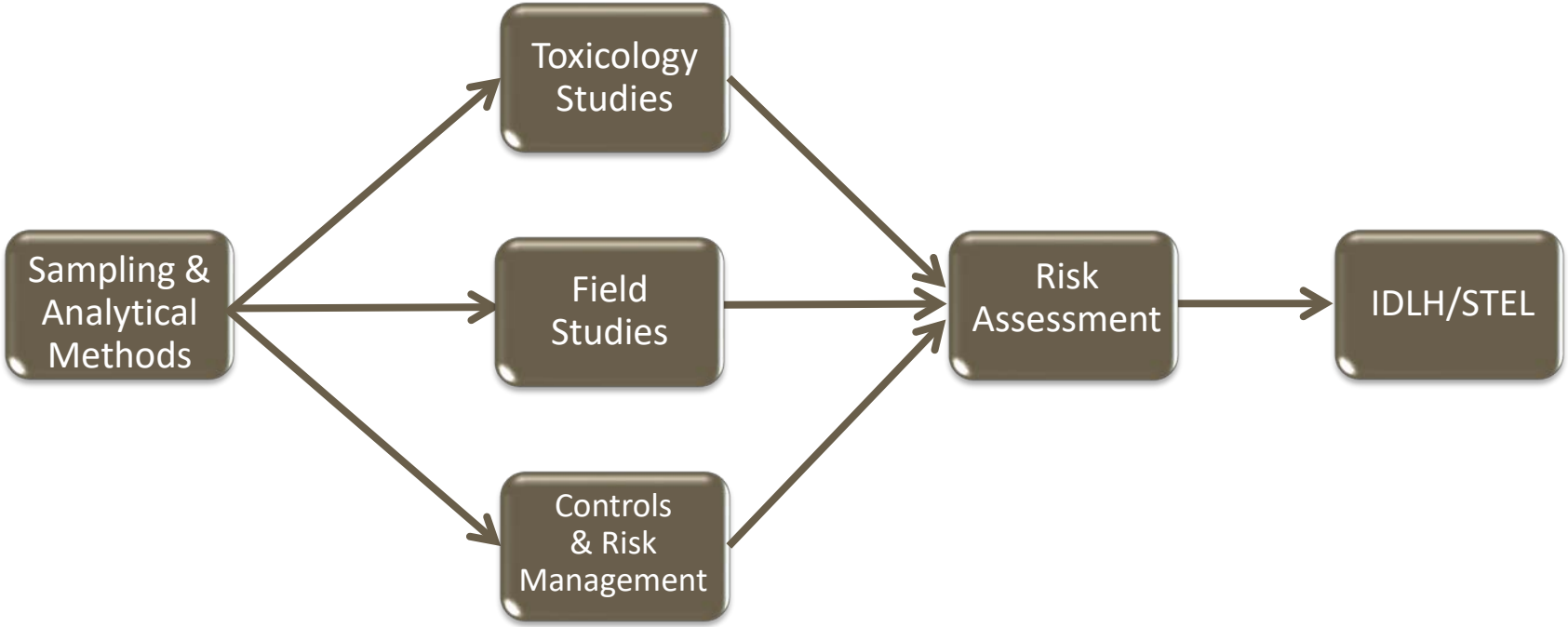
Values to inform escape from hazardous environments

Skin notations to guide chemical handling

Special project: Development of IDLH for peracetic acid

- Limited data to develop an IDLH
- Peracetic acid is crucial for infectious agent control in food supply (poultry processing) and hospitals

NIOSH Project To Develop an IDLH* For Peracetic Acid



*IDLH: Immediately Dangerous to Life and Health

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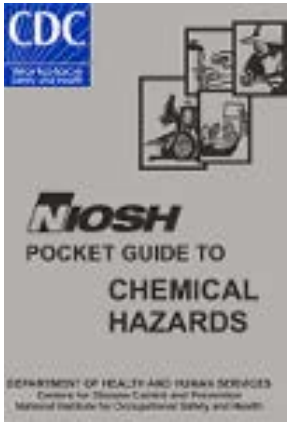
NIOSH Pocket Guide and NIOSH Manual of Analytic Methods

- Two of NIOSH's most influential publications

NIOSH Pocket Guide

- Since 1974



NIOSH Manual of Analytic Methods

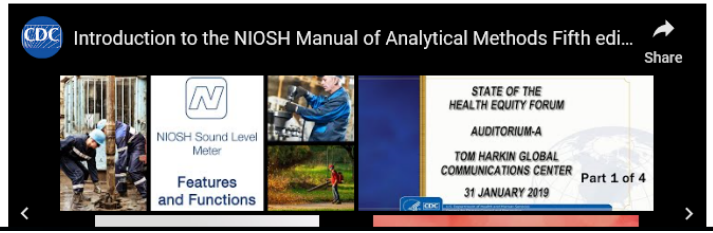
Promoting productive workplaces through safety and health research NIOSH

NIOSH Manual of Analytical Methods (NMAM) 5th Edition

NMAM

NMAM is a collection of methods for sampling and analysis of contaminants in workplace air, surfaces, and in the blood and urine of workers who are occupationally exposed. These methods have been developed or adapted by NIOSH or its partners and have been evaluated according to established experimental protocols and performance criteria. NMAM also includes chapters on quality assurance, sampling, portable instrumentation, etc.

NIOSH recommends that the best method available be used for making each measurement. Methods published by others, such as OSHA, MSHA, EPA, ASTM, ISO or commercial suppliers of sampling and analytical equipment, may have advantages over NIOSH methods for a given sampling situation. (An Industrial Hygienist should determine the sampling protocol, considering analytical accuracy, cost, and optimum sample number.) Every method should undergo an initial evaluation to demonstrate performance. When a method is used in a laboratory that did not perform the initial evaluation, that laboratory should verify that comparable results can be obtained. NIOSH methods may need to be modified, and if modified, should be re-evaluated. Various OSHA regulations (e.g. benzene) mention performance criteria for evaluating whatever method is



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NIOSH issues approvals for chemical and particulate hazards

- NIOSH evaluates some applications for Chemical Hazards
  - Ammonia (AM)
  - Chlorine (CL)
  - Chlorine Dioxide (CD)
  - Chloroacetophenone (CN)
  - Chlorobenzylidene Malononitril (CS)
  - Sulfur Dioxide (SD)
  - Formaldehyde (FM)
  - Hydrogen Chloride (HC)
  - Hydrogen Sulfide (HS)
  - Hydrogen Fluoride (HF)
  - Methylamine (MA)
  - Organic Vapors (OV)
  - Phosphine (PH)
  - CBRN
  - Others as requested

NIOSH Hazard Assessment for CBRN Respiratory Protection

- NIOSH uses 11 test representative agents (TRAs) from 7 Chemical Families to evaluate Chemical, Biological, Radiological, and Nuclear air-purifying respirators (CBRN APRs)
- NIOSH periodically evaluates emerging CBRN threats—informed by intelligence agencies—to ensure current TRAs/Chemical Families remain representative of potential CBRN threats so that CBRN APRs remain protective for emergency responders
- CBRN Hazard Assessment completed in 2018—partnered with DoD and DHS
  - 204 chemicals and 46 radioisotopes evaluated against NIOSH's current TRAs
  - Example evaluation criteria: chemical/physical properties and anticipated canister filtration behavior
  - 6 chemicals tested against 6 different NIOSH-approved CBRN canister models
  - 2018 Hazard Assessment conclusion: NIOSH's current TRAs and Chemical Families remain representative of all identified CBRN threats; no change to NIOSH CBRN APR standard at this time.

Current NIOSH Risk Assessment and Management Activities for Respiratory Protection – NIOSH Pocket Guide

- Respirator recommendations for chemicals
- Based on
  - Assigned protection factors
  - Immediately dangerous to life or health
  - NIOSH Carcinogen Policy
  - NIOSH REL
  - NIOSH Selection Logic

Silica, crystalline (as respirable dust)

Respirator Recommendations

NIOSH

Up to 0.5 mg/m³:
(APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100.
Click here for information on selection of N, R, or P filters.

Up to 1.25 mg/m³:
(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 2.5 mg/m³:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter

Up to 25 mg/m³:
(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

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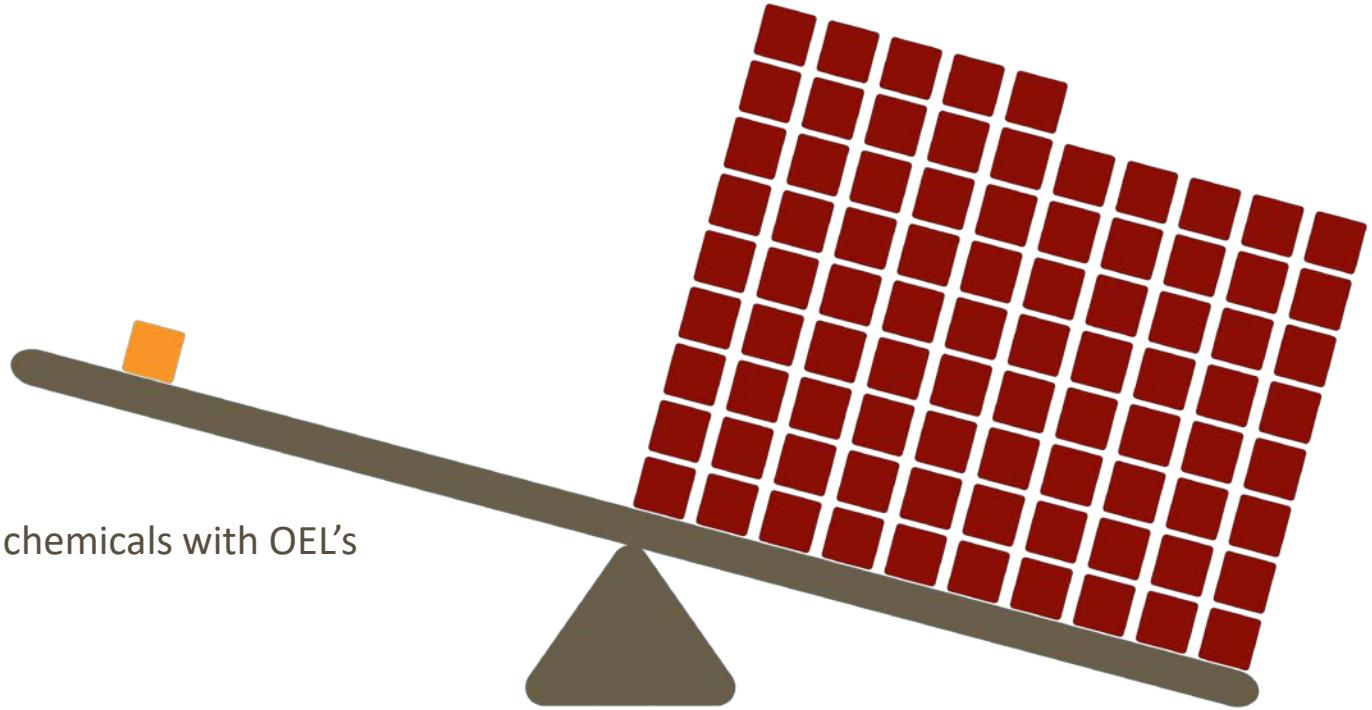
Few chemicals have occupational exposure limits (OELs)



Number of chemicals with OEL's

Number of chemicals in commerce

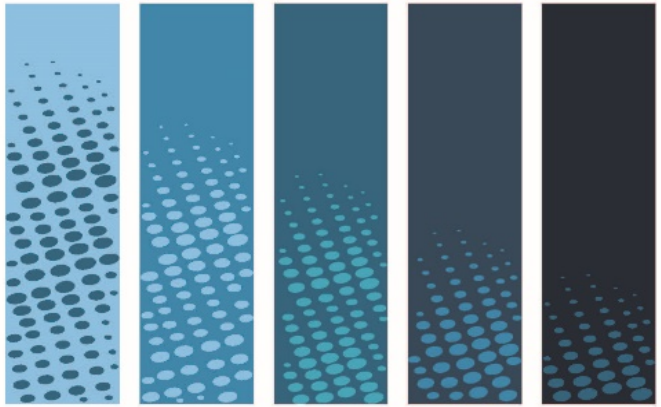
Occupational Exposure Banding

Document Objective

To create a consistent and documented process to characterize chemical hazards so timely and well-informed risk management decisions can be made for chemicals lacking OELs.

CURRENT INTELLIGENCE BULLETIN 69

The NIOSH Occupational Exposure Banding Process for Chemical Risk Management



Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

What is Occupational Exposure Banding?

A mechanism to quickly and accurately assign chemicals into “categories” or “bands” based on their health outcomes and potency considerations

Higher Concentrations

Lower Concentrations

Proposed NIOSH Occupational Exposure Bands

Occupational Exposure Band	Airborne Target Range for Particulate Concentration (mg/m^3)	Airborne Target Range for Gas or Vapor Concentration (ppm)
A	$>10 mg/m^3$	>100 ppm
B	>1 to 10 mg/m^3	>10 to 100 ppm
C	>0.1 to 1 mg/m^3	>1 to10 ppm
D	>0.01 to 0.1 mg/m^3	>0.1 to 1 ppm
E	$\leqslant 0.01\ mg/m^3$	≤ 0.1 ppm

IMPORTANT POINT

An OEB is not meant to replace an OEL, rather it serves as a starting point to inform risk management decisions.

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Prevention through Design

- Design out hazards
- Includes designing out chemical hazards

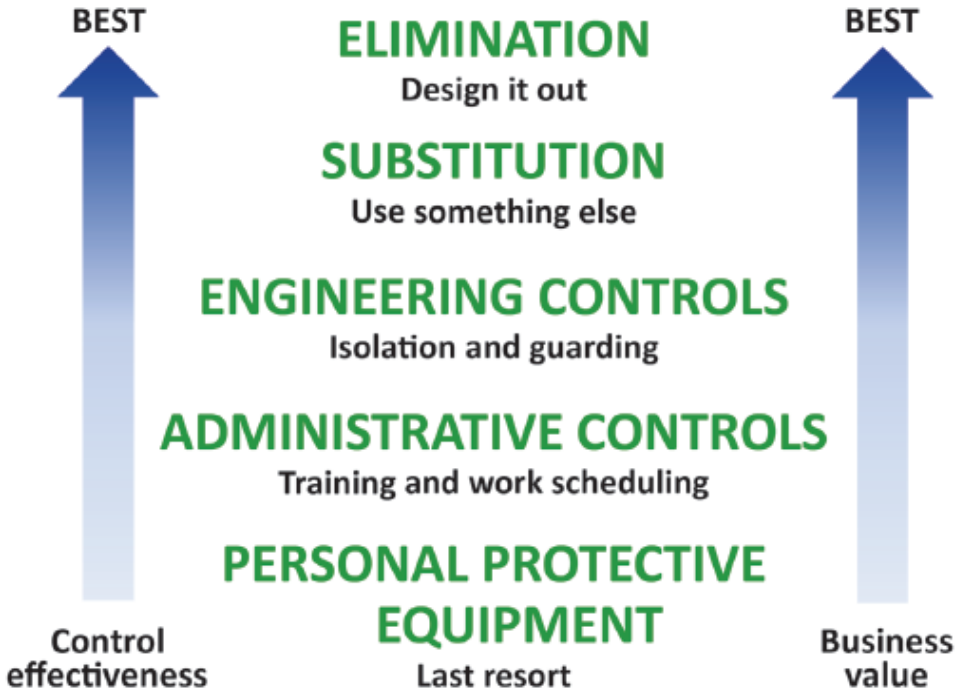
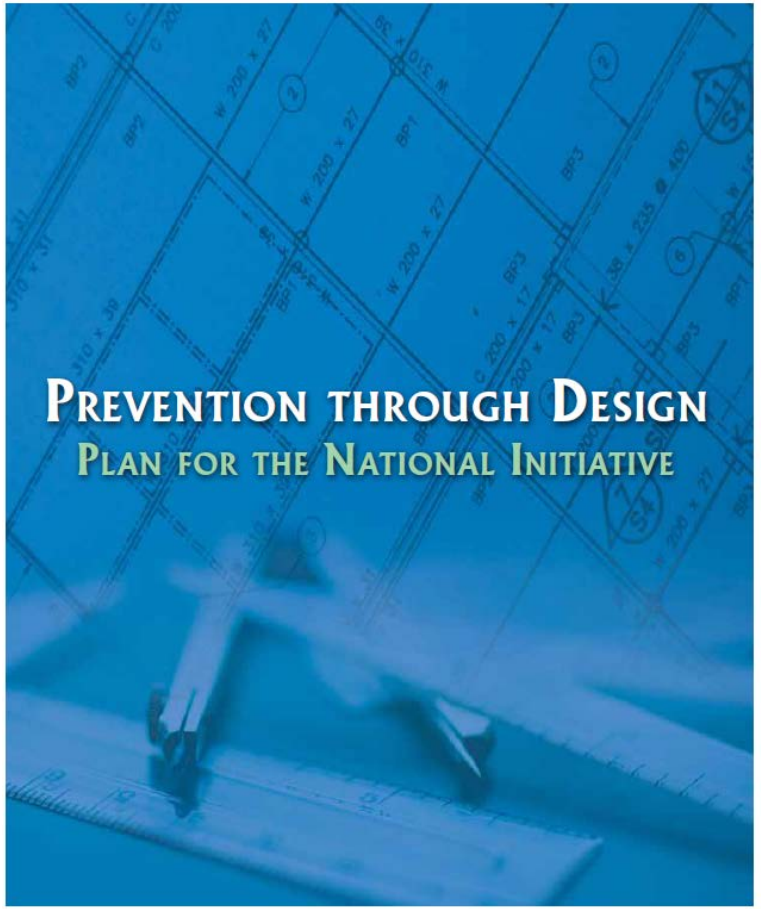


Figure 1. Prevention through Design using hierarchy of controls [Peterson 1973].



Prevention through Design

Plan for the National Initiative

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

The State of the National Initiative on Prevention through Design

PROGRESS REPORT 2014

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

Examples of designing out chemical hazards

- Highway Asphalt paver fume control
- Asphalt warm-mix
- Interagency Chemical Alternative Assessment
- Molecule to market (nanoparticle examples)
- Altered chemistry of ceramic fibers

ENGINEERING CONTROL GUIDELINES FOR HOT MIX ASPHALT PAVERS

NIOSH

National Institute for Occupational Safety and Health

PART 1 New Highway-Class Pavers

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Summary of the Making Green Jobs Safe Workshop

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

Current NIOSH Risk Assessment and Management Activities for Chemicals

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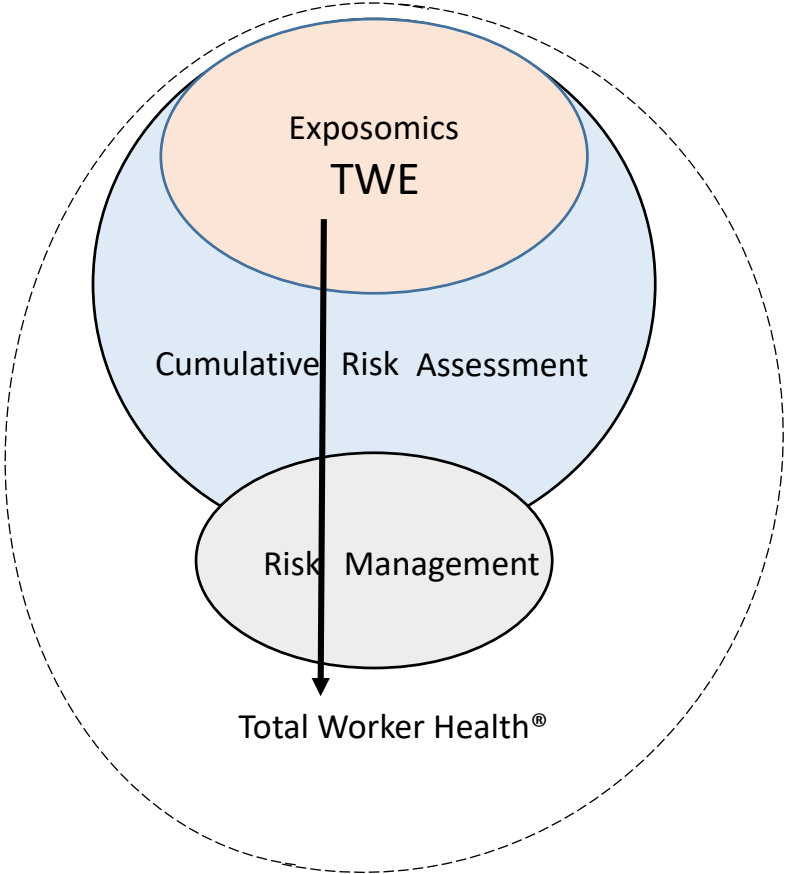
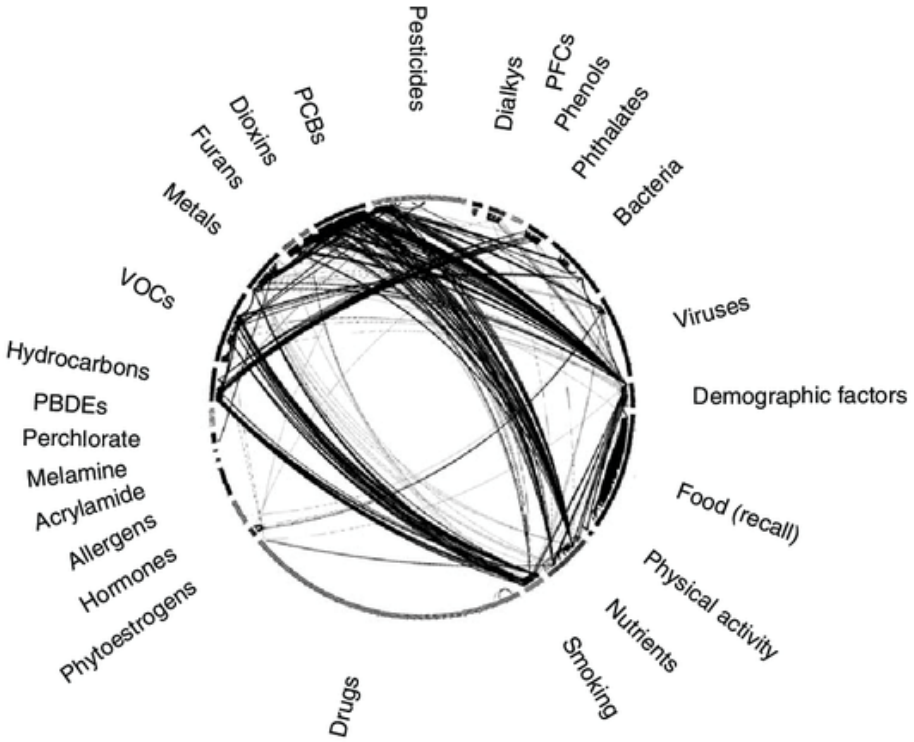
- Occupational Exposure Banding
- Prevention through Design/Green Chemistry
- **Exposome/Cumulative Risk Assessment**
- Collaboration on TSCA
- Hazardous Drugs List

Overview of holistic approaches to protect workers

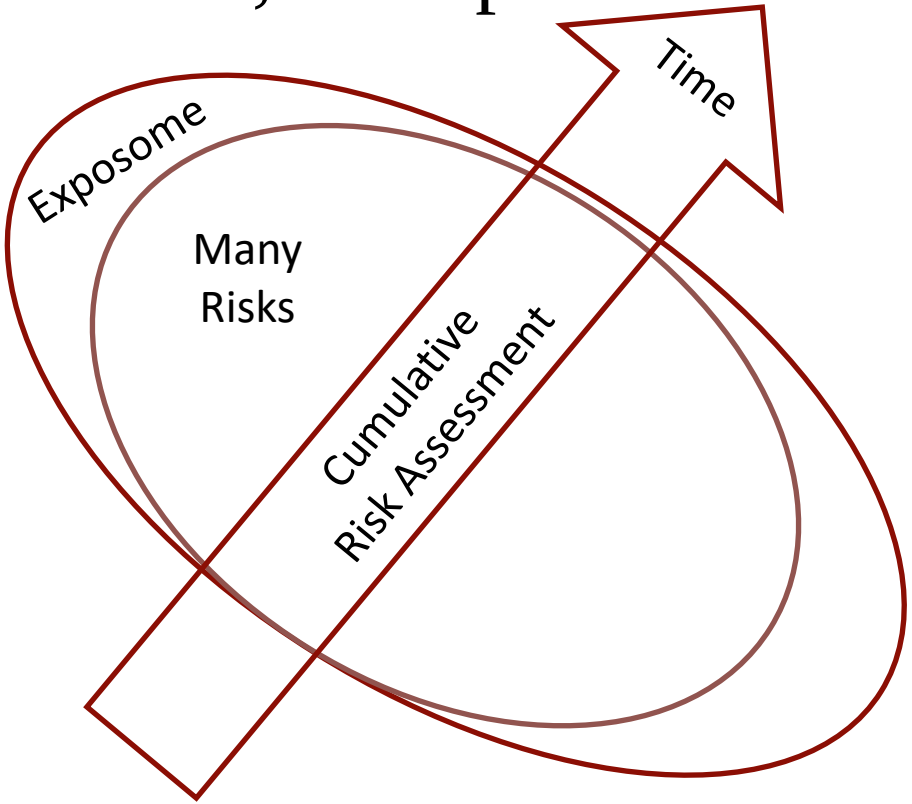


Example of an overall exposome correlation globe



(Adapted from Patel and Manrai, 2015)

Exposome/Cumulative Risk Assessment: multiple risks, multiple times



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Aggregate Exposure and Cumulative Risk Assessment—Integrating Occupational and Non-occupational Risk Factors

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Occupational exposure limits have traditionally focused on preventing morbidity and mortality arising from inhalation exposures to individual chemical stressors in the workplace. While central to occupational risk assessment, occupational exposure limits have limited application as a refined disease prevention tool because they do not account for all of the complexities of the work and non-occupational environments and are based on varying health endpoints. To be of greater utility, occupational exposure limits and other risk management tools could integrate broader consideration of risks from multiple exposure pathways and routes (aggregate risk) as well as the combined risk from exposure to both chemical and non-chemical stressors, within and beyond the workplace, including the possibility that such exposures may cause interactions or modify the toxic effects observed (cumulative risk). Although still at a rudimentary stage in many cases, a variety of methods and tools have been developed or are being used in allied risk assessment fields to incorporate such considerations in the risk assessment process. These approaches, which are collectively referred to as cumulative risk assessment, have potential to be adapted or modified for occupational scenarios and provide a tangible path forward for occupational risk assessment. Accounting for complex exposures in the workplace and the broader risks faced by the individual also requires a more complete consideration of the composite effects of occupational and non-occupational risk factors to fully assess and manage worker health problems. Barriers to integrating these different factors remain, but new and ongoing community-based and worker health-related initiatives may provide mechanisms for identifying and integrating risk from aggregate exposures and cumulative risks from all relevant sources, be they occupational or non-occupational.

Keywords aggregate exposure, cumulative risk, occupational

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INTRODUCTION

Occupational exposure limits (OELs) have traditionally focused on preventing morbidity and mortality arising from inhalation exposures to individual chemical stressors in the workplace. While there are other strategies for pursuing or promoting risk prevention and avoidance of occupational hazards, many of which enhance effectiveness when used in conjunction with OELs, the theme of this manuscript and its accompanying manuscripts pertains specifically to the establishment of OELs and the potential for incorporating new science into this practice. The basis and impetus for OELs

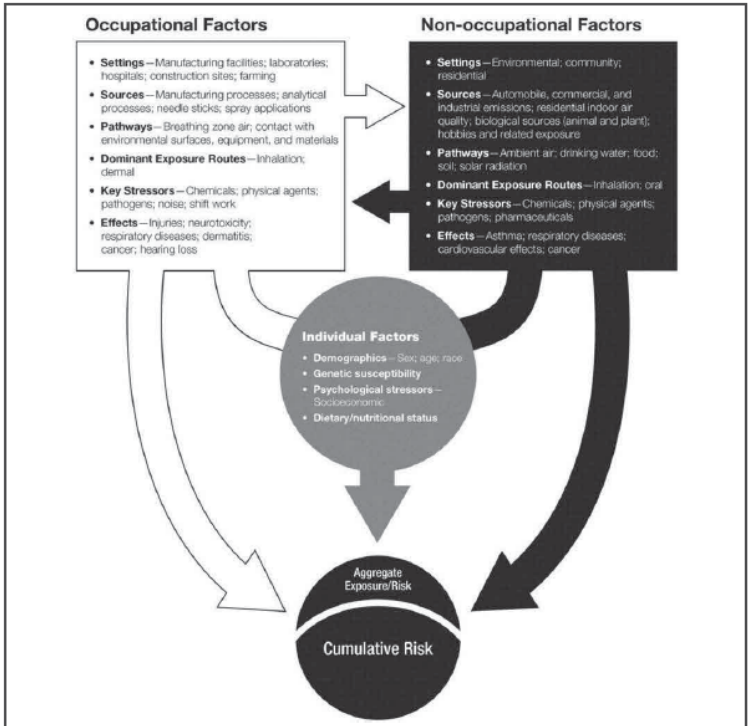

FIGURE 2. Illustration of the relationship between key factors considered in cumulative risk assessment. This figure illustrates key risk factors that may contribute to aggregate and cumulative risk. The primary factors are organized into three categories: (1) occupational factors, (2) non-occupational factors, and (3) individual factors. For each category, examples of the primary settings, sources of risk, exposure routes, key stressors, and effects are included to aid in illustrating considerations that should be included in assessing aggregate and cumulative risk to various hazards.

uncertainties associated with the assessment are described, and estimates of cumulative risk are interpreted in the context of their significance, reliability, and overall confidence. Various approaches are available for addressing the variability and uncertainty in risk estimates including sensitivity analyses and one-dimensional and two-dimensional stochastic analyses such as with Monte Carlo simulation.

With respect to the second phase of cumulative risk assessment, several techniques have been developed to examine environmental and occupational exposures. Three of the more common techniques are (1) exposure monitoring, (2) exposure modeling, and (3) biomonitoring. These methods are intended to provide estimates of the external exposure concentration to which the target population has been exposed or to provide

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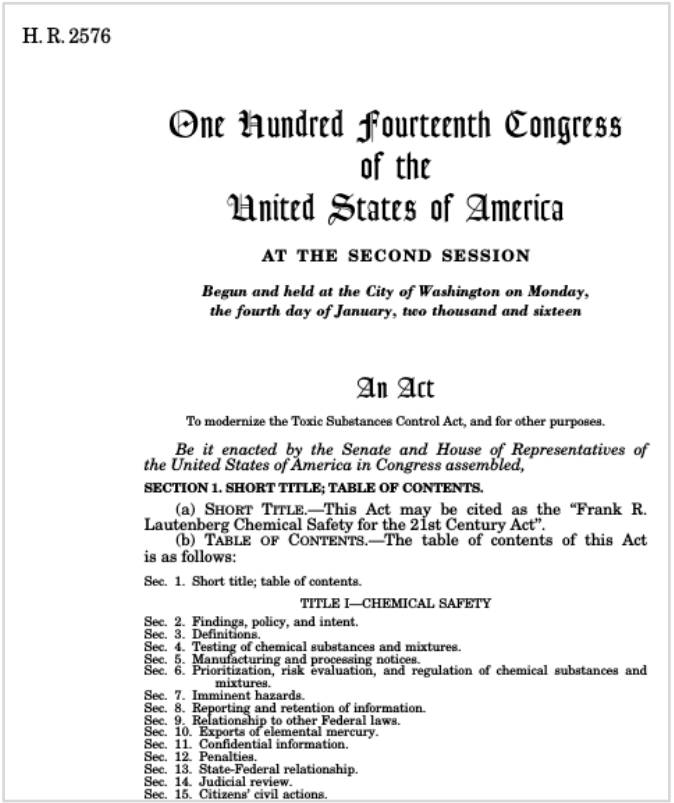
Frank Lautenberg Chemical Safety Act (LCSA) for the 21st Century

- Signed into law June 22, 2016
- Makes significant changes to the Toxic Substance Control Act (TSCA)
- EPA requested NIOSH assistance
- Workers are identified as a "susceptible population."



H. R. 2576

One Hundred Fourteenth Congress
of the
United States of America

AT THE SECOND SESSION

Begun and held at the City of Washington on Monday, the fourth day of January, two thousand and sixteen

An Act

To modernize the Toxic Substances Control Act, and for other purposes.

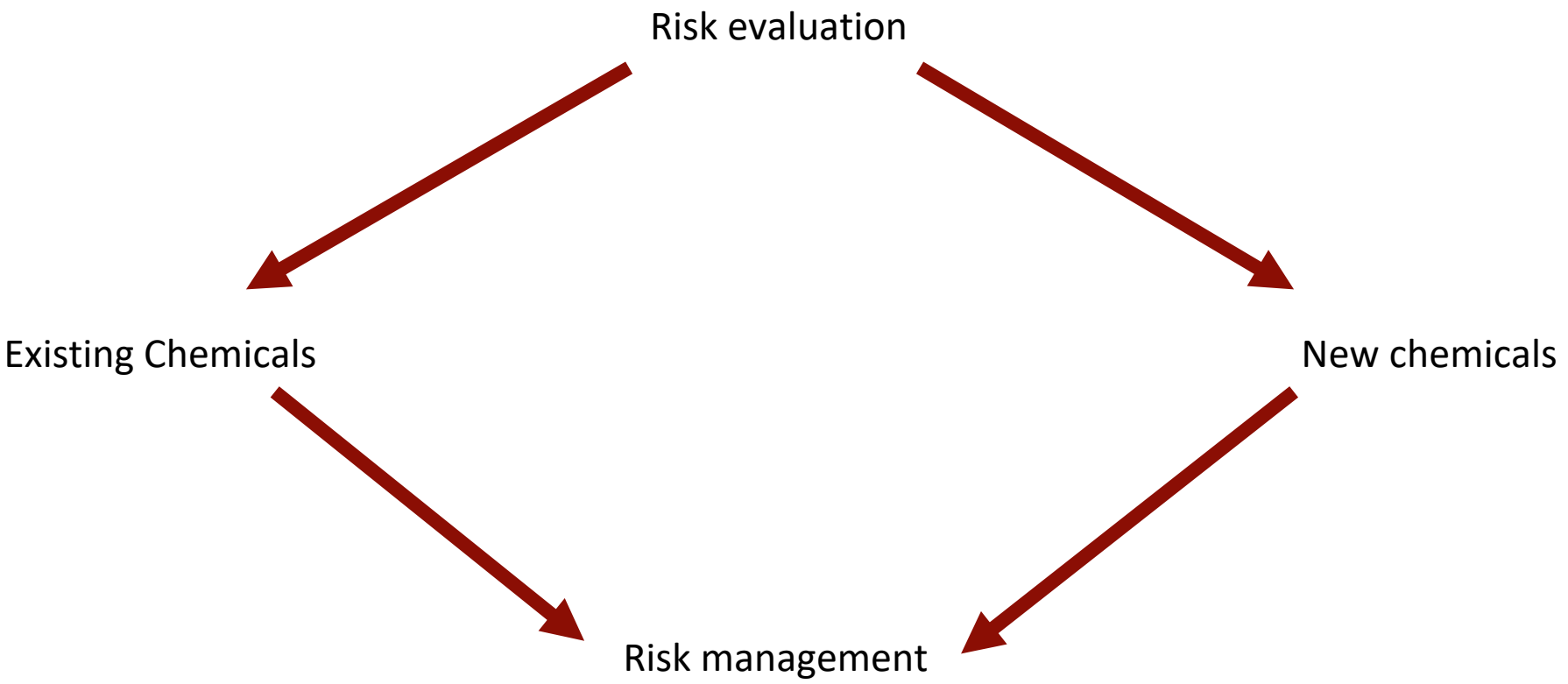
Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

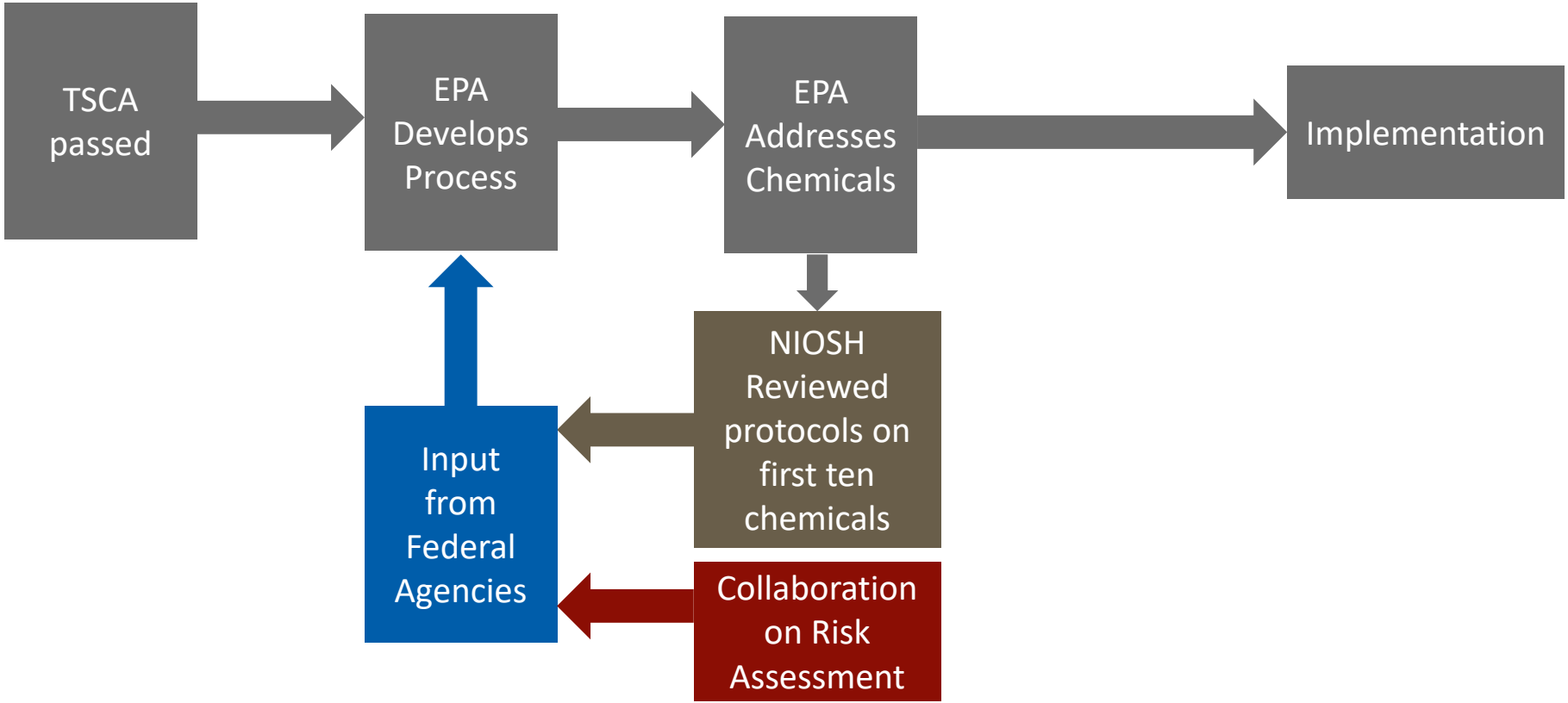
(a) SHORT TITLE.—This Act may be cited as the "Frank R. Lautenberg Chemical Safety for the 21st Century Act".

(b) TABLE OF CONTENTS.—The table of contents of this Act is as follows:

New TSCA Approach



NIOSH Support of EPA in Implementing the Toxic Substances Control Act



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Exposure of workers exposed to hazardous drugs

- Approximately 8 million workers are potentially exposed to hazardous medications in the course of their work
- Exposure may be via inhalation or through direct contact with contaminated sources.

National Institute for Occupational Safety and Health. Medical surveillance for healthcare workers exposed to hazardous drugs, (DHHS (NIOSH) Publication No. 2013-103). Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. Retrieved from http://www.cdc.gov/niosh/docs/wpsolutions/2013-103/pdfs/2013-103.pdf

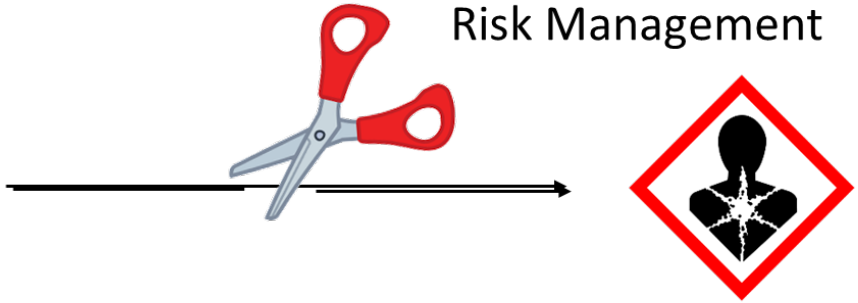
Hazardous Drugs in Healthcare

Healthcare Workers

+

Handling Hazardous Drugs

Risk Assessment and Risk Management



Cancer
Reproductive Health Effects
Others

Managing the risk of handling hazardous drugs

- Policies and Procedures for Developing the NIOSH List of Antineoplastic and other Hazardous Drugs in Healthcare Settings
- NIOSH list of Antineoplastic and other Hazardous Drugs in Health Care Settings, 2018 (Since 2004)
- Table 5, risk management guidance
- Broad partnership with various agencies and organizations

Questions for Board of Scientific Counselors

- What chemical guidance priorities should NIOSH focus on?
- Should NIOSH enhance its chemical guidance efforts?
- What areas of chemical hazards is NIOSH not focusing on but should consider?

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