Health Surveillance

Presentation by Dr Kelvin Wooller at the AFOEM Annual Training Meeting on Saturday 12th May 2018

Session Description

This presentation is designed to provide guidance in the conduct of health surveillance programs in an occupational setting.

Local and international standards and guidelines for Biological Monitoring (also known as Biomonitoring) will be noted.

Environmental issues will be discussed.

Learning Objectives

- Define biological monitoring and its relationship to environmental monitoring (workplace and community).
- Identify sources of occupational exposure standards and guidelines for biological monitoring.
- Understand the dose/response concept.
- Appreciate the practical aspects of specimen collection
- Ensure that understandable advice on the significance of the results of biological monitoring is given to both workers and management.

Health Surveillance

Part 1 Resources and Basic Principles

Keeping your Knowledge Current

- Know your information resources
- Credible quick response to queries from
  - Worker, Union, Management, Community
  - Government
  - Medical Defence
  - ‘Fake News’

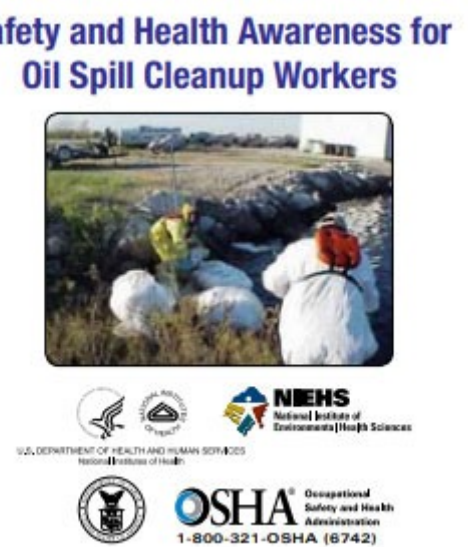
Sign protesting use of toxic "Corexit" chemical dispersant in the BP Gulf of Mexico oil disaster

Management of Worker Exposure

- According to the Deepwater Horizon Response Unified Command's website, as of June 14, 2010, over 1,262,000 gallons of dispersants had been used as part of BP's oil spill clean up efforts

- Risk
  - Human
  - Environment

US Coast Guard



Free Download [PDF]

MSDS for Corexit 9500A [PDF]
MSDS Corexit 9527A [PDF]

OSHA

Online Searching

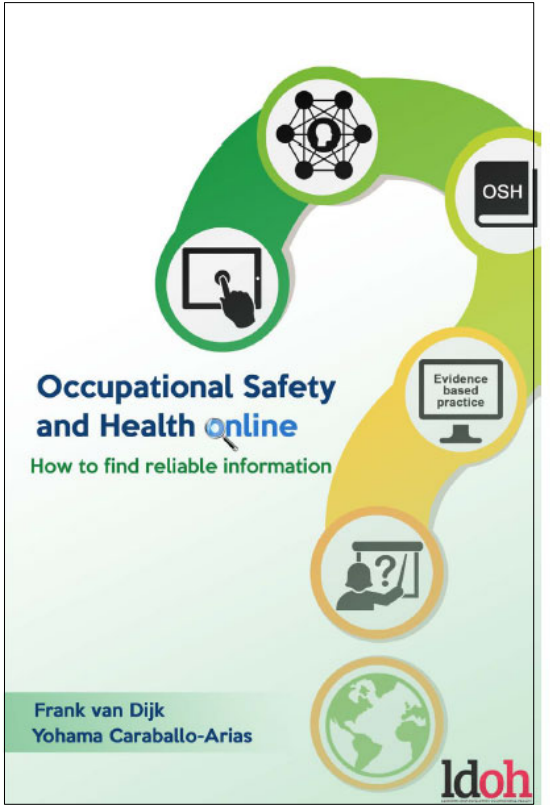
Occupational Safety and Health online
How to find reliable information

Third edition
2016

Free PDF
http://www.ldoh.net/

“carefully written, comprehensive and up-to-date book on how to find reliable occupational health and safety information online”.

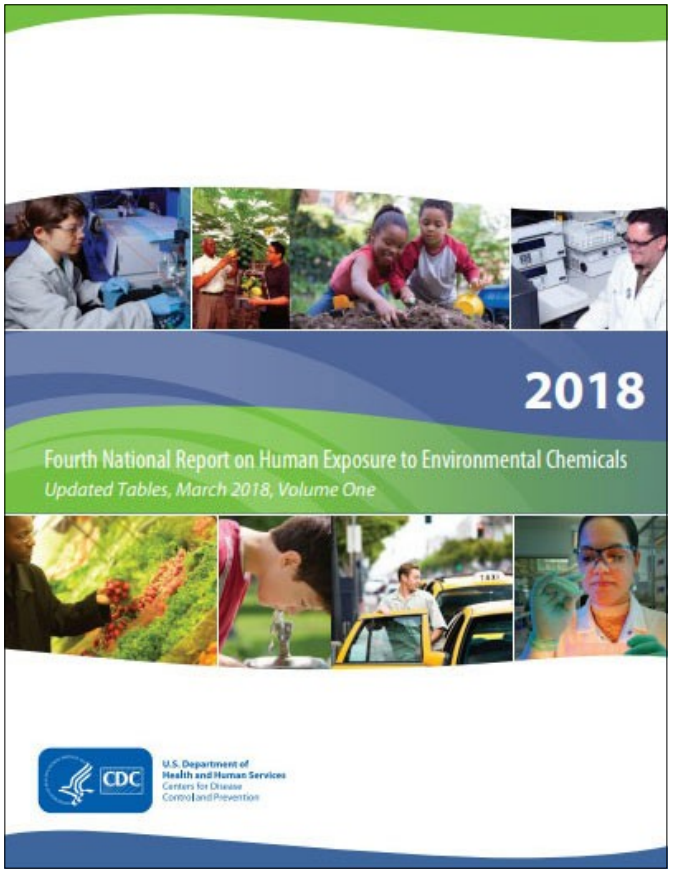
Reviewed in Occupational Medicine February 2018

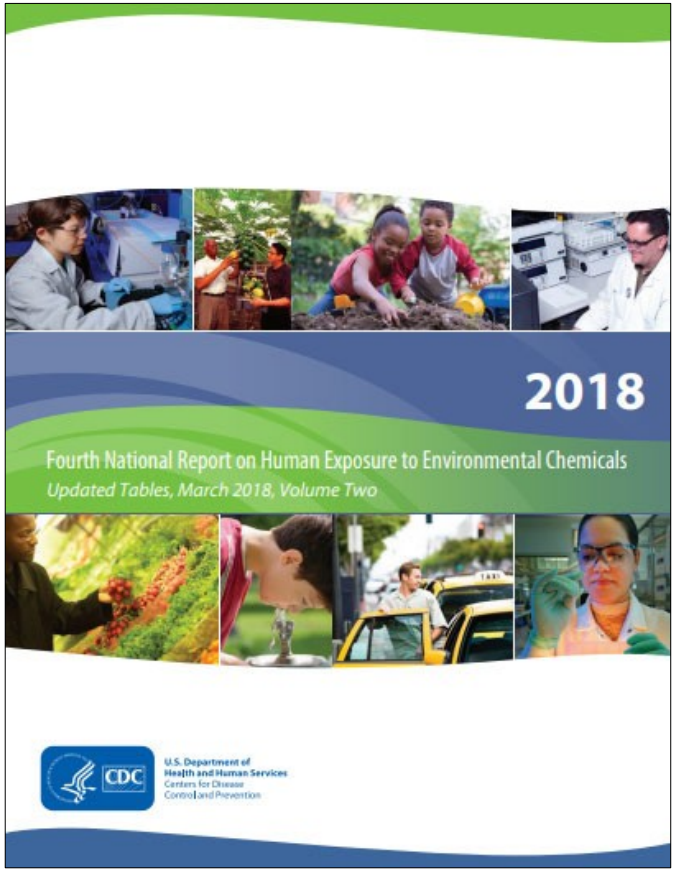


Useful Environmental Resources

- **Fourth National Report on Human Exposure to Environmental Chemicals**
- Updated Tables March 2018

Department of Health and Human Services
Centers for Disease Control and Prevention
National Center for Environmental Health





Useful Literature Resources

Journal of Occupational and Environmental Medicine (ACOEM)

Perspective
USA
Wellness

Occupational Medicine Forum

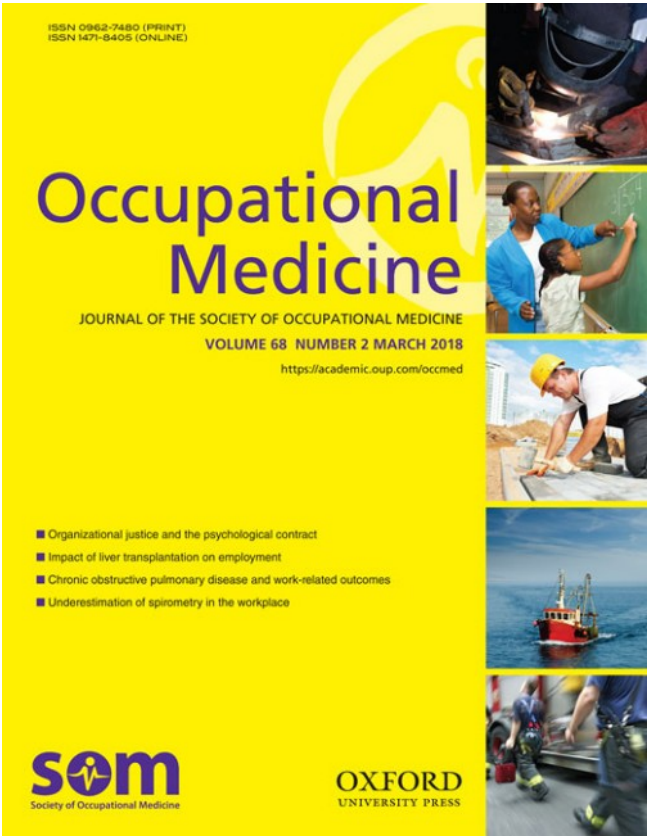
Available
Print
Online

Useful Literature Resources

Journal of the Society of Occupational Medicine

Perspective
European
Australian

Case Reports



Available
Print
Online

Discount
AFOEM

Useful Literature Resources

NIH U.S. National Library of Medicine

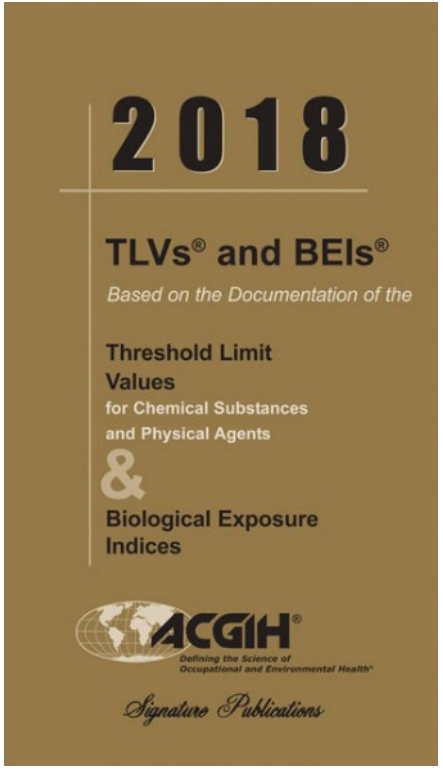
Literature Search

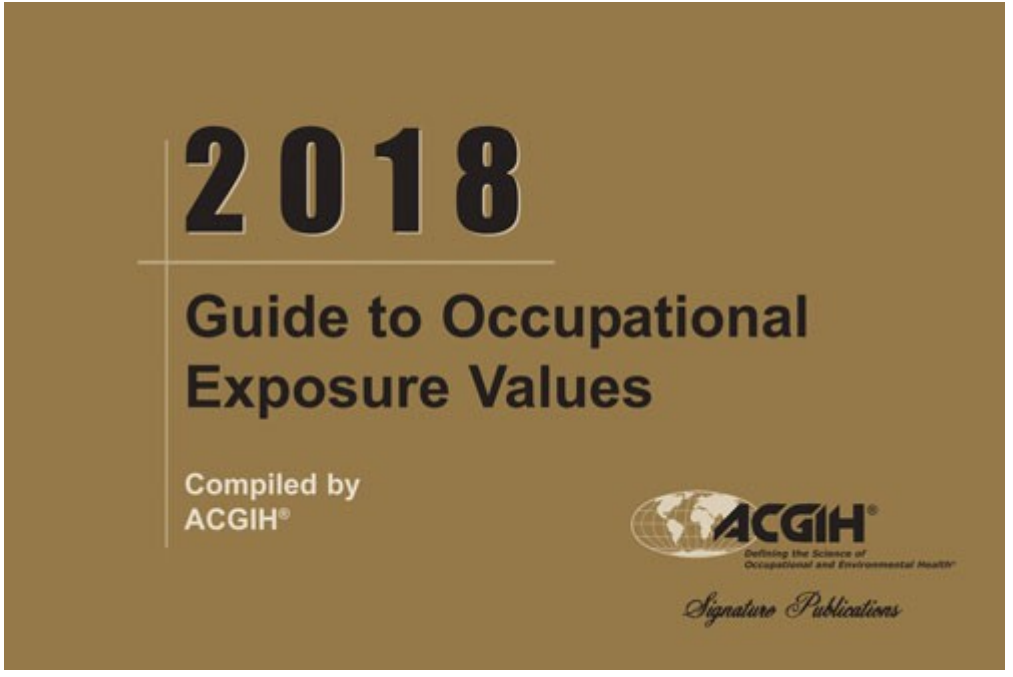
28 million citations biomedical literature

Reading Room

Useful Biological Monitoring Resources

American Conference of Governmental Industrial Hygienists



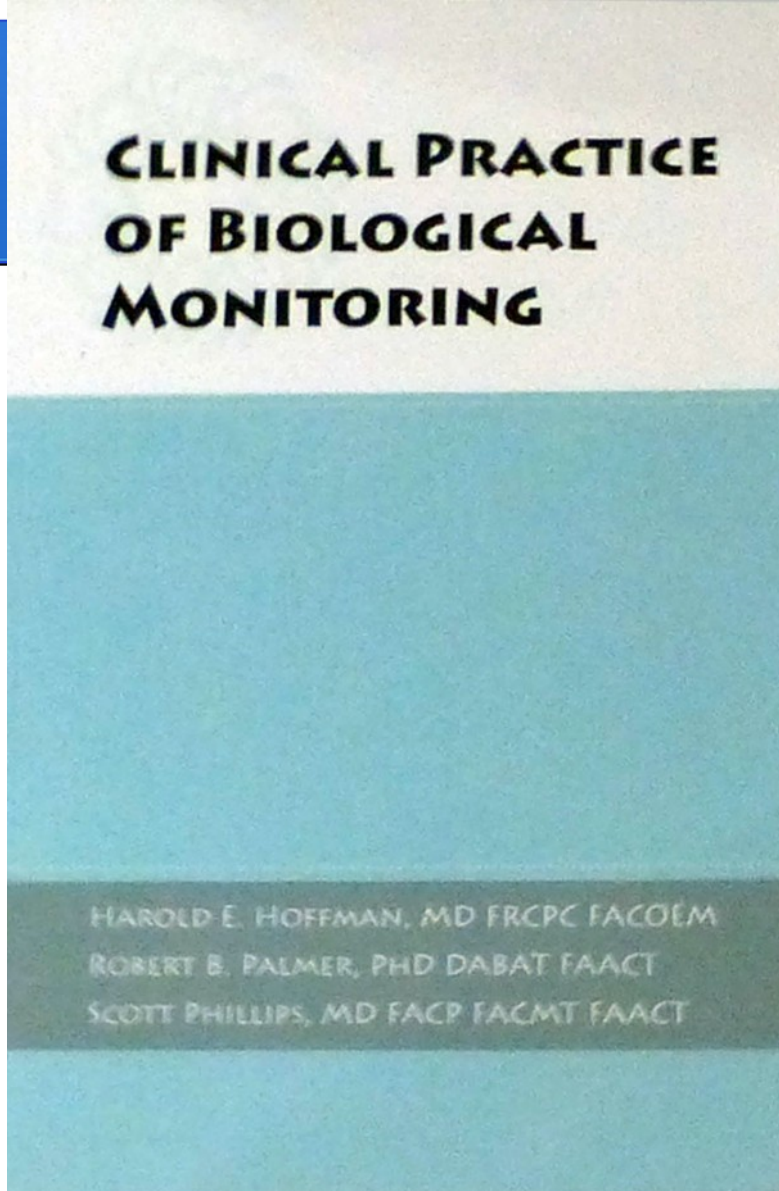


Hard Copy Only

Useful Biological Monitoring Resources

- **Quick reference resource**
- Practical guidance on the selection and interpretation of tests
- Recommendation on best test
- Referenced
- Print or **download**

Edited by Harold E Hoffman, MD,
Scott D Phillips, MD and Robert B Palmer, PhD
OEM Press 2012



Useful Biological Monitoring Resources

German Research Foundation

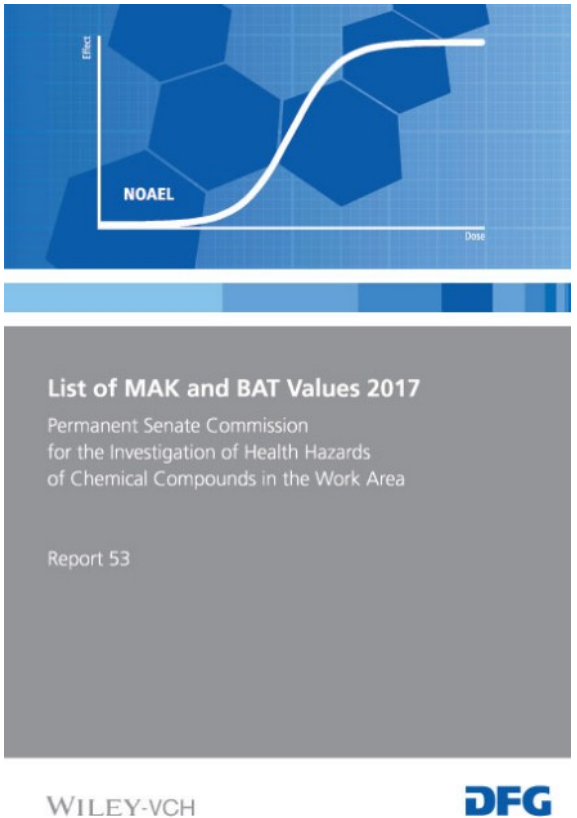
List of MAK and BAT Values 2017

Guidance on Significance and Use of MAK and BAT values

Most comprehensive listings

Includes rationale

Free Download
Wiley Online Library

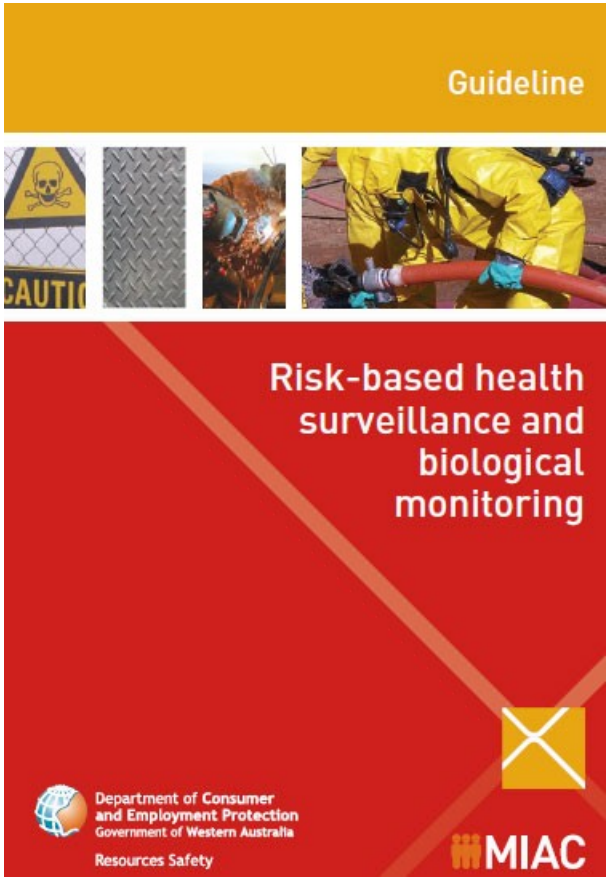


Author(s):Deutsche Forschungsgemeinschaft

Useful Biological Monitoring Resources

- General Biological Monitoring
- Specific Exposures
  - Inorganic lead
  - Metallic mercury
  - Inorganic arsenic
  - Thallium
  - ACGIH BEIs

Department of Consumer and Employment Protection
Government of Western Australia 2008



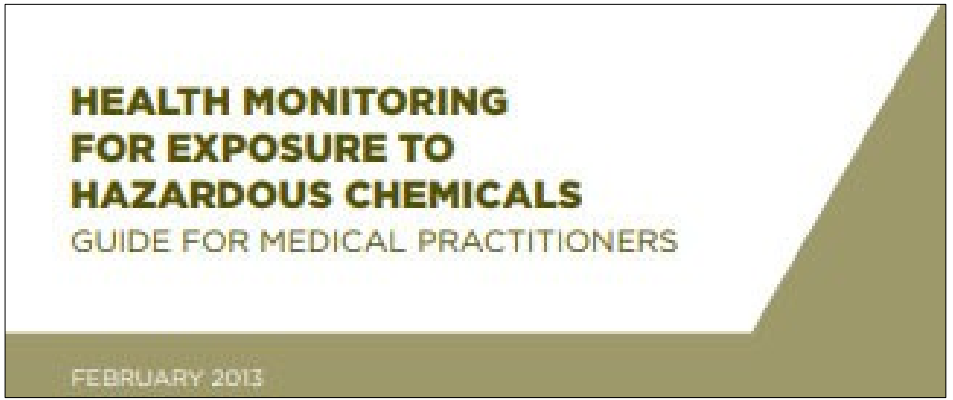
Useful Occupational Resources

safe work australia

Hazardous Chemical Information System (HCIS)

Search Hazardous Chemicals

HSIS Consolidated List



Useful Occupational Resources

Useful Occupational Resources

California Department of Public Health Occupational Health Branch

- Many publications for workers and employers with emphasis on hazards in **agriculture**
- Pesticide Illness Presentation for Physicians
  (with Speaker Notes) (2004)

Brocken Inaglory

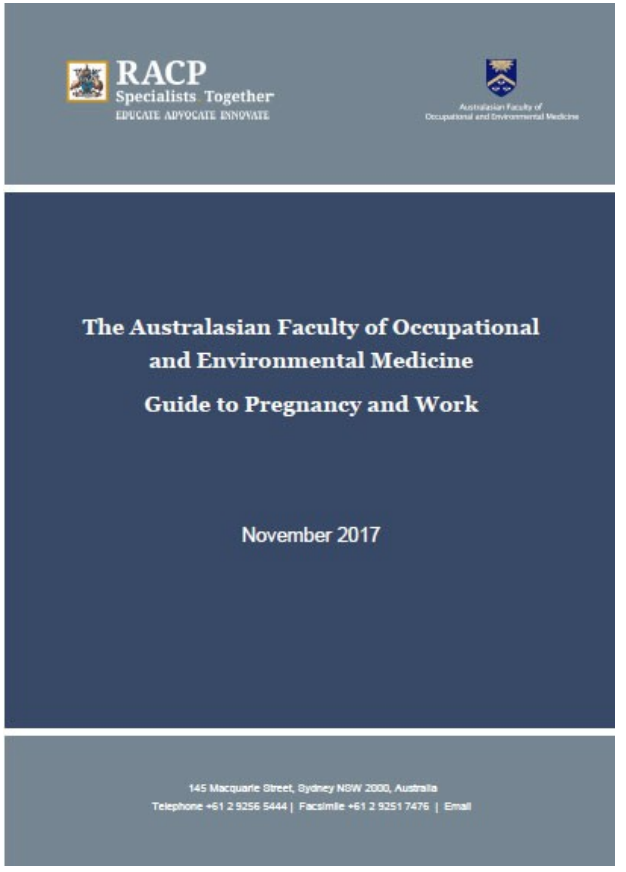
Useful Occupational Resources

- **Guide to Pregnancy and Work**
  - Advice for Pregnant Employees
  - Potential Workplace Hazards
  - Risk Assessment
  - Pregnancy Policies in the Workplace

  AFOEM 2017

- **Reproductive and Developmental Hazard Management**

  ACOEM Guidance Statement 2016



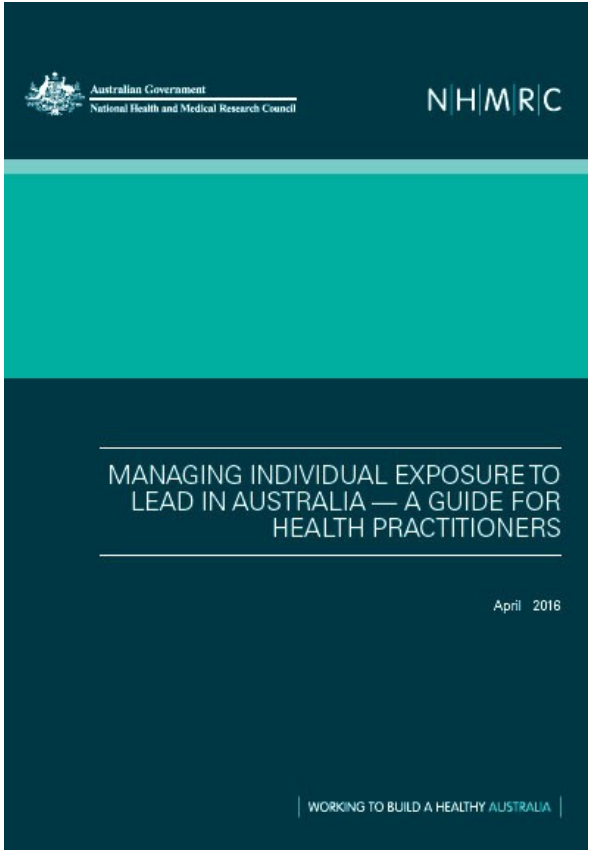
Useful Occupational Resources

- **Managing Individual Exposure to Lead in Australia – A Guide for Health Practitioners**
  - Lead exposure - Health effects
  - Blood lead levels - Testing, managing, prevention

  National Health and Medical Research Council 2016

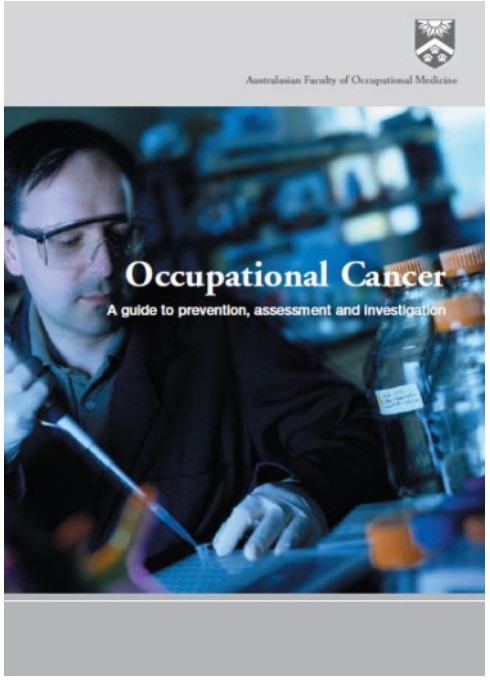
- **Workplace Lead Exposure**

  ACOEM Position Statement 2016



Useful Occupational Resources

- Cancer Epidemiology including Clusters



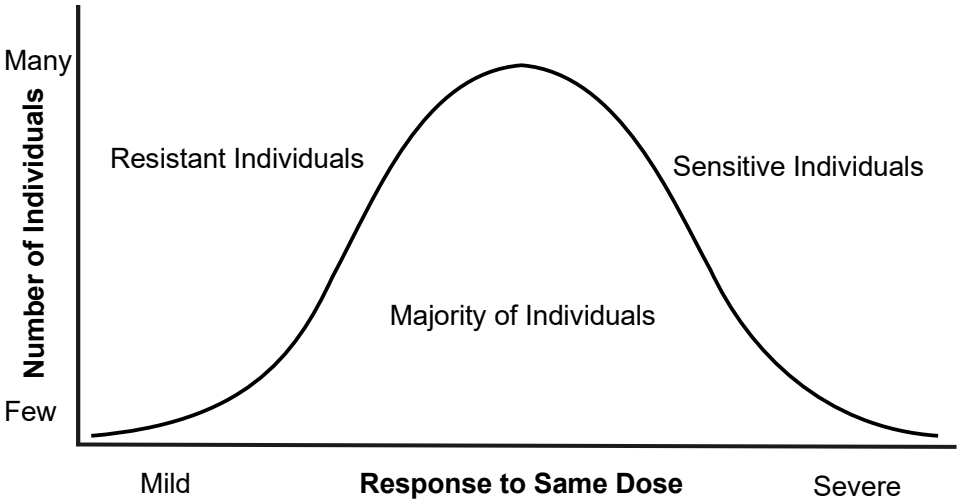
The Australasian Faculty of Occupational Medicine
May 2003

Monograph Series 2015

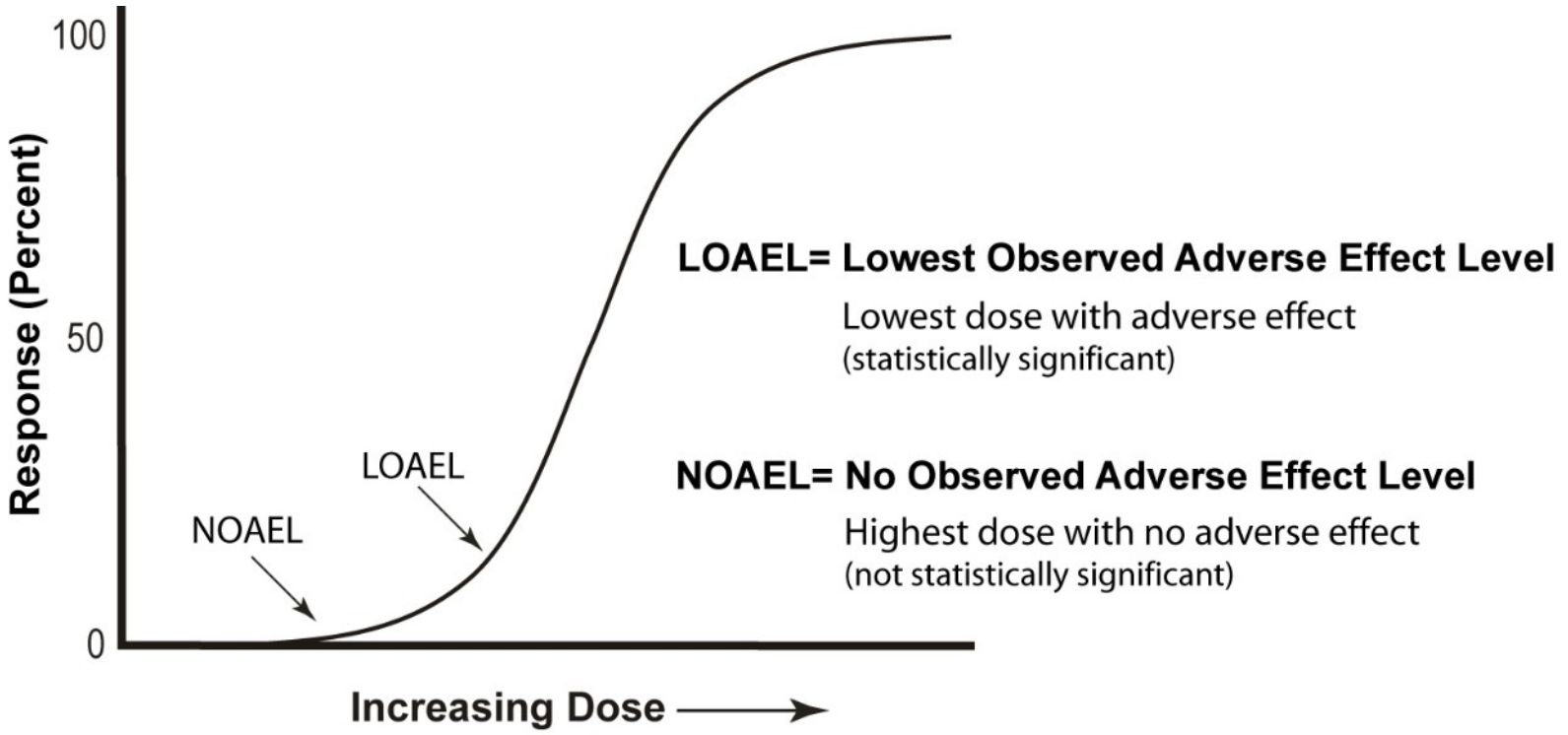
Principles of Toxicology

- Toxicity – Innate Property of a Substance
- Hazard – Potential for Exposure
- Risk – Probability of exposure

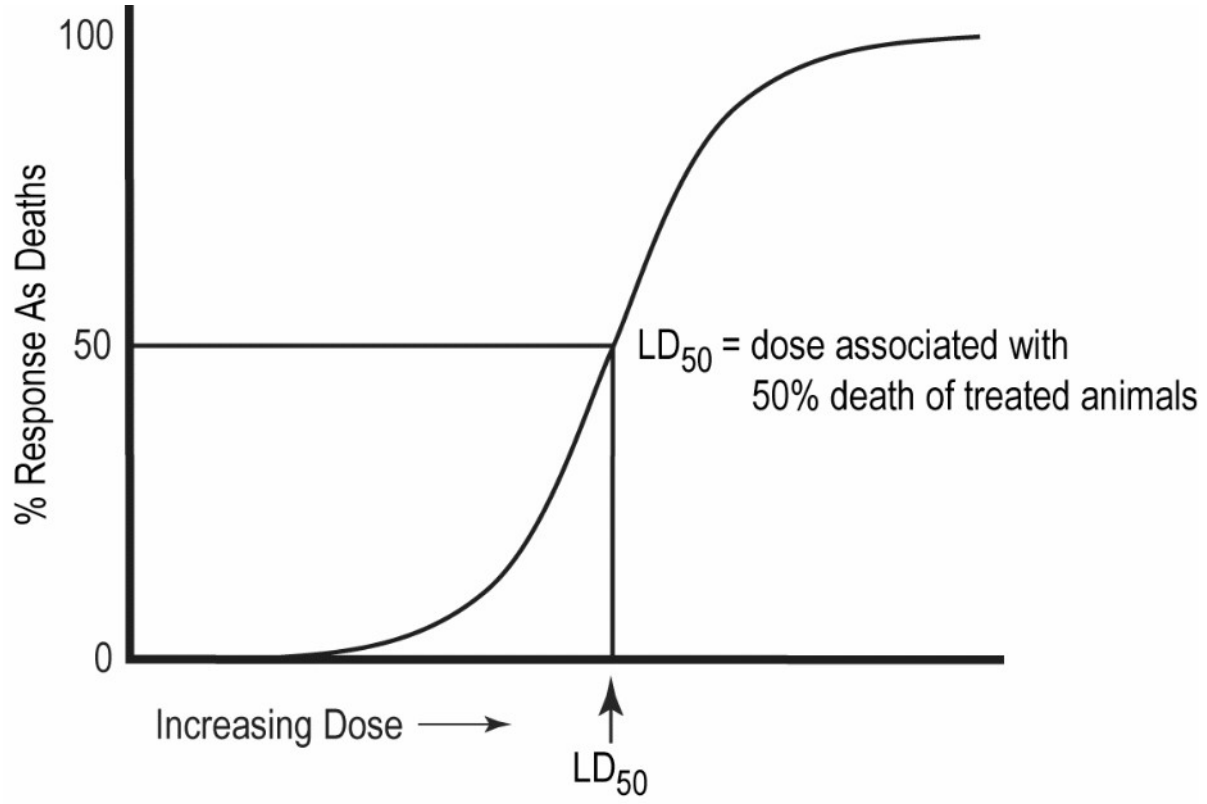
- Individual Variation



Dose and Dose Response

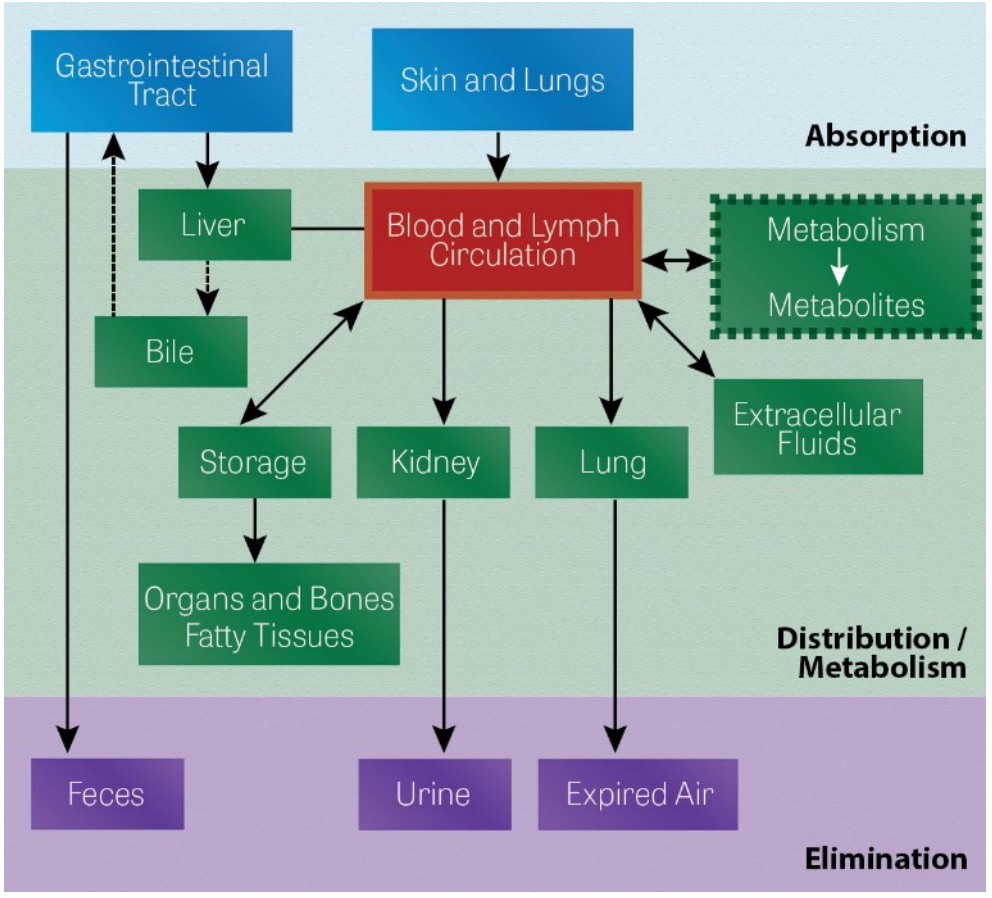


Acute Toxicity - LD_{50}



Toxicokinetics

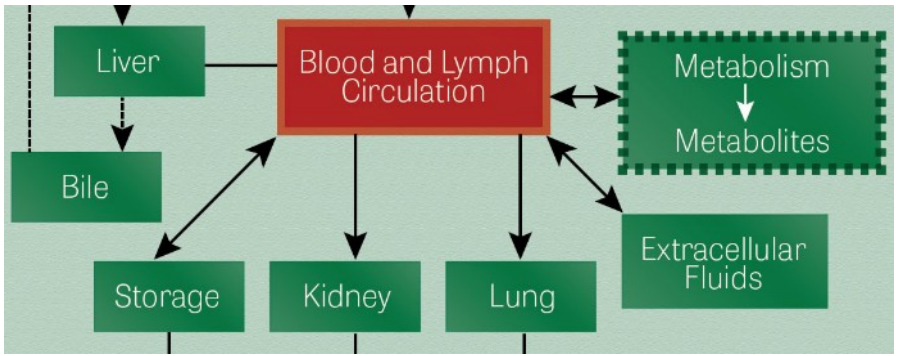
- Absorption
- Distribution
- Metabolism
- Elimination



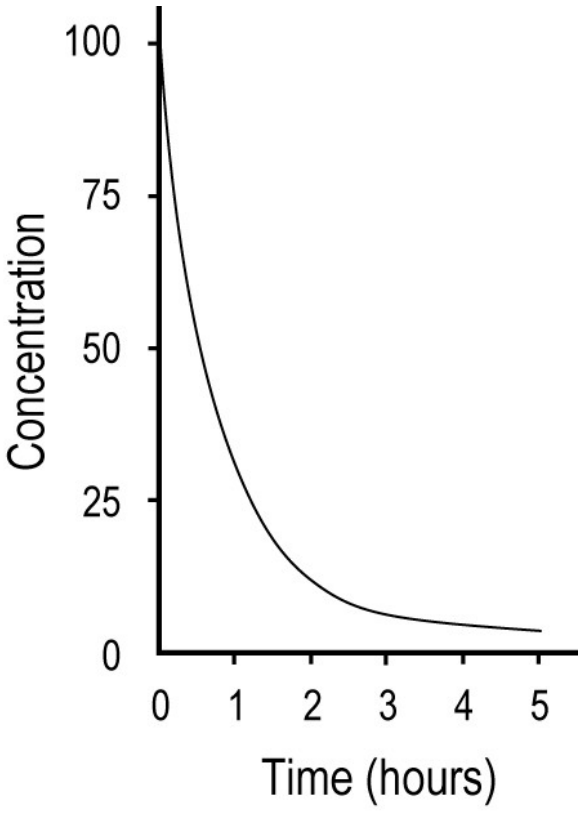
Timing of Specimen Collection

Kinetics of Excretion - ½ Life

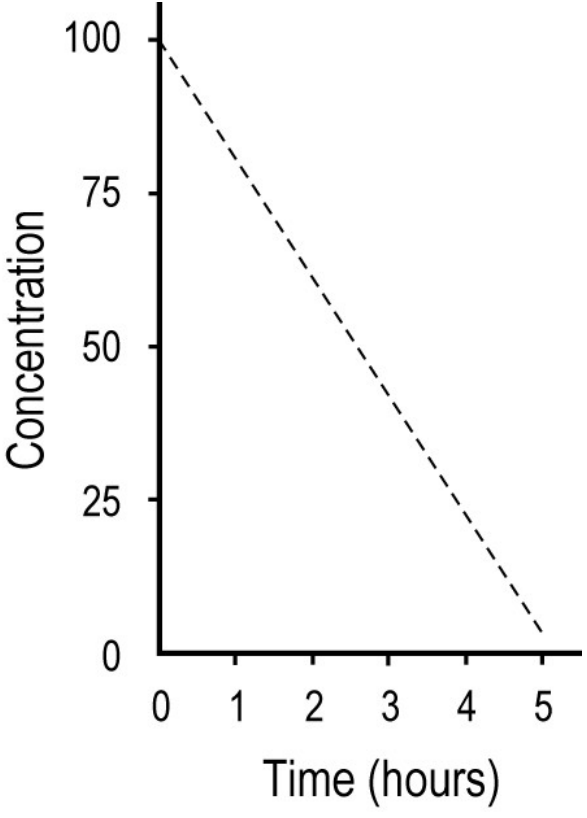
- Whole Body
  - Slow – methyl mercury, lead, cadmium (persistent)
- Expired Air
  - Fast – solvents
- Blood
  - Metabolism, storage
- Urine
  - Reabsorption in the nephron – passive or active process



Elimination Kinetics



First Order



Zero Order

Toxicology Tutorials

NIH U.S. National Library of Medicine
Environmental Health & Toxicology Information

1. Introduction to Toxicology
2. Dose and Dose Response
3. Toxic Effects
4. Interactions
5. Toxicity Testing Methods
6. Risk Assessment
7. Exposure Standards and Guidelines
8. Basic Physiology
9. Introduction to Toxicokinetics
10. Absorption
11. Distribution
12. Biotransformation
13. Excretion
14. Cellular Toxicology
15. Conclusion

Certificate of Tutorial Completion

Searchable Toxicology Databases

HSDB Hazardous Substances Data Bank.
Peer-reviewed toxicology data for over 5,000 hazardous chemicals

TOXLINE
4 million references of effects of drugs and other chemicals

OCCUPATIONAL EXPOSURE TO CHEMICALS
Links jobs and hazardous tasks with occupational diseases and their symptoms

ChemIDplus	Chemical Dictionary
LactMed	Breastfeeding
DART	Developmental and Reproductive Toxicology Database
HOUSEHOLD PRODUCT SAFETY	Household Products Database

Susceptible Populations

- Children
- Pregnant
- Breast feeding
- Impaired
- Older

Story of the Irrawaddy Big Pots

Moving the Big Pots

Loading

Transporting

Making the Big Pots

Big Pots Hazards

Who is at Risk?

At School

At Play

References

Safety and Health Awareness for Oil Spill Cleanup Workers (free download)
National Institute of Environmental Health Sciences
Occupational Safety and Health Administration (OSHA) https://www.osha.gov/Publications/Oil_Spill_Booklet_05.11_v4.pdf

Occupational Safety and Health online: How to find reliable information (free download)
Third edition 2016. http://www.ldoh.net/

Fourth National Report on Human Exposure to Environmental Chemicals (free download)
Updated Tables March 2018 https://www.cdc.gov/exposurereport/index.html

Department of Health and Human Services Centers for Disease Control and Prevention (CDC) See Website
National Center for Environmental Health

Journal of Occupational and Environmental Medicine See Website
American College of Occupational and Environmental Medicine (ACOEM)

Occupational Medicine See Website
Journal of the Society of Occupational Medicine

U.S. National Library of Medicine See Website

TLVs and BEIs: Guide to Occupational Exposure Values
American Conference of Governmental Industrial Hygienists
https://www.acgih.org/forms/store/ProductFormPublic/2018-tlvs-book-and-oev-guide-combo-set

References

Clinical Practice of Biological Monitoring
Eds H Hoffman et al. OEM Press
https://www.oempress.com/category/s?keyword=hoffman

List of MAK and BAT Values 2017 (free download) https://onlinelibrary.wiley.com/doi/pdf/10.1002/9783527812127
German Research Foundation

Risk-based health surveillance and biological monitoring
Department Consumer and Employment Protection http://www.dmp.wa.gov.au/ Search Website
Government of Western Australia 2008

safe work aust https://www.safeworkaustralia.gov.au/ Search Website
Hazardous Chemical Information System (HCIS)
Guidance on the interpretation of workplace exposure standards for airborne contaminants. April 2013
Health monitoring for exposure to hazardous chemicals: guide for medical practitioners. February 2013

The National Institute for Occupational Safety and Health (NIOSH) https://www.cdc.gov/niosh/index.htm See Website

California Department of Public Health https://www.cdph.ca.gov See Website
Occupational Health Branch

Guide to Pregnancy and Work (free download)
https://www.racp.edu.au/docs/default-source/advocacy-library/the-australasian-faculty-of-occupational-and-environmental-medicine-guide-to-pregnancy-and-work.pdf
AFOEM 2017

References

Reproductive and Developmental Hazard Management (free download)
ACOEM Guidance Statement 2016
https://journals.lww.com/joem/fulltext/2016/03000/Reproductive_and_Developmental_Hazard_Management.23.aspx

Managing Individual Exposure to Lead in Australia – A Guide for Health Practitioners (this and other free downloads)
https://www.nhmrc.gov.au/guidelines-publications/eh58
National Health and Medical Research Council 2016

Workplace Lead Exposure (free download)
http://www.acoem.org/uploadedFiles/Public_Affairs/Policies_And_Position_Statements/Guidelines/Position_Statements/Workplace_Lead_Exposure.pdf
ACOEM Position Statement 2016

References

Occupational Cancer: A guide to prevention, assessment and investigation (free download)
https://www.racp.edu.au/docs/default-source/default-document-library/occupational-cancer---a-guide-to-prevention-assessment-and-investigation.pdf?sfvrsn=4
The Australasian Faculty of Occupational Medicine. May 2003

Occupational exposures to carcinogens in Australia. Workers' compensation claims paid in Australia 2000-2012 (free download)
https://www.cancerwa.asn.au/resources/2015-05-07-Occupational-exposure-to-carcinogens-in-Australia-workers-compensation-claims-2000-2012.pdf
Cancer Council Western Australia

U.S. National Library of Medicine

ToxTutor https://toxtutor.nlm.nih.gov/

Toxnet https://toxnet.nlm.nih.gov/

Part 2 Planning and Implementation

Planning a Health Surveillance Program

- **Interface with Wellness Programs**
  - Smoking Cessation / Workplace Exposure Control

Michael Hodge

- **Workplace wellness programs: Do they work?**
  - Need to be evidence based

From Evidence to Practice: Workplace Wellness that Works

Review by:
Institute for Health and Productivity Studies
Johns Hopkins Bloomberg School of Public Health
2015

Rzshah201

Planning a Health Surveillance Program

- **Workplace Inspection**
- **Routes of Exposure**
  - Ingestion
  - Inhalation
  - Dermal
- **Measurement of Workplace Exposure**
  - Workplace
  - Individual
  - Surface

NIOSH

U.S. Navy

Planning a Health Surveillance Program

- Who is concerned?
- Who is **not** exposed?
- Who is exposed?
  - How many?
  - Sampling?

- Occupational Exposures
  - Solvents
  - Isocyanates
  - Heavy Metals
  - Asbestos
  - Silica

Phosphate smelting furnace

Alfred T. Palmer

Advantages of Biological Monitoring

- Integration of all exposures
  - Main job, second job
  - Hobbies, environmental sources
- All routes of exposure including dermal
- Internal exposure when using PPE
- Adverse effects
  - Liver enzymes, haem synthesis
- Individual differences

Gary Rice

Bradleycronk

David Bernal Del Agua

Limitations of Biological Monitoring

- Limited range of tests
- Specimen contamination
- Metabolism
  - Chemical or its metabolite/s
- Timing
  - Short ½ life
- Requires cooperation
- Interpretation may be difficult
- Expensive

Environmental Exposures - Food

Food

- Local
  - Pesticides
  - Heavy metals
- Imported
  - Pesticides
  - Heavy metals

Kitchen Garden

Jean-noël Lafargue

Goa Market

Fredericknoronha

Environmental Exposures - Water

Surface Water

Yackashima National Park

Environmental Exposures - Water

Surface Water

Mongolia

Environmental Exposures - Water

Surface Water

Dry stone creek bed in Western Australia

Environmental Exposures - Water

Surface Water

Adelaide Water Supply from the Murray River

Environmental Exposures - Water

Ground Water

Spring in Afghanistan

Old Well in Geraldton

Environmental Exposures - Water

Ground Water

Coorang Soak

Environmental Exposures - Water

Stored Water

Galvanised (seams – lead)

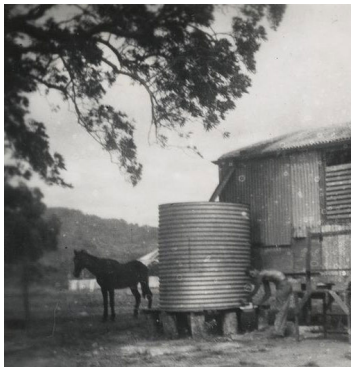
Concrete

Steel alloy * (seams – sealant)

Pre-painted steel #

Polyethylene (Poly)

* Zincalume® # Aquaplate®)



Unknown

Toby Hudson

Ingolfson

Some Hazardous Occupational Exposures

- Volatile Organic Compounds (VOCs) or ‘Solvents’
- Isocyanates
- Heavy metals
  - Lead, mercury, arsenic
- Pesticides
- Asbestos
- Silica

Alexander Hauk

Hazardous Occupational Exposures

Silica Dust

Granite

Manufactured stone

George Shuklin

Kudesnik7709

Agricultural Industry Hazards

Cotton

- Extensive range of approved pesticides
- Integrated pest and disease management
- Minimise pesticide usage
- Best practices for aerial and ground boom spray application

Cotton Research & Development Corporation and CottonInfo

Occupational Exposure – Physical Factors

- Ultra-violet radiation
- Vibration
- Heat

Heat waves from a controlled burn

I did it my way!

A7med3ssam9

Kristopher Radder

U. S. Fish and Wildlife Service - Northeast Region

Principles for Identifying Suitable Biological Monitoring Tests

- Identification of suitable biological media depending on mechanisms of excretion
- Identification of chemical exposure or suitable metabolites
- Mixed exposure – metals, solvents, pesticides

Biological Monitoring Tests

- Background levels
  - Metals
  - Solvents – metabolic and dietary sources
- Level of exposure
- Measure dose and/or effect
- Limitations on the usefulness of tests
  - Sensitivity, specificity, timing

Principles of Specimen Collection

When to Collect	v	Half-life
During Exposure		<2 hours
During/End of Shift (last 2h)		<5 hours
Prior to Next Shift		5 – 10 hours
End of Shift at End of Work Week		10 – 100 hours
Not Critical (after period of exposure)		Weeks

Principles of Specimen Collection

When to Repeat Collection	v	Half-life
1 Day		<5 hours
1 Week		5 – 50 hours
1 Month		2 – 8 days
3 Months		1 – 6 weeks
6 Months		6 – 12 weeks
1 Year		>12 weeks

Analytical Laboratories

- Accreditation and Quality Control
- Documentation of methods/interpretation
- Subcontracting to other laboratories
- Reporting
- Timeliness
- Support for specimen collection and transport
- Specificity and variability of analytical methods
- Assistance with interpretation

Collection of Biological Specimens

- Is the sample from the Worker?
- Is the sample Contaminated?
  - Blood
  - Urine
- Is it a usable Urine sample?
  - Is concentration normal?

T. Miller

Walcha, NSW

Cgoodwin

GrahamColm

Turbotorque

Collection, Transport and Reporting of Biological Specimens

- Identify specimen
- Timely transport to laboratory
- Accredited laboratory
- Timely reporting
- Interpretation

A Stall Story from Western Australia

It was a hot day and we were glad to stop for lunch in the park.

After lunch I went to the shopping centre in search of you know what.

The Stall Story

Found what I needed!

Stall clean and no graffiti

but

What was that on the wall?

The Stall Message to Workers

It is always a hot day, especially in summer and you may experience heat stress.

Dehydration makes heat stroke more likely.

Are you adequately hydrated?

What colour is your urine?

Did you pass the test?

Interpretation of Test Results

- Is the test interpretable?
- **If NOT, do NOT order**
- Explain why

Industrial Action

Some Practical Issues

- Effective Communication with Workers and Unions
- Reporting to Management Issues
  - Confidentiality
- Communication with
  - General Practitioners
  - Other Team Members

ENERGY.GOV

Biswarup Ganguly

References

From Evidence to Practice: Workplace Wellness that Works (free download)
Review by: Institute for Health and Productivity Studies.
https://www.transamericacenterforhealthstudies.org/docs/default-source/wellness-page/from-evidence-to-practice---workplace-wellness-that-works.pdf?sfvrsn=
Johns Hopkins Bloomberg School of Public Health 2015

Cotton Pest Management Guide 2017-18 (free download)
https://www.cottoninfo.com.au/publications/cotton-pest-management-guide

Part 3 Case Reports and Discussion

Case Reports: from Occupational Medicine

Journal of the Society of Occupational Medicine

Anaphylactic reaction in a hairdresser due to sensitization to persulphates

Occupational rhinoconjunctivitis caused by the common indoor plant, *Hoya compacta*

Sensitization to cow's milk protein in a dairy worker

Sensitization to xylanolytic enzymes: an underestimated health hazard among bakers

Case Reports: from Occupational Medicine
Journal of the Society of Occupational Medicine

Anaphylactic reaction in a hairdresser due to sensitization to persulphates

Background:

Persulphates present in permanent hair dyes and bleaching products. May be present in dental cement.

Irritant dermatitis common (10 – 20%) in hairdressers.

Allergic dermatitis: p-phenylenediamine, toluene-2.5-diamine, persulphates and glyceryl monothioglycolate

Asthma and rhinitis: persulphates, p-phenylenediamine, latex and natural henna

Australian Paralympic Committee

A. Kleniewska et al. *Anaphylactic reaction in a hairdresser due to sensitization to persulphates*. Occupational Medicine 2016; 66: 584–585

Case Reports: from Occupational Medicine
Journal of the Society of Occupational Medicine

Anaphylactic reaction in a hairdresser due to sensitization to persulphates

Hairdresser for 30 years. After 15 years developed sneezing and urticaria and erythema on hands and forearms after using bleaching products. Symptoms were better when not at work. She also became allergic to latex gloves and thereafter only used vinyl gloves.

Prior to hospital admission she had undertaken routine dental treatment over several months. During this time procedures using dental cement containing persulphates was used. Latex gloves were not used. She eventually developed facial oedema, erythema and severe dyspnoea during dental treatment and was admitted to hospital where an anaphylactic reaction was confirmed.

Investigations confirmed allergy to persulphates and latex. Dermatitis resolved after she left work.

X. Mun et al. *Occupational Asthma Due to Persulfate Salts: Diagnosis and Follow-up*. CHEST 2003; 123:2124–2129

David-R.-Tribble

Case Reports: from Occupational Medicine
Journal of the Society of Occupational Medicine

Occupational rhinoconjunctivitis caused by the common indoor plant, *Hoya compacta*

Allergic reactions to *Hoya compacta* (wax plant) not previously reported.

Greenhouse gardener developed rhinoconjunctivitis after working 4 months with *Hoya compacta.* Another employee developed rhinoconjunctivitis after working 2½ years.

Plant service company employee who mainly worked with *Hoya compacta* and *Ficus benjamina* (weeping fig) developed rhinoconjunctivitis after working 1 year.

Positive skin prick tests and histamine release tests showed Type I IgE mediated sensitization to *Hoya compacta*.

KorAn

D. Sherson et al. *Occupational rhinoconjunctivitis caused by the common indoor plant, Hoya compacta.* Occupational Medicine 2017. 67: 490–492

Case Reports: from Occupational Medicine
Journal of the Society of Occupational Medicine

Sensitization to cow's milk protein in a dairy worker

Dairy industry worker for 17 years making butter, cheese and dried milk.

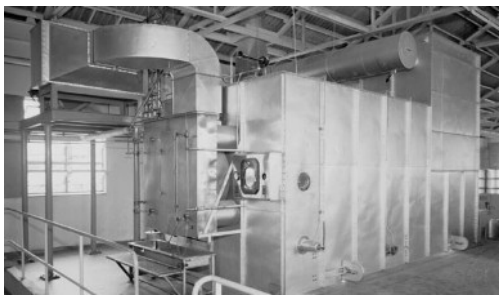
For last 10 years made dried milk without PPE. After 2 years developed eczema on face and upper limbs which improved when not at work. Made worse after eating dairy products. Eventually stopped eating dairy products.

Developed anaphylaxis after drinking milk by mistake.

Skin prick tests positive for casein, lactalbumin and lactoglobulin. Serum specific IgE tests were positive for casein but negative for lactalbumin and lactoglobulin.

B. Quirantes Sierra et al. *Sensitization to cow's milk protein in a dairy worker.* Occupational Medicine 2017. 67: 579–580

Stirring raw milk curd Bob-Nichols



Milk spray drying equipment

Queensland State Archives, Digital Image ID 1807

Case Reports: from Occupational Medicine
Journal of the Society of Occupational Medicine

Sensitization to xylanolytic enzymes: an health hazard among bakers

Xylan is a polysaccharide and is a major component of plant cell walls.
Xylanases converts water-insoluble hemicellulose into a soluble form which binds with water in the dough making it less sticky and improves the bread structure.
Allergens in bread making include flour and enzymes, especially α-amylase.

Case Report:
Baker with 6 years exposure who suffered from work-related respiratory, ocular and skin symptoms.

Investigations:
Skin prick tests with common and occupational allergens were negative.
Spirometry and methacholine challenge normal to flour exposure.
After 20 min exposure to flour adjuvants, developed cough, itching and wheezing. and fall in FEV_1 and positive metacholine challenge.
Xylanolytic enzymes IgE positive.

Abul-H

A. Lipińska-Ojrzanowska et al. *Sensitization to xylanolytic enzymes: an health hazard among bakers.* Occupational Medicine 2016. 66: 415–418

M.S. Butt et al., *Xylanases and their application in the Baking Industry.* Food Technol. Biotechnol. 2008. 46: 22–31

Case Reports: from Occupational Medicine

Journal of the Society of Occupational Medicine

Carbon monoxide poisoning in wood pellet storerooms

Occupational asthma caused by an epoxy amine hardener

Subclinical chronic left ventricular systolic dysfunction resulting from phosphine poisoning

Rhabdomyolysis with acute tubular necrosis following occupational inhalation of thinners

Case Reports: from Occupational Medicine
Journal of the Society of Occupational Medicine

Carbon monoxide poisoning in wood pellet storerooms

Background: Chemical degradation of wood pellets in storage facilities may result in emission of significant levels of carbon monoxide.

Unconscious man found in a wood pellet storeroom. Rescued by firemen and paramedics who gave CPR but he subsequently died.
Carbon monoxide level of 600 ppm was detected in the area CPR given.
Rescuers complained of dizziness, headache, nausea and fatigue.
Initial levels of carboxyhaemoglobin in the rescuers were estimated to be higher than 10%. Treated with 100% oxygen until carboxyhaemoglobin levels normal.

Rescuers should be equipped with carbon monoxide detectors and use self-contained breathing apparatus prior to entering areas with elevated carbon monoxide levels.

EnergieAgent

N. Golob et al. *Carbon monoxide poisoning in wood pellet storerooms.* Occupational Medicine 2018. 68: 143–145

Case Reports: from Occupational Medicine
Journal of the Society of Occupational Medicine

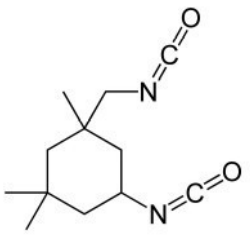
Occupational asthma caused by an epoxy amine hardener

Floor layer developed work-related asthma after using a volatile epoxy hardener based on isophorone diamine (IPDA) for ~3 years.

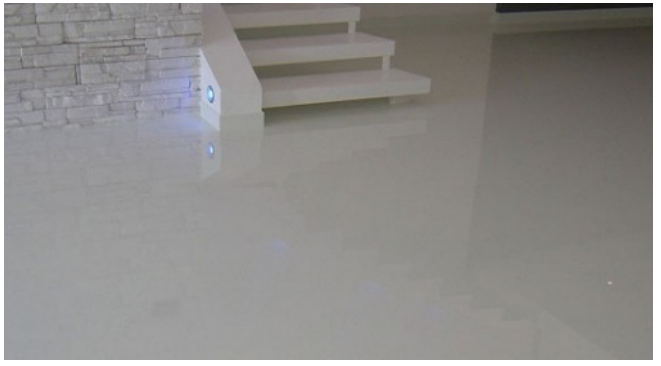
Symptoms occurred 3 – 5 hours after exposure and lasted 2 – 4 days. Used salbutamol up to 10 times a day for symptom control.

Investigated ~1 year after developing symptoms. Diagnosis was confirmed through specific inhalation challenges.

NB Cross sensitivity can occur between isophorone diamine and isophorone diisocyanate (used in paints that have high resistance to UV and abrasion).



Isophorone diamine



ARKdeko'-Desi

Steve Jurvetson

O. Vandenplas et al. *Occupational asthma caused by an epoxy amine hardener.* Occupational Medicine 2017. 67: 722–724

Case Reports: from Occupational Medicine
Journal of the Society of Occupational Medicine

Subclinical chronic left ventricular systolic dysfunction resulting from phosphine poisoning

32-year-old male crew member of a cargo ship, accidentally exposed to the fumigant phosphine.

Developed gastric symptoms then, bilateral pneumonia, acute nephritis, mild LFT abnormalities, electrolyte imbalance and leucopenia. Two other crew died from acute pulmonary oedema.

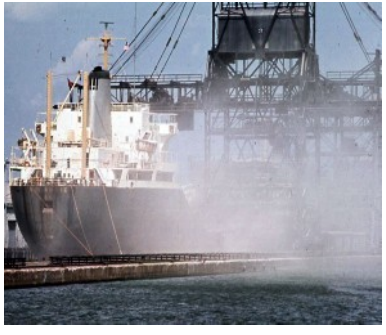
Received supportive treatment and discharged after 3 weeks asymptomatic.

Further investigation after 4 months revealed subclinical left ventricular dysfunction. This confirmed previous reports.

E. Szymczyk et al. *Subclinical chronic left ventricular systolic dysfunction resulting from phosphine poisoning.* Occupational Medicine 2017. 67: 233–235

Johnscotaus

Silo - Australia



Jim Pickerell

Unloading grain - USA

Case Reports: from Occupational Medicine
Journal of the Society of Occupational Medicine

Rhabdomyolysis with acute tubular necrosis following occupational inhalation of thinners

‘Thinners’ are mixtures of organic solvents such as toluene, xylene, acetone, hexane, benzene and methyl isobutyl ketone. Cleaned the interior surface of a 4000 L steel water tank with thinners. No PPE.

Became unwell, with headache, body pains and weakness. After 4 days developed oliguria, grossly abnormal LFTs and elevated serum creatinine kinase levels. Renal biopsy confirmed acute tubular necrosis. Haemodialysed for 7 days. Discharged after 4 weeks with biochemical levels returning to normal apart from creatine kinase which remained elevated.

Diagnosis: Rhabdomyolysis with acute tubular necrosis and renal failure probably due to high acute exposure to toluene.

D. Ngajilo et al. *Rhabdomyolysis with acute tubular necrosis following occupational inhalation of thinners.* Occupational Medicine. 2017. 67: 401–403

Wascosa-ag


Sandstein

Occupational Medicine Forum:
from Journal of Occupational and Environmental Medicine
Official Journal of the American College of Occupational and Environmental Medicine

How Do I Diagnose and Treat Workers With Injuries From Hydrofluoric Acid?

What Conditions Should Be Assessed in Evaluating Individuals Who Work in Confined Spaces?

What Is the Mediterranean Diet and How Can It Be Used to Promote Workplace Health?

Occupational Medicine Forum:

from Journal of Occupational and Environmental Medicine
Official Journal of the American College of Occupational and Environmental Medicine

- **What Is the Mediterranean Diet and How Can It Be Used to Promote Workplace Health?**
- **Typical diet Greece, Southern Italy, coastal Croatia and Spain**
  - +++ Fat – olive oil
  - +++ Carbohydrate – fruit, vegetables, legumes, nuts
  - ++ Protein – fish, seafood, poultry, eggs, yoghurt
  - + Protein – red and processed meat
  - + Sugar
  - Wine with meals

M. Korre et al. *What Is the Mediterranean Diet and How Can It Be Used to Promote Workplace Health?* JOEM. 2016. 58 (3): 111 – 113

G.steph.rocket

Occupational Medicine Forum:
from Journal of Occupational and Environmental Medicine
Official Journal of the American College of Occupational and Environmental Medicine

What Is the Mediterranean Diet and How Can It Be Used to Promote Workplace Health?

Benefits - Reduction in Risk

- CHD Mortality 20 – 40%
- CVD Mortality 25 – 45%
- Diabetes Incidence 25 – 30%
- All cause mortality 17 – 25%

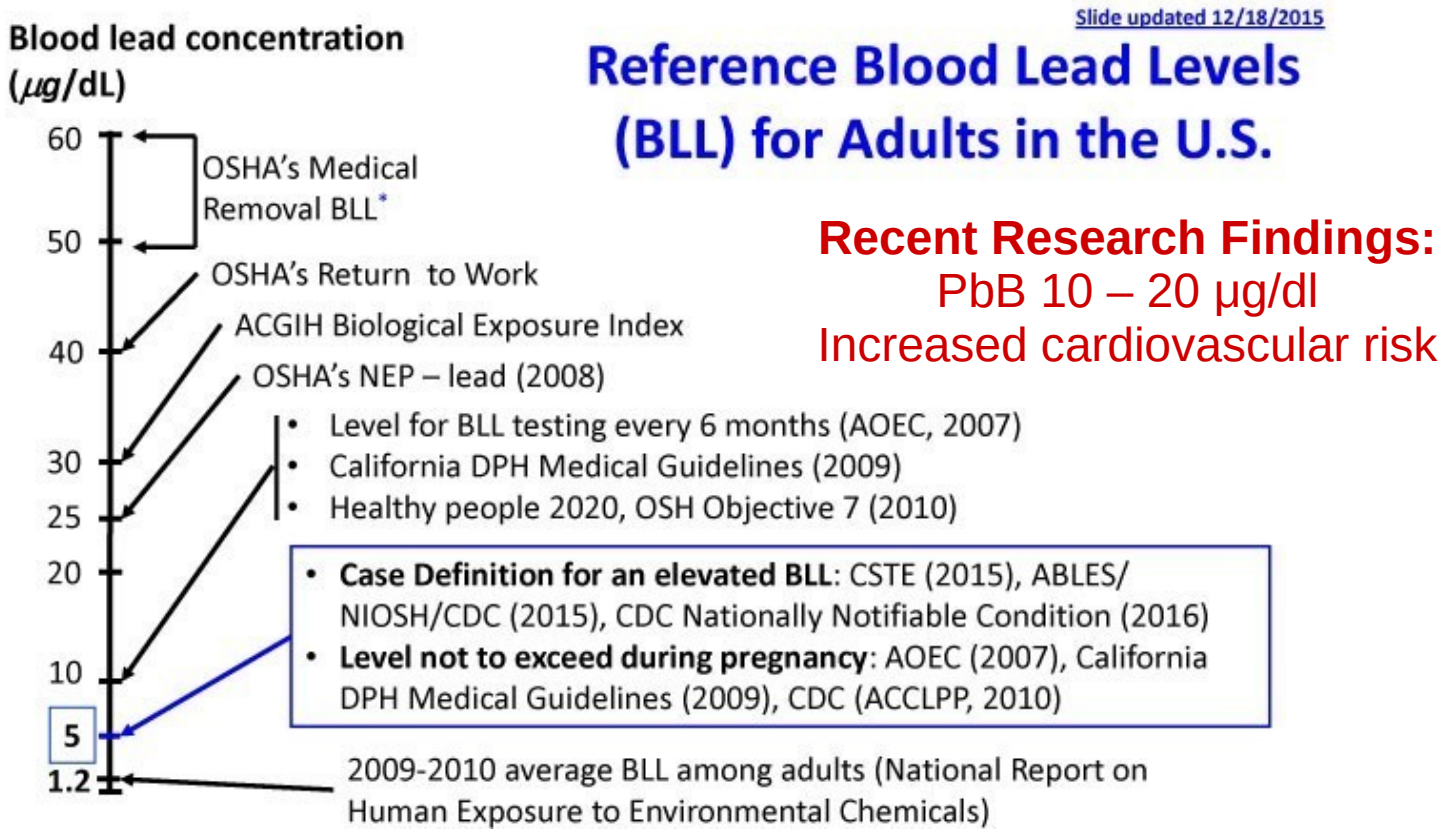
Mediterranean Diet

- Acceptable in Wellness Program Trials
- Safe, Appealing, Long term adherence

Varaine

M. Korre et al. *What Is the Mediterranean Diet and How Can It Be Used to Promote Workplace Health?* JOEM. 2016. 58 (3): 111 – 113

ACOEM Position Statement:
Workplace Lead Exposure



Recent Research Findings:
PbB 10 – 20 μg/dl
Increased cardiovascular risk

μg/dl	μmol/l
80	3.9
70	2.4
60	2.9
50	2.4
40	1.9
30	1.4
25	1.2
20	1.0
10	0.5
5	0.2
1.2	0.1

ACOEM Position Statement: Workplace Lead Exposure

Recommendations

Baseline Testing	For all workers with significant lead exposure
Testing Frequency	PbB every 2 months for first 6 months Aim: Pregnant* workers PbB <5 µg/dl Other workers PbB <15 µg/dl
Blood Lead Level	
≥5 – 9 µg/dl	≥5 µg/dl – workplace inspection
10 – 19 µg/dl	PbB every 2 months – repeat workplace inspection PbB every 6 months when <10 µg/dl#
	PbB >10 µg/dl – remove if pregnant: return <5 µg/dl#
>20 µg/dl#	Remove – repeat workplace inspection Return <15 µg/dl#
≥30 µg/dl	Remove Immediately – repeat workplace inspection Return <15 µg/dl#

µg/dl	µmol/l
1.2	0.1
5	0.2
10	0.5
20	1.0
25	1.2
30	1.4
40	1.9
50	2.4
60	2.9
70	2.4
80	3.9

* includes females trying to become pregnant # confirmed = repeat in 1 month

References

Anaphylactic reaction in a hairdresser due to sensitization to persulphates.
A. Kleniewska et al. Occupational Medicine 2016; 66: 584–585

Occupational asthma due to Persulfate salts: Diagnosis and follow-up.
X. Mun et al. CHEST 2003; 123:2124–2129

Occupational rhinoconjunctivitis caused by the Common indoor plant, Hoya compacta.
D. Sherson et al. Occupational Medicine 2017. 67: 490–492

Sensitization to cow's milk protein in a Dairy Worker.
B. Quirantes, Sierra et al. Occupational Medicine 2017. 67: 579–580

Sensitization to xylanolytic enzymes: an Health Hazard among Bakers.
A. Lipińska-Ojrzanowska et al. Occupational Medicine 2016. 66: 415–418

Xylanases and their application in the Baking Industry.
M.S. Butt et al. Food Technol. Biotechnol. 2008. 46: 22–31

References

Carbon monoxide poisoning in Wood Pellet Storerooms.
N. Golob et al. Occupational Medicine 2018. 68: 143–145

Occupational asthma caused by an Epoxy Amine Hardener.
O. Vandenplas et al. Occupational Medicine 2017. 67: 722–724

Subclinical chronic left ventricular systolic dysfunction resulting from Phosphine Poisoning.
E. Szymczyk et al. Occupational Medicine 2017. 67: 233–235

Rhabdomyolysis with acute tubular necrosis following occupational Inhalation of Thinners.
D. Ngajilo et al. Occupational Medicine. 2017. 67: 401–403

What is the Mediterranean Diet and how can it be used to Promote Workplace Health?
M. Korre et al. JOEM. 2016. 58 (3): 111–113

ACOEM POSITION STATEMENT: Workplace Lead Exposure. (free download)
M. Holland and D.Cawthon: *ACOEM Task Force on Blood Lead Levels.* JOEM. 2016. 58 (12): e371–374
http://www.acoem.org/uploadedFiles/Public_Affairs/Policies_And_Position_Statements/Guidelines/Position_Statements/Workplace_Lead_Exposure.pdf

Health Surveillance

Part 4 Community Concerns

Community Concerns

Asbestos

- Example of asbestos cement siding and lining on a post-war temporary house in Yardley (UK).
- Nearly 40,000 houses were built between 1946 and 1949.
- Photo 2016
- 70 years old
- **Concern or Risk**
  - Passers by?
  - Residents?
  - Renovation?

John M

Community Concerns

Garden

- Imidacloprid * (Confidor®)
- Spinetoram (Yates Success™ ULTRA Insect Control)
- Carbaryl (Richgro Caterpillar, Grasshopper & Millipede Insecticide)
- Pyrethrum (Hortico Insect Killer)

For further information see Safety Data Sheet of manufacturer

* A systemic neonicotinoid insecticide to be withdrawn by Australian retailers by end 2018 due to concerns regarding bees. No evidence of decline in Australian bee populations according to Pesticides and Veterinary Medicines Authority.

Andrew Curtis

Kenneth Allen

Community Concerns

Termite Control

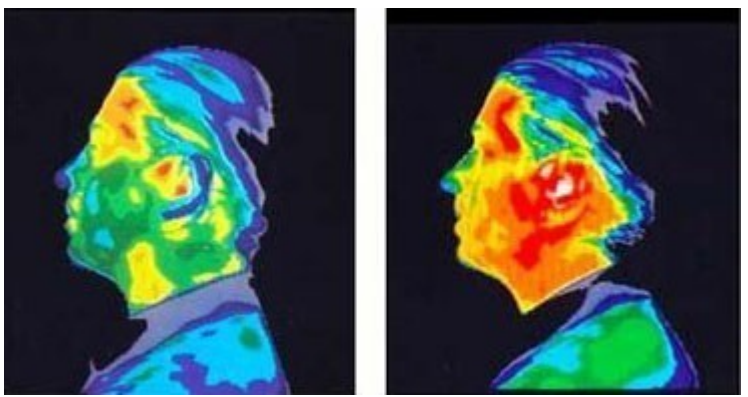
- Non-repellent
  - Fipronil (Termidor®)
  - Imidacloprid (Confidor®)
- Repellent
  - Chlorpyrifos and Bifenthrin
- Stainless Steel Mesh
- Baits
- Other

For further information see Safety Data Sheet of manufacturer

Ruwoltj CSIRO CSIRO

Community Concerns

Mobile Phones, Base Stations and Power Lines (RF)



Thermographic image after 15 min call

Monquaylob

Tracey Nicholls

Andrew Smith

Community Concerns

Fire Foam Contamination

Ken Wright

National Park Service

Community Concerns

Fire Foam Contamination

F18A Hornet

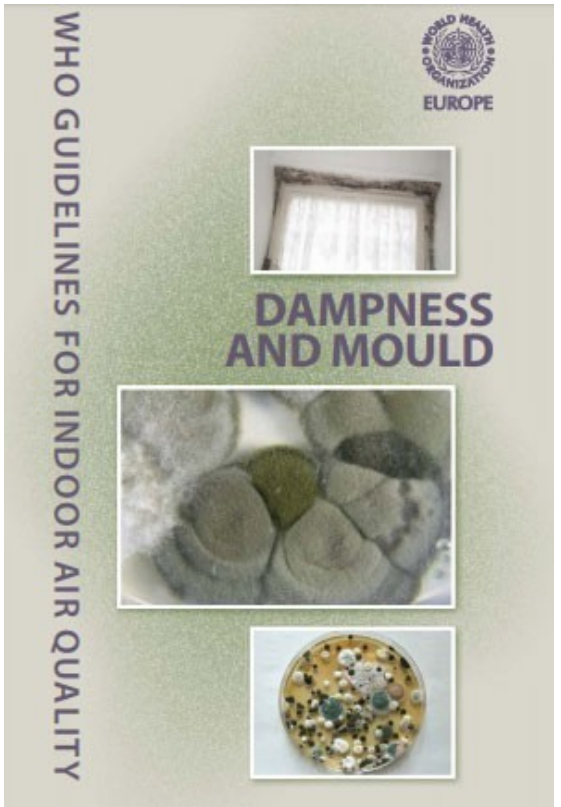
Hunter Estuary Wetlands

Bottled Water

Community Concerns

Mould in Buildings

Post Katrina



Community Concerns

Coal Transport from Upper Hunter Mines to Newcastle for Export

Coal train near Singleton

Bluedawe

Coal train near Newcastle

JT108

Newcastle Coal Terminals

Tim Starling

Community Concerns

Rail Transport of Zinc / Lead Ore for Smelting and Export

Smelter

Port Pirie
Nyrstar smelter stack

Fairv8

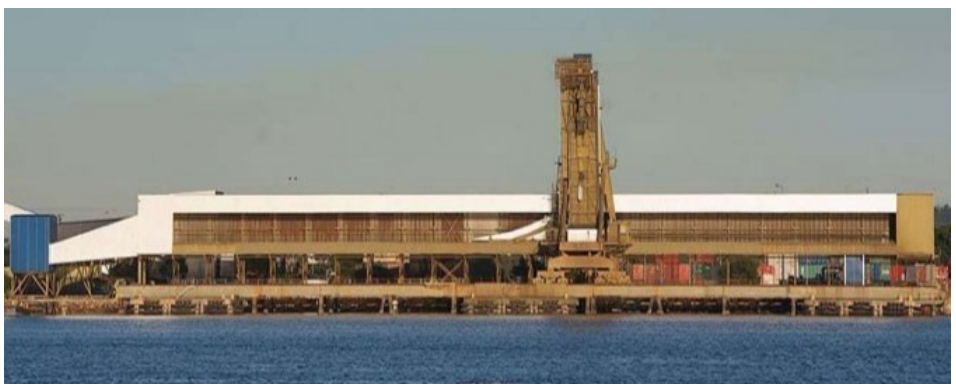
Mine

Broken Hill
Rasp Mine

CBH Resources

Export

Newcastle
Shiploader (Conports)



CBH Resources

References

Mobile phones and health
https://www.arpansa.gov.au/understanding-radiation/radiation-sources/more-radiation-sources/mobile-phones

Mobile phone base stations and health
https://www.arpansa.gov.au/understanding-radiation/radiation-sources/more-radiation-sources/mobile-phone-base-stations
Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) [For further information See Website]

Per- and Polyfluoroalkyl Substances (PFAS) and Your Health
https://www.atsdr.cdc.gov/pfas/overview.html
Agency for Toxic Substances and Disease Registry (ATSDR) For further information See Website

Health Based Guidance Values for Per- and Poly- Fluoroalkyl Substances (PFAS)
https://www.health.gov.au/internet/main/publishing.nsf/Content/2200FE086D480353CA2580C900817CDC/$File/fs-Health-Based-Guidance-Values.pdf
Australian Government Department of Health 2017 For further information See Website

Review of the New South Wales Environment Protection Authority's Management of Contaminated Sites (free down load)
https://www.epa.nsw.gov.au/~/media/EPA/Corporate Site/resources/epa/Contaminated-Sites-Review-2016.ashx
Macquarie University 2016

References

Damp Indoor Spaces and Health (free download)
https://www.nap.edu/catalog/11011/damp-indoor-spaces-and-health
The National Academies Press 2004.

WHO guidelines for indoor air quality: dampness and mould (free download)
http://www.euro.who.int/__data/assets/pdf_file/0009/78678/E91146.pdf
World Health Organization 2009.

Final Report on the Independent Review of Rail Coal Dust Emissions Management Practices in the NSW Coal Chain (free download)
http://www.chiefscientist.nsw.gov.au/reports/nsw-energy-security-taskforce/final-report-december-2017
NSW Chief Scientist & Engineer August 2016

Coal Mine Dust Exposures and Associated Health Outcomes: A Review of Information Published Since 1995: CURRENT INTELLIGENCE BULLETIN 64 (free download)
https://www.cdc.gov/niosh/docs/2011-172/pdfs/2011-172.pdf
National Institute for Occupational Safety and Health 2011

High-Volume Hydraulic Fracturing and Human Health Outcomes: A Scoping Review
R. Wright and R. Muma. JOEM. 2018. 60 (5): 424- 429

Part 5 Forgotten Exposures

Forgotten Exposures

Aboriginal children (Balgo WA)
participating in National Iodine Study 2004

Traditional or natural aboriginal medicine

Creswell Eastman

Study found WA children iodine deficient

Steve Evans

Forgotten Exposures

Lifestyle

Alice Springs
Todd River

Forgotten Exposures

Thursday Island

Indigenous

Cape York

Tourists

Forgotten Exposures

Indigenous (New Guinea)

Indigenous Diet

Fiji

New Guinea

Forgotten Exposures - Farmers

California Department of PublicHealth

Occupational Pesticide Illness Prevention Program

Fact Sheets and Reports

Preventing Illness from Pesticide Drift

Pesticide Illness: A comprehensive educational curriculum for health care providers

CDPH

USDA k4817-4

Forgotten Exposures

Californian Migrant Farmworkers

(California Rural Legal Assistance)

- **Pesticides**
- **Heat stress**

USDAgov

Forgotten Exposures

Poultry Slaughter and Evisceration *

Biological Hazards

Chemical Hazards

Physical Hazards

Ergonomic Hazards

Traumatic Injury and Safety Hazards

Reported Health Effects

* see NIOSH

NIOSH

Forgotten Exposures

Offshore Workers

Ultraviolet Radiation and Skin Cancer Risk in Offshore Workers

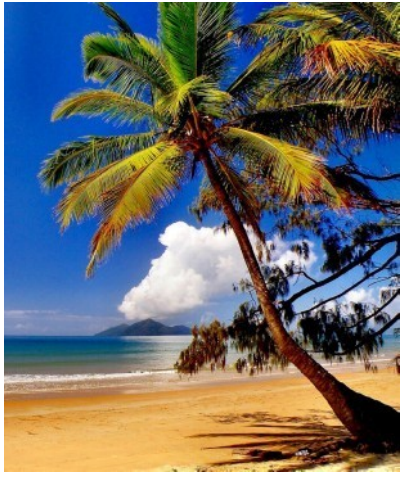
J. S. Stenehjem et al. *Occupational Medicine* 2017;67:569–573

North Sea Gas Platform

Gary Bembridge

Time for a Seachange?

1



2

3

5

4

1. Lasthib
2. Paul Toogood
3. Tourism NT
4. W. Bulach
5. Evad37

Forgotten Seachange Exposures

Leaving the city for a better Lifestyle?

Self-sufficiency?

Fewer hazards?

Still working?

Retired?

Returning to the city?

References

Occupational Pesticide Illness Prevention Program
https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/OHB/OPIPP/Pages/OPIPP.aspx
California Department of Public Health

Poultry Slaughter and Evisceration: Biological, Chemical and Physical Hazards *
https://www.cdc.gov/niosh/topics/poultry/slaughter.html

Campylobacter Infection and Exposures Among Employees at a Poultry Processing Plant — Virginia Health Hazard Evaluation Report April 2012 *
https://www.cdc.gov/niosh/hhe/reports/pdfs/2011-0058-3157.pdf

* For further information See NIOSH POULTRY INDUSTRY WORKERS Website

Ultraviolet Radiation and Skin Cancer Risk in Offshore Workers.
J. Stenehjem et al. Occupational Medicine. 2017;67:569–573

Occupational Exposure to Carbon Nanotubes and Nanofibers (free download)
Current Intelligence Bulletin 65. 2013
https://www.cdc.gov/niosh/docs/2013-145/

Environmental impact of multi-wall carbon nanotubes in a novel model of exposure: systemic distribution, macrophage accumulation, and amyloid deposition (free download)
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4598201/
A. Albini et al. International Journal of Nanomedicine. 2015:10 6133–6145