Approaches to the development of occupational health indicators

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Definition and use of occupational health indicators and national or local profiles

• An Occupational Health Indicator (OHI) provides information about a scientifically based linkage between work hazards and health.

• Indicators are pointers that simplify phenomena and help the understanding of complex realities

• The term OHI implies monitoring and action

• A national or local occupational health profile is more than a set of OHIs because it provides an understanding and context that cannot be communicated by numbers only (WHO website)
Some applications of OHIs

– help monitor trends in occurrence of workplace hazards
– help monitor trends in health effects of these hazards
– compare geographic areas and populations
– monitor impact of policies/preventive actions
– help raise awareness of occupational health issues
– help investigate links between work hazards and health
– help monitor progress towards sustainable development through improved workplaces
Analyzing the hierarchy of health hazards using indicators; steps described in the development of environmental health indicators

- Identify the higher policy level determinants of ill health and intermediate determinants for a specific issue (e.g. building materials technology and health)

- Build a framework that fits with other paradigms for analyzing determinants for environmental quality (e.g. OECD PSR scheme, UNEP DPSIR scheme)

- Link to cause-effect mechanisms and environmental and occupational epidemiology principles: DPSEEA framework proposed by WHO.
To assess issues of environmental health and sustainability several indicator frameworks have been proposed.

OECD

P  Pressure

S  State

R  Response
To assess issues of environmental health and sustainability several indicator frameworks have been proposed.

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Driving force
Pressure
State
Response
To assess issues of environmental health and sustainability several indicator frameworks have been proposed

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- Driving force
- Pressure
- State
- Exposure
- Response
To assess issues of environmental health and sustainability, several indicator frameworks have been proposed:

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<td>Response</td>
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Economic policy
Social policy
Clean technologies
Hazard management
Environmental improvement
Education Awareness raising
Treatment

Driving force
Population growth
Economic development
Technology

Pressure
Production
Consumption
Waste release

State
Natural hazards
Resource availability
Pollution levels

Exposure
External exposure
Absorbed dose
Target organ does

Effect
Well-being
Morbidity
Mortality

Kjellstrom and Corvalan, WHO, 1995
Example of OHIs for asbestos risks in workplaces

- **DRIVING FORCES**
  - Legislation on bans or restrictions of asbestos use
  - Policies and regulations in construction sector on materials to be used in e.g. buildings and water pipes
  - Union-employer agreements

- **PRESSURES**
  - Amount of asbestos used in different applications
  - Number of workers involved

- **STATE OF THE WORK ENVIRONMENT**
  - Measured dust levels in workplaces

- **EXPOSURES**
  - Personal monitoring results or estimates of individual exposures

- **HEALTH EFFECTS**
  - Pleural plaques, other x-ray changes, asbestosis, lung cancer, mesothelioma

- **ACTIONS FOR PREVENTION**
  - Can be taken at each level
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Driving force indicator: asbestos history in New Zealand

- 1938 Reference to asbestos in silicosis report: “producing a deadly lung disease”
- 1951 Min of Health annual report: “asbestos dust can be expected to cause a certain amount of lung damage unless proper precautions are taken”. Little action taken.
- 1964 First asbestos fiber standard by Min of Health
- 1977 Engineers Union raises concern about deceased asbestosis victim; Union guidelines on asbestos disease prevention
- 1978 Asbestos regulations from Min of Labor
- 1983 Major media event; TV showing “Alice a fight for life”
- 1983 Revised stricter Asbestos regulations
- 1987 Further tightening of Asbestos regulations
- 1992 Code of practice for asbestos removal; almost no new asbestos used
Pressure indicator: Imports of raw asbestos into New Zealand
State of environment indicator: Asbestos levels in the asbestos cement building product factory, fibres/ml

<table>
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<th>n</th>
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<td>1980</td>
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“Exposure” indicator: Cases of asbestosis by occupation

Five highest risk occupation groups suffered 50% of cases and included 20,000 men age 20 +

(Smartt and Kjellstrom, 2001)
**Effect indicator:** Asbestos-induced Mesothelioma rates in 4 countries, males, age > 30 years (cases/million)
Effect indicator (predictive risk assessment): Estimated future mesothelioma cases in New Zealand

Peak year: 2012. Total cases until 2035: 3737

Predicted increase 7.3%/yr..
Different applications of DPSEEA links:

Driving force

Pressures modeling of workplace levels

State

Exposure

Effect

Action

Epidemiology

Policy analysis
Epidemiological field testing of DPSEEA links.

- Driving force
- Pressure
- State
- Exposure
- Effect
- Action

Link these to “Health Tracking”
Updated version of the DPSEEA framework

Causal factors                  Modifiers                       Actions

- Driving Forces
- Pressure
- State
- Exposure
- Effect
- Actions

- Technology
- Environment
- Behavior
- Vulnerability

Technologies at each level

Legislation, regulations, policies

Information, education
Review of OHIs for Central America (Partanen, 2004)

- OHIs prioritized by importance and feasibility
- OHIs divided by:
  - Type
  - Source of data
  - Extent of national geographic or demographic coverage
  - Variability/flexibility over time
  - Coverage in time periods
  - Comparability with OHIs in other countries
- List of OHIs for legislation, administrative processes
- List of OHIs by resources, exposures and effects
- List of exposures to carcinogens and pesticides (CAREX)

- Up to 200 indicators identified
Presentation/communication of OHIs important for interpretation and action

• Epidemiological units: rates, ratios, relative or absolute
• Tables
• Figures/graphics
• Maps

• World Health Chart style
World Health Chart: GDP vs child survival <1
5 SALTRA countries and USA
World Health Chart: GDP vs child survival <1
3 SALTRA countries and USA
Conclusions

- The linkages and hierarchy of indicators helps in the interpretation of cause-effect relationships and decisions on policies and actions.

- The DPSEEA type framework is one way of depicting these linkages and this hierarchy; it has been used by WHO for environmental health indicators development, and it may be a useful tool for occupational health indicators development.

- The presentation/communication of occupational health indicators is an important part of getting the message across: the World Health Chart approach is worth exploring in SALTRA.
Asbestos-lagged pipes in ship

The end. Thank you.