Coding for Occupational Injuries and Diseases

Public Health Prevention: disease and injury
What is occupational health and safety?

Definition: it is the discipline and activities that addresses the prevention of disease and injury caused by workplace hazards and risks.

This presentation will examine the use of data in surveillance and prevention of occupational injuries and disease in Abu Dhabi
## Occupational Health and Safety Hazards

<table>
<thead>
<tr>
<th>Physical Environment</th>
<th>Chemical Environment</th>
<th>Biological Environment</th>
<th>Psychosocial Environment</th>
</tr>
</thead>
</table>
| • Injury Prevention and Control  
  - Slips, trips and falls  
  - Confined spaces  
  - Machinery guarding  
  - Falls from heights  
  - Falling objects  
  - Scaffolding  
  - Vehicle and machinery safety etc  
• Noise  
• Vibration  
  - Hand-arm  
  - Whole-body  
• Heat stress  
• Ventilation  
• Electrical safety  
• Fire safety  
• Radiation Safety  
  - Ionising  
  - Non-ionising radiation  
• Musculoskeletal hazards  
• Manual handling  
• Ergonomic hazards | • Hazardous chemical substances  
  - gasses  
  - vapours  
  - fumes  
  - mists  
  - dusts  
  - pesticides  
  - Carcinogens  
• Occupational Reproductive hazards | • Communicable and zoonotic diseases  
• Hazardous biological agents (pathogens)  
• Healthcare infection control  
• Biosafety/lab safety  
• Waste management (occupational aspects)  
• Indoor air quality  
• Endotoxins and moulds  
• Air-conditioned environments | • Workplace Stress  
• Workplace bullying  
• Workplace demands and complexity  
• Work security  
• Ageing workforce  
• Shiftwork  
• Workplace violence |
The Global situation

THE World Health Organisation (WHO) estimates that:

- Worldwide there are only 10-15% of workers who have access to a basic standard of occupational health services.
- Many individuals spend one-third of their adult life in hazardous work environments.
- About 120 million occupational accidents with 335 000 fatalities are estimated to occur annually and,
- 68-157 million new cases of occupational disease may be caused by various exposures at work and dangerous working conditions of which,
- 30-40% may lead to chronic disease and about 10 per cent to permanent work disability.
- A large number of occupational diseases go undiagnosed and unreported.
Potential costs of occupational injuries and disease in the UAE

- Gross domestic product (GDP) is a measure of the size of the economy of a particular territory.

- It is defined as the total value of all goods and services produced within that territory during a specified period (most commonly, per year).

- In addition to unnecessary human suffering, the costs involved in these health hazards have been estimated to amount to 4-5% of some countries’ GDP.

- UAE GDP in 2008 is US $240 Billion dollars
  - 5% of that is US$ 12 Billion
  - 1% of that is US $2.4 Billion

Losses include: loss of production, lost time, damage to equipment, compensation costs, health care costs, disability and compensation costs, insurance costs, costs of training new workers, legal costs etc.
Occupational Injuries

• **Definition:** Workplace/occupational Injury: is an injury that arises in or from the workplace and activities and results in traumatic injury or death as a consequence of exposure to hazards at the workplace.

• Occupational injuries could include: eye injuries, falling from height resulting in fractures, lacerations due to equipment use etc.
Occupational Disease

• **Definition: Occupational Disease:** is any chronic ailment that occurs as a result of work or occupational activity.

• An occupational disease is typically identified when it is shown that it is more prevalent in a given body of workers than in the general population, or in other worker populations.

• Occupational hazards that are of a traumatic nature (such as falls by construction workers) are not considered to be occupational diseases.

• Examples of occupational diseases could be cancers, asbestosis, silicosis, noise induced hearing loss etc.
e.g. Noise induced hearing loss

there is an ICD code for Noise Induced Hearing Loss (NIHL) of 388.12. This is a severe but completely preventable occupational disorder. The ICD code is used for hearing loss due to exposure to explosive loud noise or chronic exposure to sound levels greater than 85 decibels over time.

The hearing loss is often in the frequency range 4000-6000 hertz.

Normal audiogram

Classic NIHL audiogram
Results 2007 Abu Dhabi hospitals

<table>
<thead>
<tr>
<th>Primary diagnosis and ICD code</th>
<th>Hospital data Sep - Dec 2007 (encounters)</th>
<th>DAMAN insurance data Jan –Dec 2007 (encounters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise Induced Hearing Loss (NIHL) (388.12)</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

- Internationally NIHL is the second most common compensated occupational disorder yet in the current data submitted to HAAD only one case is identified in the current statistical data for 2007.
- This could be due to various reasons including the fact that pre-employment and periodic audiograms are not performed or the cases are not being identified and diagnoses due to various factors.
- This needs to be investigated as to why so few cases are being diagnosed and coded and improved occupational health surveillance systems need to be developed in order to pick up these types of occupational cases.
Why is data so important in Public Health?

• Data underpins the practice of Public Health and Occupational Health
• Without data, trends and epidemiological evidence is unavailable
• Policy makers are blind and cannot identify priority areas for preventative action and plan the required strategies and interventions based upon solid evidence
How is data used?

To:

• Identify priority public health areas of concern
• Design suitable interventions/health promotion and target specific groups
• Allow for long term epidemiological tracking of trends and burden of disease
• Allocate funds according to need and priority areas and calculate health economics and costs vs. benefit
• Assess interventions for effectiveness
Important data in occupational health

Data that:

• Links occupations with adverse health outcomes (disease and injuries ICD diagnoses)
• Links external causes with adverse health outcomes
• Links health outcomes to burden and cost of disease (health care and compensation costs)
• Helps monitor the effectiveness of interventions, programmes and initiatives by comparing costs savings and baseline and post intervention outcome data (decrease in cases of injury or disease)
Linking occupation to cause and outcome (diagnosis)

- Occupation
- Diagnosis (ICD code)
- Exposure

external causes of injury and disease (and if occupationally related),

Age, gender, nationality, industry sector, employment history
Occupational Health Data Sources

- Death notification data (based on ICD 10)
- Hospital inpatient data (ICD 9)
- Hospital outpatient data (ICD 9)
- Hospital emergency room data (ICD 9)
- Insurance company data (ICD 9)
- Medical Board data (sick leave and disability assessment)
- Occupational Health screening data (to follow)
- Visa screening data
- Infectious disease notification system (under development) incl. pesticide poisoning notification
- Births registration

ALL existing data sources INDICATE OUTCOMES not the cause or if the outcome is work related
Death notifications

• Captured in preventative medicine departments in 3 regions of Abu Dhabi
• New death notification forms based on ICD 10
• At present however neither occupation nor external causes are recorded on the systems systematically and accurately
Death Notification System

• Development and implementation of new death notification form (using ICD 10 codes) in the Emirate of Abu Dhabi (2007)
• Development of electronic notification and records system (2008 - )
• Ongoing improvement of data quality, reporting and statistical analysis
## Causes of Death

**To be completed by examining physician**

Complete the upper left box first, to help identify the main underlying disease or injury that caused the death. Then follow the appropriate arrow to other box(s) to provide details for cardiovascular, cancer, or injury deaths. Finally complete the boxes for the causal sequence by specifying one underlying and one immediate cause, and as many intermediate causes as necessary. Never use "natural causes", "cardiac arrest", "respiratory arrest", or "cardiorespiratory arrest" in any of the boxes; do not use "multiple organ failure" (specify dominant cause, e.g., disseminated intravascular coagulopathy), or signs and symptoms such as hypotension; do not use abbreviations.

Use this table to help define the major disease category or injury that was the underlying cause of death.

Try to choose one, but if unsure, two (e.g., diabetes with cardiovascular disease).

### Check box(es) ICD10-WHO Codes

<table>
<thead>
<tr>
<th>Injury (external cause)</th>
<th>V01-V98</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neoplasm (cancer)</td>
<td>C00-C97</td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td>I00-I99</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>E10-E14</td>
</tr>
<tr>
<td>Congenital anomalies</td>
<td>Q00-Q99</td>
</tr>
<tr>
<td>Infectious disease</td>
<td>A00-B99</td>
</tr>
<tr>
<td>Other diseases, specify</td>
<td></td>
</tr>
</tbody>
</table>

If death resulted from Cardiovascular disease, specify type(s)

### Check box(es) ICD10-WHO Codes

<table>
<thead>
<tr>
<th>Circulatory system disease</th>
<th>I00-I99</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atherosclerosis</td>
<td>I70.9</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>I20-I25</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>I21</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date and time of injury</th>
<th>dd</th>
<th>mm</th>
<th>yyyy</th>
<th>Time (24h)</th>
</tr>
</thead>
</table>

If death resulted from injury, specify the date, time, intent, cause, and place of injury.

### Intent of injury ICD10-WHO Codes

- Unintentional accident: V01-X59
- Suicide: X60-X84
- Homicide: X85-Y09
- Unknown: Y10-Y34

<table>
<thead>
<tr>
<th>External cause/type of injury</th>
<th>V01-V99</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle: road, water, air</td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td>W00-W29</td>
</tr>
<tr>
<td>Drowning</td>
<td>W65-W74</td>
</tr>
<tr>
<td>Burn, fire, steam</td>
<td>X00-X29</td>
</tr>
<tr>
<td>Poisoning</td>
<td>T61-T90</td>
</tr>
<tr>
<td>Other, please specify</td>
<td></td>
</tr>
</tbody>
</table>

### Place of Injury

- Home
- Street
- Work
- School
- Other, specify
Occupationally related fatalities account for an estimated 16% + of total fatalities in Abu Dhabi (n = 106 in 2007) but is probably under-reported.
Estimating numbers of occupational injuries and fatalities

The Heinrick Accident Triangle Ratios applied to the Emirate of Abu Dhabi occupational fatality data for 2007

<table>
<thead>
<tr>
<th>Serious injuries or deaths</th>
<th>Lost workday cases</th>
<th>Medical treatment cases</th>
<th>First aid cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>106</td>
<td>3180</td>
<td>31 800</td>
<td>318 000</td>
</tr>
</tbody>
</table>
Occupational health surveillance

Occupational health surveillance is the ongoing, systematic collection, analysis, interpretation, and dissemination of data regarding a health-related event for use in public health action to reduce morbidity and mortality and to improve health.
Simplified flow chart of surveillance and occupational health prevention and control activities
ICD codes for occupational injury (safety issues)

- **2006 ICD-9-CM Volume 1 Diagnosis Codes** > Injury And Poisoning 800-999
- **800-804** Fracture of skull
- **805-809** Fracture of spine and trunk
- **810-819** Fracture of upper limb
- **820-829** Fracture of lower limb
- **830-839** Dislocation
- **840-848** Sprains and strains of joints and adjacent muscles
- **850-854** Intracranial injury, excluding those with skull fracture
- **860-869** Internal injury of chest, abdomen, and pelvis
- **870-879** Open wound of head, neck, and trunk
- **880-887** Open wound of upper limb
- **890-897** Open wound of lower limb
- **900-904** Injury to blood vessels
- **905-909** Late effects of injuries, poisonings, toxic effects, and other external causes
- **910-919** Superficial injury
- **920-924** Contusion with intact skin surface
- **925-929** Crushing injury
- **930-939** Effects of foreign body entering through orifice
- **940-949** Burns
- **950-957** Injury to nerves and spinal cord
- **958-959** Certain traumatic complications and unspecified injuries
- **960-979** Poisoning by drugs, medicinals and biological substances
- **980-989** Toxic effects of substances chiefly nonmedicinal as to source
- **990-995** Other and unspecified effects of external causes
- **996-999** Complications of surgical and medical care, not elsewhere classified
ICD10 codes for occupational diseases (Occ health issues)

ICD-10 CODES OF SELECTED OCCUPATIONAL DISEASES

- A.1 CERTAIN INFECTION AND PARASITIC DISEASES (A00-B99)
  - A.1.1 Intestinal and bacterial infections (A00-A69)
  - A.1.2 Chlamydial and rickettsial infections (A70-A79)
  - A.1.3 Viral infections (A80-B34)
  - A.1.4 Mycoses (B35-B49)
  - A.1.5 Protozoal and parasitic diseases (B50-B89)
- A.2 MALIGNANT NEOPLASMS (C00-C97)
- A.3 NON-MALIGNANT DISEASES OF THE BLOOD (D50-D89)
- A.4 MENTAL AND BEHAVIOURAL DISORDERS (F00-F99)
- A.5 DISEASES OF THE NERVOUS SYSTEM (G00-G99)
- A.6 DISEASES OF THE EYE AND ADNEXA (H00-H59)
- A.7 DISEASES OF THE EAR AND MASTOID PROCESS (H60-H95)
- A.8 DISEASES OF THE CIRCULATORY SYSTEM (I00-I99)
- A.9 DISEASES OF THE RESPIRATORY SYSTEM (J00-J99)
  - A.9.1 Pneumoconioses and pulmonary or pleural fibrosis caused by inorganic dusts
  - A.9.2 Occupational asthma and allergic respiratory diseases
  - A.9.3 Toxic and irritative respiratory diseases
- A.10 DISEASES OF LIVER (K00-K93)
- A.11 DISEASES OF THE SKIN AND SUBCUTANEOUS TISSUE (L00-L99)
- A.12 DISEASES OF THE MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE (M00-M99)
- A.13 DISEASES OF THE GENITOURINARY SYSTEM (N00-N99)
- A.14 SYMPTOMS, SIGNS AND ABNORMAL CLINICAL AND LABORATORY FINDINGS, NOT ELSEWHERE CLASSIFIED (R00-R99)
- A.15 INJURY, POISONING AND CERTAIN OTHER CONSEQUENCES OF EXTERNAL CAUSES (S00-T98)
- A.16 EXTERNAL CAUSES OF MORBIDITY AND MORTALITY (V01-Y98)
- A.17 FACTORS INFLUENCING HEALTH STATUS AND CONTACT WITH HEALTH SERVICES (Z00-Z99)
### A.5 Diseases of the nervous system (G00-G99)

<table>
<thead>
<tr>
<th>CODE</th>
<th>DISEASE</th>
<th>AGENT</th>
<th>OCCUPATION/INDUSTRY</th>
</tr>
</thead>
<tbody>
<tr>
<td>G21.-</td>
<td>Secondary parkinsonism</td>
<td>Manganese</td>
<td>Manganese mining and processing, metallurgy, manufacture of batteries, welding</td>
</tr>
<tr>
<td></td>
<td>G21.2 Secondary parkinsonism due to other external causes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G25.-</td>
<td>Other extrapyramidal and movement disorders</td>
<td>Mercury and its compounds</td>
<td>Electrolytic chlorine production, battery production, fungicide manufacture, mercury metallurgy, manufacture of mercury containing equipment (e.g. thermometers)</td>
</tr>
<tr>
<td>G56.-</td>
<td>Mononeuropathies of the upper limb</td>
<td>For G56.0: Forceful repetitive work, vibration and extreme postures of the wrist. Especially a combination of these risk factors</td>
<td>For G56.0: Work involving forceful repetitive movements, work with vibrating tools, work involving extreme postures of the wrist. E.g. meat, poultry and fish processors, sawmill and creamery workers, construction workers</td>
</tr>
<tr>
<td></td>
<td>G56.0 Carpal tunnel syndrome</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>G56.2 Lesion of the ulnar nerve</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>G56.3 Lesion of the radial nerve</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>G56.8 Other mononeuropathies of the upper limb</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### A.7 Diseases of the ear and mastoid process (H60-H95)

Noise-induced hearing loss:

<table>
<thead>
<tr>
<th>CODE</th>
<th>DISEASE</th>
<th>EXPOSURE</th>
<th>OCCUPATION/INDUSTRY</th>
</tr>
</thead>
<tbody>
<tr>
<td>H83.3</td>
<td>Noise effects on inner ear</td>
<td>Excessive noise</td>
<td>A variety of industries and occupations</td>
</tr>
</tbody>
</table>
Pleural Malignancy (ICD-9 Code 163)

- Malignant neoplasm of pleura (ICD-9 code 163) is a disease category that might be expected to include pleural malignant mesothelioma, a tumor type that is strongly associated with asbestos exposure.
- Approximately 85 percent of individuals with malignant mesothelioma have a history of asbestos exposure.
Occupational Sentinel Health Events SHE(O)

• An occupational SHE is a preventable occupational disease, disability, or untimely death whose occurrence serves as a warning signal that;
• provide the impetus for epidemiologic or other studies; or
• serve as a warning signal that materials substitution, engineering control, personal protection, or medical care may be required.
• In 1991 an updated list of 64 occupational sentinel disease conditions were published based on ICD 9 codes.

<table>
<thead>
<tr>
<th>ICD-9</th>
<th>Condition</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>Industry/process/occupation</th>
<th>Agent</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>Coalworker's pneumoconiosis</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>Coal miners(^{114,177}). Snow crab processing worker(^{11}).</td>
<td>Unknown(^{41}).</td>
</tr>
<tr>
<td>501</td>
<td>Asbestosis</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>Asbestos industries and utilizers.(^{21,143,183}).</td>
<td>Coal dust(^{114,121,177}).</td>
</tr>
<tr>
<td>502M(^{k})</td>
<td>Silicosis</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>Quarrymen, sandblasters, silica processors(^{15}), mining, metal, and ceramic industries,(^{186,284}).</td>
<td>Silica(^{15,121,186,237,284}).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cryolite refining(^{175}).</td>
<td>Cryolite (Na(_2)AlF(_6)), quartz dust(^{175}).</td>
</tr>
<tr>
<td></td>
<td>Talcosis</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>Talc processors(^{135}), soapstone mining/milling, polishing,(^{23}) cosmetics industry(^{179}).</td>
<td>Talc(^{23,135,179}).</td>
</tr>
<tr>
<td>503</td>
<td>Chronic beryllium disease of the lung</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>Beryllium alloy workers, ceramic and cathode ray tube makes, nuclear reactor workers.(^{104,269}).</td>
<td>Beryllium(^{104,269}).</td>
</tr>
<tr>
<td>504</td>
<td>Byssinosis</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>Cotton industry workers(^{28,170,185}).</td>
<td>Cotton, flax, hemp, and cotton-synthetic dusts(^{28,170,185}).</td>
</tr>
<tr>
<td>506.0</td>
<td>Acute bronchitis, pneumonitis, and pulmonary edema due to fumes and vapors (O)</td>
<td>P,T</td>
<td>P,T</td>
<td>P,T</td>
<td>Refrigeration, fertilizer,(^{146}) oil refining industries(^{178}).</td>
<td>Ammonia(^{146,178}).</td>
</tr>
<tr>
<td>.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Alkali and bleach industries(^{178}).</td>
<td>Chlorine(^{178}).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silo fillers, arc welders, nitric acid industry.(^{80}).</td>
<td>Nitrogen oxides(^{80,178}).</td>
</tr>
</tbody>
</table>
Useful websites and resources

Updated Guidelines for Evaluating Public Health Surveillance Systems:
http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5013a1.htm

Occupational Sentinel Health Events SHE(O):
http://www.cdc.gov/niosh/topics/SHEO/

INTERNATIONAL STATISTICAL CLASSIFICATION OF DISEASES AND RELATED HEALTH PROBLEMS (ICD-10) IN OCCUPATIONAL HEALTH:

Thank you...😊