Diagnosis and Reporting of Occupational Diseases and Injures in Taiwan

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Diagnosis and Reporting of Occupational Diseases and Injures in Taiwan

- Background and history
- Network of Occupational Diseases and Injuries Service
- Internet-Based Reporting System for Occupational Diseases
- Future Perspectives
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A 37-year-old Male Topside Coke Oven Worker with Lung Adenocarcinoma in 1989
Brief Introduction of Taiwan

- Total/labor population: 23.5/11.7 million
- Unemployment rate: 3.92% in 2016
- GDP per capita: 24,027 USD.
- National health insurance: 99% coverage rate
- Features of industries
  - Small- and medium-sized: 78.1%
  - Service industry: 59.2%
  - Science park: IC manufacturing
The Trend of Employment by Industry Sectors in Taiwan

(Taiwan Statistical Data Book 2017)
Safety and Health Laws and Regulations in Taiwan

- **Labor Insurance Act** in 1958
- **Labor Inspection Act** in 1993 (amended from Factory Inspection Act in 1931)
- **Labor Standards Act** in 1974
- **Regulations of Hazard Communication on Dangerous and Harmful Materials** in 1992
- **Act for Protecting Worker of Occupational Accidents** in 2001
- **Occupational Safety and Health Act** in 2013
- **2014**
Establishment of an Occupational Diseases Surveillance System to Monitor Blood Lead Levels in Taiwan

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Background. Occupational diseases share many common characteristics with infectious diseases. However, the successful approach of using surveillance systems to eradicate infectious diseases has never been applied to the control and prevention of occupational diseases.

Methods. On the basis of a nationwide survey of blood lead levels in the general population in Taiwan, the Ministry of Health, Taiwan, ROC, have developed an obligatory surveillance system for blood lead.

Results. This government-administered system, which uses laboratory data as its source of information, enrolls all workers whose blood lead level exceeds regulation points (40 μg/dl for men and 30 μg/dl for women). A group for Health Promotion of Lead-using Workers (GHPLW) has been organized to be responsible for conducting epidemiological investigations to locate exposure sources in the workplace and to improve the working environment of cases and other workers with the same exposure.

Conclusions. We emphasize that the accomplishment of the GHPLW’s task depends not only on “curing” the case, but also on eradicating the lead exposure source and decreasing the blood lead level of workers in the workplace during long-term follow-up. The system aims to upgrade occupational disease control to the stage of specific prevention and health promotion. The establishment of this system is a historic step in industrial hygiene and occupational disease prevention in Taiwan.
Background

To understand the extent of noise-induced hearing loss (NIHL) among noise-exposed workers, an ongoing public health surveillance system (Program to Reduce Exposure by Surveillance System or PRESS-NIHL) was established in Taiwan in 1995 to monitor the prevalence of NIHL.

Methods. A total of 9,535 noise-exposed (>85 dBA) workers were recruited into PRESS-NIHL from January to June 1995. Each received a periodic annual audiological examination at 1 of 73 well-qualified audiological examination rooms in accredited hospitals. Among those examined, 9,463 audiograms were acceptable for evaluation to determine the severity of NIHL at 4KHz.

Results. The mean hearing threshold at 4KHz was 36.8 dB among male workers and 28.7 dB among female workers. The mean hearing loss at 4KHz for male workers was higher than that of female workers. Among both men and women, hearing ability was found to decrease with increasing age. A total of 2,216 (34.0%) workers were found to have NIHL, with a hearing threshold higher than 40 dB (NIHL) in either one or both ears. Among these workers, 1,886 (19.9%) had mild NIHL (hearing threshold between 40 and 55 dB) and 1,330 (14.1%) had severe NIHL (hearing threshold above 55 dB) in either one or both ears. The proportion of severe NIHL was higher in certain industries, including construction (38.6%), ship building/repairing (19.2%), and weapon manufacturing (13.0%).

Conclusion. This surveillance system for NIHL is one of the first surveillance systems in the world established to monitor and control NIHL in the setting of industrial hygiene and occupational disease prevention. Our finding of a high prevalence of NIHL in certain industries will trigger immediate actions to control noise hazard, which in turn will provide better protection for noise-exposed workers.
Establishment of a Work-Related Diseases Surveillance System in Taiwan, Republic of China

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*Department of Labor and Occupational Health, Taiwan Centers for Disease Control, Taipei; †Department of Health, the Executive Yuan, Taipei; ‡Institute of Biomedical Sciences, Academia Sinica, Taipei; §Department of Health, the Executive Yuan, Taipei, Taiwan, Republic of China

Background. The occurrence of occupational illness and injury has been seriously underestimated in Taiwan, which subsequently contributes to difficulties in performing effective control of occupational hazards and implementing intervention programs for protecting workers.

Methods. Based on the successful experience of the nationwide blood lead level surveillance program, the Department of Health, the Executive Yuan, Taiwan, Republic of China, has established a work-related diseases surveillance system. This government-administered system requests practicing physicians to report the suspected cases suffering from six categories of work-related disorders.

Results. An occupational illness and injury surveillance program in Taiwan has been in operation since June of 1985.

Conclusion. Background information of work-related diseases obtained from this surveillance system will be useful for providing better management of available resources for occupational medicine, for preventing hazards, and for enforcing occupational diseases prevention programs. Our experience in establishing this surveillance system will be used in other countries and settings. © 1996 Academic Press, Inc.

Key Words: work-related diseases, surveillance system, epidemiology, strategy, process, reporting criteria, confirm standards, industrial hygiene, PRESS-WORD.
Ministry of Health
- 1990 1st Center
- 1993 PRESS-BLL
- 1995 PRESS-NIHL
- 1995 PRESS-WORD

Ministry of Labor
- NODIS
- 2003 1st Center of CODISs
- 2007 Center for CODISs
- 2008 Web-based system

Nest Steps
...
Diagnosis and Reporting of Occupational Diseases and Injuries in Taiwan

- Background and history
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Network of Occupational Diseases and Injuries Service (NODIS)

• To set up standard protocols and guidelines of occupational health services including prevention, diagnosis, and return to work
• To report occupational diseases and injuries
• To ensure data quality of occupational diseases and injuries
• To identify occupational disease clusters and sentinel events
• To conduct field epidemiologic investigations of emerging occupational diseases
Network of Occupational Diseases and Injuries Service (NODIS)

• 2003: NTUH served as the first Center for Occupational Disease and Injury Services (CODIS)
• 2007: a coordination center for all CODISs
• 2008: internet-based reporting system
• 2013: Occupational Safety and Health Act
• 2017: 10 CODISs and 77 local network hospitals
10 CODISs + 77 Network Hospitals

- OSHA
- Coordination Center
  - North
    - NTUH
    - VGH
    - CGMH
    - CSMUH
    - CMUH
    - CCH
    - NTUH*
  - Central
    - CMUH
    - CCH
    - NTUH*
  - South
    - CMUH
    - NCKUH
    - TTCH
  - East
    - CSMUH
    - CMUH
    - CCH

*Yunlin branch
10 CODISs + 77 Network Hospitals

- **NTUH**
  - Cardiovascular and lung diseases

- **VGH**
  - Toxic chemical substances

- **CGMH**
  - Chemical and metal toxicity

- **CMUH**
  - Cardiovascular diseases

- **CSMUH**
  - Musculoskeletal disorders

- **CCH**
  - Musculoskeletal disorders

- **NTUH (Yunlin branch)**
  - Musculoskeletal disorders

- **NCKUH**
  - Cancer and skin diseases

- **KMUH**
  - Heavy metal toxicity

- **TTCH**
  - Noise-induced hearing loss

- **CODISs**
- **Network hospitals**
- **Coordination center**
Weekly Outpatient Clinics

CODISs

Network hospitals

Prevention

- Health examination for special hazards
- Basic occupational health service (BOHS)

Diagnosis

Return
- Health examination for special hazards.
- Basic occupational health service (BOHS).
- Diagnosis and treatment of occupational disease/injury
- Evaluation of causal inference
Incidence Rate of Reported Occupational Diseases (per 100,000 employees)
Prevention

- Health examination for special hazards
- Basic occupational health service (BOHS)

Diagnosis

- Diagnosis and treatment of occupational disease/injury
- Evaluation of causal inference

Return

- Fitness for work assessment
- Collaborative training program for return to work (RTW)
Case Number of Successful RTW
Diagnosis and Reporting of Occupational Diseases and Injures in Taiwan

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Internet-Based Reporting System for Occupational Diseases

• To provide comprehensive and reliable national data on the incidence of occupational disease
• To publish comparative national statistics and reports, and contribute to international data
• To inform measures for the primary prevention of occupational diseases
• To ensure appropriate and effective workers’ compensation schemes
List of Occupational Diseases, Labor Insurance Act

- Diseases and their sequelae caused by chemical agents
- Diseases and their sequelae caused by biological agents
- Diseases and their sequelae caused by physical agents
- Diseases and their sequelae caused by other agents
- Occupational cancers
- Cancers caused by specific processes
- Occupational lung diseases
Guidelines for Occupational Diseases, OSHA

- Diseases and their sequelae caused by chemical agents (127)
- Diseases and their sequelae caused by physical agents (12)
- Diseases and their sequelae caused by biological agents (17)
- Diseases and their sequelae caused by ergonomic hazards (7)
- Diseases and their sequelae caused by social and psychological hazards (3)
### 個案通報

**現在狀態：新增**

**通報表單類別：** 目前正新增通報個案

<table>
<thead>
<tr>
<th>系統編號(電腦編號)：</th>
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#### 個案基本資料

<table>
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<tr>
<th>醫院名稱：</th>
<th>(0000000002)職業傷病管理服務中心</th>
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<table>
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<th>西元</th>
<th>出生日期：</th>
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<th>* 性別：</th>
<th>(1)男</th>
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| 電話(宅)： | | 電話(公)： |
|------------|-----------------|

<table>
<thead>
<tr>
<th>有無使用職業(傷)病門診單：</th>
<th>(U)請選擇...</th>
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<th>個案關係姓名：</th>
<th>林子涵</th>
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<th>主治醫師：</th>
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<tr>
<th>培訓醫師：</th>
<th>請選擇</th>
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#### 傷病情形及診斷

<table>
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<tr>
<th>(1)勞保表列職業病</th>
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<table>
<thead>
<tr>
<th>患病時間：西元</th>
<th>年</th>
<th>月 (個案自述)</th>
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</table>

<table>
<thead>
<tr>
<th>確診時間：西元</th>
<th>年</th>
<th>月</th>
</tr>
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* 勞保局職業病種類表：
Criteria for Diagnosis of Occupational Diseases

• 1. Evidence of physical or mental illness
• 2. Evidence of hazardous exposures
• 3. Temporality including appropriate induction time
• 4. Consistency with other medical or epidemiological reports
• 5. Other alternative explanations largely ruled out
OM specialists in the NODIS

Reporting OD cases through internet-based system

Coordination center

3 experienced OM specialists review work-relatedness

Fulfill OD criteria

Accept and include in reporting database

Fail to fulfill OD criteria

Reject and exclude from reporting database

Occupational disease reporting system
Reporting rate of OD (per 100,000)

Compensation rate of OD (per 100,000)
<table>
<thead>
<tr>
<th>Rank</th>
<th>Condition</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Noise-induced hearing loss</td>
</tr>
<tr>
<td>2</td>
<td>Carpal tunnel syndrome</td>
</tr>
<tr>
<td>3</td>
<td>MSD of upper extremities</td>
</tr>
<tr>
<td>4</td>
<td>Lumbar HIVD</td>
</tr>
<tr>
<td>5</td>
<td>Contact dermatitis</td>
</tr>
<tr>
<td>6</td>
<td>Pneumoconiosis</td>
</tr>
<tr>
<td>7</td>
<td>Caisson disease</td>
</tr>
<tr>
<td>8</td>
<td>Lead toxicity</td>
</tr>
<tr>
<td>9</td>
<td>Acute cardiovascular disease</td>
</tr>
<tr>
<td>10</td>
<td>Cervical HIVD</td>
</tr>
<tr>
<td>11</td>
<td>Asthma</td>
</tr>
<tr>
<td>12</td>
<td>Cancer</td>
</tr>
<tr>
<td>2008 Leading OD (case number)</td>
<td>2017 Leading OD (case number)</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>1. NIHL (404)</td>
<td>1. NIHL (1,556)</td>
</tr>
<tr>
<td>2. CTS (230)</td>
<td>2. Contact dermatitis (240)</td>
</tr>
<tr>
<td>3. Lumbar HIVD (169)</td>
<td>3. MSDs of upper limb (189)</td>
</tr>
<tr>
<td>4. MSDs of upper limb (154)</td>
<td>4. CTS (183)</td>
</tr>
<tr>
<td>5. Cervical HIVD (37)</td>
<td>5. Lumber HIVD (159)</td>
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<tr>
<td>6. Contact dermatitis (28)</td>
<td>6. Pneumoconiosis (69)</td>
</tr>
<tr>
<td>7. Pneumoconiosis (20)</td>
<td>7. Lead toxicity (31)</td>
</tr>
<tr>
<td>8. Cancer (15)</td>
<td>8. Acute CV disease (23)</td>
</tr>
<tr>
<td>10. Lead toxicity (9)</td>
<td>10. Cervical HIVD (8)</td>
</tr>
<tr>
<td>11. Acute CV disease (6)</td>
<td>11. Caisson disease (4)</td>
</tr>
<tr>
<td>12. Asthma (1)</td>
<td>12. Asthma (3)</td>
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Color coding:
- **Physical**: Light blue
- **Chemical**: Green
- **Ergonomic**: Orange
- **Psychosocial**: Yellow
- Higher or same ranking: Solid black line
- Lower ranking: Dashed black line
<table>
<thead>
<tr>
<th>Top reported OD</th>
<th>Total</th>
<th>Mean age</th>
<th>M/F ratio</th>
<th>Frequently reported industries</th>
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</thead>
<tbody>
<tr>
<td>NIHL</td>
<td>9,619</td>
<td>47.5</td>
<td>93.3</td>
<td>Manufacturing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Electricity, gas and water supply</td>
</tr>
<tr>
<td>CTS</td>
<td>2,068</td>
<td>47.8</td>
<td>30.8</td>
<td>Manufacturing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Accommodation and food service</td>
</tr>
<tr>
<td>MSDs of upper limb</td>
<td>1,951</td>
<td>47.4</td>
<td>45.3</td>
<td>Manufacturing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Construction</td>
</tr>
<tr>
<td>Lumbar HIVD</td>
<td>1,543</td>
<td>47.5</td>
<td>79.4</td>
<td>Manufacturing</td>
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<td>Transportation and storage</td>
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<tr>
<td>Contact dermatitis</td>
<td>1,329</td>
<td>35.1</td>
<td>58.1</td>
<td>Accommodation and food service</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Professional, scientific and technical</td>
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<td>Pneumoconiosis</td>
<td>724</td>
<td>64.3</td>
<td>77.2</td>
<td>Manufacturing</td>
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<tr>
<td></td>
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<td></td>
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<td>Mining and quarrying</td>
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<tr>
<td>Caisson disease</td>
<td>313</td>
<td>43.1</td>
<td>99.7</td>
<td>Agriculture, forestry and fishing</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Professional and technical activities</td>
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<td>Lead toxicity</td>
<td>247</td>
<td>40.1</td>
<td>77.7</td>
<td>Manufacturing</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>Construction</td>
</tr>
<tr>
<td>Acute CV disease</td>
<td>161</td>
<td>49.2</td>
<td>89.4</td>
<td>Manufacturing</td>
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<td></td>
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<td>Transportation and storage</td>
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<td>84.1</td>
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<td></td>
<td>Construction</td>
</tr>
<tr>
<td>Asthma</td>
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<td>46.4</td>
<td>60.6</td>
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<td></td>
<td></td>
<td></td>
<td>Construction</td>
</tr>
<tr>
<td>Cancer</td>
<td>111</td>
<td>60.2</td>
<td>91.9</td>
<td>Construction</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Manufacturing</td>
</tr>
</tbody>
</table>
Working ≥55 hours per week
- RR of CHD: 1.13 (1.02-1.26)
- RR of stroke: 1.33 (1.11-1.61)
Diagnosis and Reporting of Occupational Diseases and Injures in Taiwan

- Background and history
- Network of Occupational Diseases and Injuries Service
- Internet-Based Reporting System for Occupational Diseases
- Future Perspectives
10-Year Results in 2008-2017

• 10 CODISs and 77 local network hospitals
• Weekly outpatient clinics from 142 to 260
• Outpatient services from 9,435 to 22,156
• Reported occupational diseases: 15.5 to 23.0 per 100,000 employees
Network of Occupational Diseases and Injuries Service (NODIS)

ILO 2013
Emerging Occupational Hazards

- Asbestos
- Mesothelioma
- Overwork
- Acute CVD
- Ergonomic
- MSDs
- Psychosocial
- PTSD
- Noise
- Hearing loss

Multispecialty Collaboration

Network of Occupational Diseases and Injuries Services

AI-Assisted Data Linkage

- Occupational Safety and Health Administration
- Bureau of Labor Insurance

- Early detection and prevention of newly emerging occupational hazards.
- Reduce underreporting of OD and enhance compensation rate.
- Individualized and comprehensive program for return to work.
Note: reprinted and adapted from *International comparisons of compensation rates for occupational diseases*, by Ya-Wen Cheng, 2014
Future Works

• Reports from general practitioners as well as other clinical specialties represent an important mechanism for improving the coverage

• Mechanisms for cooperation with other relevant authorities and organizations, such as health, social security, education, safety and research, can help to expand the coverage

• Informal sector through the Basic Occupational Health Services approaches

• Campaigns on the importance of diagnosis and reporting of occupational diseases

• Prohibition against discriminating against workers who report their injuries or diseases

• Collecting data on occupational and work-related diseases from multiple sources

• Use surveys of occupational injuries and illnesses to obtain information to supplement the reporting system

• AI-assisted quality assurance for the reporting system

• ...
Occupational diseases are common. Common diseases are occupational.