Introduction to Chinese Occupational Health

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P. R. China
Occupational Health (OH) in China before 1949

- It was behind the world
  - United Kingdom
    - In 1833, labour laws and the Factory Inspectorate were established
  - China
    - In 1926, OH exploration just began
    - In 1929, the Factory Health Law was established
    - In 1931, the Factory Inspection Law was established

- OH stopped in 1937 (Second World War)

- The serious OH problem
  - More than 90,000 workers died caused by pneumoconiosis in Hu’nan Tin Mine from 1898 to 1947
OH in China after 1949

- People’s Republic of China was established in 1949
  - elementary period (1949-1959)
    - First institute for OH was set up in north-east of China in 1950
    - First list of occupational disease was published in 1957
      - 14 kinds of occupational disease
    - First standard of OH was published in 1959
  - developing period (1960-1965)
    - 22 province set up institutes for OH
    - More than 200 cities set up institutes for OH
    - National program for Occupational disease prevention and treatment was published
  - break period (1966-1976 Cultural Revolution)
  - rebuilding period (1977-1986)
    - Institutes for OH were reconstructed
    - Some researches of OH were reinstated.
  - legal management period (1986 until now)
OH in China after 1949

- **Legal management period**
  - Local legislations were published in 1987
  - Second list of occupational disease was published in 1987
    - 9 sorts and 99 kinds of Occupational disease
  - 3 national rules for OH were published in 1987
  - The Law for Occupational Disease Prevention and Treatment was published in 2001
  - Third list of occupational disease was published in 2002
    - 10 sorts and 115 kinds of Occupational disease
  - A serial of national rules for OH were published in 2002
  - A serial of national standard for OH were published from 2002 until now
  - 1327 institutes for health examination
  - 1200 institutes for OH service (test, assessment, training)
  - 356 institute for diagnosis of occupational disease
OH system in China

- Legislation
- Administration
- OH standard
- Technical service
- Inspection
Occupational health legislative framework

Framework of legal system related to occupational health and safety in China
Legal Frameworks of Occupational Health

- Law for Occupational Diseases Prevention and Treatment
  promulgated on Oct. 27, 2001

- Working safety Law
  promulgated on June 29, 2002

- Labor Law
  promulgated on July 5, 1994

- Labor Contract Law
  promulgated on June 29, 2007

- Employment Promotion Law
  promulgated on Aug. 30, 2007

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Legal Frameworks of Occupational Health

Regulations promulgated by the State Council

- Regulations on Management of Chemicals Safety
- Regulations on Labor Protection for Using Toxic Substances in Workplace
- Regulations on Radiation Safety
- Regulations on Insurance for Work-related Injuries
Main rule on occupational health management

- Source control of occupational hazard
  - Administrative measures on classification of construction project with occupational hazards
  - Administrative Measures on identification of chemical toxicity

- Workplace management
  - Notification of Occupational Hazards
  - Periodical surveillance and assessment of Occupational hazard

- Health management
  - Administrative measures on health surveillance and protection for workers
Main rule on occupational health management

- Patient’s right protection
  - List of occupational diseases
  - Administrative measures on occupational disease diagnosis and identification
  - Occupational disease treatment
  - Insurance for work-related injuries

- Accident management
  - Forecast on occupational hazardous accident
  - Accident treatment
  - Basic Occupational Health Service pilots
Occupational hazard management of Construction project

Period of feasibility study
The owner submits a preliminary assessment report on the hazards

Period of design
For serious hazards project, the design of the protective facilities shall be subject to examination

Period of construction
protective facilities shall be constructed with the main body of the construction project same time.

Period of completed and acceptance
assess the effect of the control of hazards

Operation and production
Health surveillance and protection

Health files management

- Check-ups before exposed to hazards
- Periodical Check-ups in service
- Check-ups while engaged exposed to hazards
- Check-ups while accident
- Medical observation after exposed to hazards
List of Occupational Diseases

一、尘肺（Pneumoconiosis）
1、矽肺(Silicosis)
2、煤工尘肺(Coal Miners’ Pneumoconiosis)
3、石墨尘肺(Graphite Pneumoconiosis)
4、碳黑尘肺(Carbon Black Pneumoconiosis)
5、石棉肺(Asbestosis)
6、滑石尘肺(Talc Pneumoconiosis)
7、水泥尘肺(Cement Pneumoconiosis)
8、云母尘肺(Mica Pneumoconiosis)
9、陶工尘肺(Potters’ Pneumoconiosis)
10、铝尘肺(Aluminosis)
11、电焊工尘肺(Welders’ Pneumoconiosis)
12、铸工尘肺(Foundry Workers’ Pneumoconiosis)
13、根据《尘肺病诊断标准》和《尘肺病理诊断标准》可以诊断的其它尘肺
(Other Pneumoconioses Diagnosed by《Diagnostic Criteria of Pneumoconioses》
and《Pathologic Diagnostic Criteria of Pneumoconioses》)
List of Occupational Diseases

二、职业性放射性疾病 (Occupational Radiation Sickness)

1. 外照射急性放射病 (Acute Radiation Sickness from External Exposure)
2. 外照射亚急性放射病 (Subacute Radiation Sickness from External Exposure)
3. 外照射慢性放射病 (Chronic Radiation Sickness from External Exposure)
4. 内照射放射病 (Internal Radiation Sickness)
5. 放射性皮肤病 (Radiational Dermatosis)
6. 放射性肿瘤 (Radiational Tumour)
7. 放射性骨损伤 (Radiational Injury of Bone)
8. 放射性甲状腺疾病 (Radiational Thyroid Disease)
9. 放射性性腺疾病 (Radiational Gonad Disease)
10. 放射复合伤 (Combined Radiation Injury)
11. 根据《职业性放射性疾病诊断标准》 (总则) 可以诊断的其它放射性损伤 (Other Radiational Injuries Diagnosed by 《General Diagnostic Guideline of Occupational Radiation Sickness》)
List of Occupational Diseases

三、 职业中毒(Occupational Poisoning)
1、 铅及其化合物中毒（不包括四乙基铅）
   (Lead and its Compound Poisoning (not Including Tetraethyl Lead))
2、 汞及其化合物中毒(Mercury and its Compound Poisoning)
3、 锰及其化合物中毒(Manganese and its Compound Poisoning)
4、 镉及其化合物中毒(Cadmium and its Compound Poisoning)
5、 铍病(Beryllium Disease)
6、 砷及其化合物中毒(Arsenic and its Compound Poisoning)
7、 钡及其化合物中毒(Barium and its Compound Poisoning)
8、 钒及其化合物中毒(Vanadium and its Compound Poisoning)
9、 磷及其化合物中毒(Phosphorus and its Compound Poisoning)
10、 砷及其化合物中毒(Arsenic and its Compound Poisoning)
List of Occupational Diseases

11. Ura[ium Poisoning
12. Arsenic Trihydride Poisoning
13. Chlorine Poisoning
14. Sulfur Dioxide Poisoning
15. Phosgene Poisoning
16. Ammonia Poisoning
17. Dimethylhydrazine Poisoning
18. Nitrogen Oxides Poisoning
19. Carbon monoxide Poisoning
20. Carbon Disulfide Poisoning
List of Occupational Diseases

- 21、硫化氢中毒 (Hydrogen Sulfide Poisoning)
- 22、磷化氢、磷化锌、磷化铝中毒 (Phosphine, Zinc, Phosphide, Aluminium Phosphide Poisoning)
- 23、工业性氟病 (Industrial Fluorosis)
- 24、氰及腈类化合物中毒 (Cyanides and Nitriles)
- 25、四乙基铅中毒 (Tetraethyl Lead Poisoning)
- 26、有机锡中毒 (Organic Tin Poisoning)
- 27、羰基镍中毒 (Nickel Carbonyl Poisoning)
- 28、苯中毒 (Benzene Poisoning)
- 29、甲苯中毒 (Toluene Poisoning)
- 30、二甲苯中毒 (Xylene Poisoning)
List of Occupational Diseases

- 31、正己烷中毒 (N-hexane Poisoning)
- 32、汽油中毒 (Gasoline Poisoning)
- 33、一甲胺中毒 (Monomethylamine Poisoning)
- 34、有机氟聚合物及其热裂解物中毒
  (Organic Fluoride Compounds and their Pyrolysates Poisoning)
- 35、二氯乙烷中毒 (Dichloroethane Poisoning)
- 36、四氯化碳中毒 (Carbon Tetrachloride Poisoning)
- 37、氯乙烯中毒 (Vinyl Chloride Poisoning)
- 38、三氯乙烯中毒 (Trichloroethylene Poisoning)
- 39、氯丙烯中毒 (Allyl Chloride Poisoning)
- 40、氯丁二烯中毒 (2-Chlorobutadeine Poisoning)
List of Occupational Diseases

- 41. 苯的氨基及硝基化合物(不包括三硝基甲苯)中毒 (Aromatic Amino-and Nitro-Compounds (not Including Trinitrotoluene) Poisoning)
- 42. 三硝基甲苯中毒 (Trinitrotoluene Poisoning)
- 43. 甲醇中毒 (Methanol Poisoning)
- 44. 酚中毒 (Phenol Poisoning)
- 45. 五氯酚（钠）中毒 (Pentachlorophenol Poisoning)
- 46. 甲醛中毒 (Formaldehyde Poisoning)
- 47. 硫酸二甲酯中毒 (Dimethyl Sulfate Poisoning)
- 48. 丙烯酰胺中毒 (Acrylamide Poisoning)
- 49. 二甲基甲酰胺中毒 (Dimethyl Formamide Poisoning)
- 50. 有机磷农药中毒 (Organophosphates Pesticides Poisoning)
List of Occupational Diseases

- 51. Carbamates Insecticides Poisoning
- 52. Chlordimeform Poisoning
- 53. Bromomethane Poisoning
- 54. Pyrethroids Insecticides Poisoning
- 55. Other Toxic Hepatopathies Diagnosed by *Diagnostic Criteria of Occupational Toxic Hepatopathy*
- 56. Other Occupational Acute Poisonings Diagnosed by *General Diagnostic Criteria of Occupational Acute Poisoning*
List of Occupational Diseases

四、物理因素所致职业病 (Occupational Diseases Caused by Physical Factors)

1. 中暑 (Heat Stress)
2. 减压病 (Decompression Sickness)
3. 高原病 (Mountain Sickness)
4. 航空病 (Aviation Sickness)
5. 手臂振动病 (Hand-arm Vibration Syndrome)
List of Occupational Diseases

五、生物因素所致职业病

1. 炭疽 (Anthrax)
2. 森林脑炎 (Forest Encephalitis)
3. 布氏杆菌病 (Brucellosis)
List of Occupational Diseases

六、 职业性皮肤病 (Occupational Dermatosis)

1、 接触性皮炎 (Contact Dermatitis)
2、 光敏性皮炎 (Photosensitive Dermatitis)
3、 电光性皮炎 (Electroflash Dermatitis)
4、 黑变病 (Occupational Melanosis)
5、 痤疮 (Occupational Acne)
6、 溃疡 (Occupational Ulcers)
7、 化学性皮肤灼伤 (Chemical Skin Burns)
8、 根据《职业皮肤病诊断标准（总则）》可以诊断的其它职业性皮肤病

(Other Occupational Dermatoses Diagnosed by 《General Diagnostic Criteria of Occupational Dermatosis》)
List of Occupational Diseases

七、 职业性眼病 (Occupational Ophthalmopathy)

1、 化学性眼部灼伤 (chemical Eye Burns)

2、 电光性眼炎 (Electric Ophthalmia)

3、 职业性白内障（含放射性白内障、三硝基甲苯白内障）

(Occupational Cataract Including Radiational Cataract, Trinitrotoluene Cataract)
List of Occupational Diseases

八、职业性耳鼻喉口腔疾病 (Occupational Otolaryngological and Stomatological Diseases)

1、噪声聋 (Noise-induced Hearing Loss)
2、铬鼻病 (Chromium Induced Nasal Disease)
3、牙酸蚀病 (Dental Erosion)
List of Occupational Diseases

九、 职业性肿瘤 (Occupational Tumour)
1、 石棉所致肺癌、间皮瘤 (Cancer of Lung, Mesenterioma Caused by Asbestos)
2、 联苯胺所致膀胱癌 (Bladder Carcinoma Caused by Benzidine)
3、 苯所致白血病 (Leukemia Caused by benzene)
4、 氯甲醚所致肺癌 (Cancer of Lung Caused by Chloromethyl Ether)
5、 砷所致肺癌、皮肤癌 (Cancer of Lung, Skin Carcinoma Caused by Arsenic)
6、 氯乙烯所致肝血管肉瘤 (Angiosarcoma Caused by Vinyl Chloride)
7、 焦炉工人肺癌 (Lung Cancer of Coke Furnace Workers)
8、 铬酸盐制造业工人肺癌 (Lung Cancer of Workers in Chromate Manufacturing Industry)
List of Occupational Diseases

十、其它职业病(Other Occupational Diseases)

1、金属烟热(Metal Fume Fever)
2、职业性哮喘(Occupational Asthma)
3、职业性变态反应性肺泡炎(Occupational Allergic Alveolitis)
4、棉尘病(Byssinosis)
5、煤矿井下工人滑囊炎(Bursitis of Underground Coal Miners)
Occupational disease diagnosis and identification

**Diagnosis**
- Team work (Diagnosed by more than 3 doctors)
- The institute for Occupational disease diagnosis
- Going to identification if patient disagree the diagnosis

**First identification**
- Team work (Identified by more than 5 experts)
- Health department of city government

**Last identification**
- Team work
- Health department of province government
Classification and system of occupational health standards

- OELs for occupational hazards in workplace
- Basic occupational health standards
- Measurement for occu. hazards in workplace
- OH assessment for occu. hazards in workplace
- OH management standards for workplace
- Diagnostic Criteria of Occupational Disease
- Guideline for occupational health surveillance
# Occupational Health Standard

<table>
<thead>
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<th>Occupational health</th>
<th>Diagnostic criteria of occup. Dis.</th>
<th>Radiation protection</th>
<th>Diagnostic criteria of radiat. Dis.</th>
<th>total</th>
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<td>201*</td>
<td>103</td>
<td>103</td>
<td>448</td>
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*400 OELs included
OH Administration system

- Ministry of Health
- Department of health
  - On province level
- Department of health
  - On city level
- Department of health
  - On county level
OH Inspection System

- OH section
  National center for health inspection

- OH section
  Bureau for health inspection
  On province level

- OH section
  Bureau for health inspection
  On city level

- OH section
  Bureau for health inspection
  On county level
OH Technical Service System

- OH department, National CDC
- Hospital(institute) for occupational disease prevention and treatment
  - Oh department of province CDC
- Hospital(institute) for occupational disease prevention and treatment
  - Oh of city CDC
- OH department of County CDC
- Institute for Oh on township level;
  - OH section of township hospital
Introduction to Guangdong
Location: closing to Hong Kong
Introduction to Guangdong Status

- The earliest opening province
  - Three earliest Special Economic Zones all locate in Guangdong
    - Shenzhen, Zhuhai and Shantou
- The first largest province in population
  - More than 100 million in 2008
  - Working population is 55 million
- 20 million migrant workers in Guangdong
Introduction to Guangdong

Fast developing. In 1978, the GDP was only 2.5 Bi US$, but it became to 700 Bi US$ in 2008.

Changing GDP in Guangdong
1978-2008
Introduction to Guangdong

- Most of serious poisoning accidents caused by new chemicals happened in Guangdong, China.

- The earliest province establishing PCC and promulgating local regulation for occupational health and safety.

- Better professional technical system for occupational disease prevention and treatment (ODPT)
  - province level: 1 hospital for ODPT
  - city level: 8 hospitals for ODPT
  - 4 institutes for occupational health (OH)
  - 9 OH departments of CDC
  - county level: 144 OH departments of CDC
Professional Technical System for ODPT in Guangdong

Guangdong Province Hospital for Occupational Disease Prevention and Treatment

Hospital/Institute for ODPT on City Level

OH Department of CDC on County Level

OH Department of Institute for Disease prevention on Township Level

OH workers of Medical Care Center on Community Level
New Character 1
The total cases of occupational disease are increasing recent years

- The number of silicosis cases decreased.
- The number of occupational poisoning cases is increasing.
- The number of other kinds of occupational disease is increasing
  - Noise-induced hearing loss
  - Hand-arm vibration syndrome
  - Heat stress
Changing the Total Number of Occupational Disease in Guangdong from 1989 to 2009

1989–2009年广东省职业病发病总数变化

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<th>Year</th>
<th>1989</th>
<th>1991</th>
<th>1993</th>
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<td>710</td>
<td>631</td>
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<td>276</td>
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Classification of Occupational Disease in 2006

- 尘肺 (Pneumoconiosis)
- 职业中毒 (Occupational Poisoning)
- 中暑 (Heat Illness)
- 减压病 (Decompression Sickness)
- 手臂振动病 (Hand-arm Vibration Syndrome)
- 职业性皮肤病 (Occupational Dermatosis)
- 噪声聋 (Noise-induced Hearing Loss)
- 苯所致白血病 (Leukemia Caused by benzene)
- 职业性眼病 (Occupational Ophthalmopathy)
New Character 2
The organic solvent poisoning increased

- The percentage of organic solvent poisonings increased
  - from 2.4% in 1980s to more than 30% in 2000s

- The percentage of organic solvent poisonings more than 80% in some year
From 1995 to 1998, the poisoning numbers caused by n-hexane, trichloroethylene, dichloromethane, benzene are 126 cases that is 44.21% of total poisoning cases.
Some New Chemical Poisoning Events Were Found

- n-Hexane
- Vanadium pentoxide ($V_2O_5$)
- Dichloroethane (DCE)
- m-Fluorophenol
- Trichloromethane
- Acetic acid ethenyl ester
- Trichloroethylene
- Organic Tin
- TOCP
- Dimethyl formamide (DMF)
- Hydro arsenide
- Ethyl mercaptan
New Problems Caused by Trichloroethylene

- Medicamentose-like dermatitis
  - a serious immune damage
- Features
  - Fever,
  - Serious damage of skin
  - Serious damage of liver
  - Swollen superficial lymphonodes
Hemorrhage in Colon
Poisoning Caused by \textit{n}-Hexane
Poisoning Caused by Benzene
Poisoning Caused by Benzene
Poisoning Caused by Dichlororoethane
Poisoning Caused by Organic Tin
Poisoning Caused by Organic Tin
Poisoning Caused by Organic Tin
More than 75% New Chemical Poisoning Events First Found in Foreign Small-Middle Enterprises

- Dichloroethane (DCE) in Zhuhai
- n-Hexane in Donguan
- Organic tin in Boluo
- Trichloroethylene in Baoan
- Acetic acid ethenyl ester in Shanwei
Character 4
Serious Occupational Disease Accidents Happened Sometimes

- Silicosis happened in Shanwei, Huizhou
- Poisoning caused by n-hexane in Shengzhen, Dongguan
- Poisoning caused by organic tin in Huizhou, Zhongshan
- Poisoning caused by dichloroethane in Zhuhai
New Character 5
Some Aftermaths Caused by Chronic Effect of Industry Raw Materials Are Appearing

- Cadmium
- Benzene
- Vibration
New Character 6
Occupational Disease Accidents Caused Serious Social Problem

- Lose money
- Enterprises bankruptcy
- Social unsteady
  - Workers become poor due to disease
Strategy 1
Management by the Law

- Occupational hazard source control
- Workplace management
- Health monitoring and protection
Strategy 2
Enhance Science Research

- Causes and mechanism of occupational disease
- Strategies
  - Administration
  - Technology
- Treatment methods for patients
Strategy 3
Enhance Economic Control

- Occupational hazard tax
- Social insurance
  - Occupational disease insurance
- The relief fund for occupational disease patients
Strategy 4
Promoting Basic Occupational Health Service

- Plan for occupational disease control
- Government support
- Professional training
- Public education
Strategy 5
Developing a Net of Poison control

- Poison Control Branch, City level
- Poison Control Center, Province level
  - Information
  - Emergency
  - Consultation
Introduction to Guangdong Province Hospital for Occupational Diseases prevention and Treatment (GDHODPT)

Resources

- Personnel: 335 professionals
  - Physician, Nurses, Toxicologists, Analytical Chemists, etc.
- Building: 22,000 M² (236,800 FT²)
- Funding US$ 2 million from the Government
- 1 inpatient department (120 beds and 1 ICU)
- 4 Labs.
Main Laboratories of the Hospital

- Toxicological lab.
  - National lab. for pesticides
- Toxicant analysis lab.
  - Important lab. in Guangdong province
- Clinical lab.
- Radiological lab.
Main Departments of the Hospital

- Department of Management for Occupational Health
- Institute for Radiological Prevention and Protection
- Institute for Occupational Health Assessment
- Department of Physical Factors
- Clinical Branch
  - In-patient department
    - Poisoning section
    - Radiological section
    - ICU
  - Center for occupational health surveillance
Main Functions

- Surveillance and management of occupational health
- Management of radioisotope and radiation apparatus
- Diagnosis and treatment of occupational disease
- Investigation, treatment and rescue of poisoning and nuclear accidents
- Management of the quality of large medical equipment
- Training, health education and health promotion
- Body check-up and health monitoring for various kinds of workers
- Scientific research on radiation hygiene and occupational disease prevention and treatment
- Editing and publishing the magazines of
Main Analysis Apparatus

- 气-质联用仪：GC-MS
- 液-质联用仪：LC-MS
- 电感耦合等离子体质谱：ICP-MS
- 高效液相色谱仪：LC
- 气相色谱仪：GC
- 原子吸收光谱仪：AAS
- 原子荧光分光光度仪：AFS
- 傅立叶红外光光谱仪：IR
- 离子色谱仪：IC
Main Radiological Surveillance Apparatus

- Digital ray spectrometer
- Neutron monitor dosimeter
- Radon monitor
- Electromagnetic radiation measurement
- Other radiation detection instruments
- Instruments for physical factor detection
Main Toxicological Test Apparatus 3

- Pathological analysis system
- Two-dimensional electrophoresis
- Microscopic operation system
- PCR
- Nucleic acid detection system
- -197°C Liquid nitrogen refrigerator
- Dynamic inhalation chamber system
- Fluo inverted microscope

- Pathological analysis system
- Two-dimensional electrophoresis
- Microscopic operation system
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Main Clinical Apparatus

- 肺功能测定仪  Lung function examination
- 听力测定系统  Audition examination
- 肌电图仪  Electromyography
- 全身多功能彩色多普勒超声诊断仪  Coloring ultrasonic doppler
- 全自动生化分析仪  Automatic biochem analyser
- 放射免疫测定仪  Radiation immunoassay analyser
- 酶标仪  Enzyme-linked immunosorbent analyser
- 血液透析机  Hemodialysis facilities
Histories of GDHODPT

- Established in 1959
- Former name:
  - Only 2 departments
  - Personnel: 20 professionals
  - Building: 100M²
  - Almost no apparatus
- In 1972, she was united with Hospital for Workers and the name changed to Guangdong Province Hospital for Occupational Disease Prevention and Treatment (GDHODPH)
- In 1982, she disjoined with , but the name remained
- In 1996, the site moved to the place right here.
Co-operation and exchange

International cooperation
- ILO
- WHO
- Nagoya U., Japan: skin and liver serious damage caused by trichloroethene
- NCI, US: benzene, trichloroethene, formaldehyde on cancer
- US UCB, US: biosample collection and storage

National cooperation
- National CDC, China
- Sun Ye-sen U
- Middle China U.
- Shanxi U.
- Beijing U.
- South Med. U
- Hong Kong Opening U.
Researches and achievements in recent 5 years

- 80 national and provincial projects
- 9 books
- 400 articles
- 9 patents
- 1 law draft
- 90 national standard drafts
- 4 national awards on science research
- 70 provincial awarded achievements
- 3 important medical subjects of Guangdong province
Thanks!