Recollection

History of the Development of the Reporting System of Occupational Diseases and Occupational Disease List in China

Dan Wang[1]; Anqi Liu[1]; Siyu Zhang[1]; Yue Yu[1]; Weijiang Hu[1]; Xin Sun[1,#]

Overview

An occupational disease reporting system has been developed starting from a paper-based reporting system to a network-based direct reporting system. The reporting system has been linked with more than 43,300 users from 25,000 agencies at the national, provincial, municipal, and county levels in a unified vision to report individual cases of occupational diseases and chemical poisonings. Following the establishment of the reporting system of occupational diseases, the list of occupational diseases has been published since the 1950s, beginning with 14 diseases and revised by recognition and establishment of more occupational diseases in accordance with scientific advancements in medical science. The list of occupational diseases represents increasing knowledge on the development of medical sciences and disease diagnosis technologies and it plays a dual role in prevention and compensation of occupational diseases.

Definition of occupational disease

According to the *"Law on Prevention and Control of Occupational Disease*" modified in 2018, the term "occupational diseases" has been defined as diseases caused by exposure to dust, radioactive substances, and other poisonous and dangerous substances during occupational activities (*1*). There are two critical prerequisites to define an occupational disease: 1) a causal relationship can be established between exposure to a specific hazard during occupational activities and a specific disease; and 2) the concentration or intensity of exposure to a specific hazard is sufficient to cause a specific disease.

Chronology of the Reporting System of Occupational Diseases in China

Surveillance data is crucially important to guide policy development and public health practice, and the reporting system of occupational diseases has been gone through three stages in China including the initial stage, rebuilding stage, and development stage.

In the initial stage (1956–1970s), the State Council issued the "*Guideline on Reporting of Death and Occupational Accidents of Workers and Employers*" in 1956, and this official document normalized investigations, registrations, and reporting of acute chemical poisoning accidents. Following the guideline, a paper-based reporting system was established to investigate, register, and report acute poisoning accidents.

In the rebuild stage (mid 1970s–mid 1980s), the Ministry of Health and the State Bureau of Labor jointly published the *"Regulation on Reporting of Chemical Poisoning and Occupational Disease"* in 1982 (*2*). In 1985, the Ministry of Health issued a notice on the establishment of an annual reporting system for the prevention and control of occupational diseases including statistical reports of the hazard measurement in the workplace and medical examinations of workers exposed to hazards in the workplace. This built a foundation for the standardization and institutionalization on management of occupational disease reporting in China with indicators of occupational disease prevention, management, and effect evaluation.

In the development stage (mid 1980s–now), with the rapid technological development of informatics, a computer-based national reporting system was established in 1997 to electronically report individual cases of occupational diseases and pesticide poisoning. The database of occupational diseases had been established at the national and provincial levels for data analysis.

Since 2006, a network-based direct reporting system has been developed, which is a subsystem of the national information system of disease control and prevention managed by China CDC. In the current reporting system, based on the "*Occupational Disease Classification and Catalogue*" revised in 2013 (*3*), a total of 121 diseases in 9 categories were reported including 19 classified as occupational pneumoconiosis and other respiratory diseases, 9 as occupational dermatoses, 3 as occupational eye diseases, 4 as

occupational otolaryngologic and oral diseases, 60 as occupational chemical poisoning, 7 as occupational diseases caused by exposed to physical factors, 5 as occupational infectious diseases, 11 as occupational tumors, and 3 as other occupational diseases; 11 occupational radioactive diseases are reported separately.

The contents reported in the document contain 1) occupational pneumoconiosis; 2) occupational diseases without occupational pneumoconiosis and radioactive diseases; 3) occupational disease diagnostic information; 4) occupational health examination information; 5) suspected occupational diseases; and 6) pesticide poisoning. The reporting agencies include occupational disease diagnostic agencies, occupational health examination agencies, and other medical agencies at different levels.

Over past 60 years, there have been remarkable changes in the nature of work, such as the demographics of workers, and efforts have been made to improve and modernize the reporting system to achieve a better and more intelligent system. Under the management of the National Health Commission (the successor to China's Ministry of Health), monthly, quarterly, and annual reports are prepared by China CDC, and a national report of occupational diseases is published annually by the National Health Commission.

Historical Development of the List of Occupational Diseases in China

The list of occupational disease is a collection of diseases caused by exposure to hazardous risks during occupational activities. It reflects the increasing knowledge and cognition for changes in the types of work and rapid advancements of medical sciences and diagnostic technology of diseases. It plays a critical role in both of prevention and compensation of occupational diseases.

Following the "*Regulation on Scope of Occupational Diseases and Treatment Occupational Disease Patients*" first released in 1957 (*4*), the list of occupational diseases was first published with 14 occupational diseases (Table 1). Over the past 30 years, there have been remarkable changes in the types of work and the demographics of the workforce in China. The list of occupational diseases was revised in 1987 by adding occupational diseases from 14 to 99 in 9 classifications (*5*). A significant change was the increase in the number of diseases and the classification of diseases.

TABLE 1. The list of occupational diseases published in 1957.

No.	Name of Occupational Diseases
1	Occupational poisoning
2	Occupational pneumoconiosis
3	Occupational heat stroke and heat cramp
4	Occupational sunstroke
5	Occupational dermatoses
6	Electric ophthalmia
7	Occupational deafness
8	Occupational cataract
9	Decompression sickness
10	Mountain sickness and Aerial sickness
11	Vibration disease
12	Occupational radiation-induced diseases
13	Occupational anthrax
14	Occupational forest encephalitis

On May 1, 2002, the "*Law on Prevention and Control of Occupational Disease*" was approved by the National People's Congress Standing Committee, and the "*Regulation on the Scope of Occupational Diseases and Treatment of Occupational Disease Patient*" was jointly revised by the Ministry of Health and the Ministry of Labour. Meanwhile, the "*Occupational Disease Classification and Catalogue*" was revised again, and the list of occupational diseases was also revised again by increasing occupational diseases from 99 in 9 classifications to 115 in 10 classifications including the separation of the classification of radioactive diseases.

With rapid socioeconomic development and extensive applications of new technology and new materials in industry, some new and unidentified hazardous risks could incur new occupational diseases, so the "*Occupational Diseases Classification and Catalogue*" has been revised again in 2013 to meet the changing needs of prevention and control of occupational disease (*3*). In this new revision, the changes added 18 occupational diseases and expanded the scope of occupational diseases. The number of occupational diseases was increased from 115 to 132 including 4 open items (Table 2). In the new revision's structure, these 132 diseases were divided into 10 classifications with classifications 1 through 4 being occupational diseases in target organs; 5 to 8 being occupational disease caused by exposed to hazards including chemical, physical, radioactive, and biological hazardous risks; 9 being occupational cancer; and 10 being other occupational diseases.

TABLE 2. Occupational disease classification and catalogue as revised in 2013.

Classification	Number of occupational diseases	Number of open items	Total
1 Occupational pneumoconiosis and other occupational respiratory diseases	18	1	19
1.1 Occupational pneumoconiosis	12	1	13
1.2 Other occupational respiratory diseases	6		6
2 Occupational dermatoses	8	1	9
3 Occupational eye diseases	3		3
4 Occupational otolaryngologic and oral diseases	4		4
5 Occupational chemical poisonings	59	1	60
6 Occupational diseases caused by physical factors	7		7
7 Occupational radiation-induced diseases	10	1	11
8 Occupational infectious diseases	5		5
9 Occupational tumors	11		11
10 Others*	3		3
Total	128	4	132

* "others" as used in the "*Occupational Disease Classification and Catalogue*" is a category that includes only specified diseases, such as metal fume fever and underground workers' bursitis.

The increasing number of potential hazards have contributed to the increase of occupational diseases. It is estimated that occupational exposure may contribute to approximately 15% of chronic obstructive pulmonary disease (COPD) (*6*). In the new revision, COPD caused by irritant chemicals, pneumoconiosis caused by exposed to metal dusts (tin, iron, antimony, and barium), and hard metal lung disease were recognized and added to the list. Cancer is also becoming a family of common chronic and non-communicable diseases in the world as 3.8 million of new cases of malignant tumors were reported in 2014 in China (*7*).

Occupational cancers can arise because of extensive and continuous exposure to well-known and suspected occupational carcinogens. Lung cancer and malignant mesothelioma are likely caused by occupational exposure to asbestos, an estimated 9% of lung cancer and 2% of leukemia were related to exposure to occupational carcinogens in 2000 (*8*). In the new revision, additions to the list included lung tumor and mesothelioma caused by exposed to erionite; skin cancer caused by exposed to coal tar, coal tar bitumen and petroleum bitumen; and bladder tumor caused by exposed to β-naphthylamine.

With widespread occupational and non-occupational exposure to chemicals, it is critically important to identify exposure to unknown or unidentified chemicals and to register and report potential chemical poisonings. In new revision, 5 diseases were added to the list including poisoning caused by exposed to indium and related compounds; poisoning caused by exposed to bromopropane; poisoning caused by exposed to iodine methane; and poisoning caused by exposed to chloroacetic acid and ethylene oxide.

Comments

The reporting system of occupational diseases plays an important role on the collection effective data of occupational disease diagnosis and medical examination of workers exposed to hazards in the workplace. The current reporting system is not a full-process reporting system as it lacks information on medical examinations of workers on pre-employment and post-employment and information on the follow-up of suspected patients and patients. At the request of the Information System for Prevention and Control of Disease, a full-process reporting system including hazard measurement in the workplace, medical examinations of workers exposed to hazards on pre-employment, during employment, and post-employment, diagnosis of occupational diseases, and follow-up of suspected patients and current patients will be developed for the needs of occupational disease reporting in the future.

The list of occupational diseases includes a wide range of occupational diseases officially recognized and represents knowledge on the prevention and treatment of diseases caused by exposure to hazards during occupational activities. It plays a critical role in both the prevention and compensation of occupational diseases. The International Labour Organization (ILO)

TABLE 3. International Labour Organization (ILO) international list of occupational diseases as revised in 2010.

Classification	Number of occupational diseases	Number of open items	Total
1 Occupational diseases caused by exposure to agents arising from work activities			
1.1 Diseases caused by chemical agents	40	1	41
1.2 Diseases caused by physical agents	6	1	7
1.3 Biological agents and infectious or parasitic diseases	8	1	9
2 Occupational diseases by target organ systems			
2.1 Respiratory diseases	11	1	12
2.2 Skin diseases	0	4	4
2.3 Musculoskeletal disorders	7	1	8
2.4 Mental and behavioral disorders	1	1	2
3 Occupational cancer	20	1	21
4 Other diseases	1	1	2
Total	94	12	106

published the first international list of occupational diseases in 1925 beginning with 3 diseases (*9*), and this list was revised in the 1960s, 1980s, and 2002 to reflect scientific advancements in diagnostic techniques and medical sciences (*10*–*13*). The latest version of ILO list of occupational diseases was published in 2010 (*14*) and includes a range of occupational diseases recognized internationally from illnesses caused by chemical, physical, and biological agents to respiratory and skin diseases, musculoskeletal disorders, and occupational cancer. Mental and behavioral disorders have been included for the first time in the ILO list (Table 3). Globally, 30 countries were found to have an occupational disease list with a similar structure to the ILO list (*13*). Although the number of traditional occupational diseases is still increasing because of widespread traditional hazards such as dust, noise, and chemicals in workplaces, work-related diseases, such as work-related musculoskeletal diseases (e.g. lower-back pain), and work-related stress are significant contributors to the global burden of occupational diseases, and work-related disease and death have been recognized as a major international challenge relevant to global occupational health according to estimates of GBD 2017 (*15*). With the rapid development of medical science, increasing awareness on protection of worker's health, and improving ability to compensate patients with occupational diseases, it is necessary to continue to identify diseases through occupational health and medical practice to meet the needs of occupational disease prevention and to protect current and future workers' health.

doi: 10.46234/ccdcw2020.080

[#] Corresponding author: Xin Sun, sunxin@niohp.chinacdc.cn.

[1] National Institute of Occupational Health and Poison Control, Chinese Center for Disease Control and Prevention, Beijing, China.

Submitted: April 15, 2020; Accepted: April 28, 2020

REFERENCES

1. Department of Occupational Health. Law of the people's republic of China on the prevention and control of occupational diseases. 2019. http://www.nhc.gov.cn/zyjks/zcwj2/201905/23139e16d23c4ffdba281988ce52467e.shtml.[2020-03-22]. (In Chinese).
2. Ministry of Health, State Bureau of Labor. Regulation on reporting of chemical poisoning and occupational disease. 1982. (In Chinese).
3. National Health and Family Planning Commission (NHFPC) of China. Circular on printing and issuing the occupational disease classification and catalogue. 2013. http://www.nhc.gov.cn/jkj/s5898b/201312/3abbd667050849d19b3bf6439a48b775.shtml.[2020-3-5]. (In Chinese).
4. Ministry of Health. The regulation on scope of occupational diseases and treatment occupational disease patients. 1957. (In Chinese).
5. Ministry of Health, Ministry of Labor, Ministry of Finance. The regulation on the scope of occupational diseases and treatment occupational disease patients. Chem Ind Occup Saf Health 1988;1:5 – 7. (In Chinese).
6. Balmes J, Becklake M, Blanc P, Henneberger P, Kreiss K, Mapp C, et al. American thoracic society statement: occupational contribution to the burden of airway disease. Am J Respir Crit Care Med 2003;167(5):787 – 97. http://dx.doi.org/10.1164/rccm.167.5.787.
7. Chen WQ, Sun KX, Zheng RS, Zeng HM, Zhang SW, Xia CF, et al. Cancer incidence and mortality in China, 2014. Chin J Cancer Res 2018;30(1):1 – 12. http://dx.doi.org/10.21147/j.issn.1000-9604.2018.01.01.
8. Nelson DI, Concha-Barrientos M, Driscoll T, Steenland K, Fingerhut M, Punnett L, et al. The global burden of selected occupational diseases and injury risks: Methodology and summary. Am J Ind Med 2005;48(6):400 – 18. http://dx.doi.org/10.1002/ajim.20211.
9. ILO. C018 - workmen's compensation (occupational diseases) convention, 1925(no. 18). 1927. http://www.ilo.org/dyn/normlex/en/f?p=1000:12100:0::NO::P12100_ILO_CODE:C018. [2020-03-24].
10. ILO. C121 - Employment injury benefits convention, 1964[schedule I amended in 1980] (no. 121). 1967. http://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:::NO:12100:P12100_ILO_CODE:C121:NO.[2020-03-22].

11. ILO. Ratifications of C121 - employment injury benefits convention, 1964[schedule I amended in 1980] (no. 121). http://www.ilo.org/dyn/normlex/en/f?p=1000:11300:0::NO:11300:P11300_INSTRUMENT_ID:312266.[2020-03-25].
12. ILO. R194 - list of occupational diseases recommendation, 2002(no. 194). 2002.http://www.ilo.org/dyn/normlex/en/f?p=1000:12100:0::NO::P12100_ILO_CODE:R194. [2020-03-22].
13. Kim EA, Kang SK. Historical review of the list of occupational diseases recommended by the International Labour Organization (ILO). Ann Occup Environ Med 2013;25(1):14. https://link.springer.com/article/10.1186/2052-4374-25-14.
14. International Labour Office. List of occupational diseases (revised 2010): Identification and recognition of occupational diseases: criteria for incorporating diseases in the ILO list of occupational diseases. Geneva (Switzerland): International Labour Office, Occupational Safety and Health Series, No. 74. https://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safework/documents/publication/wcms_150323.pdf.
15. GBD 2017 Risk Factor Collaborators. Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks for 195 countries and territories, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet 2018;392(10159):1923 – 94. http://dx.doi.org/10.1016/S0140-6736(18)32225-6.