INFORMATION NOTE

National Center for Infectious Diseases
of the Centers for Disease Control and Prevention
in the United States of America

1. Introduction

1.1 On 5 May 2003, the Chief Executive of the Hong Kong Special Administrative Region announced that “the Government has begun to study establishing an organisation similar to those around the world and on the Mainland - a CDC-type of organisation to fight and prevent infectious diseases.” Members of the Legislative Council (Council) have expressed concerns on various aspects of the suggested organization in meetings of both the Council and Panel on Health Services.

1.2 Against this background, this information note compiles information on one of the renowned centres for disease control and prevention in the world, i.e. the Centers for Disease Control and Prevention (CDC) in the United States of America (US). Particular attention is put on the National Center for Infectious Diseases (NCID), one of CDC’s organizational components.

2. Centers for Disease Control and Prevention

Development

2.1 In 1946, the Communicable Disease Center was established by the federal government in the US to work with state and local health officials in the fight against malaria, typhus and other communicable diseases. In 1970, the Communicable Disease Center was renamed the Center for Disease Control to reflect the wider scope of activities that had been developed over the years. In 1980, the Center for Disease Control was renamed the Centers for Disease Control to reflect its diverse organizational components. In 1992, the Centers for Disease Control added "Prevention" to its name to reflect a broader role and vision of the organization. All along, the abbreviation CDC has been used to represent the organization.

2.2 Although CDC has expanded its size and scope of activities in the past 57 years, the prevention and control of infectious diseases continue to be a vital part of the organization’s work.

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1 CDC stands for centre for disease control and prevention.
Organizational structure

2.3 CDC is a federal agency under the Department of Health and Human Services. Its mission is “to promote health and quality of life by preventing and controlling disease, injury, and disability.” CDC consists of 12 organizational components and has approximately 8,600 employees in the US and overseas.

2.4 The Office of the Director is the organizational component responsible for the overall administration of CDC and specific programme areas such as vaccination and global health. Other organizational components, i.e. six centres and one institute, are dedicated to specific health threats, such as chronic diseases and occupational/non-occupational injuries. The remaining organizational components, i.e. one centre, two offices and one programme, are responsible for particular health affairs, such as health statistics and immunization. Appendix I is the organizational chart of CDC.

2.5 Among the health threats-oriented organizational components, NCID plays a leading role in the control and prevention of infectious diseases. A few others, such as the National Center for HIV, STD, and TB Prevention and Epidemiology Program Office (EPO), also contribute to the control and prevention of infectious diseases.

Policies on prevention and control of infectious diseases

2.6 CDC's policies on the prevention and control of infectious diseases focus on “emerging” infectious diseases in the US and around the world. Emerging infectious diseases are diseases of infectious origin whose incidence in human beings has increased within the past two decades or threatens to increase in the near future.

2.7 Emerging infectious diseases can be classified into newly emerging infectious diseases such as Severe Acute Respiratory Syndrome (SARS) and re-emerging infectious diseases such as malaria and cholera. Evolution of existing organisms and ecological changes are the primary factors contributing to the occurrence of newly emerging infectious diseases. The development of antimicrobial resistance in existing agents and breakdowns in public health measures for previously controlled infections are considered to the causes for the spread of re-emerging infectious diseases.

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2 HIV, STD and TB are abbreviations for human immunodeficiency virus, sexually transmitted disease and tuberculosis.
3 Please refer to references No. 1, 2 and 4.
2.8 CDC's goals and objectives in tackling infectious diseases are elaborated in a series of policy papers (listed in footnote 3) and summarized in the following chart. CDC considers that building up epidemiology and laboratory capacity is essential to recognize, monitor and tackle infectious diseases since high epidemiology and laboratory capacity increases the chances of early detection of possible outbreaks and the development of effective diagnostic and treatment interventions. The end result will be the reduction of morbidity and mortality.

**Chart 1 - Model for Prevention and Control of Infectious Disease**


3. **National Center for Infectious Diseases**

**Mission**

3.1 The mission of NCID is to prevent illness, disability, and death caused by infectious diseases in the US and around the world. In order to accomplish the mission, NCID works with partners such as local and state governments to conduct surveillance, epidemic investigations, epidemiologic and laboratory research, training and public education programmes to develop, evaluate, and promote prevention and control strategies for infectious diseases.
Organizational structure by activities

3.2 NCID consists of 11 upper-tier organizational components, including the Office of the Director and 10 divisions and programmes. These divisions and programmes are subdivided into branches. Under branches are sections, followed by units or activities further down the hierarchy. Appendix II is the organizational chart of NCID.

Management activities

3.3 The Office of the Director of NCID is responsible for the overall management of NCID. It administers three offices which provide NCID-wide services:

(a) The Office of Administrative Services performs an administrative support function for NCID.

(b) The Office of Health Communication facilitates the development of public health communications programmes for the prevention and control of infectious diseases.

(c) The Office of Surveillance co-ordinates some of CDC's existing surveillance systems and participates in the development of CDC’s National Electronic Disease Surveillance System.

Disease-oriented activities

3.4 The five divisions dedicated to the prevention and control of various types of infectious diseases are the Division of Bacterial and Mycotic Diseases, the Division of Parasitic Diseases, the Division of Vector-Borne Infectious Diseases, the Division of Viral Hepatitis and the Division of Viral and Rickettsial Diseases. Their spheres of coverage include the US as well as the global arena.

3.5 Each disease-oriented division is subdivided into branches, most of which specialize in a particular group of diseases. For instance, branches of the Division of Parasitic Diseases specialize in a wide range of parasitic diseases, branches of the Division of Vector-Borne Infectious Diseases specialize in infectious diseases carried by insects or other organisms, and branches of the Division of Viral and Rickettsial Diseases specialize in infectious diseases caused by virus and rickettsiae, a kind of micro-organisms.

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4 Pending information on the number of staff of NCID.
3.6 Under branches are sections, followed by units or activities. These lower-tier organizational components perform various designated tasks in relation to the prevention and control of infectious diseases. Two designated tasks commonly performed by almost all branches are research and service provision tasks.

3.7 The research task is related to conducting epidemiologic and microbiological researches on specific infectious diseases. Epidemiologic studies explore the distribution of a specific infectious disease and the factors determining such distribution. Microbiological researches study the biological characteristics of micro-organisms that cause diseases, such as their genetic characterization and antigenic characteristics. Based on the understanding of specific infectious diseases, both epidemiologic and microbiological researches also attempt to develop effective methods for the prevention, diagnosis and treatment of infectious diseases.

3.8 In relation to the service provision task, these lower-tier operational components of NCID, upon the request of domestic and international organizations, offer reference or diagnostic services, provide epidemic aid and epidemiologic consultation, and render training services. For instance, the Mycotic Diseases Branch's epidemiologic services provide expert advice upon request on the conduct of epidemiologic investigation of outbreaks of fungal infection, as well as guidance on the prevention of these infections, and clinical management of individual cases.

**Quarantine activities**

3.9 The Public Health Service Act authorizes the Surgeon General, with the approval of the Secretary of Health and Human Services, to make and enforce such regulations to control communicable diseases. Under this delegated authority, the Division of Global Migration and Quarantine of NCID is empowered to detain, medically examine, or conditionally release individuals and wildlife suspected of carrying a communicable disease. By taking these actions, the Division intends to prevent the introduction, transmission, or spread of communicable diseases from foreign countries into the US.

**Activities for designated targets**

3.10 The Division of Healthcare Quality Promotion protects patients and healthcare personnel from acquiring infectious diseases in healthcare settings and promotes safety, quality and value in the healthcare delivery system.

3.11 The Arctic Investigations Program is responsible for the prevention of infectious diseases in inhabitants of the Arctic and Subarctic.
Laboratory activities

3.12 The Scientific Resources Program provides materials and research supports for laboratories of NCID and other organizational components of CDC.

3.13 The Division of AIDS, STD, and TB Laboratory Research is responsible for laboratory studies on AIDS, STD, TB and other infectious diseases.

Other activities

3.14 Other activities engaged by NCID include public education on specific diseases and academic exchanges through organizing conferences and publishing *Emerging Infectious Diseases Journal*.

Board of Scientific Counselors, NCID

3.15 The Board of Scientific Counselors, NCID (BSC), is an independent advisory committee which consists of infectious disease experts from local, state, and other federal agencies, universities, private practice, private industries, medical and public health associations, and international institutions.

3.16 Appointed by CDC, members of BSC provide advice and guidance to the Director of CDC and the Director of NCID in the following areas: programme goals and objectives, strategies, programme organization and resources for infectious disease prevention and control, and programme priorities.

Funding

3.17 The funding of CDC, of which NCID is a part, comes from both appropriations of the federal government and donations from the National Foundation for the Centers for Disease Control and Prevention (CDC Foundation).

3.18 CDC receives an annual appropriation proposed by the federal government and approved by the US Congress to support its various activities. Most of the CDC’s budget is spent on public health work performed by CDC’s partners. For instance, about 62% of CDC's appropriations in the financial year of 2002 were allocated to extramural programmes.

3.19 Since the available CDC budget information is grouped by activities, it is not possible to isolate the budget of NCID. In the financial year of 2003, CDC has a budget of US$6.5 billion of which 5.2% has been earmarked for infectious disease control activities. Nonetheless, this figure does not include infectious disease prevention activities such as HIV/AIDS, STD and TB prevention.
3.20 CDC Foundation was established in 1994 under the Public Health Service Act. It is a private, non-profit organization, and operates independently from CDC. Since its establishment, CDC Foundation has been soliciting support from individuals, foundations, corporations and organizations to build programmes that can accomplish the mission of CDC. Some of these programmes are particularly geared towards infectious disease control and prevention. For instance, the Ellison Medical Foundation is solicited by CDC Foundation to support the Joint Global Field Epidemiology and Laboratory Training Program — Keyna organized by CDC.

NCID partnerships

3.21 NCID, in line with CDC’s policy, develops strong partnerships with external organizations to achieve its mission.

3.22 NCID works with various governmental departments in the prevention and control of infectious diseases. For instance, the Division of Global Migration and Quarantine under NCID collaborates with the Bureau of Citizenship and Immigration Services, the US Customs Service, the US Department of Agriculture and the US Fish and Wildlife Service to prevent the introduction of communicable diseases into the US.

3.23 Consistent with CDC’s practice, NCID develops partnerships via its extramural grants, co-operative agreements, and programme contracts. For instance, in the prevention of the West Nile virus and other arboviral diseases, NCID provides funding for states to bolster their epidemiologic and laboratory capacity for surveillance and response to the threats.

3.24 NCID also develops partnership with other countries in the prevention and control of infectious diseases. For instance, the Arctic Investigations Program participates in the International Circumpolar Surveillance which consists of eight arctic countries, with the aim to prevent and control infectious diseases in the Arctic.

3.25 NCID develops partnership with international organizations in the prevention and control of infectious diseases as well. For instance, several disease-oriented branches of NCID serve as World Health Organization (WHO) Collaborating Centers, such as the Mycotic Diseases Branch of the Division of Bacterial and Mycotic Diseases acting as the WHO Collaborating Center for the Mycoses in North America.
4. Surveillance

4.1 NCID maintains 21 infectious disease surveillance systems which are managed by different organizational components. These surveillance systems monitor specific infectious diseases by ongoing collection and analysis of data. The dissemination of data by these surveillance systems facilitates the prevention and control of infectious diseases. For instance, the Division of Parasitic Diseases manages the National Malaria Surveillance System which collects epidemiologic and clinical information on malaria cases diagnosed in the US.

4.2 The Office of Surveillance (OS) of NCID co-ordinates the Emerging Infections Program network which gives rise to two surveillance networks, one for invasive bacterial diseases and the other for foodborne diseases. OS also co-ordinates the Epidemiology and Laboratory Capacity Program which assists state and local health departments in developing capabilities to identify, understand and control infectious diseases.

4.3 Apart from NCID, EPO of CDC maintains the National Notifiable Diseases Surveillance System. Currently, reporting of nationally notifiable diseases to CDC by states is voluntary, except for the internationally quarantinable diseases of cholera, plague and yellow fever. Every year, the Council of State and Territorial Epidemiologists, in collaboration with CDC, compiles a list of notifiable diseases and states supply CDC with information on the list. EPO compiles data received and publishes data on selected notifiable infectious diseases in the Morbidity and Mortality Weekly Report and MMWR Summary of Notifiable Diseases, United States, both being publications of CDC.

4.4 Other organizational components of CDC also participate in different global surveillance systems in the prevention and control of infectious diseases. For instance, the WHO Collaborating Center for Surveillance, Epidemiology, and Control of Influenza in the Division of Viral and Rickettsial Diseases serves the function of global surveillance on influenza.

4.5 These infectious disease surveillance systems at the local, national and international levels not only monitor known infectious diseases, they also detect unusual incidents which may be caused by unknown infectious diseases.
5. **Outbreak investigation and management**

**Unintentionally generated outbreak**

5.1 Upon request, epidemiologists of NCID conduct or participate in outbreak investigation in the US and around the world. In the case of a global outbreak, CDC works closely with WHO and other partners in a global effort to address the outbreak. During the 1990s, CDC participated in 58 outbreak investigations in other countries, sometimes as part of an international WHO team and sometimes in direct response to a request from an affected nation. For instance, CDC participated in the outbreak investigation of the Avian influenza in Hong Kong in 1997.

5.2 In the case of the recent SARS outbreak, CDC has activated its Emergency Operations Center immediately when the SARS outbreak was detected in Canada in March 2003. The Emergency Operations Center serves the functions of round-the-clock co-ordination and providing responses for the SARS outbreak. As revealed by CDC, it has committed more than 700 medical experts and support staff to fight SARS in the US and around the world, as a member of the Global Outbreak Alert and Response Network of WHO.

5.3 CDC has engaged in two main types of activities in fighting SARS. CDC’s epidemiologic actions include deploying medical officers, epidemiologists, and other specialists to assist with on-site investigations around the world and providing ongoing assistance to state and local health departments in investigating possible cases of SARS in the US. At the same time, CDC has conducted extensive laboratory testing of clinical specimens from SARS patients to identify the cause of the disease. It has also initiated a system for distributing health alert notices to travellers who may have been exposed to the virus that causes SARS.

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The Emergency Operations Center is the central operational unit of CDC under the leadership of the Office of the Director. It provides quicker, better co-ordinated responses to public health emergencies such as a bioterrorist attack or an outbreak of a new infectious disease across the US and around the world. It is equipped with facilities for immediate communication between CDC and all public health and security related government departments in the US. In addition, it is also equipped with sophisticated technological equipment to facilitate its operation, such as geographic information system for tracking the infectious disease.
Intentionally generated outbreak

5.4 Outbreaks of infectious diseases can be intentionally generated as in the case of bioterrorist attacks. Apart from the actions similar to those mentioned in paragraphs 5.1 to 5.3, CDC also performs the role of upgrading the public health capabilities locally and nationally to respond to such intentionally generated public health emergencies. CDC carries out five types of activities to improve the capabilities of the US public health infrastructure:

(a) Providing guidelines for state and local communities to develop a co-ordinated response plan to a possible bioterrorist attack, e.g. the smallpox response plan and guidelines.

(b) Enhancing laboratory capacity in rapid diagnosis of the infectious disease at the state and local levels, e.g. the Epidemiology and Laboratory Capacity Program.

(c) Establishing sentinel disease detection systems that involve local networks of clinicians and other health care providers, e.g. Infectious Diseases Society of America Emerging Infections Network which is a network of over 500 infectious disease practitioners.

(d) Improving CDC's ability to communicate rapidly with state and local health departments, US quarantine stations, health care professionals, other public health partners, and the public. The ability to communicate rapidly is crucial in ensuring a prompt and co-ordinated response to a bioterrorist attack.

(e) Keeping a stockpile of pharmaceuticals which can be delivered to victims of an incident anywhere in the continental US within 12 hours.
References


