

# Study on the Compositions of Information Platforms of Medical-nursing Care in Developed Countries

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## Abstract

**In terms of elderly care service promotion, Developed countries have focused on the coordination of nursing facilities and medical facilities by using integrated information platforms to achieve the seamless cohesion between nursing services and medical services. This paper first investigates the compositions of the information platforms of medical-nursing combination in four developed countries, namely Australia, Japan, the United States and Canada. Then it analyzes the working mechanisms of the platforms and their working mechanism in medical-nursing coordination, then summarizes their common features: launched by the government, under the guidance of specific policies, integrate the information of nursing facilities and medical facilities, establish nationwide databases and information feedback mechanisms, develop electronic health records, etc. By giving the conclusions, this article aims to provide reference for the work of medical-nursing combination in China.**

## Keywords

**Elderly care service; Developed countries; Medical-nursing combination; Information platforms.**

## 1. Introduction

In recent years, with the rapid development of aging in our society, the elderly has an extremely urgent need for medical care and nursing care. The medical-nursing care has been established as a national policy of China. However, the progress of medical-nursing care in China is limited to the setting of geriatric departments in medical facilities and that of medical services in nursing facilities. Moreover, medical care and nursing care are respectively under the supervision of two different departments, which lack in cooperation. Therefore, the landing work of medical-nursing care is very difficult, which means the work of medical-nursing care in China is still in the exploring stage.

Developed countries use a number of unified information platforms to play an coordinating role in linking medical and nursing facilities, medical and nursing service providers and the elderly to achieve continuous services for the elderly, which is worth a reference to China. At present, many information platforms of elderly service and those of medical service have emerged in various regions of China, yet no information platform integrates services or facilities of medical and nursing care, which is not beneficial to provide continuous services for the elderly.

## 2. Cases Overview

Through literature searching, this chapter investigates the information platforms of medical-nursing care of Australia, Japan, the United States and Canada. It is found that governments of

these countries have formulated specific information development strategies to support the establishment of platforms of medical-nursing care, and have also set up official information websites and collaborative working mechanisms to promote the integration of medical and nursing care. This chapter will introduce the compositions and linkage mechanisms of these platforms of medical-nursing care in the four countries.

## 2.1. Australia

### 2.1.1 Services Australia Website

At present, 90% of the elderly in Australia are receiving home care services from the community. They can obtain services based on community through the website --Services Australia, which includes seeking assistance, obtaining benefits, inquiring for surrounding medical and nursing facilities and pension policies. They can also enter Center Link to apply for pensions and inquiring for services, or enter Medicare to apply for medical insurance cards (Medicare card) and handle the staff of medical reimbursements. Whether it is the elderly, individual service providers, enterprise service providers, community managers, volunteers, or health practitioners, they could all find the corresponding entrance.

The elderly can find Australian policies and regulations about health care and pensions on the web, and get information about housing, pensions, medical subsidies and so on. They can also calculate the payments and find out medical and nursing care services around them through "payment and service finder". Nursing practitioners can obtain the training, occupational qualifications, subsidies and so on through the website. Service providers can access their own softwares by API to provide service resources. Medical practitioners, such as general practitioners and specialists, can also enter the dedicated entry to register accounts, manage their own files and provide professional online services to patients.

### 2.1.2. Digital Health Website

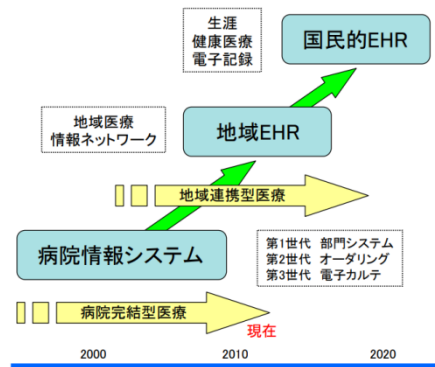
The Australian government established "Digital Health Agency", created a digital health website (digitalhealth.gov), and promulgated the "My Health Records Act" to guide the construction of "My Health Record system". The electronic health record has a dedicated website (myhealthrecord.gov.au) for patients and medical staff. The contents of the records include medical insurance and drug history, application records of welfare, details of organ donation and immunization records, clinical records and personal care service records. Patients, medical personnel and service providers can also log into the records and carry out related operations respectively through the service information website, the Medicare website and the digital health website, which helps to provide continuous services of medical-nursing care for the elderly.

## 2.2. Japan

### 2.2.1. Electronic Health Records

Japan revised the i-Japan strategy in 2015 and proposed to establish an electronic health record (EHR) nationwide. It has now gone through three development stages and reached the stage of National EHR (As shown in the figure).

The first stage is the EMR of medical facilities with hospitals building information system as the main feature, and electronic diagnosis is implemented in each medical facility. The second stage is based on the integration of medical information between regions, which is called Regional EHR. At this time, medical information between medical facilities in different regions begins to be exchanged. The third stage in which national-scaled medical health information are exchanged is called the national EHR. At this time, EHR expanded to nationwide, aiming to form a lifelong electronic health and medical record for each citizen. The formation of national EHR is an effective integration of regional EHRs, the development of EHR in Japan is shown in Figure 1.



**Figure 1.** The development of EHR in Japan

(TANAKA Hiroshi. Towards the adoption of Japan version of HER[J], J-STAGE: December 01, 2011.)

### 2.2.2. Systematic Information Network of Community Comprehensive Nursing Care

In order to improve the coordination of medical care and nursing care for the elderly at home, the Ministry of Health, Labour and Welfare (the department in charge of the national medical and social security in Japan) has created a systematic information network of community comprehensive nursing care on the government portal website, including the interpretation system for long-term care insurance, the publication system of nursing care information and the "visualization" system of community comprehensive nursing.

In the publication system of nursing care information, the information of about 210,000 nursing care institutions in Japan can be retrieved. The contents include nursing facilities, community comprehensive support centers, life support centers, housing for the elderly, care centers for dementias and so on. According to the information, users can compare and review nursing care, business premises and facilities, then make appropriate choices. The website also supports searches of comprehensive community support centers, care centers for dementias, residential medical services and life support services. In order to facilitate the use, the system has also developed an APP, so that the elderly and their families can easily find it on phone.

By collecting the cases of implementation of long-term care insurance policies and those of establishment of the community comprehensive care system, and showing it in a visual way such as charts, tables and so on, the "visualization" system of community comprehensive nursing care is used to fully promote the formulation and implementation of official business of long-term care insurance in counties and cities. Through the website, regional governments can compare the status of policy implementation in other areas and take appropriate measures with reference to initiatives in regions facing similar challenges.

The Government of Japan has also established a database for long-term care(LTC) insurance, which includes basic information about the user, such as city, age, degree of need for care, duration, types, frequency of monthly use as well as the cost of the insurance and is used as the basis for long-term care insurance operators to submit insurance claims to the National Insurance Union every month. Another database VISIT collects the care&health status from serviced population in disease rehabilitation, disability treatment, ADL assessment, recovery as well as their treatment status of physical and mental function in daily life. In addition, another database CHASE has been established to collect information from nursing care institutions which is missing in the LTC insurance database and VISIT, and actively integrate the Chase and Visit databases to further strengthen the data combination of rehabilitation and nursing care.

## 2.3. The United States

U.S. has set up WEDI, a group working on the electronic data interchange with health information technology as an authoritative organization, aiming at improving the exchange of health information and nursing quality as well as reducing costs. They adopt HL7 (health level seven) standard to achieve the transmission of medical information. HL7 is a standard set up by the United States to improve the degree of information sharing among medical facilities and promote the unification of data transmission formats. At present, it has been widely used in the world.

In the United States, matters related to health care and nursing care are under the jurisdiction of the Department of Health & Human Services (HHS). Under the control of HHS are two departments, The Centers for Medicare & Medicaid Services (CMS) and The Administration of Community Living (ACL), who are responsible for the elderly affairs related to medical and nursing care.

### 2.3.1. the Platform of CMS

CMS, as the administrative department of Medicare (a federal health insurance program that subsidizes healthcare services mainly for citizen 65 or older) in the United States, has established Freedom of Information Act, Interoperability Program and other regulations to promote the sharing of health care information, and it has a website (Medicare.gov) to support the elderly to compare, find and accept various medical care facilities, domestic health care services and medical equipment suppliers within Medicare business, and obtain a variety of information including doctor fees, details and quality evaluations of medical and nursing facilities and so on.

CMS has also led the implementation of e-health programs, including e-prescriptions, Promoting Interoperability Programs, personal health records and electronic health records.

E-prescribing is an electronic medical certificate sent directly from the point of care to the pharmacy by doctors. It was included in the " Medicare Modernization Act" (MMA) in 2003 and is the direct basis for the implementation of e-prescribing. Promoting interoperability (PI) is designated by CMS in order to improve the interoperability of the medical and healthcare industries. It encourages the use of certified electronic health record technology (CEHRT) to continuously improve the quality of care at the spots, and exchanges information in the most structured form as much as possible. The personal health record (PHR) is controlled by the individual, and can also be shared with other people including caregivers, family members, and service providers, which uses data from multiple sources (including personal allergy history, drug resistance history, medical family history, etc.) to make a relatively comprehensive extract of the elderly's health and medical history. The electronic health record (EHR) is about the patient's medical history, which is maintained by the providers and can greatly simplify the work process of clinicians and help doctors with decision-making.

CMS has also adopted MDS (Minimum Data Set) to evaluate the quality of care in nursing facilities. At present it has developed to version 3.0. CMS uses MDS to collect relevant data from nursing facilities and suppliers, then calculates through special software tools to screen out non-compliant ones.

### 2.3.2. the Platform of ACL

Administration of Community Living (ACL) established the Administration of aging (AOA) to ensure that the elderly live healthy and normal lives in the community and at home. They set up long-term care website (LongTermCare.gov) to provide home care plans for the elderly and provide information about care insurances. They set up Long-term Care Pathfinder to provide care solutions, set up eldercare locator to provide care inquiry services, home support services, legal assistance, and to assist in solving the housing problems of the elderly.

AoA has established the State Health Insurance Assistance Program (SHIP) to allocate funds to states and set up assistance groups to disseminate knowledge about Medicare, and dispatch one-to-one service consultants to select, make or change insurance plans for customers. SHIP uses the SHIP Tracking and Reporting System--STARS to collect data, which connects with the system of Senior Medicare Patrol (SMP, an action to prevent and control fraud in medical insurance for the elderly) to share data, effectively improving the local efficiency of elderly insurance security.

ACL built an on-line query system called the AGing, Independence and Disability (AGID) Program Data Portal to provide a variety of information source on ACL supportive services and comprehensive systems of care for older adults and their caregivers. It allows users to quickly produce tables, maps, and other summary information from ACL-related data files and surveys. The user also has the ability to make comparisons between states in U.S. In addition, the location of the State Unit on Aging (SUA), Area Agencies on Aging (AAA), and Tribal Organizations (where applicable) are displayed in both map and tabular form.

To supervise the nursing services, ACL has also set up Long-Term Care Ombudsman Program (LTCOP), which works to resolve problems related to the health, safety, welfare, and rights of individuals who live in LTC facilities and help identify, investigate and resolve complaints made by or on behalf of LTC facility residents. State Ombudsman programs use information systems which is known as the National Ombudsman Reporting System (NORS) to document cases and complaints received and investigated and to track other program activities such as visits to facilities, instances of information and assistance, participation in resident and family councils, etc. The data is available on ACL's AGID website.

## 2.4. Canada

### 2.4.1. the Information Organization--Infoway

The Canadian government established and invested in Infoway, a medical and health information organization, to lead the informatization construction of the healthcare industries across the country. The system uses InfoCentral as its information publication platform for clinicians, electronic health representatives, nursing care service providers, developers and other people or groups who are relevant to promoting clinical interoperability.

Through Infoway, the government publishes the standards and acts of electronic information sharing in the health field, announces the latest research results of pan-Canadian health care system, plans the digital health blueprint of the digital health system, and builds the medical information infrastructure (Infostructure) to promote the coordination in operational process of the industry. Infoway is also committed to establishing a unified national electronic health record (EHR) and ambulatory electronic medical record (aEMR) and promoting their sharing among medical practitioners and service providers.

### 2.4.2. the Information-coordinating Institute--CSSS

To implement the reform of primary care and to support the research of chronic diseases, Canadian government is strengthening the links among them, using interconnected information networks to create integrated chronic disease care programme so as to achieve "Integrated Care". The key to the programme is a shared information system and Health and Social Service Centres (CSSS). CSSS uses an integrated information system to allow health care organizations and clinicians to share clinical information about the elderly to improve the continuity of nursing care. After accessing the CSSS system, all health professionals and institutions participating in the program can view the electronic medical records of patients through the network and use the data of the medical records for research. If the doctor believes that the elderly needs to change the level of care based on the EMR diagnosis record of the patient, he can contact the CSSS case manager at any time. The case manager is responsible for

transferring the electronic medical record (EMR) of the patient to the corresponding service provider through the system.

### 2.4.3. the Data-collecting System—CPCSSN

Infoway has also established the first and only pan-Canadian collection system of EMR information: Canadian Primary Care Sentinel Surveillance Network (CPCSSN), which collects electronic medical records issued by clinicians from primary care research networks across Canada to study eight types of common clinical symptoms of chronic diseases and neurological diseases. This system uses data from treatment demand database of elder patients with chronic disease in community clinics, which wasn't included in data sources of relevant researches before, to analyze and display the results through data-based reports and visual presentation tools to provide reference for community doctors in clinical diagnosis, which helps the elderly attain better treatment in community health care.

## 3. Analysis on Information Platforms of Medical-nursing Care in these Countries

Based on the investigation on the compositions of these platforms in chapter 2, This chapter respectively analyses their working mechanisms and summarizes their features, then puts forward the conclusions.

### 3.1. Working Mechanism Analysis of the Platforms

#### 3.1.1. Australia

The Australian government has established a comprehensive service information website that integrates various objects such as the elderly, care providers and medical practitioners, which integrates medical care and nursing care facilities, and provides information consulting services for the elderly in various aspects, such as medical care, pension, welfare, insurance and so on. In order to build a national electronic health record system, Australia has established specialized electronic health agencies, website of "My Health Records", digital health website as well as introduced relevant bills, which aims to creating an interoperable environment for medical electronic information. The government has also devoted to establishing a regulatory network for elderly care services, trying to improve the nursing evaluation mechanism. The working mechanism of the platform is shown in Figure 2.

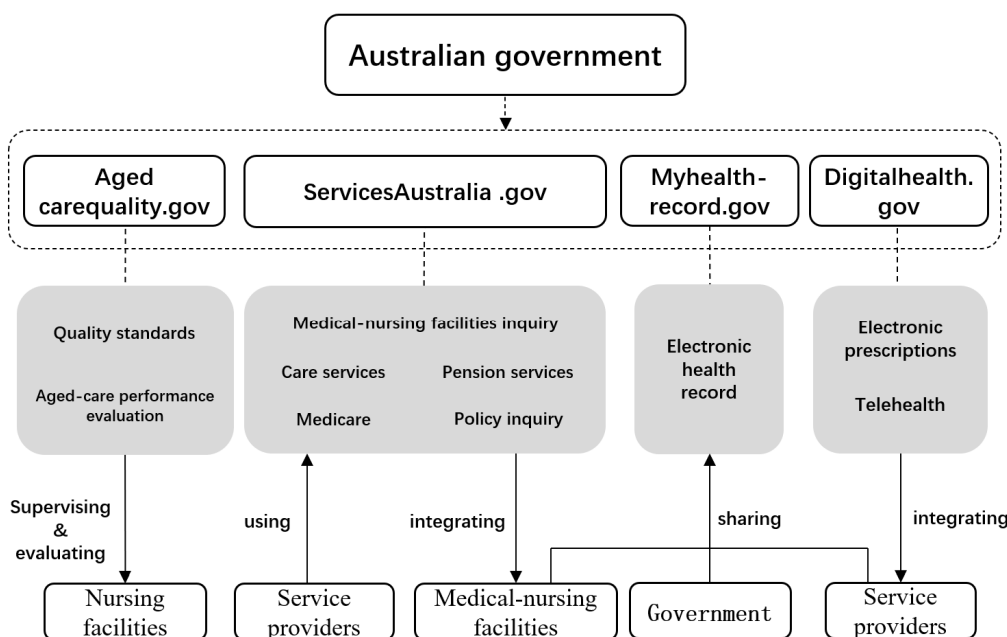
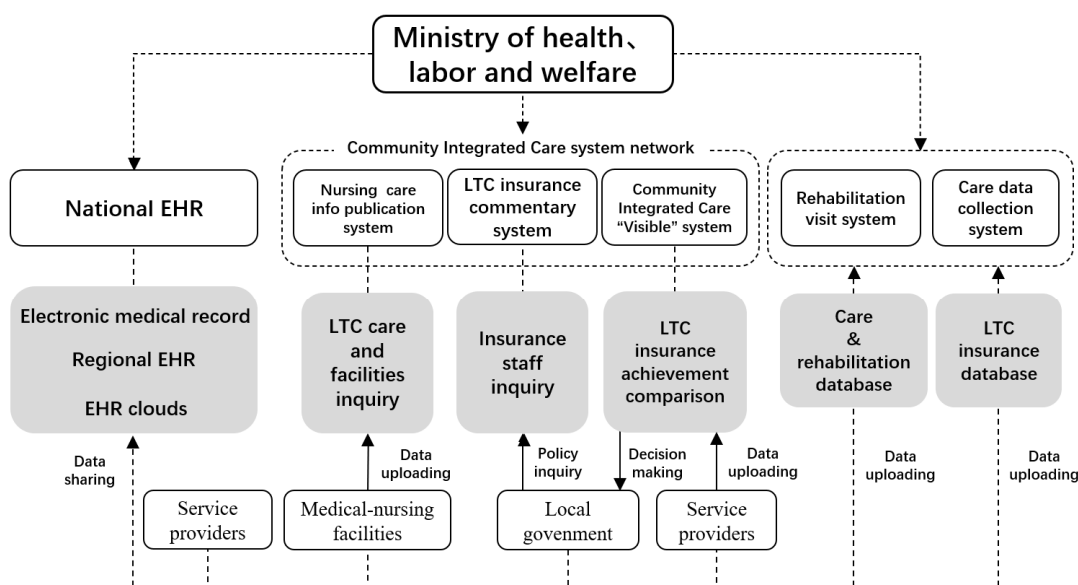


Figure 2. Working Mechanism of the Australian platform

### 3.1.2. Japan

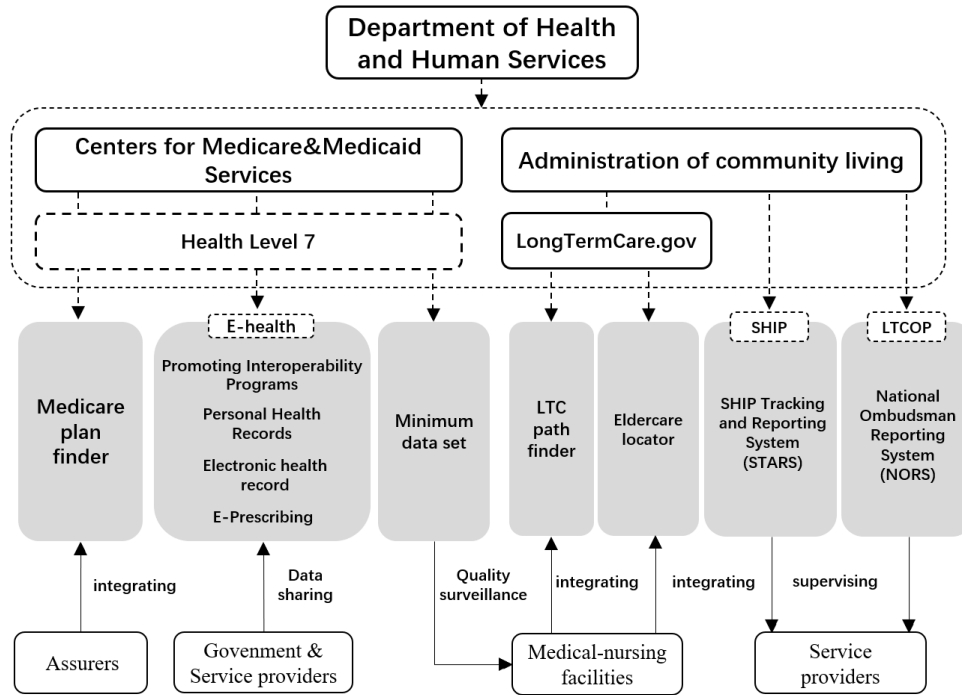
The Japanese government is committed to building a sound publishing mechanism of nursing care information. The explanation system of LTC insurance provides the consultation service of LTC insurance. Based on the LTC Insurance Act, the publishing system of nursing care information integrates the information of local medical facilities, nursing facilities and pharmacies, so that users can compare and review facilities of nursing and health care then make appropriate choices. The "visualization" website of community comprehensive care uses intuitive data to compare the achievements of local governments in implementing LTC Insurance Act, and provide data support of decision-making for local governments. In terms of data utilization, the government has established databases of LTC insurance and nursing care&rehabilitation, collecting and analyzing various data of the elderly to optimize relevant services. The working mechanism of the platform is shown in Figure 3.



**Figure 3.** Working Mechanism of the Japanese platform

### 3.1.3. the United States

U.S. government has established platforms for medical-nursing care with a clear division of labor, severe laws and regulations, and a strict supervision mechanism. First of all, specific laws and regulations such as Freedom of Information Act and Promoting Interoperability Programs have been formulated to make sure information exchange more feasible. Secondly, e-prescribing, personal health records and medical electronic health records have been established based on a unified data conversion standard to enhance their interoperability. Thirdly, a data evaluation standard is adopted to standardize the service quality of nursing homes, and a special website is set up to provide help and guidance for nursing care and insurance services for the elderly. Finally, systems like NORS and SMP have been built to supervise these services for the elder. The working mechanism of the platform is shown in Figure 4.

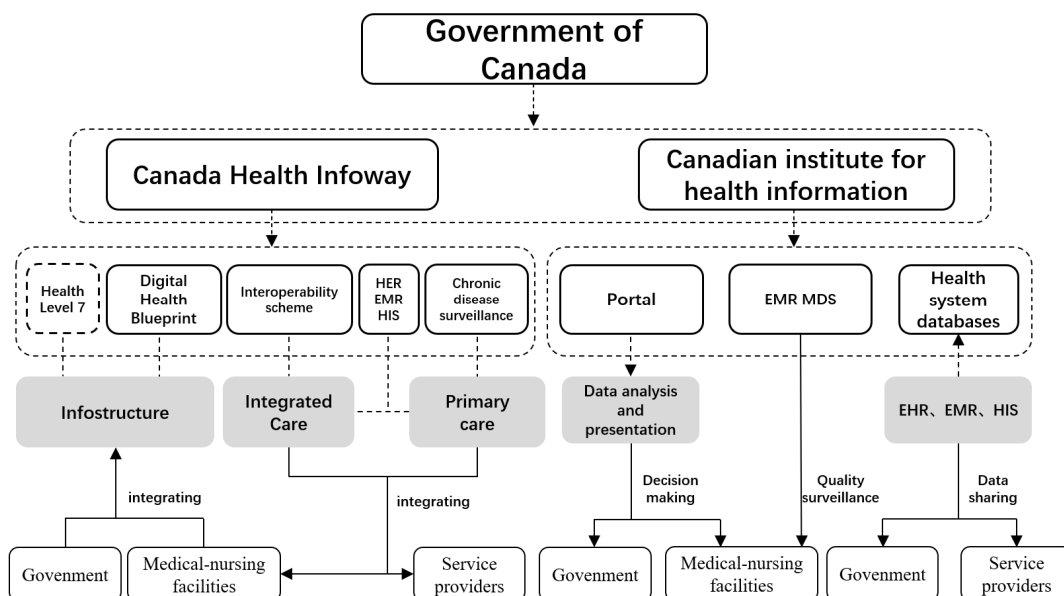


SHIP: State Health Insurance Assistance Program LTCOP: Long-Term Care Ombudsman Program

**Figure 4.** Working Mechanism of the American platform

3.1.4. Canada

The Canadian government has led the establishment of a national medical information organization to release standards and up-to-date information on electronic operation in the medical and health care industries. The organization has depicted a blue print for collaboration in the field of health and is committed to creating a collaborative workflow. In terms of community care, “integrated care”, featured as continuous medical and nursing care services are provided for the elderly in the community through a coordinated organization, collaborative work flow and a shared EMR system. Moreover, by collecting chronic disease information of the elderly from EMRs in the community, the research on chronic diseases can be strengthened so as to improve the quality of community life of the elderly. The working mechanism of the platform is shown in Figure 5.



**Figure 5.** Working Mechanism of the Canadian platform



### 3.2. Feature Analysis of the Platforms

By analyzing the information platforms of medical-nursing care in these countries, it is found that these platforms have some features in common. For example, they have all set up specialized working organizations to construct the platforms, legislate to guide the construction of the information platforms of medical-nursing care, and establish information-publishing websites of medical-nursing care and nationwide databases, as shown in Table 1:

**Table 1.** Features of the platforms

	Australia	Japan	US	Canada
Specialized Institution or Organization	Digital Health Agency		WEDI	Infoway
Policies and Regulations	My Health Records Act	i-Japan	Freedom of Information Act, Prompting Interoperability Program	Clinical Interoperability Standards
Information Website	Website of service information (ServicesAustralia.gov.au)	Website of nursing care service information publication (kaigokensaku.mhlw.go.jp)	Website of medicare ; (Medicare.gov)	InfoCentral (infocentral.info way-inforoute.ca)
Information Databases of Medical-nursing Care	Database of medical facilities and nursing care facilities; Database of chronic diseases	Database of medical facilities and nursing care facilities; Database of rehabilitation-nursing care	Database of medical facilities and nursing care facilities; Database of LTC insurance; Database of chronic diseases; Database of local aging agencies	Database of chronic diseases
Info-research Institute		"Visualization" system of community comprehensive care	AGID Program Data Portal	Canadian Institution of Health Information (CIHI)
Quality Supervision	Aged Care Quality and Safety Commission (agedcarequality.gov.au)		Minimum data set; SMP&STARS; LTCOP&NORS	Evaluation standards of health-related system
Electronic Health Records	Electronic health records	National/Regional electronic health records	Electronic health records ; E-prescribing; Personal health records	Electronic health records; Electronic medical records
Information Standards	HL7		HL7	HL7
Website of Elder Insurance	Services Australia-Medicare (servicesaustralia.gov.au/individuals/medicare)	Commentary website of long-term care insurance (kaigokensaku.mhlw.go.jp/commentary/)	Medicare.gov; Healthcare.gov	

### 3.3. Conclusions

The conclusions are as follows:

(1) Set up a special institution or organization to be responsible for the establishment of the information platform of medical-nursing care, such as WEDI in the United States, Infoway in Canada and the Digital Health Management Agency in Australia.

(2) Introduce specialized regulations or guiding policies to guide the informatized construction of medical-nursing care. For example, the Health Records Act for electronic health records in Australia, the Freedom of Information Act and Interoperability Plan in the US and clinical interoperability standards in Canada.

(3) The government should take the lead in establishing the national information website, which integrates the government, medical facilities, elderly care facilities and service providers with the basic functions of facility inquiry, service inquiry or policy inquiry.

(4) Establish nationwide databases of medical-nursing care information, which can be used as the data basis for information inquiry and data analysis. Australia, Japan and the United States have all established national databases of medical and elder care facilities to various degrees, while Japan and the United States have respectively established rehabilitation-nursing integrated database and LTC care insurance database. The United States, Australia and Canada have respectively established the information database of chronic diseases from the EMRs of the elderly.

(5) Establish an information research institution to process and analyze the collected medical-nursing care data to assist decision-making. The "visualization" website of community comprehensive care system in Japan presents the processed data results directly on the website to compare the works of local government; Canada has set up CIHI to collect and analyze the data of medical care and nursing care, and publish the data results on the website for the government to introduce policies of medical-nursing care.

(6) Establish an information feedback mechanism to supervise service quality. In this respect, Australia has Aged Care Quality and Safety Commission to set up quality standards for nursing facilities. The United States has minimum data set to monitor the qualities of nursing homes and has monitoring systems to ensure the legal operations of endowment insurance and long-term care.

(7) Promote the development of electronic health records, electronic medical records and e-prescriptions, and urge the info-exchanging among medical and nursing care facilities at different levels.

(8) Set up an information website of insurances for the elderly. The United States, Japan and Australia have all set up specialized websites for medical-nursing insurance for the elderly to provide more information on elder insurances.

#### 4. Summary

This paper first reviews the experiences of the construction of information platforms for medical-nursing care in four developed countries: Australia, Japan, U.S. and Canada. And then it respectively analyses the working mechanism in each platform. At last, it summarizes the common features of these platforms and give some conclusions, including but not limited to: the government should introduce specialized regulations or guiding policies, set up a special organization to lead the affairs, establish an information website of medical-nursing facilities or endowment insurance, organize a research institution of medical-nursing care, etc. The conclusions aim to provide references for the work of medical-nursing combination in China.

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