Functional Analysis of Health Information System in Public Health Centers Focusing on Health Business Programs

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Abstract

The purpose of this study is to analyze the functionalities of Health Information System in Public Health Centers focused on Health Business Program. Field research was performed in accordance with the business guidelines of the Ministry of Health and Welfare. After analyzing the users' requirement and the functionalities of the system, we suggest a model of functionalities for interoperable EHR system. This will help to promote application of health information system and to improve efficiency of Public Health Centers.

Keywords:

Health Information System, Public Health Centers, Health Business Program, Health Electronic Health Record

Introduction

The Electronic Health Record (EHR) has evolved to become center-stage in the national health informatics strategies[1].

But many incompatible Health Information Systems that cannot effectively exchange information have been implemented, and substantial duplication of effort has occurred as different jurisdictions address similar information management needs[2].

Health Information System in Public Health Centers has several sub-systems that support direct care, supportive care and Health Business Programs. Various Health Business Programs are performed in Public Health Centers as major business. sub-system that supports Health Business Program has many problems to manage systematically and efficiently. Although the sub-systems are connected among each other, it needs more interactions between Health Business Programs and other systems of health centers in a nation.

In this study we will analyze the process of Health Business Programs and functionalities of the system for EHR implementation.

Methods

There were many Health Business Programs in Public Health Centers. To analyze function, we had to choose several Health Business Programs, which were considered as a important business and each had different work processes.

Nine Health Business Programs which recognized as key Health Business Programs in Public Health Care were selected.

Then, they have classified into following three categories: The First includes the Health Business Program which was managed by the local Health Information System. Second category includes the Health Business Program which was not managed by the local Health Information System but was managed by web system in common. Consequently, the personnel in charge of Health Business Program can't manage the cases by using their own Health Information System. Third category includes the Health Business Program has no Health Information System, so it was performed manually.

The methods of this study are as follow.

Analysis of the work process

Questionnaires and field interview survey were conducted at six Public Health Centers in Korea. And people in charge of each health business program named business manager were interviewed. After their work processes were inspected carefully, the functions of health information system and works performed manually using MS Excel or Word were investigated.

To show the functionalities, Unified Modeling Language (UML) was used, which showed the work process functionally.

Analysis the system of health business programs

The functions of business process of Health Information System that the manager use were analyzed. Functions were categorized into following three: mega process, major process and sub process.

Results

Analysis the work process

The health business managers perform the work of Health Business Program. They register the clients in Health Business Program and perform it. For example, they visit client's home and provided health care service. They also support the medical finance to the clients that allowed to reimbursement. And then the business managers report the results and statistics to the superior part . By these process, the clients are managed.

In short, it was analyzed that they have three mega processes. We called these functions as "registration", "acting" and "management"(Figure 1).

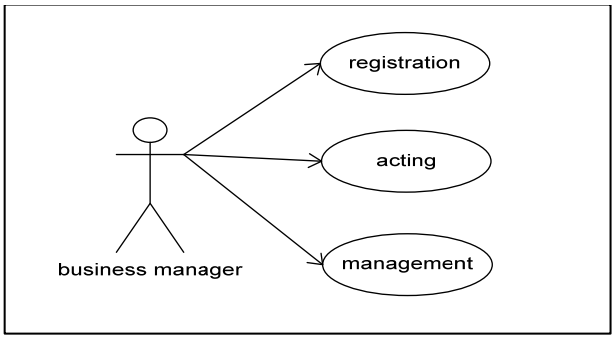

Figure 1. Usecase Diagram: Health Business Program

Each Mega process was analyzed more detail level as following usecase diagram.(Figure2, 3, 4)

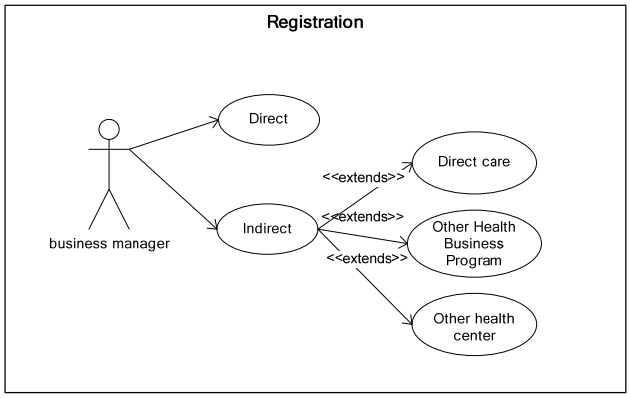

Figure 2. Usecase Diagram: Registration

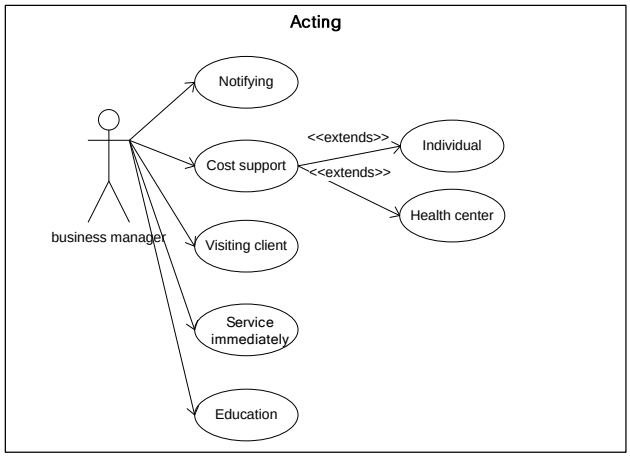

Figure 3. Usecase Diagram: Acting

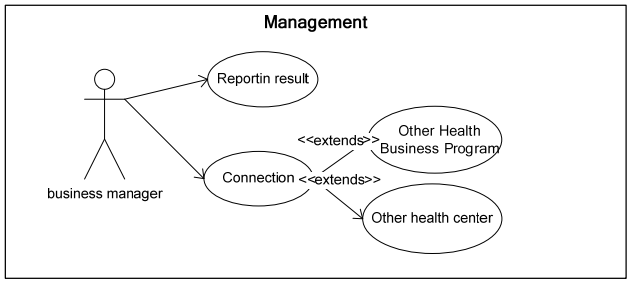

Figure 4. Usecase Diagram: Management

Analysis the system of Health Business Programs

In Health Business Program, Health Information System hardly has been developed . Even in the case that the Health Information System has been developed, the business managers rarely use Health Information System., because the Health Information system in Public Health Centers couldn't support the functions that can interface among other Health Business Programs, and communicate between Public Health Center and other Health Centers. They are the most important functions for the business managers to perform their work. The functions of interface also are the core functions for the interoperable EHR system.

There are categorized processes above Table1. Each Mega processes have Major processes, and also each Major processes have Sub processes. Similarly Each Sub processes have been performed by business managers, but each function was conducted in different ways.

So, several symbols are marked. A Mark "●" means that the function was performed by using Heath Information System in Public Health Center. A Mark "○" means that the function was performed by using website in common system. Finally a mark "◎" means that the function doesn't have any Health Information System, so business managers performed manually.

Table 1. Functional analysis of Health Information System

Mga process	Major Process	Sub Process	1.Using Health Information System†			2.Using website of other health center‡			3.No system (manual work)§		
			A	B	C	D	E	F	G	H	I
Regist-ration	Direct registration	At Health Bsiness Program in Public Health Center	●	●	●	◎	◎	◎	○	○	○
	Indirect registration	Direct care		●	○	○					
		Other Health Business Program			○						
		Other health centers				◎	◎				◎
Act-ing	Notifying cost support	Notifying			○	◎	◎		○	◎	
		Individual				◎	◎				
		Health center				◎	◎				◎
	Visiting client	Visiting client					◎			○	
	Services immediately	Services immediately	●	●				◎	○	○	
	Education	Education			○			◎	○	○	
Management	Reporting results	Reporting results	●	●	●	◎	◎	◎	○	○	○
	Connection	Other Health business program			○				○	○	
		Other Health Center	◎	◎	◎	◎	◎	◎	◎	◎	◎

† Using Health Information System: It means that works were performed by using Health Information System in Public Health Center.
‡ Using website of other health center: It means that works were performed by using website developed in other health center.
§ No system (manual work): It means that works were performed manually. For example, business manager used MS Excel or Word.

The name of each health business program is as follow;

A: Vaccination Program

B: Tuberculosis Control Program

C: Chronic Diseases Management Program

D: Rehabilitation Management Program

E: Sealing Program in Dental Health Care

F: Caner Screening Program

G: Medical Expense Subsidy for Caner Patient Program: Adults

H: Medical Expense Subsidy for Cancer Patient Program: Children

I: Smoking Cessation Management Program

It was analyzed that utility of health information system in public health center was poor.(Figure 2). In Registration, the coefficient of utilization of the System was 25%. Similarly in Acting, was 10%, and in Management was 15%.(Figure 5)

Business managers use other health centers' website or work manually in most of cases. It was showed 75% in Registration, 90% in Acting, 85% in Management when they use website or work manually.. Because of that, business managers feel inefficient and uncomfortable, thus they need the functions which could share the client's information efficiently.

These results showed that the Health Information system was in needs of functions that support interoperability between Health Information System in Public Health Centers and other health centers.

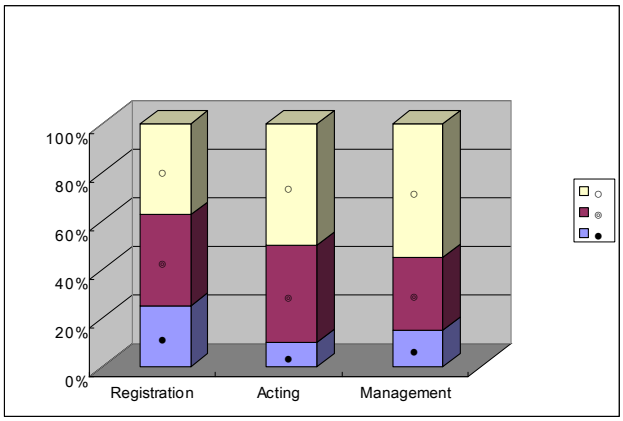

Figure 5. Rate of functional using the Health Information System (Sub process level)

Conclusions

Health business programs in public health center are recognized recently as essential activity of information system in Community Health. But actual condition can not support the effective management because there is little information system developed efficiently. From now on, establishing a health information system will be demanded for EHR system implementation.[3]

Health Information System offers an important infrastructure of efficient delivery and use of healthcare services. To develop the information system, it is important to develop a strategy covering the scope of work processes, public and private activities and adequate use of resources.[4]

So, in this study, we analyzed the function of Health Information System in Public Health Centers focused on Health Business Programs, which are recognized some core businesses in Public Health Centers.

In Public Health Centers, there are many different Health Business Programs. The Health Information System that supports the Health Business Programs was not integrated into a interoperable EHR system, but it has each Health Information System or has no Health Information System. This is why the functional analysis of Health Information System is significant.

We showed that it lacks for interoperability on relations with the Systems of other Health Business Programs and the Systems in other health centers.

For the EHR functionality, health information systems should include functions we suggested. The model for interoperable EHR system will be derived.(Figure 6)

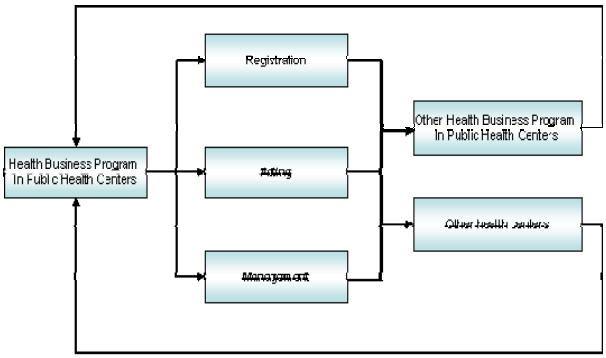

Figure 6. Model for interoperable EHR system in public health programs

Electronic Health Record (EHR) systems need to offer a flexible framework for recording the consultation process, and accommodate the individuality of the clinician.[5]

Health Information System should be developed reflecting the end users' requirements. Our study could be helpful to engineers who develop Health Information System , so they could have a good understanding of medical domain. And that can help to reflect the users' requirements. Furthermore, the Health Information System would be adopted various Health Business Programs. Eventually these make increasing the efficiency of the user's business and make sure the implementation of interoperable Electronic Health Record System.

Acknowledgments

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