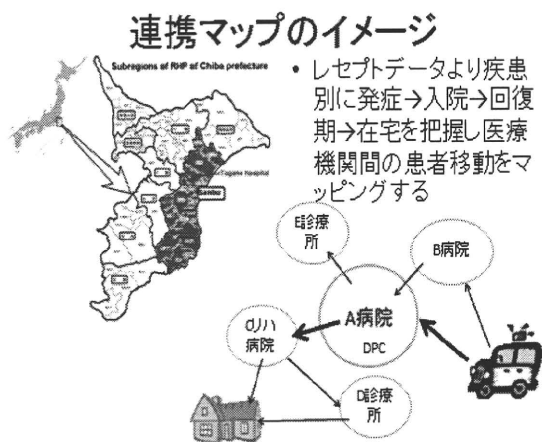


れを地図上に表示させる。かかる全国連携マップは都道府県の第二期医療計画のため

の重要な参考資料となることが期待される。



A県2005年5月～2006年5月複数医療機関に入院した国保被保険者の転院状況(上位10病院のみ例:B病院→A病院に転院した者28人)

上欄から左欄へ転院者数	A	B	C	D	E	F	G	H	I	J	合計
A病院	28	25	1	16	28	15	16	19	24		1289
B病院	24	22	3	10	23	7	98	46	66		1251
C病院	27	21	2	7	4	43		14	9		786
D病院	10	12	1		1						558
E病院	40	15	17						1		508
F病院	55	32	6			1	2	1	2		426
G病院	33	12	48	2	3		1	1	7		341
H病院	18	85							1	3	331
I病院	14	67	18	1	1	6				1	323
J病院	14	61	10		3	4	1	3			273
総計	1272	1157	713	424	318	352	333	302	239	223	17094

図5. 連携マップのイメージ

F. 健康危険情報

該当なし

G. 研究発表

1. 論文発表

Etsuji Okamoto, Masaki Miyamoto, Kazuhiro Hara, Jun Yoshida, Masaki Muto, Aizan Hirai, Haruyuki Tatsumi, Masaaki Mizuno, Hiroshi Nagata, Daisuke Yamakata. “ Integrated care through disease-oriented critical paths:experience from Japan’s regional health planning initiatives”. the International Journal of Integrated Care: the 10th anniversary issue. [in press]

2. 学会発表

Etsuji Okamoto. “Medical and economic evaluation of disease management program for poorly-controlled elderly diabetes patients”. the 138th Annual Meeting & Exposition of the American Public Health Association. 6-10 November 2010 held at Denver (USA).

H. 知的所有権の取得状況

特になし

東京都
地域連携診療計画
計画管理料・退院時指導料

届出医療機関リスト
(2011年2月現在)

東京都 地域連携診療計画管理料・退院
時指導料届出医療機関(N=497)の分布



[以下,Excel ワークシート【参考表】挿入]

【参考資料 2】

国際連携ケア誌
(the International Journal of Integrated Care)

<http://www.ijic.org>

掲載予定論文

Policy paper (for the special issue celebrating the 10th anniversary of the IJIC)

Integrated care through disease-oriented critical paths: experience from Japan's regional health planning initiatives

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Summary

Introduction: Japan launched a radical reform in the regional health planning (RHP) starting in April 2008. The new RHPs emphasized disease-oriented inter-provider critical paths to ensure effective integration of various providers ranging among primary care practitioners, acute care hospitals, rehabilitation hospitals, long-term care facilities and home care.

Description of policy practice: All 47 prefectures developed their RHPs pursuant to the guideline requiring that RHPs should include at least four diseases: diabetes, acute myocardial infarction (AMI), cerebrovascular accident (CVA or stroke) and cancer. The author describes the guideline referring to its chapter on strokes and examples of the new RHPs as well as examples of disease-oriented inter-provider clinical paths. Also the information sharing through electronic health records (EHR) to enhance effective integration among providers is discussed.

Discussion and Conclusion: Japan's reform in 2008 is unique in that the concept of "disease-oriented regional inter-provider critical paths" was adopted as a national policy and all 47 prefectures developed their RHPs simultaneously. How much the new RHPs improve the quality and outcome of care will be evaluated in 2013 after the five year plan period.

keywords

regional health planning, critical path, electronic health record,

1. Introduction

Japan's health care system is financed by universal coverage of health insurance with strong price control by the government and is provided by hospitals and clinics in the predominantly private sector with little control over utilization. It is an outlier in terms of international comparison among OECD countries [i]. Japan has the highest number of hospital beds per population (8.2 per thousand population vs. OECD average 3.8) with the longest length of stay (LOS) (19.0 days vs. OECD average 6.5 days), the highest utilization of physician consultations (13.6 per capita annually vs. OECD average 6.8) and by far the highest number of MRI and CTs (40.1 and 92.6 per million population vs. OECD average 11.0 and 22.8 respectively). However, Japan's health care expenditure is kept relatively low in relation to its GDP (Gross Domestic Product) (Japan: 8.1% vs. OECD average 8.9%).

The discrepancy between the high utilization of health care resources and relatively low health care expenditure can be explained by the strong and universal price control by the government. Such price control is a strength of Japan's national health insurance system in guaranteeing the equal and universal access to health care. However, Japan's health care has its limitations: while exerting strong control over prices, it exerts little control over utilization.

One of the reasons of the long hospital stay is the lack of integration between hospitals and primary care practitioners. Effective referral systems between specialized hospitals and primary care practitioners are desperately lacking. Practitioners have been reluctant to refer their patients to secondary or tertiary hospitals and hospitals have been reluctant to discharge the patients to be taken care of by local practitioners because keeping the beds always in full was of the supreme importance. Such situation is most evident in psychiatric and geriatric hospitals.

- There have been attempts to develop American-style "Open system" hospitals with which practitioners continue to serve as the attending doctors of inpatients but many of them did not take root [ii]. There remains a strongly held idea that a single health care institution should ideally provide complete sets of care to a patient. The government has been making efforts to shorten the length of stay (LOS) and/or increase the referral rate through economic incentives of the fee schedule (e.g., increasing the reimbursement for hospitals with shorter LOS and higher referral rate) to help reduce the geographical variance of length of stay particularly among the elderly[iii]. However, the economic incentives alone provided a limited success. Later, the government started a model project of regional information network of strokes in the 1990s. In the model project, hospitals discharging a stroke patient report it to a local public health center [iv]. This model project was discontinued by the time the Long-term Care Insurance (LTCI) was introduced in 2000 [v].

1.1. In-hospital vs. inter-provider critical paths

- The concept of critical path was originally developed in the U.S. as a process management tool, which was later adopted to in-hospital management by Karen Zander in 1988 in the wake of the introduction of DRG reimbursement to acute care hospitals [vi].

- Japan's LOS was much longer than the OECD average and the government attempted a variety of measures to shorten it. In 1996, the "hospital discharge planning" was introduced to Japan's national fee schedule. A hospital received additional reimbursement by providing a newly admitted patient with a discharge plan specifying the expected LOS. Although, the discharge plan was not binding, it contributed to shorten the LOS by preparing the patient when he/she would expect to discharge. The hospital discharge planning may be a precursor of "in-hospital" critical path, then, as the government policy to shorten the LOS had been strengthened, critical paths were gradually introduced to hospital management mainly to streamline the in-hospital care and shorten the LOS. In 1998, a group of doctors organized to form the "Critical Path Study Group", which later developed into today's "Japan Society of Health Care Management" [vii].

- Soon, it became realized that in-hospital critical path can also be applied to integration among different health care providers and pioneering works started in some areas. Integration among different providers would be easy in staff-model Health Maintenance Organizations (HMO) but would be difficult in Japan where such contractual arrangement between insurers and providers is not authorized by law. Subsequently mutually rivaling providers must cooperate by sharing the patients' information. In 2005, the Ministry of Health, Labour & Welfare (MHLW)

research project was conducted to investigate such pioneering works [viii]. The project revealed that in as many as 20 areas inter-provider critical paths were already in place and operational. These findings provided important evidence leading to the inclusion of disease-oriented inter-provider critical paths into the Regional Health Planning (RHP) in 2008.

1.2. Development of Japan's health planning

- Japan's health care system used to be characterized by its *lack of planning*: there was no control over hospital constructions or location of expensive medical equipment. Consequently Japan has become a country with highest medical devices and hospital beds per capita (the number of CT scan and MRI per million population was 97.3 and 43.1 and hospital beds per thousand population was 13.8 in 2008 according to OECD Health Data, by far the highest in OECD countries. Cf. US: 34.3, 35.9 and 3.1 respectively). Japan's post-war health policy had been dominated by Japan Medical Association (JMA) led by a powerful and charismatic leader, Dr. Taro Takemi (1904-83, JMA presidency:1957-82)[ix]. Under the leadership of Takemi, JMA became one of the most powerful pressure groups which advocated the professional self-governance of doctors and excluded any governmental interventions. It was only after Takemi stepped down in 1982, when the then Ministry of Health & Welfare (MHW) fostered the idea of planning in health policy.

- In 1984, the MHW first proposed the introduction of RHP, which was enacted into the Medical Care Act in 1986 mandating each of 47 prefectures to design its RHP by 1988. The intent and objectives of the introduction of RHP was mainly to control the growth of hospital beds. Until then, hospital construction was approved as long as applications were compliant with legal requirements. Boosted by the robust economy at that time, hospital construction was booming (Japan's acute care hospital beds increased by 50% in just ten years between 1978 and 1988) and there was fear of undue inflation of health care expenditure due to the "Roemer's law (a built bed is a filled bed)"[x]. The new RHP authorized prefectural governments to refuse applications for new hospitals construction where hospitals beds were already in over supply. However, little emphasis was placed on how health care shall be provided in the RHP.

- In April 2008, the Medical Care Act was further amended and the prefectural governments' initiative over the RHP was strengthened. The new RHP was required to include the "disease-oriented" critical paths to facilitate the "role sharing and effective integration" among different levels of providers and secure a "seamless" provision of care ranging over the primary, secondary and tertiary care as well as home care. For a long time, there has been poor specialization and integration among providers and it was common to see that a stroke patient admitted to a hospital with no recuperative rehabilitation ward was kept in the same hospital after the acute phase without being referred to other appropriate facilities. Referrals among hospitals or doctors tend to be confined among doctors of the same academic clans (informal alumnae networks of the apprenticeship under the same professor) and outsider doctors occasionally found it difficult to choose appropriate referring facilities. There has been a growing understanding that disease-oriented inter-provider critical paths are the best way to ensure that each patient will receive the "right" care at the "right" time, and also to achieve the quality and efficacy of care.

- Pursuant to the Medical Care Act, inter-provider critical paths were required to be developed on a disease-oriented manner for at least four disease categories and five health care systems (cancer, acute myocardial infarction (AMI), diabetes, cerebrovascular accidents (CVA), emergency care, rural care, perinatal care and pediatric care). The new RHP was required to specify which health care providers in the prefecture had certain treatment functions (such as cardiac care unit (CCU) or recuperative rehabilitation) and in what role of the disease-oriented critical paths the provider be able to provide. For example, in case of the critical paths for CVA, the A medical center has SCU (stroke care unit) and is ready for receiving the first line treatment, the B hospitals has the recuperative rehabilitation program and is capable of accepting referrals from the A medical center and the C visiting nursing station is capable of providing home rehabilitation services of the LTCI, and so forth. A special emphasis was placed on the CVA critical path because the CVA is a disease which requires different types of care in acute, recuperative and chronic phases and hence an effective integration is of crucial importance [xi].

1.3. Promotion through the fee schedule

The disease-oriented inter-provider critical paths were also promoted through the national mandatory fee schedule. Japan has a universal health insurance system and prices of each service are meticulously set by the national uniform fee schedule [xii]. The fee schedule is revised every two years and certain prices are introduced to encourage (or discourage) certain practices. In the 2006 fee schedule, a new fee “regional inter-provider care planning fee (priced at 15,000 yen or \$120 according to the rate in 2006: \$1=¥124.34)” was introduced. Hospitals can charge this fee for reimbursement upon a discharge of a patient with hip fracture by networking with other local providers to refer the discharged patient (plus conducting an ADL appraisal). In the 2008 fee schedule, the covered diseases were expanded to include CVA. To qualify for reimbursement, networking providers must be listed in the critical paths for CVA in each prefectural RHP and networking providers must have regular meetings at least three times a year. The Institute of Health Economics & Policy (IHEP) conducted a questionnaire survey on a total of 625 hospitals fulfilling the requirement for this fee in December 2009 and received responses from 232 hospitals (37.1%)[xiii]. On average each eligible hospital had a network with 14.5 hospitals (9.1 hospitals with recuperative rehabilitation ward) and 1.3 clinics. More recently, in the 2010 fee schedule, the extent of networking providers was expanded to include LTC facilities and home care agencies.

1.4. Role of public health centers

- Although most of the local network of providers developed voluntarily, local public health centers (PHCs) took initiatives in networking in some areas. PHCs are administrative branches of local governments endowed with various administrative authorities delegated by the Regional Health Act. There were a total of 494 PHCs as of April 2010 and each PHC has its geographical areas of jurisdiction, which overlap with the zoning of the RHP^{xiv}. Therefore, PHCs are expected to act as a coordinator for disease-oriented critical paths of the RHP. Historically, PHCs have been a forefront of primary and secondary prevention but the importance of tertiary prevention (= disease management) for chronic diseases is growing. If PHCs are to provide disease management, networking with local providers will be essential. Also, since PHCs have, by law, authority to oversee all health care facilities in the jurisdiction, PHCs are in a better position to coordinate the often-rivaling local providers. For example, PHCs may provide venue for regular meeting for networking providers or act as a liaison with local medical associations.

1.5. Guideline of RHP

- To help prefectural governments develop RHP, MHLW issued a guideline [xv] to help assist prefectural governments with developing disease-oriented RHPs. The guideline emphasizes: “as a policy, RHPs must ensure “seamless” health care by *integrating* the specialized functions of health care providers in the region. To achieve this, RHPs must list-up the *names* of providers and their respective specialized functions. Also RHPs should include objective indicators by which quality of care in the region can be evaluated (such as structure, process and outcome indicators)”.

- The disclosure of provider’s names in the RHP was a radical departure from the long-held policy that restricted the advertising of health care facilities. To ensure accuracy, prefectural governments are authorized to conduct surveys on health care providers to grasp the functions of individual providers. To assist the development of RHPs, a national database collecting all health insurance claims nationwide was established by the MHLW.

- The guideline places a particular emphasis on CVA because it is a disease “requiring good integration of different types of care such as medical care, long-term care and social care most”. The following is the excerpt of the guideline using the part of CVA as an example.

1.5.1. epidemiology of CVA.

- Japan had notoriously high incidence and prevalence of CVA due in large part to high prevalence of hypertension and high salt intake (Age-adjusted mortality of cerebrovascular disease of Japan was by far the highest among OECD countries in 1960: 295.2 per 100,000 population or nearly 100 higher than the second [Germany 198.3] according to OECD Health Data.). Not only CVA can be life-threatening, it could lead to disability and subsequent deteriorated QOL. However the severity of CVA and its sequelae can be minimized through a better coordination of different phases of care. CVA accounts for approximately 11% of emergency patients brought in

by ambulances (approximately 330,000^{xvi}) and a total of 1.37 million patients were estimated to be under treatment for the disease in 2005^{xvii}. CVA is the 3rd cause of deaths accounting for 11.8% (approximately 130,000) of total deaths. It is also important in the social context because in many cases it leaves disability. CVA accounts for approximately 25.7% of beneficiaries of the LTCI and 30% of the bed-bound elderly^{xviii}. Approximately 23% of the new CVA cases ended up in bed-bound in the first month and 19% in the first year according to a local stroke registry^{xix}.

1.5.2. acute phase of treatment of CVA

- Prompt transfer to appropriate health care facilities is of crucial importance for the initial acute phase of treatment. However, only 37% of the new cerebral infarction cases were started treatment at the facilities appropriate for CVA within three hours of the onset according to a survey^{xx}. The study found that improper selection of transferring facilities was part of the reason for the delay in treatment. The initial delay in treatment can be crucial particularly because the advanced CT is able to detect the very early phase of cerebral infarction, thereby enabling the timely administration of thrombolytics. Ideally, patients should be brought in to a facility with SCU (stroke care unit) within two hours and the initial treatment such as administration of thrombolytics within one hour of the arrival.

1.5.3. rehabilitation phase of CVA

- For patients who survived the acute phase, early and intensive rehabilitation becomes essential. Such recuperative rehabilitation may initiate in the first 24 hours of the onset because early intervention results in better outcomes [^{xxi}]. Recovery of lost motion can be expected up to three to six months but once the paralysis is completed, it cannot improve any more. Recuperative rehabilitation is continued as long as improvement is expected but the decision to switch to the chronic phase becomes necessary to avoid unnecessarily prolonged hospitalization. A patient will be discharged when his/her maximum recovery is achieved [^{xxii}].

- After discharge, patients will migrate to the chronic phase of rehabilitation at home or at a LTC facility. In this phase, the LTCI replaces the health insurance and a variety of services are managed by certified care managers. Visiting nursing services and visiting rehabilitation services are staples of the LTCI.

1.5.4 outcome and evaluation

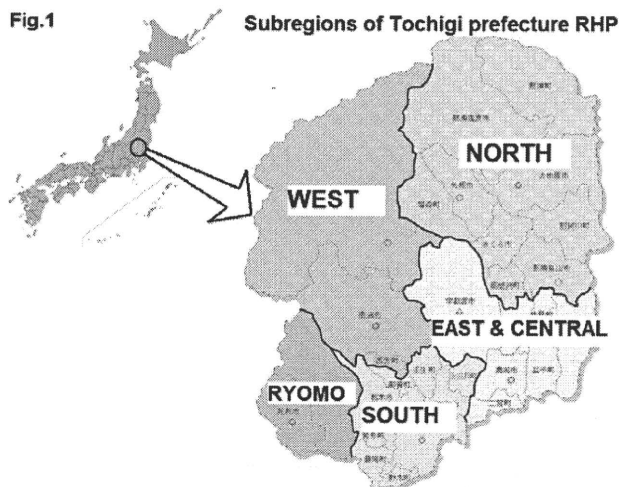
The RHP must incorporate targets to be achieved in the planned period (five years). The targets are expressed in quality indicators measuring the structure, process and outcome. The MHLW guideline suggests the number of hospitals fulfilling the requirements for t-PA (tissue plasminogen activator) thrombolytic treatment as an example of structure indicators, the number and % of patients brought to hospitals with primary diagnosis of ischemic stroke who received t-PA administration as an example of process indicators and the survival rate and the level of ADL one year after the onset of CVA as examples of outcome indicators. Prefectural governments are required to analyze the quality indicators to evaluate the effectiveness of the RHP. The first RHP covers the five year period between 2008 and 2012 with the final evaluation will take place in 2013.

2. Description of the policy development

The authors are members of the research project “Standardization of data format and EHR (electronic health record) for disease-oriented critical path” funded by MHLW and will present examples

2.1. An example of RHP, Tochigi prefecture

In April 2008, all 47 prefectures developed their RHPs and we look at Tochigi prefecture (population approximately two million) as an example [^{xxiii}]. Tochigi prefecture is a land-locked prefecture 70 miles north of Tokyo. Its RHP divides the prefecture into five regions and lists up the providers based on their functions.



The following table describes the number of providers specialized for diabetes care. The providers are further divided into a variety phases of diabetes care and the entire list is published through the prefecture's website [<http://www.qq.pref.tochigi.jp/>] together with the links to individual provider's website.

[Table 1] N of health care providers for diabetes in Tochigi Regional Health Plan

Name of the region	primary care	special care	acute complication	chronic complication		
				nephropathy	retinopathy	neuropathy
north	33	13	1	7	12	12
west	21	8	0	4	6	9
east-central	90	15	1	21	16	44
south	58	13	2	12	9	17
Ryomo	28	7	1	7	9	9
TOTAL	230	56	5	51	52	91

developed by the author from the source [<http://www.qqpref.tochigi.jp>]

2.2. An example of diabetes, Chiba prefecture

- The Sanbu-region of Chiba prefecture had a problem of poor glycemic control among diabetic patients. The region had a high amputation rate of diabetics, about five-time the national average in 1998, when Dr. Hirai was appointed as administrator of Togane hospital, a prefectural general hospital serving as a center of the region [xxiv]. This situation prompted Dr. Hirai to apply for the model project of regional EHR in 2000 [xxv].
- The created regional EHR system of Togane hospital now manages 3200 diabetic patients data which will be shared by local practitioners. It was demonstrated that the minimal dataset would be sufficient as a referral criteria (HbA1c, eGFR[estimated glomerular filtration rate], urine-albumin, urine-protein, intima-media thickness of carotid artery and LDL-Cholestrol). This minimal dataset are shared with practitioners through EHR and the explicit referral standards (for example, two or more times of elevated albuminuria >30mg/g/cre) enable them to make an appropriate judgment to refer patients requiring specialists treatment. Once the patients are stabilized by specialists care by Togane hospital, they will referred back to the referring practitioners.

[Fig2]

[Fig] The front page of the electronic health record for inter-provider critical path for diabetes

患者ID	0000013	年齢	76	開始日付	2008/06/18	期間	12ヶ月	終了日付	
患者氏名	東金いちろう	性別	男	パスモデル	糖尿病/パスモデルA	終了理由			
< 2/2巡目 >		patient ID		バリエーション指標表示		検査値入力		パス変更	
		2008			2009				
		6月	9月	12月	3月	6月			
provider		Togane Hp	Matsuo clinic	Matsuo clinic	Matsuo clinic	Togane Hp			
検査日付		06/10							
physical exam	体重 (kg)	77	●	●	●	●			
	腹囲 (cm)	88	●	●	●	●			
	血圧 (mmHg)	156/101	●	●	●	●			
	脈拍 (回/分)	89	●	●	●	●			
laboratory exam	血糖	●	●	●	●	●			
	Hb-A1c	●	●	●	●	●			
	LDLコレステロール (mg/dL)	●	●	●	●	●			
	HDLコレステロール (mg/dL)			●	●	●			
	TG (mg/dL)			●	●	●			
	eGFR (ml/D)	88.5	●	●	●	●			
微量Alb尿 (mg/g・Cre)	●	●	●	●	●				
検査(画像)	頸動脈エコー/ウラナ最大肥厚度 (cm)	●				●			

For each listed patient, minimal dataset (HbA1c, eGFR etc.) of laboratory exams done at participating providers are displayed chronologically to be shared by all providers.

Hirai A. Regional disease management program for diabetes. In: Ministry of Health, Labour & Welfare research grant "Study on realization of Japan EHR (PI: Hiroshi Tanaka)" 2009 Report, p76-81 (in Japanese).

- Also the skills of practitioners were improved through study groups (Staged Diabetes Management, SDM). Consequently, the number of diabetic patients requiring insulin injection under management of practitioners increased from eight patients (by one clinic) in 1998 to 450 patients (by 36 clinics) in 2007, thereby reducing the burden of doctors of Togane hospital in chronic shortage of doctors. Seven projects are going on as a chronic disease management each with explicit inclusion criteria, intervention and outcome measurement (For example, a project aimed at tertiary prevention of chronic kidney disease (CKD) has an inclusion criteria of eGFR<=30. Interventions on phosphate and sodium intake plus antihypertensive medication brought about the reduction of new cases of dialysis).

2.3 An example of strokes, Aichi prefecture

- In Aichi prefecture, an EHR system called "CVA inter-provider critical paths support system" was established in 2006 by a NPO "Tokai Net Iryo Forum" with funding from the Ministry of Economics & Industry [xxvi]. The system provides data exchange between acute care hospitals, rehabilitation facilities and the LTC facilities. The project listed up the minimal dataset to be shared by providers (such as consciousness level by GCS) and standardized it based on the HL7 Ver2.5 CDA R2 [xxvii].
- When a patient admitted to an acute care hospital and survived the initial phase, the patient is asked where he/she wants to be included in the system. When the acute phase nears to an end, the acute care hospital sends the patient ID as well as the relevant dataset to the participating recuperative rehabilitation hospitals. The rehabilitation hospitals reply their decision on whether they accept the patient or not. At this moment, all of the patient's data are still in the repository of the acute care hospital and the rehabilitation hospitals which refused admission will see their access to the patient's data any longer. The acute care hospital will decide to which rehabilitation hospital they are going to transfer the patient. The receiving rehabilitation hospital will conduct an assessment of ADL, which will be feedback to the acute care hospital to help them monitor the recovery of the patient. Likewise, chronic care facilities will conduct an assessment of ADL, which will be feedback to the original acute care and rehabilitation hospitals.
- In 2007, a total of 25 facilities (10 acute care facilities, 9 rehabilitation care facilities and 6 terminal care facilities) exchanged patient data and in 2008, the number grew to 31 adding four acute care and two rehabilitation facilities. During one year (November 2007 thru

October 2008), a total of 292 CVA patients were registered in the system of whom 71 completed through the chronic phase.

- Using this system, patients discharged from the acute care hospital continue to receive the follow-up outpatient treatment at an acute care hospital and the exercise program provided by a rehabilitation clinic simultaneously while both the hospital and the clinic are able to share his/her health records on an ongoing basis.
- The following is the professional version of the inter-provider critical path to be shared by providers [Fig3] and a patient version [Fig4]. The professional version is a form of the shared EHR.

[Fig3] Inter-hospital critical path for strokes (to be shared by different providers)

	acute phase	recuperative phase	chronic phase
provider's information	name of the facility () admission date () discharge date () attending doctor attending nurse treatment goals conference	name of the facility () admission date () discharge date () attending doctor attending nurse treatment goals conference	name of the facility () admission date () discharge date () attending doctor attending nurse treatment goals conference
patient's information	rehabilitation course ADL eating bathing urination/defecation mobility/toileting mobility/walking clothing sanitation speech disturbance swallowing disturbance Instrumental assistance other ADL(rank) cognitive level complications	rehabilitation course ADL eating bathing urination/defecation mobility/toileting mobility/walking clothing sanitation speech disturbance swallowing disturbance Instrumental assistance other ADL(rank) cognitive level complications	rehabilitation course ADL eating bathing urination/defecation mobility/toileting mobility/walking clothing sanitation speech disturbance swallowing disturbance Instrumental assistance other ADL(rank) cognitive level complications
patient's background information	housing condition prerequisite for home care prerequisite for institutional care problems of the patient/family	housing condition prerequisite for home care prerequisite for institutional care problems of the patient/family	housing condition prerequisite for home care prerequisite for institutional care problems of the patient/family
goals to be achieved	completion of acute treatment stabilization of general condition LOS within 17 days	ADL/walking achieved the goal or FIM gain plateaued over 1 month (<3) ready for discharge back home/institution	ADL maintenance(3 months)
variance	patient factor provider factor facility factor social factor others	patient factor provider factor facility factor social factor others	patient factor provider factor facility factor social factor others
prognosis	ADL evaluation bed rest raising one hand up to chest rolling over on bed sitting up maintain sitting position mobility moving method oral hygiene clothing communication understanding directions dangerous behaviors	ADL evaluation bed rest raising one hand up to chest rolling over on bed sitting up maintain sitting position mobility moving method oral hygiene clothing communication understanding directions dangerous behaviors	ADL evaluation bed rest raising one hand up to chest rolling over on bed sitting up maintain sitting position mobility moving method oral hygiene clothing communication understanding directions dangerous behaviors

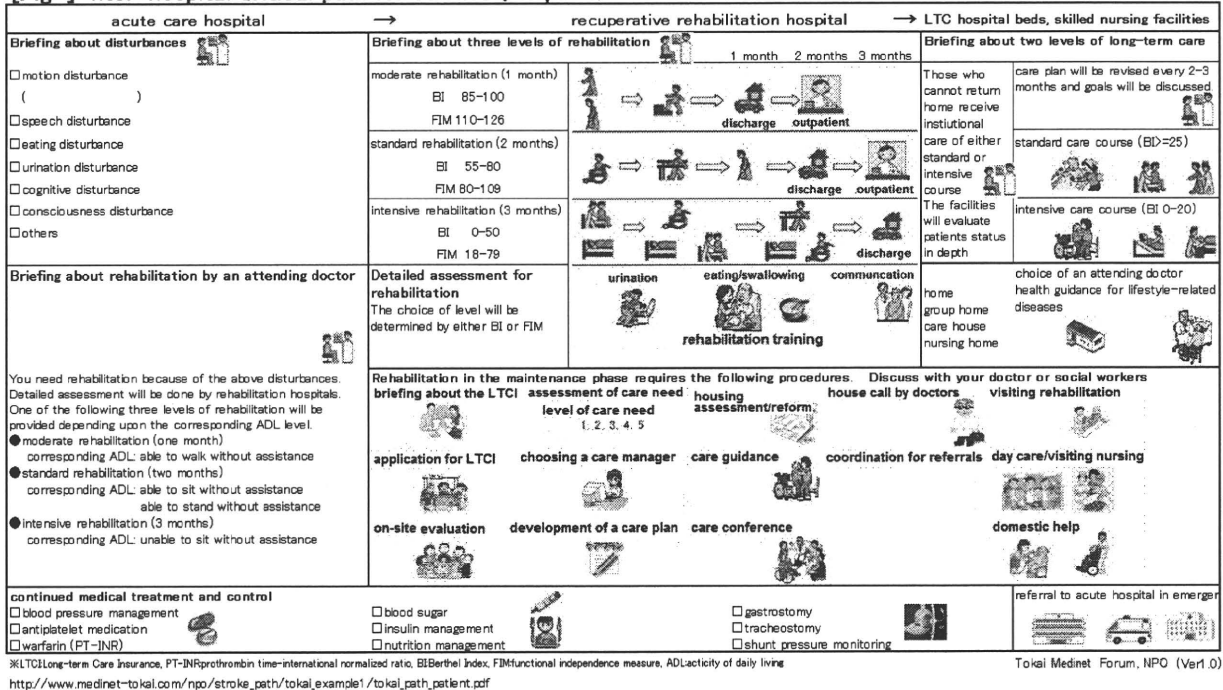
*t-PA: tissue plasminogen activator, PT-INR:prothrombin time --international normalized rate, ADL:activity of daily living, mRS:modified Rankin Scale, BI:Barthel index, FIM: functional independence measure, LOS:length of stay

Tokai Medinet Forum NPO (ver2008082901)

http://www.medinet-tokai.com/npo/stroke_path/tokai_example1/tokai_path.doc.pdf

[Fig4]

[Fig] Inter-hospital critical path for strokes (for paMr/Ms. (cerebral infarction/bleeding/subarachnoid hemorrhage)



※LTCILong-term Care Insurance, PT-INRprothrombin time-international normalized ratio, BI(Berthel) Index, FIMFunctional independence measure, ADLactivity of daily living
http://www.medinet-tokai.com/npo/stroke_path/tokai_example1/tokai_path_patient.pdf Tokai Medinet Forum, NPO (Ver1.0)

2.3 Web-based information exchange ---Kagawa prefecture

- Kagawa prefecture developed a distance health care system called K-MIX (Kagawa Medical Internet eXchange) originally providing perinatal care to pregnant women when it was started in 2003 [xxviii]. K-MIX is an ASP type and hence any health care providers can access via internet without a particular software at low cost and with high safety. K-MIX facilitates medical information (patient information, medical image etc.) exchange between hospitals and clinics. K-MIX is managed by Kagawa Medical Association and over 90 hospitals and clinics including those in adjacent prefectures are users. And it was expanded to include various critical paths for other than perinatal care such as strokes and diabetes.
- In 2009, Kagawa university hospital started the development of the inter-provider critical path for diabetes using K-MIX. Hospitals and clinics are able to share the patient data (basic patient information, routine clinical test, index of complication, estimation) over the K-MIX web pages and the input data can be integrated with other K-MIX systems. The following [Fig5] is the input page of a diabetic patient on K-MIX.

[Fig5] Web page of K-MIX for data input of critical path for diabetes

Basic patient information

糖尿病リハビリパス【診療計画・定期診療】 - Microsoft Internet Explorer

更新日: 2010/2/25

患者番号: 10-001-99999991 氏名(年齢): テスト太郎(テスト) 性別: 男性 連携病院:

患者基本情報

入院期間: 入院年月日: 年 月 日 退院年月日: 年 月 日

地域連携診療計画

定期連携	実施施設	前回実施日	予約日
外部MR	○総合病院	年 月 日	年 月 日
外部工科	○総合病院	年 月 日	年 月 日
工科	△診療所	年 月 日	年 月 日
ABI	その他	年 月 日	年 月 日
HW	○総合病院	年 月 日	年 月 日
外部OT	○総合病院	年 月 日	年 月 日
外部PT	○総合病院	年 月 日	年 月 日

合併症情報等

合併症名	症状	受診目安
神経障害	異常なし	なし
網膜症	異常なし	なし
黄斑浮腫	異常なし	なし
腎症	1期	なし
心血管障害	異常なし	なし
虚血性心疾患	異常なし	なし
脳血管障害	異常なし	なし
末梢血管障害	異常なし	なし

治療目標

評価コメント

患者の更新日: 2010年02月25日
医師の更新日: 2010年02月25日

Index of complication

Routine clinical test

Aim of treatment

2.4. Outcome of inter-provider critical paths

The number of hospitals fulfilling the requirement for reimbursement of “regional inter-provider critical path” has increased steadily starting from 76 in 2006 when it was introduced to 209 in 2007, 405 in 2008 and 613 in 2009 (cf. Japan’s total number of acute hospitals is 7,714 as of Oct 1, 2008) according to the report submitted to the Central Social Insurance Health Care Committee (CSIHCC) which is responsible for the fee schedule revision [xxix].

The authors’ research project conducted a survey on all hospitals to investigate how much the inter-provider critical paths were used. The survey was conducted as a questionnaire via regular mail or internet between November 2008 and January 2009 with 546 providers responded (response rate 10.2%) [xxx]. Of the respondents, 177 of them responded that they were already using the inter-provider critical paths (151 of them relied on paper forms and only 26 of them used electronic data exchange). On disease-specific basis, 144 used critical paths for CVA followed by 111 for hip fractures (others were cancer: 17, diabetes:13, AMI:11). As for the potential for the quality improvement, 65.2% of respondents agreed that the regional integration critical paths will contribute to the improvement of quality of care while only 5.5% denied it. Also, 85.2% of respondents believed that IT would be necessary for effective regional integration while 11.9% denied it.

Later CSIHCC conducted an evaluation survey in June 2009, sending mail questionnaire to randomly selected 2058 hospitals with 744 responses (response rate:36.1%), of which 138 hospitals were those fulfilling the requirement for the regional inter-provider critical path. Contrary to expectation, discharged stroke patients who were charged for the inter-provider critical path had a longer LOS than those otherwise (33.3 days vs. 30.0 days) [xxxi].

The Institute of Health Economics & Policy (IHEP) also conducted a similar survey on all hospitals fulfilling the requirement for the regional inter-provider critical path (N=625) in December 2009 with 232 responses (response rate:37.1%) and came up with a similar result: the discharge patients applied the critical path showed a longer LOS than those otherwise (32.9 days vs. 27.4 days, SD:9.5 days vs. 10.6 days).

Overall, there have been no evidence that the inter-provider critical path definitely reduced the

LOS. One might be cautioned that neither CSIHCC survey nor IHEP survey adjusted the case-mix of the patients and it is premature to draw a definite conclusion yet. However there is a study on the inter-provider critical path on hip fracture patients concluding that the apparently shorter LOS of acute hospitals just cost-shifted part of their cost to chronic hospitals [xxxii].

3. Discussion and conclusion

The concept of “critical path” was originally developed in the U.S. as a project management tool and was later adopted to in-hospital management in the wake of the introduction of DRG reimbursement. Recently, the critical path came to be used for inter-provider integration on a regional level [xxxiii]. Such form of integration is called case management in some countries like PRISMA in Canada [xxxiv]. Japan’s new RHP does not involve case management concept, nor it involves a fully integrated model like the social HMO in the U.S. [xxxv]. Rather it is unique in that the concept of “disease-oriented regional inter-provider critical paths” was adopted as a national policy and all 47 prefectures developed their RHPs simultaneously. The authors, participating in a research project on EHR for the purpose of standardizing the data format of the inter-provider critical path, reported our latest findings and achievements on how EHR would enhance the inter-professional integration. However, the use of EHR is merely a tool to achieve the purpose and is by no means a prerequisite for effective inter-professional integration. The government’s new initiative for RHP does not require the use of EHR. Ironically enough, we came to believe personal networking and mutual trust is far more important than the IT. The examples we reported in this article were possible not because of IT but because of strong personal networking developed in the long time. EHR is definitely an effective tool to supplement the human network but can never replace it. This fact is echoed in the requirement for regular meeting with participating providers to qualify for reimbursement for “regional inter-provider care planning”. Unlike the in-hospital critical path, which is used only by the in-house staff, the inter-provider critical path involves staff of different providers. EHR will enhance, but not guarantee, the success of the inter-provider critical path.

4. Acknowledgments

This study is a product of the Health, Labour & Welfare research grant “Development of regional integration critical paths toward Japan EHR” (PI: Hiroshi Tanaka)

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厚生労働科学研究費補助金（地域医療基盤開発研究事業）
分担研究年度終了報告書

日本版EHRを目指した地域連携電子化クリティカルパスにおける共通形式と疾患別項目の標準化に向けた研究

研究分担者 秋山昌範（東京大学政策ビジョン研究センター 教授）

研究要旨

本研究においては、地域連携のための医療情報基盤構築のために、有効と考えられる先進的事例を検討することを目的とする。特に、米国・欧州における医療 IT 事情並びにクラウドコンピューティングの医療への応用に関して検討した。米国においては、ARRA のインセンティブプログラムの元に、Meaningful use の基準を満たした電子カルテの導入が促進されている。そこでは、地域連携のための情報交換も必須に定められており、米国の医療制度改革における目玉の 1 つとなっている。また、クラウドコンピューティングの発展は医療分野にも波及しつつあり、連携システムのクラウド化や Web を通じた情報連携が拡大傾向にある。米国・欧州では、医療情報の標準化、医療情報教育に関して協力の合意が成立し、国際的な枠組みが急速に決定しつつある。また、各国において、プライバシーに配慮した形での個人認証番号の導入などが行われており、情報連携基盤構築のために参考となる事例が見られる。日本においても、インフラ面での認証番号の整備やプライバシーの問題への対応、コンテンツ面での情報の標準化などを各国の事例を参考にしながら、早急に整備する必要がある。

A. 研究目的

本研究においては、地域連携のための医療情報基盤構築のために、有効と考えられる先進的事例を検討することを目的とする。特に、米国・欧州における医療 IT 事情並びにクラウドコンピューティングの医療への応用に関して検討する。米国においては、電子カルテ導入にかかるインセンティブプログラムが導入され、クリニックを中心に電子カルテの導入と開発競争が進展している。米国においても地域連携は大きな課題であり、米国での取り組みを概観することで、日本への含意を導くと考えられる。ま

た、米国・欧州間で医療情報の相互運用性（Interoperability）と医療情報教育の共通化に向けた合意が締結されている。国境を越えた連携への動きであり、注視する必要がある。また、医療情報分野におけるクラウドコンピューティングの導入並びにウェブ型サービスの導入についても検討を行う。これらの情報技術は、情報の真正性を担保しつつ、携帯性・利便性を格段に高めるものであり、特に連携システムの構築に力を発揮すると考えられる。米国・日本の事例を検討し、応用可能性を検証する。

B. 研究方法

研究方法として、文献およびインターネット上の調査ならびに実際のシステムのケーススタディから米国医療 IT 事情並びにクラウドコンピューティングの医療応用の有効性を検証する。National Healthcare IT coordinator、EU information center 等の Web サイト、医療情報関連の最大のイベントの一つである、Health Information and Management System Society (HIMSS)の展示や発表等を参考にした。

(倫理面への配慮)

本研究においてはあくまで先進的な医療情報・地域連携の枠組みと事例を検討することが主眼であり、実際に個人情報の運用は行っていないため、倫理面での問題はなないと考えられる。

C. 研究結果

米国における電子カルテの推進は、リーマンショック後の経済刺激策であると同時に医療制度改革の大きな柱となっている。米国経済再生法；American Recovery and Reinvestment Act (ARRA)において、医療 IT へのインセンティブプログラムが策定されたが、電子カルテに関しては、Meaningful Use で規定された医療情報の電子化に対して、補助金をつけるものである。この Meaningful Use は、一義的には以下のような目標達成が望まれている。

- ・ 電子オーダー
- ・ 各患者の Problem Lists の電子化と適切な入力
- ・ 実施診療行為の電子的な記録
- ・ 患者属性（アレルギー・言語・民族・基

礎的な健康情報等）の保存

- ・ 臨床指標の測定
- ・ 意志決定支援
- ・ 患者への医療情報の提供
- ・ 医療情報・検査データの構造化と交換

これらを通じて、無駄な検査の削減と医療連携のための情報基盤整備を行っている。

クラウド技術の医療への応用に関して、萌芽期であり、実践例は非常に少ない。クラウドコンピューティングの初期の実践例としては、画像情報システムの統合に見られる程度である。医療情報関連の最大のイベントの一つである、Health Information and Management System Society(HIMSS)の展示においては、クラウドコンピューティング型の医療情報システムの実践例が増加しつつある。これまで分担研究者は、クラウドコンピューティング型の電子カルテ、地域連携システムを構築しており、糖尿病疾病管理システム等へも応用が進んでいる。これは世界的にも非常に数少ない応用例である。

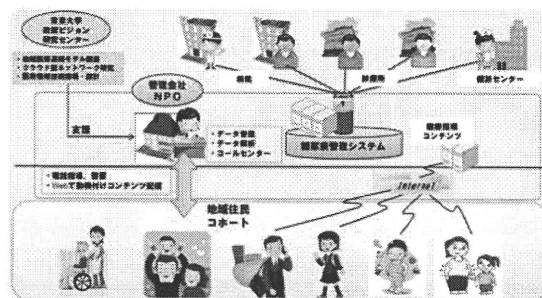


図 1. 徳島県における糖尿病管理システム

また、Web サービスに関しては、各国において進展しつつある。イギリスの NHS においては、早くから電子カルテのインター

ネット化に焦点を合わせてきた。これはイギリスにおけるガバナンス改革の中で、情報公開・透明性への意識が高まったことや患者側の情報への意識変化などが背景にあると考えられる。加えて、NHS側としても、Pay for Performanceによる家庭医の質の評価や臨床研究などを行うモチベーションから、積極的にインターネットを用いて電子カルテの導入を行ってきた。アメリカでも、インターネットをベースにした医療情報システムが増加傾向にある。その背景としては、イギリスと同様の傾向に加えて、アメリカの医療制度では医師は病院に所属しておらず、独立しているため、病院での医療情報を外部から閲覧する必要性の高いことも理由として考えられる。多くの病院においてインターネットでの閲覧を前提としたシステムが導入されているが、例えばワシントン大学では、電子カルテへのインターネットを通じたアクセスに加えて、血糖値等の測定機器と電子カルテを、インターネットを通じて連携したり、インターネットを通じてコンサルティングを行うことが試みられている。アメリカでは上述した Meaningful Use というフレームワークの元で電子カルテの導入が進められているが、その目的は、単純に電子化により効率化するだけでなく、最終的に、下図のようなフレームでアメリカ全体の医療情報システムをつなげることで、医療の質向上・効率化や臨床研究の促進を目指している。

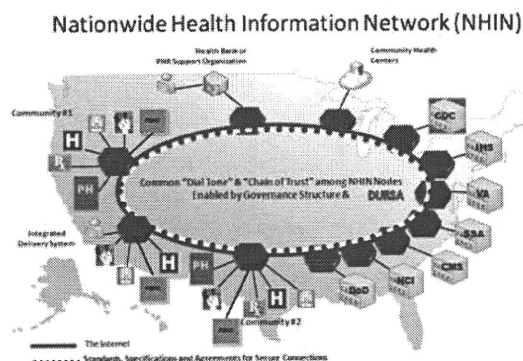


図 2. Nationwide Health Information Network (NHIN)

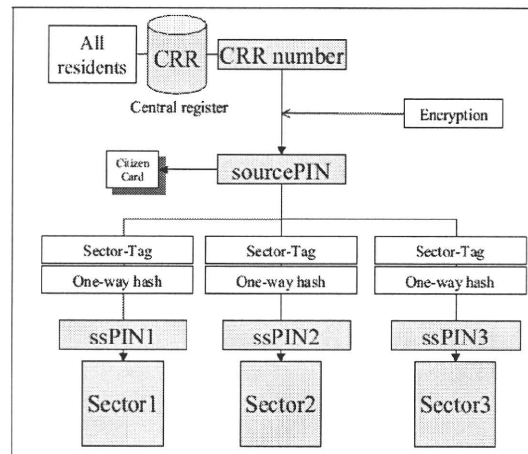
D. 考察

アメリカにおいては、ARRAによって急速にクリニックの電子化が進展している。その背景には、電子化による直接的な効率化や連携のベネフィットだけでなく、Patient Centered Medical Home や Accountable Care Organization などの組織に代表されるような、医療提供体制のシステムの転換にもつながりを見せている。また、アメリカにおける電子カルテ導入に呼応して、米国と欧州連合間で、医療情報の相互運用性 (Interoperability) と医療情報教育に関する協力の合意が成立している (Memorandum of Understanding between the European Commission and the United States Department of Health and Human Services on Cooperation Surrounding Health Related Information and Communication Technologies)。この合意によって、医療連携のコンテンツに関しては、欧州連合側の研究成果が活用され、情報技術に関しては、米国の技術普及が進展すると考えられている。この協力に対して、日本がどのような関係性を取るかは非常に重要な戦略的決定となると考えられる。

医療連携の促進や医療情報のクラウド化にあたって、個人認証やプライバシーの問題も重要である。医療情報革新の進展により、近年医療に関する個人認証番号の導入が進んでいる。例えば、オーストラリアにおいては、包括的な個人認証番号の導入に失敗し、医療分野に限定した ID を設けるための連邦の法律（Healthcare Identifiers Act 2010）を 2010 年 6 月に制定した。政府機関が ID 管理のために保有するのは、氏名と生年月日のみでプライバシー保護のために、ID が記されたカードは発行しない。国民は、知りたいときに ID 自体と ID の利用記録を入手することができ、誤った情報を訂正できるというような特性を持ち、非常にプライバシーに配慮した形式となっている。

また、オーストリアは 2002 年より新しい国民認証制度を創設した。以下の図はオーストリアにおける個人認証システムの概念図で、認証番号はセクター毎に設定されている。個人は、中央管理された個人認証番号を保有しているが、通常はセクター毎の PIN で管理されている。必要なときだけリンク用のソース PIN が提供され紐付けされる。

効果的な医療連携やクラウド化のためにもこういった議論も重要であると考えられる。



Source: Leitold H, Hollosi A, Posch R.(2002)
"Security Architecture of the Austrian
Citizen Card Concept"

E. 結論

クラウド技術の進展により、医療情報のクラウド化や医療連携が、米国・欧州において進展しつつある。医療情報の構造化・標準化に関しても、急速に進みつつあり、こういった流れと協働していくことは、日本にとっても重要である。医療連携のための IT 基盤構築だけでなく、医療提供体制をどのように構築するか、どういった医療を提供するかといった点を射程に置きながら、米国・欧州の事例を参考として、医療連携を進めていく必要があると思われる。

F. 研究発表

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