

The Regional Collaboration System for Treating Diabetes Mellitus Using the Community Liaison Critical Pathway: Wakayama Style

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Abstract

Aiming to create a high quality and effective community liaison system for treating diabetes mellitus using a shared healthcare tool, Wakayama City Medical Association developed the Wakayama Liaison Critical Pathway through mutual discussions with hub hospitals in the region. The Pathway was launched in the region after defining the outcomes as (1) good blood glucose control with HbA1c of 6.5% or less, (2) no onset or progression of complications, and (3) coping well with the stress of diabetes.

In this community healthcare collaboration based on the “two attending physicians” system, patients receive routine cares from their family physician and periodically visit specialized medical institutions to receive medical guidance, following the liaison critical pathway for diabetes mellitus of the Wakayama City. This system, called the Wakayama Community Liaison System for Diabetes Mellitus, has surpassed the conventional hospital-clinic collaboration that was limited to the collaboration between a hub hospital and adjacent medical institutions. It has become the mean for wide-area medical collaboration system and is now used in multiple secondary-care medical service areas in Wakayama Prefecture.

Key words Liaison critical pathway, Diabetes care, “Two attending physicians” system, Community medical collaboration

Introduction

The foremost role of regional medical associations in the adverse healthcare environment at present is to ensure high quality community healthcare.

The community healthcare program according to the 5th amendment to the Medical Service Act pursues the development of a clinical collaboration system focusing on four diseases (cancer, cerebral apoplexy, acute myocardial infarction, and diabetes mellitus) and five activities (emergency care, disaster medicine, remote areas, prenatal care, and pediatric medicine).¹ The introduction of the liaison critical pathway has become a focus of attention as a tool to promote

seamless and intensive clinical collaboration.^{2,3} Since 2006, the government permitted extra medical service charges for hospital-hospital collaboration based on the critical pathway in the treatment of transcervical fracture. Similar extra charges have been allowed for the treatment of cerebral apoplexy from 2008. The applicability of this method is expected to expand to other diseases, such as myocardial infarction and diabetes mellitus.

Diabetes mellitus is a common disease and encountered frequently in daily practice. It often develops serious complications and requires continuation of strict control for a long period of time. The numbers of diabetic patients and pre-diabetic individuals, is enormous,⁴ far exceeding

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Name		Sex		Type of diabetes				ID			Chart No.		
		Male	Female	Type 1	Type 2	Other	Specialized Medical Institution (SMI)			Family physician (FP)			
Date of Birth: (Yr) (Month) (Day)		Height	cm	Complications				Specialized Medical Institution (SMI)			Family physician (FP)		
Age:		Weight	kg	Nephropathy	Neuropathy	Retinopathy	Heart						
Date of procedure		Waist	cm	Guidance: Eating (Kcal, units)									
		/	/	/	/	/	/	/	/	/	/	/	/
Facility		FP	FP	SMI	FP	FP	SMI	FP	FP	FP	FP	FP	SMI
Course		1 month	2 months	3 months	4 months	5 months	6 months	7 months	8 months	9 months	10 months	11 months	12 months
Urinalysis	Urine Protein/ Urine sugar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Body measurement	Body weight/ Blood pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Examination	Physical examination findings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tests	Blood sugar/HbA1c	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Lipid metabolism/ Liver function/ Kidney function			<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Visit to ophthalmologist (guidance from ophthalmologist)			<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Tests for complications	Carotid echography, ABI						<input type="checkbox"/>						<input type="checkbox"/>
Tests selected by medical institutions													
Treatment for diabetes	Oral hypoglycemic agent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Insulin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Guidance	Eating guidance (by dietitian)			<input type="checkbox"/>			<input type="checkbox"/>						<input type="checkbox"/>
	Medication guidance/ Lifestyle guidance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outcomes	Good blood sugar control (HbA1c <6.5)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	No onset or progression of complications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Coping with the stress from having diabetes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Remarks													

(Reproduced in English from the original figure.)

Fig. 1 The Wakayama Liaison Critical Pathway for Diabetes Mellitus (first year version)

the capacity of specialized medical institutions. Thus, diabetic patients are currently followed up by both diabetes specialists and internists who are not specialized in diabetes. At long-term care institutions, physicians other than internists are also performing follow-ups. This poses the need to ensure the quality of cares for diabetes patients. Moreover, the needs to involve various health care vocations such as nutrition management, exercise instruction, and management of complications, emphasizes the importance of

clinical collaboration⁵ even further.

Wakayama City has had specialized diabetes departments at four hub hospitals, and there are also a considerable number of private hospitals and clinics staffed with diabetes specialists affiliated with the Medical Association. This has created a favorable environment to promote collaboration in diabetes care. At hub hospitals, various professional circles, study groups, and gatherings with patients have been organized to support diabetes treatment, care, and collabo-

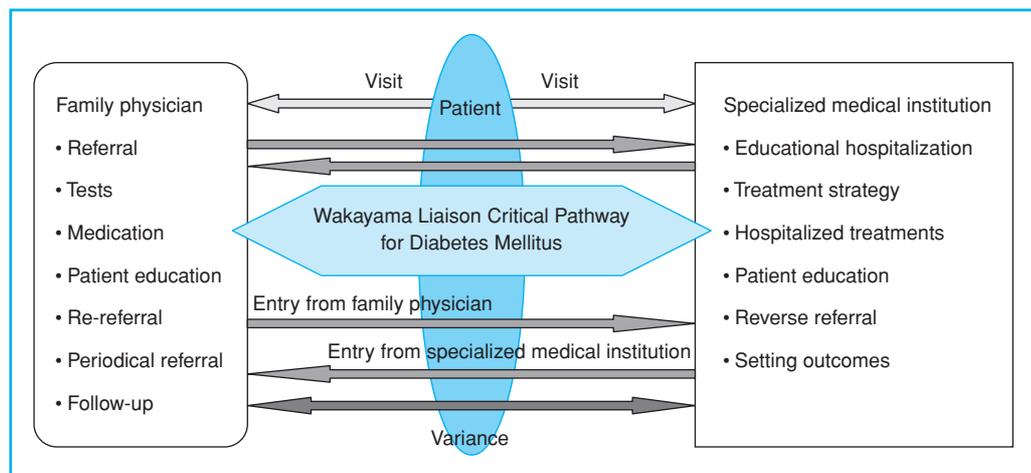


Fig. 2 The Wakayama Community Liaison System for Diabetes Mellitus

ration, which have been effective in facilitating referrals and reverse referrals through face-to-face relationships. However, many have pointed out the insufficiency in the level of collaborations and poor tracking of the actual conditions of patients. Therefore, there has been a strong need for a system that supports patient-oriented treatment and care plans.

In light of this healthcare situation and the regional characteristics of Wakayama City, Wakayama City Medical Association has established the Wakayama Community Liaison System for Diabetes Mellitus using the shared critical pathway (hereafter the pathway) throughout the secondary-care medical service areas. This article describes the details of this system.

Methods and Results

The Wakayama Liaison Critical Pathway for Diabetes Mellitus

In order to develop tools for diabetes treatment and cares that are to be used commonly throughout the medical service areas, a committee was established to develop the Wakayama Liaison Critical Pathway for Diabetes Mellitus (DM Wakayama Pathway) (Fig. 1). The committee was composed of the representatives from the hub hospitals, medical associations, and local communities.

The DM Wakayama Pathway links specialized medical institutions and family physicians in a circular fashion. There are two versions of this

Pathway; one for the first year and another for the second and subsequent years. The target outcomes are defined as good blood glucose control of 6.5% or less HbA1c, no onset or progression of complications, and coping well with the stress of diabetes. The basic procedures consist of monthly visits to family physicians and examinations of body weight, urinalysis, blood pressure, blood glucose level, and HbA1c. Because aggravation is often observed 3 to 6 months after the end of education or hospitalized care, patients are required to visit a specialized medical institution after 3, 6, and 12 months during the first year. In the second and subsequent years, the regular visits are planned at 6-month intervals.

The distinct feature of the DM Wakayama Pathway is that it is relatively non-restrictive and consists of a set of common procedures required in the region and optional test procedures that can be added by specialized medical institutions or family physicians.

Practice of the Wakayama Community Liaison System for Diabetes Mellitus (Fig. 2)

There are two entry points in the DM Wakayama Pathway; one is through a family physician, and the other is through a specialized medical institution.

When entering through a family physician, a family physician refers a patient specifying the patient's intention to follow the DM Wakayama Pathway with the family physician for future follow-ups. If the patient is considered appro-

- (i) The physician from the specialized medical institution and the family physician work in the “two attending physicians” system to support the diabetic patient following the Wakayama Liaison Critical Pathway for Diabetes Mellitus.
- (ii) This Pathway contains common items performed throughout the region and the tests selected by medical institutions to match each patient’s needs, warranting individualized medical treatments.
- (iii) The patient receives routine care from the family physician and regularly visits the specialized medical institution to obtain assessment on conditions, treatment strategies, and outcomes.
- (iv) The patient is issued the DM Community Liaison Card that shows the names of the specialized medical institution and the family physician, “Diabetes Health Handbook,” and “Handbook of Diabetic Eye Disease.”
- (v) The DM Community Liaison Card is designed to improve the awareness of patients and their sense of assurance. Showing this card on hospital visits facilitates medical treatments and emergency response.
- (vi) “Diabetes Health Handbook” and “Handbook of Diabetic Eye Disease” helps to share medical information by providing appropriate clinical information such as test data and follow-up findings.
- (vii) The family physician is encouraged to produce data sheets for each patient and use them effectively by appending it to the referral letter to the specialized medical institution.
- (viii) Variances are treated flexibly according to circumstances through effective functioning of hospital-clinic collaboration.

(Reproduced in English from the original figure.)

Fig. 3 Practice of the Wakayama Community Liaison System for Diabetes Mellitus



Fig. 4 (a) “Diabetes Health Handbook,” (b) “Handbook of Diabetic Eye Disease,” and (c) Diabetes Mellitus (DM) Community Liaison Card

appropriate for the DM Wakayama Pathway after the completion of educational hospitalization or treatment at the specialized medical institution, then, the outcomes and the details of the pathway are

determined, and a referral is made to the family physician together with the documents supplying medical information (reverse referral).

When entering through a specialized medical

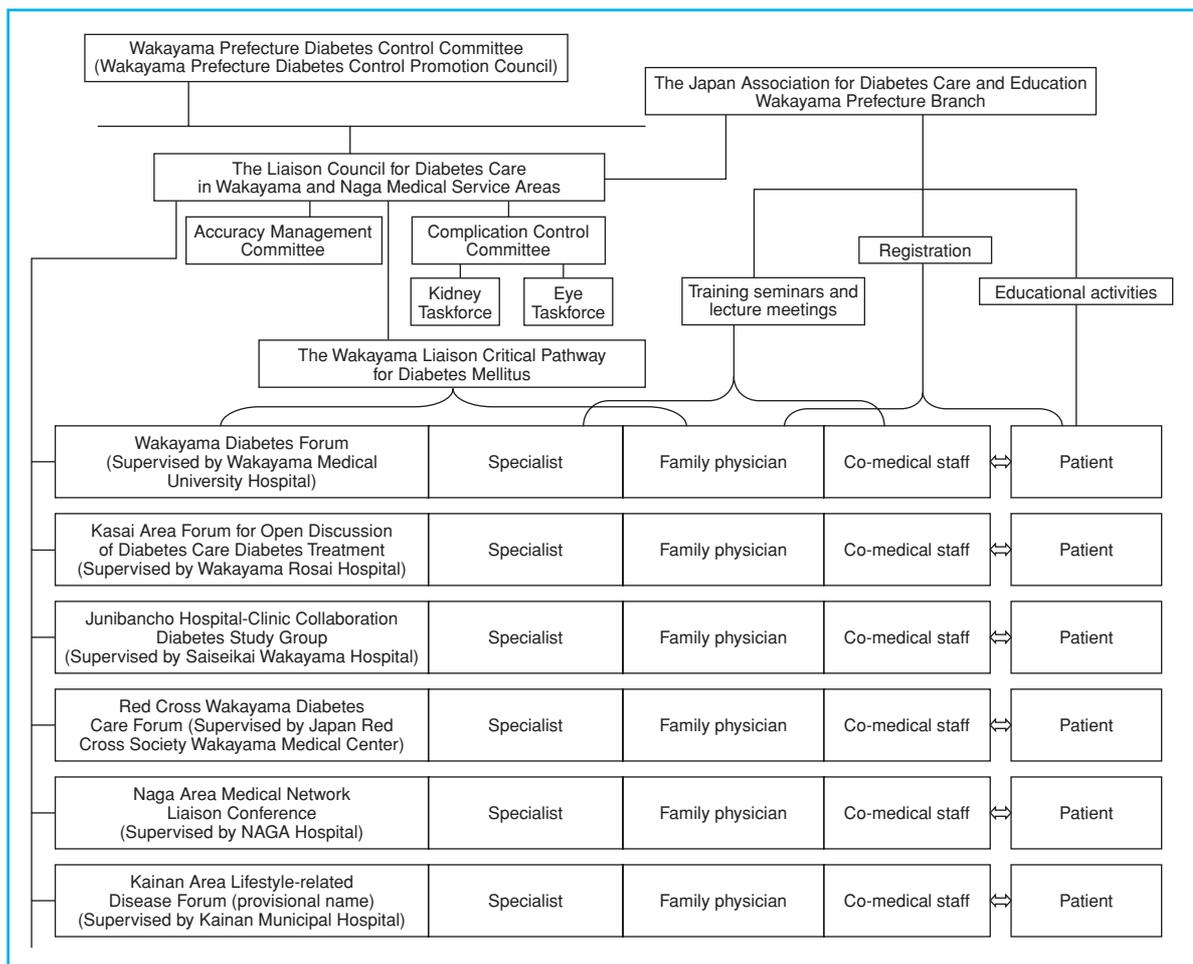


Fig. 5 Organization Chart of the Wakayama Community Liaison System for Diabetes Mellitus

institution, the institution refers a patient to a family physician in a local community, asking to provide treatments following the DM Wakayama Pathway. This practice is expected to facilitate redistribution of patients to communities.

In either case, the family physician continues to advise on management plans for treatment and care following the DM Wakayama Pathway, and makes re-referrals to the specialized institution at regular intervals. The institution receiving the re-referral then examines the condition of the patient, performs tests and other procedures beyond the capacity of the family physician, and provides with the medical evaluations including assessment, guidance, and resetting of outcomes (Fig. 3) to the family physician. Ophthalmological examinations are scheduled at some points in

the course, as determined by an ophthalmologist.

Patients will receive copies of the “Diabetes Health Handbook,” edited by the Japan Association for Diabetes Care and Education, and the “Handbook of Diabetic Eye Disease,” produced by the Japanese Society of Ophthalmic Diabetology. It is important that these handbooks are distributed to patients which would enable to keep track of the data and treatment records of each patient provided from medical institutions (Fig. 4).

Diabetes Mellitus (DM) Community Liaison Card

To assure that the DM Wakayama Pathway is followed, each patient is issued a “Diabetes Mellitus (DM) Community Liaison Card” (Fig. 4),

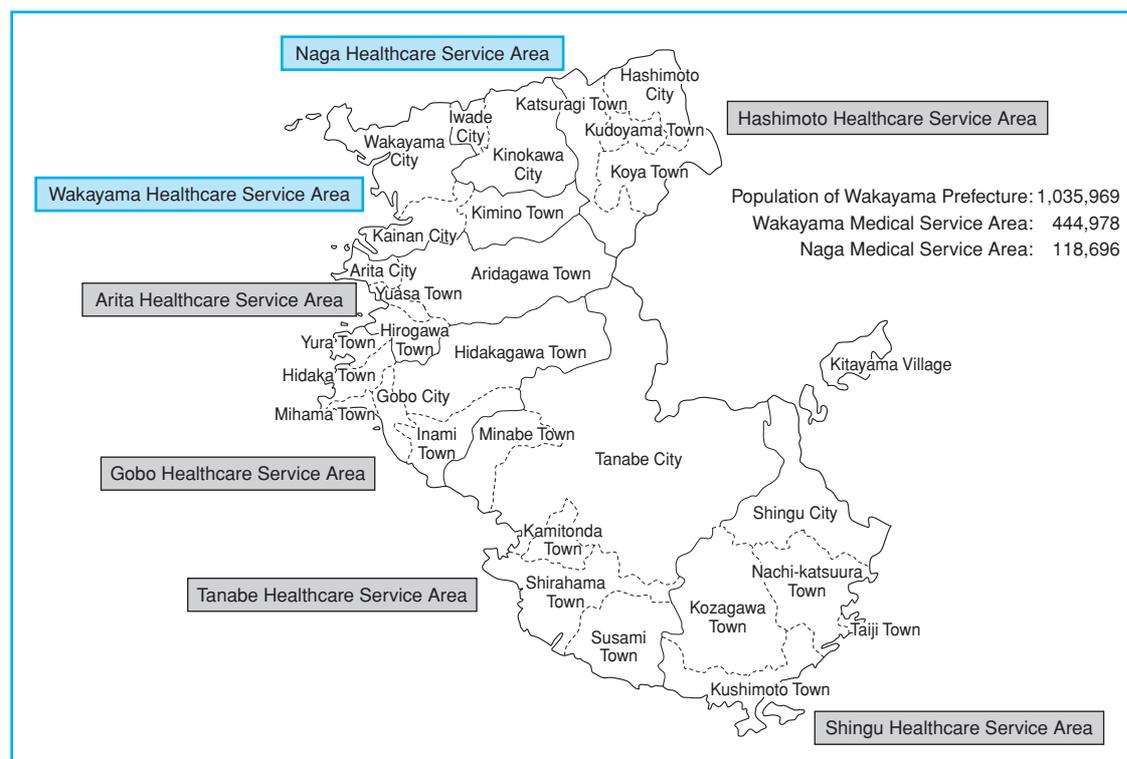


Fig. 6 Secondary-care medical service areas in Wakayama Prefecture

which bears the signatures and seals of both the physician at the specialized medical institution and the family physician. This card states, “If your family physician is not available or finds difficulty in treating during emergency, please rest assured as you will be treated at the specialized medical institution,” to provide a sense of security to the patient.

The collaboration using the DM Wakayama Pathway is oriented toward patients. A family physician can collaborate with any specialized institution in the region that a patient chooses. It is perfectly acceptable for a family physician to independently provide treatments that follow the pathway. Similarly, a family physician is not prevented from providing treatments independently that are not specified in the pathway.

Organization chart of the Wakayama Community Liaison System for Diabetes Mellitus (Fig. 5)

The Liaison Council for Diabetes Care in Wakayama and Naga Medical Service Areas (DM Wakayama Liaison Council) has been established

as a medium for coordinating study groups, professional circles, and other hospital-clinic collaboration organizations at hub hospitals. Its functions also include accuracy management, complication control, and management of pathway operation. The ultimate supervising organization of this system is the Wakayama Diabetes Control Promotion Council. The collaboration with the Wakayama Branch of the Japan Association for Diabetes Education and Care is effective for training seminars and information acquisition. Thus, family physicians are therefore encouraged to join the Wakayama Branch of the Japan Association for Education and Care, but it is not a requirement when participating in the Wakayama Community Liaison System for Diabetes Mellitus.

Accuracy management, variances, and complication control in the DM Wakayama Pathway

Two committees have been established under the DM Wakayama Liaison Council for system management and complication control; Accuracy Management Committee and Complication

Control Committee.

The Accuracy Management Committee is responsible for the revision and accuracy management of the DM Wakayama Pathway and the response to variances. Naturally, responding to variances require flexible judgments according to circumstances through effective functioning of hospital-clinic collaboration. This committee guides and supervises the accumulation of cases and their analysis, as well as response methods.

The Complication Control Committee, consisting of the Kidney Taskforce and the Eye Taskforce, distributes information and promotes knowledge and use of measures to prevent the progression of complications.

Result of operation

During the World Diabetes Day event on November 14, 2008, a summary on the Wakayama Community Liaison System for Diabetes Mellitus was presented and the declaration of its implementation was announced. Recognizing the importance of publicity among Medical Association members, we also called for participations in this system at every opportunity, including local meetings and group meetings within the Medical Association. Although the results such as the number of cases using the system are not available at this early stage of operation, the application is increasing steadily among the members of Wakayama City Medical Association, Kainan Medical Association, and Naga Medical Association.

Every patient using the DM Wakayama Pathway is treated by two attending physicians (a family physician and a physician at the specialized medical institution). The coverage of medical care using this system has expanded to two of the seven medical service areas in Wakayama Prefecture, namely Wakayama Medical Service Area and Naga Medical Service Area (population 444,978 and 118,696, respectively; as of 2005), representing 54% of the total population of Wakayama Prefecture (Fig. 6).

Discussion

The critical pathway for diabetes has been in development since around 2006.⁶ It has proved its effectiveness in diabetes care and has been introduced in many institutions nationwide including Izumiotsu Municipal Hospital,⁷ National Hospi-

tal Organization Yokohama Medical Center,⁸ and Tsukuba Memorial Hospital.⁹ It is significant that the critical pathway for diabetes has come to be used among communities in this way.¹⁰ However, most of the cases reported previously consisted of collaboration in a closed pyramid-shaped system between a single hub hospital and adjacent medical institutions, and the coverage had been limited to relatively small areas. Only recently, the practice of using a common pathway across the frameworks of hospitals has started.^{11,12}

The Wakayama Community Liaison System for Diabetes Mellitus proposed by Wakayama City Medical Association is predicated on the medical practice following the shared set of collaboration tools in the medical service areas. Its aims also include the sharing of medical information such as treatment plans, examination data, and prognosis, as well as the establishment of the “two attending physicians” system, in which a physician from the specialized medical institution and a family physician collaborate for the benefit of a patient. While respecting the value of conventional pyramid-shaped collaboration between a hub hospital and adjacent medical institutions, our system intends to provide highly flexible collaborations that respond to a patient’s preferences through the application of shared community collaboration tools, thereby contributing to the improvement of medical care standards in the region and enhancing the effectiveness to support patients.

Of the seven secondary-care medical service areas in Wakayama Prefecture, this system has been implemented well in the two major medical service areas, Wakayama and Naga Medical Service Areas, which represent more than 50% of the total population of Wakayama Prefecture. The factor that contributed to the acceptance of this system in such wide coverage was that the DM Wakayama Pathway was developed through mutual discussion among representatives from hub hospitals and the communities. Because the pathway contained not only the items that are common to all institutions in the region but also optional items to respect discretions of individual medical institutions, it was considered to be an inherent mechanism with a high degree of freedom suitable for application beyond the frameworks of hospitals. It is significant that this system started in this fashion, which enables us to expect further expansion to the entire Wakayama

Prefecture.

The issuance of the DM Community Liaison Card to patients warrants the “two attending physicians” system and provides a sense of assurance for emergency responses. In addition, the use of the “Diabetes Health Handbook” and the “Handbook of Diabetic Eye Disease” increases the awareness on patients about their disease and care. These handbooks and the card should lead to the qualitative improvement and further expansion of diabetes care in the region.

While the DM Wakayama Pathway has two entry points, by allowing the system entry from specialized medical institutions, it is expected to facilitate the redistribution of patients who prefers hospitals to family physicians in local communities. To facilitate referrals and reverse referrals from specialized medical institutions, Wakayama Prefecture is announcing the office hours of family physicians and posting details of their services on the internet as part of emergency care information. Wakayama Medical Association is making efforts in producing and distributing medical institution maps, too.

The use of shared tools in the chronic diseases like diabetes poses a few drawbacks. For example, the standardization and the range of complications involve various systems, like cardiovascular, peripheral circulation, and peripheral nervous systems. And, a diverse array of treatments are required for each system.¹³ It is the responsibility

of regional medical associations and family physicians to pursue further improvement of the level of medical treatments in the region and to create an environment in which patients can receive cares without any anxieties. For this purpose, DM Wakayama Liaison Council has established the Accuracy Management Committee and the Complication Control Committee, and they are striving to expand and reinforce collaboration, manage the accuracy of the pathway, and validate its effectiveness. The Council also plans to make revisions to improve the pathway in the future. In addition, we strive to provide training opportunities and distribute information, in collaboration with the Wakayama Prefecture Branch of the Japan Association for Diabetes Education and Care.

Recognizing the importance of complication control, the Complication Control Committee has established the Kidney Taskforce and the Eye Taskforce. The Committee is now considering the development of a patient guidance system based on collaboration with specialized physicians, which objective is the early detection of complications and prevention of progression.

It is hoped that the operation of Wakayama Community Liaison System for Diabetes Mellitus may help the establishment of a patient-oriented healthcare delivery system, leading to better quality and higher efficiency for community healthcare programs.

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