# Cross-Regional Perinatal Healthcare Systems: Efforts in Greater Kansai Area, Japan

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## Introduction

Aiming to create a society in which any woman can give birth without any sense of anxiety, Japan's Ministry of Health, Labour and Welfare (MHLW) has been promoting the establishment and systemization of general perinatal medical centers nationwide since 1996.

In Osaka Prefecture, Neonatal Mutual Cooperative System (NMCS) was established in 1977, and then Obstetric & Gynecologic Cooperative System (OGCS) in 1978. This illustrates that systemization of perinatal healthcare is in progress in Osaka. Under OGCS, six hospitals (namely Osaka Medical Center and Research Institute for Maternal and Child Health, Osaka City General Hospital, Takatsuki General Hospital, Aizenbashi Hospital, Kansai Medical University Hirakata Hospital, and Yodogawa Christian Hospital) are designated as Base Hospitals, plus, nine other facilities are designated as Sub-base Hospitals. These hospitals play a large role in the Osaka's regional perinatal healthcare system.

In 1999, Osaka Council on Perinatal Healthcare Strategies was established, and in December of that year Osaka Medical Center and Research Institute for Maternal and Child Health was designated as the general perinatal medical center for Osaka Prefecture. Subsequently, four additional hospitals (Takatsuki General Hospital, Aizenbashi Hospital, Kansai Medical University Hirakata Hospital, and Osaka University Hospital) were designated as general perinatal medical centers, serving as core facilities for perinatal healthcare system in Osaka. In 2007, Osaka Prefectural Government formulated Guideline for Improving the Perinatal Emergency Medical System, and 13 regional perinatal medical centers were approved. Furthermore, Osaka Prefecture Guidelines for Prioritizing Perinatal Healthcare Functions were drawn up in December 2008 based on discussions by Obstetric and Perinatal Spe-

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cialists Subcommittee of Osaka Council on Perinatal Healthcare Strategies, and medical facilities to be improved as the priority were selected.

Of those medical facilities to be improved, a particularly unique implementation was the installation of perinatal emergency coordinators. In November 2007, Osaka Prefecture entrusted Osaka Medical Center and Research Institute for Maternal and Child Health to establish and operate perinatal emergency coordinator project.

Moreover, Osaka Prefecture has commissioned Osaka Medical Center and Research Institute for Maternal and Child Health to create models for securing and enhancing perinatal healthcare systems. As part of the coordinator project activities, Osaka Medical Center and Research Institute for Maternal and Child Health is to secure sufficient number of obstetricians/gynecologists and neonatal pediatricians. These physicians are to be dispatched approximately twice a week to medical institutions in the region (for now, public hospitals only) that require their services.

In addition, efforts made by Osaka Prefecture for perinatal healthcare systemization included the following five unique and/or pioneering activities: 1) announcement of the "OGCS observation concerning transportation of pregnant women at maternity homes" (since 1998), from the standpoint of protecting the lives of all pregnant women, fetuses, and newborns, 2) coordination between infertility and perinatal medicine (since 2002), 3) participation of midwives at OGCS member hospitals in the perinatal healthcare system and formation of OGCS Midwives and Nurses Association (since 2002), 4) implementation of the "scenario-based neonatal resuscitation training" to ensure at least one person trained in resuscitating newborns at each delivery facility (since 2004), and 5) discussions concerning collaboration between perinatal healthcare and emergency services (since 2007).

## Installation of Perinatal Emergency Coordinators

During nights and weekends, responsibility of searching for a hospital that can accept an emergency transport/transfer of perinatal patient falls on the obstetricians on duty. However, it is not necessarily carried out swiftly because their normal duties take precedence, such as delivering babies, performing emergency operations, and attending inpatients. Corresponding with the physician requesting the patient transfer and communicating with the hospital accepting the patient can be quite a burden, both physically and mentally. In November 2007, Osaka Medical Center and Research Institute for Maternal and Child Health began operation of the "perinatal emergency coordinator" as a project entrusted by Osaka Prefecture.

Under this project, a third physician on duty is arranged to Osaka Medical Center and Research Institute for Maternal and Child Health during nights and weekends to specifically perform the duty of "emergency transportation coordination." The coordinators are current and former managers of Osaka Medical Center and Research Institute for Maternal and Child Health, managers of other general prenatal medical centers, and current and former managers of OGCS Base Hospitals. By utilizing experienced obstetricians and gynecologists in this fashion, it is expected to facilitate prompt transfers of emergency perinatal patients to proper hospitals in accordance with the severity and urgency of each case.

Before the implementation of the coordinator system, physicians at Osaka Medical Center and Research Institute for Maternal and Child Health had already been performing this function, spending approximately 50 minutes to call an average of 3.3 facilities per case to find the receiving hospital. Now, the handling time per case is reduced to approximately 30 minutes with an average of 2.6 facilities to call.

## Transportation of Pregnant Women That Involves Risk to the Mother's Life

According to a survey conducted by Osaka Medical Association in 1989, 83% of emergency transfers of pregnant women involved some kind of risk related to their newborns. When one takes another way of looking at this survey, approximately 50% of emergency transfer cases involved some abnormality or complication involving the mother. Placental abruption, placenta praevia, and pregnancy-induced hypertension (toxemia) are typical examples; all of which can be life-threatening even with a minor mistake. When a case of prenatal emergency calls for the monitoring of the mother and requires the high-risk neonatal monitoring at the same time, the receiving hospital is asked to take both the mother and the

**Table 1 Emergency Maternity Centers in Osaka Prefecture (Suggested List)**

| No. | Secondary medical district | City/block | OGCS | Medical institution | NMCS participation | Emergency center tertiary emergency | Treatment priority | | Positioning in the Osaka perinatal healthcare system |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Maternal/neonatal | Priority on mother | |
| 1 | Toyono | Minoh C | OGCS | Minoh City H | | | | | |
| 2 | Toyono | Toyonaka C | OGCS | Toyonaka M H | ○ | | | | Regional |
| 3 | Toyono | Suita C | SubB | Nat. Cerebral and Cardiovascular Center | ○ | Emergency Dept. | ○ | | Regional |
| 4 | Toyono | Suita C | SubB | Saiseikai Suita H | ○ | | | | Regional |
| 5 | Toyono | Suita C | OGCS | Osaka U | ○ | High-level EC | ○ | | General |
| 6 | Toyono | Suita C | OGCS | Saiseikai Senri H | | EC | | ○ | |
| 7 | Toyono | Suita C | OGCS | Suita M H | | | | | |
| 8 | Mishima | Takatsuki | B | Takatsuki General H | ○ | | | | General |
| 9 | Mishima | Takatsuki | SubB | Osaka Medical College | ○ | | | | Regional |
| 10 | Mishima | Takatsuki | | Osaka-Mishima Emergency and Critical Care Center | (Self) | | ○ | | |
| 11 | N Kawachi | Hirakata C | OGCS | Hoshigaoka Koseinenkin H | | | | | |
| 12 | N Kawachi | Hirakata C | B | Kansai Medical U Hirakata H | ○ | EC | ○ | | General |
| 13 | N Kawachi | Moriguchi C | OGCS | Matsushita Memorial H | | | | | |
| 14 | N Kawachi | Moriguchi C | | Kansai Medical U Takii H | | High-level EC | | ○ | |
| 15 | Naka Kawachi | E Osaka C | OGCS | Higashiosaka C General H | ○ | EC | | ○ | Regional |
| 16 | Naka Kawachi | Yao C | OGCS | Yao M H | | | | | Regional |
| 17 | S Kawachi | Matsubara C | OGCS | Hannan Chuo H | ○ | | | | |
| 18 | S Kawachi | Osaka Sayama C | OGCS | Kinki U | ○ | EC | ○ | | Regional |
| 19 | Sakai | Sakai C | OGCS | Osaka Rosai H | | | | | |
| 20 | Sakai | Sakai C | SubB | Sakai M H | ○ | | | | |
| 21 | Sakai | Sakai C | SubB | Belland General H | ○ | | | | Regional |
| 22 | Senshu | Izumi C | OGCS | Izumi M H | | | | | |
| 23 | Senshu | Izumi C | B | Osaka Medical Center and Research Institute for Maternal and Child Health | ○ | | | | General |
| 24 | Senshu | Izumi Otsu C | OGCS | Izumi Otsu M H | | | | | |
| 25 | Senshu | Kaizuka C | OGCS | Kaizuka C H | | | | | |
| 26 | Senshu | Izumisano C | SubB | Izumisano M H | ○ | EC | ○ | | Regional |
| 27 | Osaka C | N | SubB | Kitano Hospital | ○ | Emergency Dept. | | | |
| 28 | Osaka C | N | B | Osaka City General H | ○ | EC | ○ | | |
| 29 | Osaka C | N | B | Yodogawa Christian H | ○ | | | | Regional |
| 30 | Osaka C | N | OGCS | Saiseikai Nakatsu H | ○ | | | | |
| 31 | Osaka C | W | OGCS | Osaka Koseinenkin H | ○ | | | | |
| 32 | Osaka C | W | SubB | Chibune General H | ○ | | | | Regional |
| 33 | Osaka C | E | OGCS | Otemae H | | | | | |
| 34 | Osaka C | E | OGCS | Nat. Osaka Medical Center | ○ | EC | | ○ | |
| 35 | Osaka C | E | OGCS | Osaka Red Cross H | ○ | EC | | ○ | Regional |
| 36 | Osaka C | E | OGCS | St. Barnaba H | ○ | | | | |
| 37 | Osaka C | E | OGCS | NTT West Osaka H | | | | | |
| 38 | Osaka C | E | OGCS | Osaka Police H | | EC | | ○ | |
| 39 | Osaka C | E | B | Aizenbashi H | ○ | | | | General |
| 40 | Osaka C | S | OGCS | Osaka City U | ○ | Emergency Dept. | | ○ | |
| 41 | Osaka C | S | OGCS | Osaka City Sumiyoshi H | ○ | | | | Regional |
| 42 | Osaka C | S | SubB | Osaka General Medical Center | ○ | EC | | ○ | |

Abbreviations (listed alphabetically): B = Base Hospital, C = city, E = east, EC = emergency center, H = hospital, M = municipal, N = north, S = south, SubB = Subbase Hospital, U = university

child. However, such case is frequently rejected because a hospital could not accept either the mother or the child.

It is precisely such abnormalities/complications requiring emergency treatment for both mother and child that perinatal medical centers are most suited for. In many cases, a successful outcome was somehow achieved by the cooper-

**Table 2 List of Base Hospitals in Greater Kansai Area to coordinate transports under the cross-regional perinatal emergency collaboration system**

| Prefecture | Medical institution | Telephone No. | Fax. No. |
|---|---|---|---|
| Fukui | Fukui Prefectural Hospital | 0776-57-2950 | 0766-57-2951 |
| Mie | Mie University Hospital | 059-224-5123 | 059-231-5143 |
| Shiga | Japanese Red Cross Otsu Hospital | 077-522-4131 | 077-522-4073 |
| Kyoto | Japanese Red Cross Kyoto Daiichi Hospital | 075-561-1121 | 075-561-6308 |
| Osaka | Osaka Medical Center and Research Institute for Maternal and Child Health | 0725-56-1220 | 0725-57-3207 |
| Nara | Nara Medical University Hospital | 0744-22-3051 | 0744-22-4121 |
| Wakayama | Wakayama Medical University Hospital | 073-447-2300 | |
| Hyogo | Hyogo Prefectural Children's Hospital | 078-732-6961 | 078-735-0910 |
| Tokushima | Tokushima University Hospital | 088-631-3111 | |

(Extracted from the Implementation Guidelines/Operation Manual of Kinki Region Cross-Regional Collaboration System for Perinatal Healthcare.)

ation of neonatal pediatricians who understood the position of obstetricians wanting to save both the mother and child while prioritizing the mother. However, what we need is an agreement from the neonatal pediatricians that prenatal emergency patient will be accepted even if the NICU ward is full if the mother's life is at stake (meaning neonatal pediatricians will accept the newborn).

The results of MHLW surveys show that there are limits in treating conditions such as cerebral hemorrhage, acute cardiac failure, severe sepsis, and traffic injuries, at conventional perinatal medical facilities alone. The collaboration among university hospitals, high-level emergency centers (tertiary emergency centers), National Cardiovascular Center, and other facilities is imperative. In response to such need, efforts to create a system for treating pregnant women with severe complications is in progress through the cooperation of university professors in emergency medicine, the board members of the prefectural medical association, and the obstetrics and gynecology association.*2 That is to say, those involved in the perinatal healthcare system and those at emergency centers are investigating and conducting surveys on actual cases of patient transports.

Furthermore, emergency centers that can accept pregnant women with severe complications are being listed as Emergency Maternity Centers (**Table 1**), and coordination/operation manuals and checklists are currently being prepared. Fortunately in Osaka Prefecture there are 13 emergency centers and National Cerebral and Cardiovascular Center, providing a foundation for systemization already.

## Primary Obstetric/Gynecological Emergencies

We must realize that recently there are pregnant women who do not receive any prenatal examinations at any healthcare facilities until they require urgent obstetric care and emergency transportation. For such pregnant women, especially parous women with social risk and some chronic conditions who have not undergone regular checkups, often their lives could be put in danger. Additionally, such cases frequently involve the risk for preterm birth and low-weight babies.

Since it is difficult to respond to such cases with OGCS alone, the collaboration with the administration, in other words with the primary emergency system, is preferable. That is to say, first a primary emergency hospital receiving a patient performs the risk evaluation, and then the patient is to be transported to an appropriate OGCS hospital. Several OGCS hospitals can handle primary emergency cases; however, the increases in primary emergency cases at times can impede the original role of OGCS, which is

*2 Please refer to the Research Concerning Regional Treatment of Pregnant Women with Severe Complications Project, which is part of "Research concerning the analyses and recommendations regarding infant mortality and maternal mortality (principal researcher: Dr. Tomoaki Ikeda)" that is being conducted as a MHLW Scientific Research Grant Child and Family Research Project.

to handle secondary emergencies. There is also an issue of uncollected medical fees that must be resolved through thorough discussions with the administrative bodies.

With regard to this problem of primary gynecological and obstetric emergencies, Osaka Prefecture has established a subcommittee within Osaka Medical Association to consider the issues involved in preparing an appropriate system. Deliberations among those involved with perinatal medical facilities, obstetricians, gynecologists, representatives from fire departments, and government officials, have already begun.

## Cross-Regional Perinatal Emergency Coordination in Greater Kansai Area

Perinatal healthcare is community healthcare—thus, it is preferable that services be provided entirely within one medical district (prefecture, etc.). However, when a case involves severe or rare maternal complications or high-level neonatal surgeries or fetal treatments, it can be difficult and possibly inefficient to provide all the necessary care within the one medical district. For such cases, it is more effective to develop a Base Hospital that covers a large area. Moreover, collaboration at cross-prefectural level can be useful for a case that require emergency care but cannot be handled within the one medical district for some reasons.

In 2006, a council to consider cross-regional perinatal healthcare collaboration for Greater Kansai Area (eight prefectures in Kansai/Kinki Region and Tokushima Prefecture) was established. The council is comprised of government officials and people involved in perinatal healthcare in the area, and the members examined how cross-regional perinatal emergency medicine should be. In April 2009, an operation manual for cross-regional collaboration system of perinatal emergency medicine in Greater Kansai Area was compiled, and Base Hospitals in each prefecture to coordinate emergency transports under this collaboration system were designated (**Table 2**).

However, as I understand, the operation manual and the list of Base Hospitals that were made available in April 2009 did not mean the launch of a new project. Rather, it meant that the collaborations in Greater Kansai Area that already existed were carefully and administratively situated. In Osaka Prefecture, the physician-staffed helicopter service (so called “Dr. Heli” or “Dr. Helicopter” in Japan) began in January 2009 and is being used as part of regional collaboration system for perinatal emergency. However, in order to further promote the level of collaboration under this cross-regional system, there are still issues to be addressed, such as sharing perinatal medical information systems as well as perinatal healthcare systems among prefectures.

## New Obstetric/Gynecologic Cooperative System (New OGCS)

The focus of OGCS so far has been the transportation of high-risk pregnant women and emergency cases to higher level perinatal facilities. As a result, there has been a certain degree of success with regard to preterm and low-weight birth and high-risk neonates and fetuses. But the achievement made for cases of sudden abnormalities with pregnancy or childbirth or severe maternal complications has not met the expectations. To handle such difficult cases, it is important to build consolidated large-scale medical facilities and promote collaboration among university hospitals and tertiary emergency centers.

Some cases of suddenly occurring abnormalities with pregnancy or childbirth can be treated appropriately at the first receiving hospital without coordinating with a university hospital or tertiary emergency center, if sufficient human resources (obstetricians) are available. However, many regional core facilities that do not have any problem to carry out ordinary duties often experience difficulty to deal with such sudden cases due to the urgency of the situation or shortage of staff.

It is therefore imperative to implement a system that can dispatch a specialist to the spot from the designated general perinatal medical center in charge of the region when an emergency arises or a facility in the region runs short of staff, by securing sufficient staff at general perinatal medical centers. To do so, there are various issues that need to be resolved, one of which is to reconsider the regulations enforced upon civil servants that restrict them from performing non-assigned duties.