Padjadjaran University

Summary Report

Indonesia

Verification Survey with the Private Sector
for Disseminating Japanese Technologies
for Electronic Medical Record and
Hospitals-Clinics Linkage to Care Pregnant
and Parturient Women

April, 2021

Japan International Cooperation Agency

Mitla Co. Ltd.

1. BACKGROUND

The maternal mortality rate in Indonesia was reported to be 305 per 100,000 people[1] in 2015, which is significantly high compared to nearby countries, such as 20 in Thailand and 40 in Malaysia[2].

There are three major factors of maternal death in Indonesia, that is, pregnant women hypertension (32%), pregnancy complications (31%) and postpartum hemorrhage (20%)[3]. These causes can be predictable by analyzing various information and data collected during pregnancy. Those include history of pregnancy and delivery (number of times of pregnancy, birth, miscarriages, etc.), height, weight, BMI and blood pressure and blood test results. It is also useful for prediction to collect and analyze information and data in chronological order such as infectious disease, amniotic fluid, placenta and fetal condition, allergy and drinking and smoking frequency.

There exists a referral system for high-risk pregnant women. However, the medical data are not well shared between hospitals and clinics and many inefficient medical practices such as re-examination are observed. In remote areas, the disparity of medical services with urban areas has become a big problem because of the lack of doctors and medical service facilities. The electronic medical record (EMR) can provide solutions for those longstanding difficulties by sharing accurate time-series medical data of pregnant women and by strengthening the hospital-clinic linkage.

In the Survey, Mitla Co. provides the Indonesian Counterpart Team with information and know-how using its EMR called Hello Baby Program (HBP), which has been widely used in major hospitals in Japan including Keio University Hospital.

2. OUTLINE OF THE PILOT SURVEY FOR DISSEMINATING SME'S TECHNOLOGIES

(1) Purpose

The purposes of the Survey are:

- Medical doctors, midwives and nurses recognize the effectiveness of sharing medical data between pilot hospitals and clinics using HBP by managing and sharing medical data and strengthening the referral system.
- The business model and business plan are developed by which HBP is disseminated in the region and contributes to the improvement of quality of perinatal care.

---

[1] Ministry of Health: 2015 Indonesia Health Profile
[2] Trend in Maternal Mortality: 1990-2015 by WHO, UNICEF, UNFPA, World Bank Group
[3] Indonesia Health Profile 2013, Ministry of Health

(2) Activities

The activities of the Survey were as follows:

I. Activities to prove the effectiveness of HBP

1. Customize HBP to Indonesian context by carrying out adjustments such as selecting medical data to be handled in HBP and translating it into Indonesian

2. After selecting pilot hospitals and clinics, provide them with the necessary support to introduce HBP, which includes consideration of Internet environment and operation check

3. Provide medical doctors, midwives, nurses and administrative staff with training on how to use HBP

4. Monitor and assist to check accurate data entry, and to obtain feedback from medical doctors, midwives, nurses and administrative staff, in order to evaluate its effectiveness

5. Develop a mechanism to strengthen referral system between pilot hospitals and clinics, which includes standardization of data entry and analysis

6. Conduct baseline and endline surveys to measure improvements brought about by HBP, which includes 1) changes in statistical data such as referral rate, number of delivery and number of outpatients and 2) questionnaire survey to medical doctors, midwives, nurses and administrative staff

II. Activities to develop a business model to disseminate HBP

1. Conduct interview surveys to hospitals and clinics by explaining advantages and effectiveness of HBP with results of the endline survey and collect the necessary information to develop business model and plan, as well as to prepare for policy recommendations

2. Develop a business model and plan with information collected in II.1

3. Execute dissemination activities such as joint seminars with relevant government agencies and university hospitals

4. Recommend relevant government agencies use of EMR and appropriate hospitals-clinics linkage system using EMR

(3) Information of Product/ Technology to be Provided

HBP is a perinatal EMR designed for the fields of obstetrics and gynecology. HBP has been widely used in Japan and contributing to upgrading medical services by connecting primary health care facilities with their referral hospitals through medical information sharing. The customers of HBP are currently a number of leading university hospitals,

secondary and tertiary medical service facilities, and perinatal clinics in Japan.

(4) Counterpart Organization

The main implementation organizations 1) Japanese Side: Mitla Co. and 2) Indonesian Side: Padjadjaran University (UNPAD).

(5) Target Area and Beneficiaries

The target area and beneficiaries are shown below:

Target Area: West Java Province

Beneficiaries: Pregnant and parturient women

(6) Duration

Implementation period: 29 June 2018 to 15 June 2021

(7) Progress Schedule
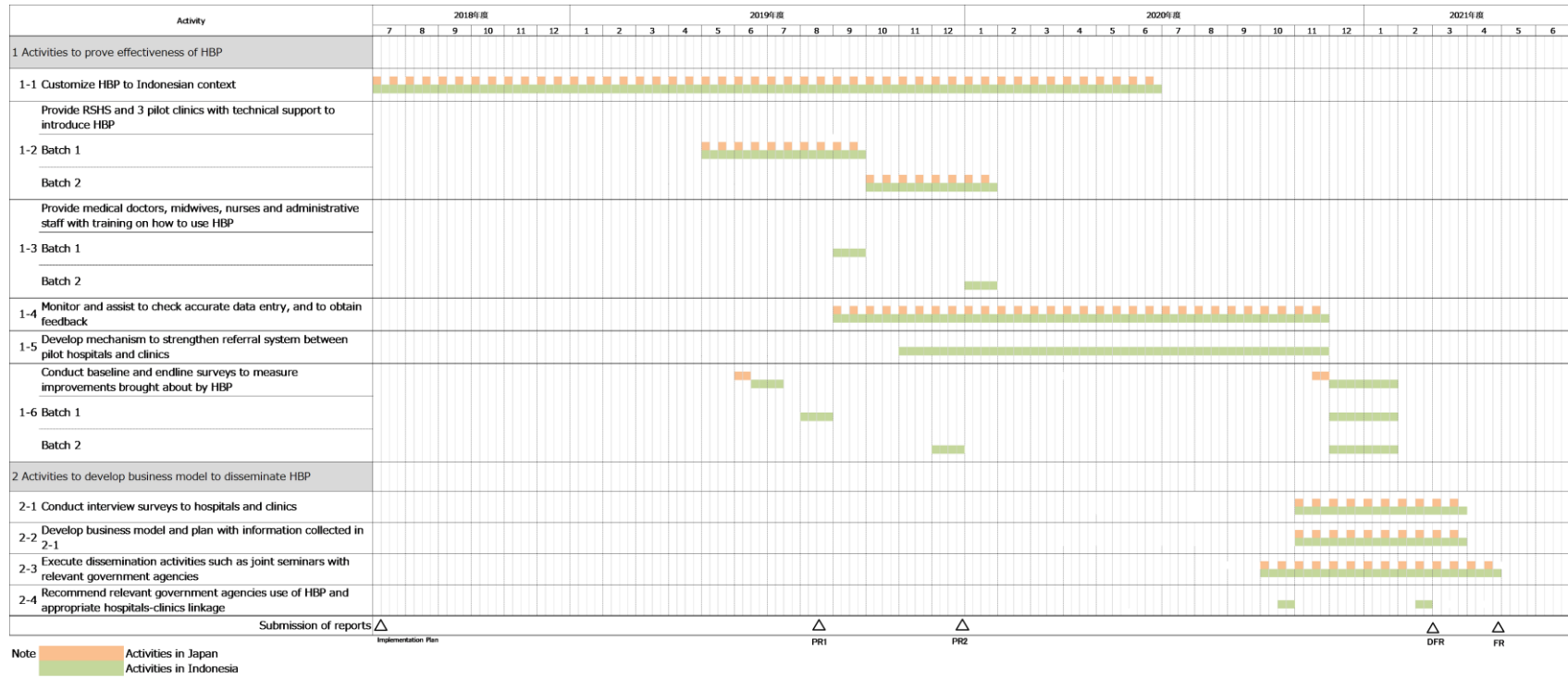
The progress schedule is shown in Figure 1.

Activity	2018年度						2019年度												2020年度												2021年度					
	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
1 Activities to prove effectiveness of HBP																																				
1-1 Customize HBP to Indonesian context																																				
Provide RSHS and 3 pilot clinics with technical support to introduce HBP																																				
1-2 Batch 1																																				
Batch 2																																				
Provide medical doctors, midwives, nurses and administrative staff with training on how to use HBP																																				
1-3 Batch 1																																				
Batch 2																																				
1-4 Monitor and assist to check accurate data entry, and to obtain feedback																																				
1-5 Develop mechanism to strengthen referral system between pilot hospitals and clinics																																				
Conduct baseline and endline surveys to measure improvements brought about by HBP																																				
1-6 Batch 1																																				
Batch 2																																				
2 Activities to develop business model to disseminate HBP																																				
2-1 Conduct interview surveys to hospitals and clinics																																				
2-2 Develop business model and plan with information collected in 2-1																																				
2-3 Execute dissemination activities such as joint seminars with relevant government agencies																																				
2-4 Recommend relevant government agencies use of HBP and appropriate hospitals-clinics linkage																																				
Submission of reports	△ Implementation Plan											△ PR1							△ PR2															△ DFR		△ FR

Note:
Activities in Japan
Activities in Indonesia

Figure 1 Progress Schedule

4

(8) Manning Schedule

The manning Schedule is shown in Figure 2.

Project Team Members from Mitla Co., Ltd.

	Name	assignment	Project period	Mon-month

(detailed Gantt chart schedule for 2018–2021)

Assignment in Indonesia:

Name	assignment	Indonesia
Tomohiro Fujii	Team Leader, business model	0.90
Susumu Nagae	Basic system design	2.20
Shinji Inoue	Detail system design	0.57
Takayuki Fujita	Detail system design/development	1.73
Tateo Tsurumi	System development and	0.47
Kazuhisa Kioka	Monitoring	0.00
Shiho Fujii	Training and hospital marketing	1.07
Yasuhisa Tokunaga	Clinic marketing	1.07

Assignment in Japan:

Name	assignment	Japan
Tomohiro Fujii	Team Leader, business model	3.50
Susumu Nagae	Basic system design	9.05
Shinji Inoue	Detail system design	11.40
Takayuki Fujita	Detail system design/development	22.35
Tateo Tsurumi	System development and	2.75
Kazuhisa Kioka	Monitoring	0.25
Shiho Fujii	Training and hospital marketing	2.15
Yasuhisa Tokunaga	Clinic marketing	1.40

Total mon-month in Indonesia	8.01
Total mon-month in Japan	52.85

Project Team Members from Other Companies

Assignment in Indonesia:

Name	assignment	Indonesia
Toru Ishibashi	Chief advisor, business strategy	4.23
Toru Ishibashi	System design/development	0.00
Ryo Ishibashi	System design/development	5.37
Shio Kuwabara	Impact survey and market survey	0.97
Atsuko Nonoguchi	Impact survey and market survey	0.97
Keio University	Perinatal medicine	0.50

Assignment in Japan:

Name	assignment	Japan
Toru Ishibashi	Chief advisor, business strategy	4.15
Toru Ishibashi	System design/development	1.95
Ryo Ishibashi	System design/development	0.60
Shio Kuwabara	Impact survey and market survey	0.85
Atsuko Nonoguchi	Impact survey and market survey	2.88
Keio University	Perinatal medicine	0.83

Total mon-month in Indonesia	12.04
Total mon-month in Indonesia	11.26

Figure 2 Manning Schedule

5

(9) Implementation System

The implementation system is illustrated in Figure 3.
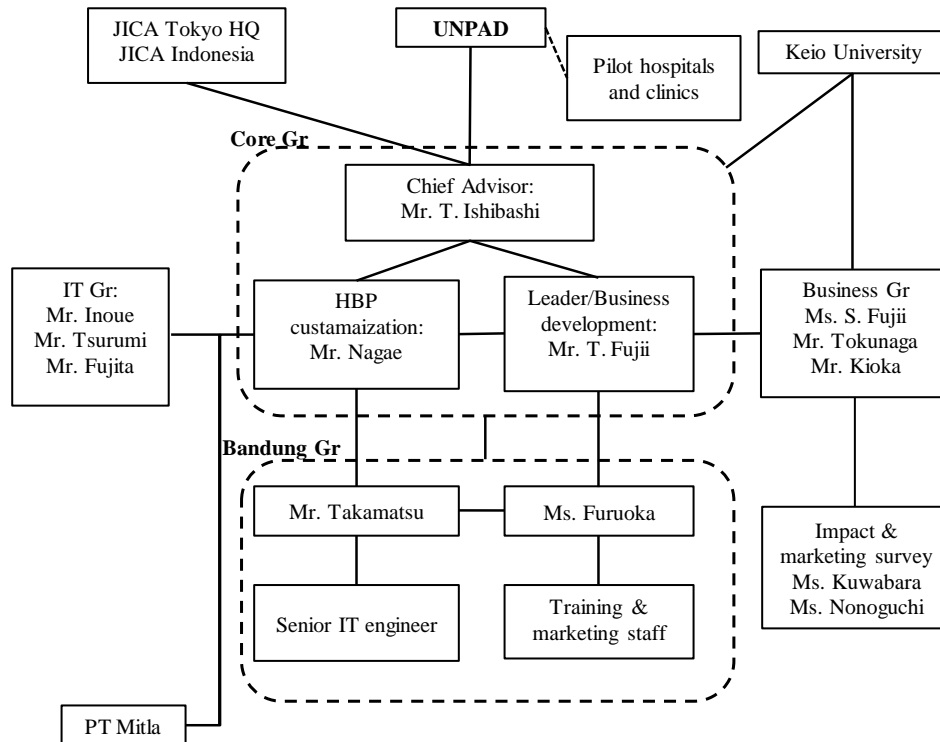

Figure 3 Implementation System

3. ACHIEVEMENT OF THE SURVEY

(1) Outputs and Outcomes of the Survey

HBP was customized in the Indonesian context and was used in pilot activities conducted at two hospitals and three clinics. After the pilot activities, an impact survey was conducted with results of the following favorable evaluations. In terms of management, medical record management and statistical document preparation were highly evaluated, because the work time to find medical records, to prepare monthly Puskesmas submissions, and to compile statistical data in the hospital has been reduced. In terms of medical services, reliability of medical information, time-series display of medical examination history, sharing of medical information in hospitals and clinics, and usefulness for early detection of risks were especially evaluated. The details are described below.

(1.1) Managerial effects and changes due to the introduction of HBP

As for the changes and effects in management due to the introduction of HBP, 89.6% answered that they were effective. The detail of the effects is shown in Fig. 4.
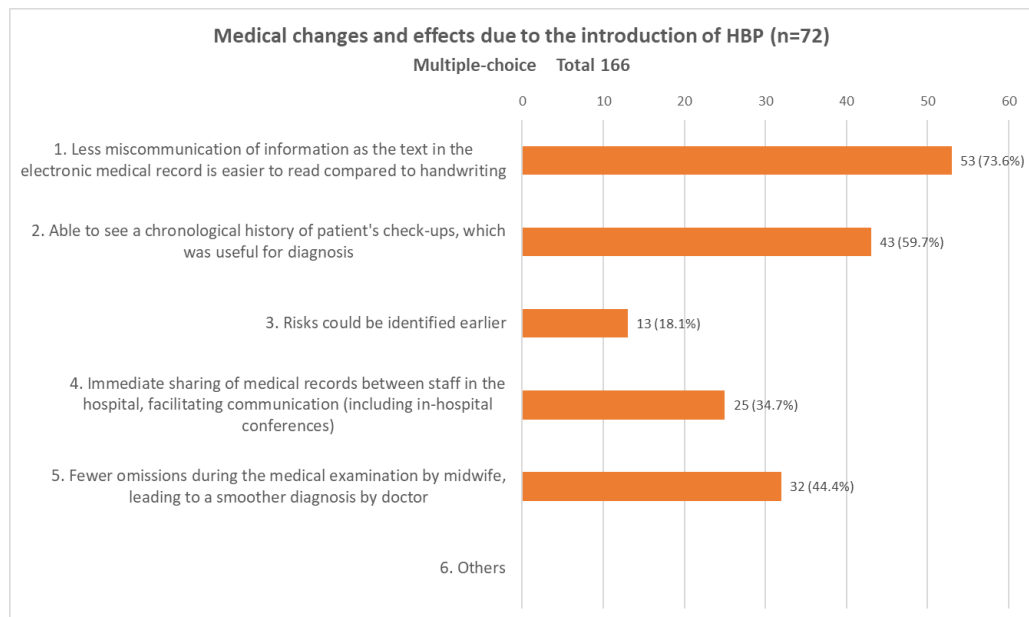
Managerial effects and changes due to the introduction of HBP (n=69)

Multiple-choice   Total 148

1. The time spent searching for medical records could be reduced	53 (76.8%)
2. Fewer medical records were lost or duplicated	43 (62.3%)
3. There was a reduction in the time taken to prepare Puskesmas submissions and hospital registers	21 (30.4%)
4. There was a reduction in the time taken to compile statistical data in the hospital	26 (37.7%)
5. Others	5 (7.2%)

Figure 4 Managerial effects and changes due to the introduction of HBP

(1.2) Medical changes and effects due to the introduction of HBP

As for the changes and effects in medical care due to the introduction of HBP, 93.6% answered that they were effective. The detail of the effects is shown in Fig. 5.

Medical changes and effects due to the introduction of HBP (n=72)

Multiple-choice   Total 166

1. Less miscommunication of information as the text in the electronic medical record is easier to read compared to handwriting	53 (73.6%)
2. Able to see a chronological history of patient's check-ups, which was useful for diagnosis	43 (59.7%)
3. Risks could be identified earlier	13 (18.1%)
4. Immediate sharing of medical records between staff in the hospital, facilitating communication (including in-hospital conferences)	25 (34.7%)
5. Fewer omissions during the medical examination by midwife, leading to a smoother diagnosis by doctor	32 (44.4%)
6. Others	

Figure 5 Medical changes and effects due to the introduction of HBP

(1.3) Reasons for recommendation of HBP to others

As a result of the survey, 97.4% said they would recommend it to others. And the reasons are shown in Fig. 6.
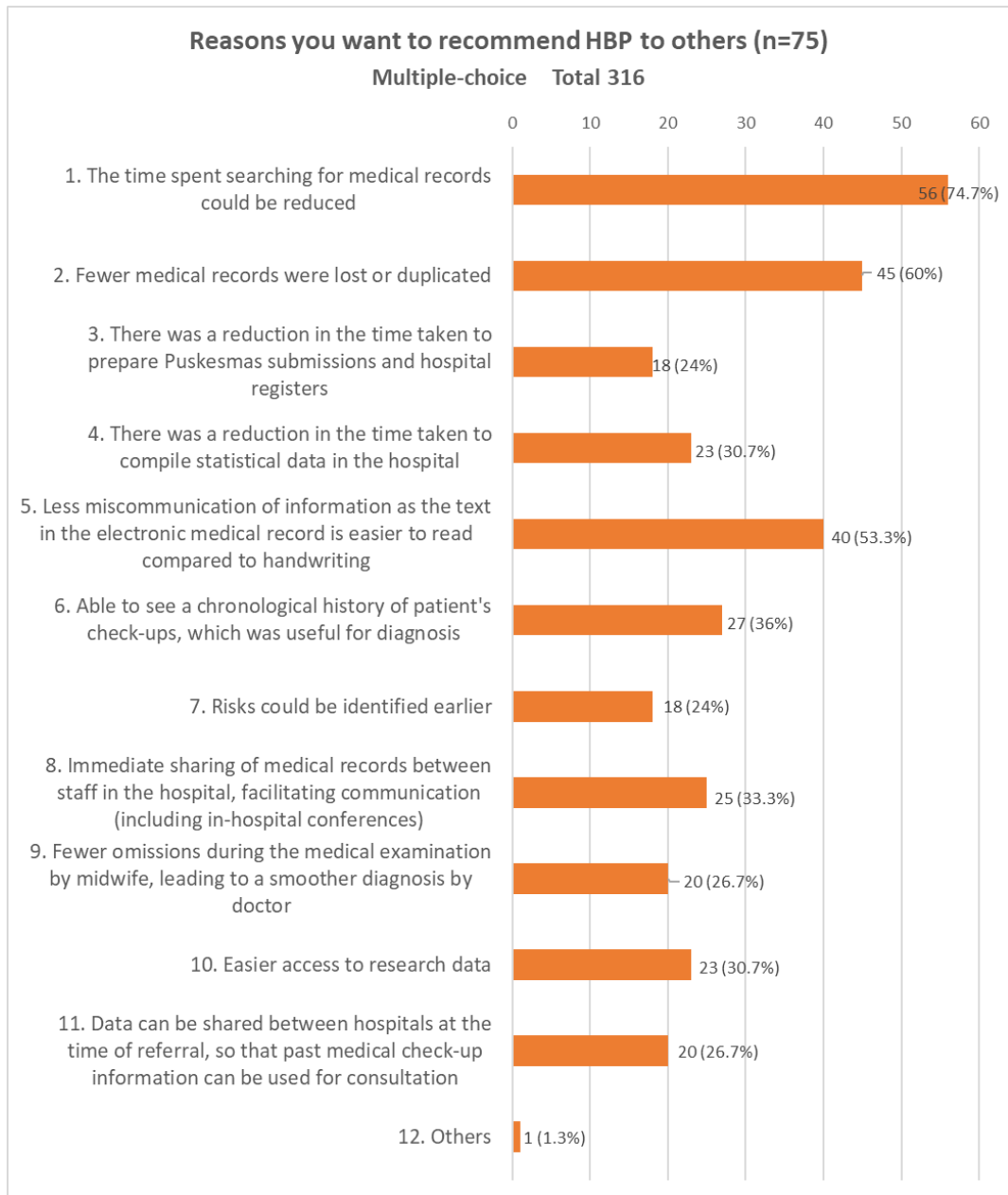
Reasons you want to recommend HBP to others (n=75)

Multiple-choice Total 316

Reason	Value
1. The time spent searching for medical records could be reduced	56 (74.7%)
2. Fewer medical records were lost or duplicated	45 (60%)
3. There was a reduction in the time taken to prepare Puskesmas submissions and hospital registers	18 (24%)
4. There was a reduction in the time taken to compile statistical data in the hospital	23 (30.7%)
5. Less miscommunication of information as the text in the electronic medical record is easier to read compared to handwriting	40 (53.3%)
6. Able to see a chronological history of patient's check-ups, which was useful for diagnosis	27 (36%)
7. Risks could be identified earlier	18 (24%)
8. Immediate sharing of medical records between staff in the hospital, facilitating communication (including in-hospital conferences)	25 (33.3%)
9. Fewer omissions during the medical examination by midwife, leading to a smoother diagnosis by doctor	20 (26.7%)
10. Easier access to research data	23 (30.7%)
11. Data can be shared between hospitals at the time of referral, so that past medical check-up information can be used for consultation	20 (26.7%)
12. Others	1 (1.3%)

Figure 6 Reasons you want to recommend HBP to others

Based on these results, the JICA Survey Team introduced HBP on Webinars and obtained the following favorable results from a questionnaire survey:

- Contribution of EMR to reduce maternal mortality rate: 100%

8

- Necessity of sharing medical data at the time of referral by EMR: 100%
- Contribution of HBP's functions such as time-series data display and outlier alert display to reduce maternal mortality rate: 100%

With the favorable results at the webinars, as of March 2021, the number of hospitals with a high possibility of introducing HBP was 5 in pilot hospitals/clinics and 15 in other hospitals/clinics, for a total of 20 facilities.

Based on these results, Mitla decided to expand its business in the country. The business strategies are summarized below:
- The target segments are mainly secondary private hospitals and primary private Utama clinics, but also public hospitals and clinics that have shown interest in the webinars.
- The target area will be West Java Province for the time being. Hospitals and clinics in other areas that have shown interest in the webinars will also be targeted.
- Mitla will maintain cooperation with UNPAD / RSHS and related government agencies to promote its business expansion.

(2) Self-reliant and Continual Activities to be Conducted by Counterpart Organization

In addition to UNPAD / RSHS, which are the counterpart organizations, Health Department in West Java Province and POGI [4] can be expected as cooperating organizations. The following specific contents of cooperation have been discussed:

- These cooperating organizations organize seminars, webinars and conferences in order to introduce HBP to medical service facilities.
- Mitla provides these cooperating organizations with medical data and statistical data from HBP in order to support their research activities.
- Mitla supports HBP training to be conducted for the medical students as part of their curriculum in these cooperating organizations.
- Mitla provides HBP training for residents in higher hospitals.

4. FUTURE PROSPECTS

(1) Impact and Effect on the Concerned Development Issues through Business Development of the Product/Technology in the Surveyed Country

The goal of this business is to reduce the maternal mortality rate. The main reason for the higher maternal mortality rate is that risk detection and treatment may be delayed

---

[4] Perkumpulan Obstetri dan Ginekologi Indonesia or Indonesian Society of Obstetrics and Gynecology

for pregnant women attending Pratama Clinics, Puskesmas, and midwives where no obstetricians are available. Therefore, it is necessary to establish a referral system that allows pregnant women who are considered to be at high risk to go to hospitals with obstetricians at an early stage. This referral system should include all levels of obstetrician-related facilities.

Since it is difficult to introduce HBP to all of these facilities, Mitla decided to develop a risk assessment mobile application program and provide it free of charge. With this mobile application program, pregnant women who are considered to be at high risk can be referred to hospitals/clinics that have introduced HBP at an early stage. Therefore, even in areas where there are no hospitals/clinics with an obstetrician, a referral system without any omissions can be built. The conceptual diagram is shown in Figure 7. The risk judgment of the mobile application program used 20 judgment criteria officially approved by the Ministry of Health. These criteria are also adopted by HBP.
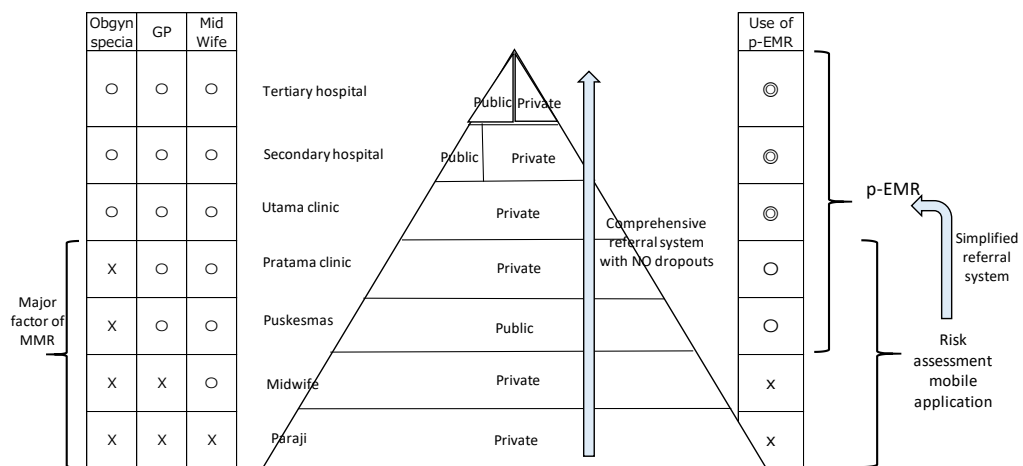
Obgyn specia	GP	Mid Wife	Facility	Sector	Use of p-EMR
O	O	O	Tertiary hospital	Public / Private	◎
O	O	O	Secondary hospital	Public / Private	◎
O	O	O	Utama clinic	Private	◎
X	O	O	Pratama clinic	Private	O
X	O	O	Puskesmas	Public	O
X	X	O	Midwife	Private	X
X	X	X	Paraji	Private	X

Major factor of MMR

Comprehensive referral system with NO dropouts

p-EMR

Simplified referral system

Risk assessment mobile application

Figure 7 Referral system using risk judgment mobile application program

It was confirmed that, by utilizing HBP and risk assessment mobile application program, medical service facilities could contribute to reducing the maternal mortality rate and decreasing medical disparities between remote areas and urban areas. Besides, it was confirmed that the sharing of medical big data accumulated by HBP may contribute to improve the quality of perinatal medical care services and strengthen research capabilities.

Mitla plans to start business development after the end of this Survey, and five years

later, it is expected that the annual number of outpatients using HBP will be 1.22 million and the number of deliveries will be 43,000. Assuming that the number of medical examinations for pregnant women per childbirth is four, 300,000 pregnant women will use HBP. It is assumed that 900 pregnant women would normally die if the maternal mortality rate in Indonesia were 300 per 100,000. However, early risk detection through the use of HBP and risk assessment mobile application program, and rapid medical data sharing with referral destination higher hospitals will significantly reduce the risk of death for these pregnant women.

Since the operation cost of HBP except a cloud usage cost does not basically increase even if the number of users increases, it is possible to dramatically increase the number of users if the effect is widely recognized. Therefore, if the introduction of HBP can be realized in more medical service facilities after the 6th year, the risk of maternal mortality will be reduced nationwide, and it will contribute to the ultimate goal of reducing the maternal mortality rate of the entire country.

(2) Lessons Learned and Recommendation through the Survey

Figure 8 shows a conceptual diagram of policy proposals for the realization of a regional medical cooperation system based on the results, experiences, and know-how obtained from this Survey. By collaborating with government-affiliated organizations, academic societies/universities, medical service facilities, and the perinatal electronic medical record industry, it is expected that 1) construction of a referral system without omissions, 2) improvement of the quality of perinatal medical care, and 3) strengthening of research capabilities using medical big data will be realized. The details are described below.

- Government agencies and academic societies/universities will work together to standardize the format of medical data and share it with the perinatal electronic medical record industry. By standardizing the format of domestic medical data, it will be possible to share data between different electronic medical record systems, and it will be easier to improve the quality of medical services and research.
- Medical service facilities with specialists use perinatal electronic medical records with standardized medical data, so referrals can be easily performed between medical service facilities with different electronic medical record systems. Medical service facilities without specialists will be able to detect early risks by using the risk assessment application program. Besides, if a system capable of sharing data between electronic medical records and risk assessment application program can be developed, data sharing between all medical service facilities in the country will

become possible. (This Survey has not been completed up to this stage so far.)

● Perinatal medical societies such as POGI will be able to carry out rapid research by collectively analyzing medical data nationwide. In particular, it is expected to be effective in the event of a highly urgent pandemic such as the new coronavirus. By utilizing these medical data, joint research with foreign medical personnel such as Japan will be possible, which contributes to improving the quality of research capabilities in the medical field in Indonesia.

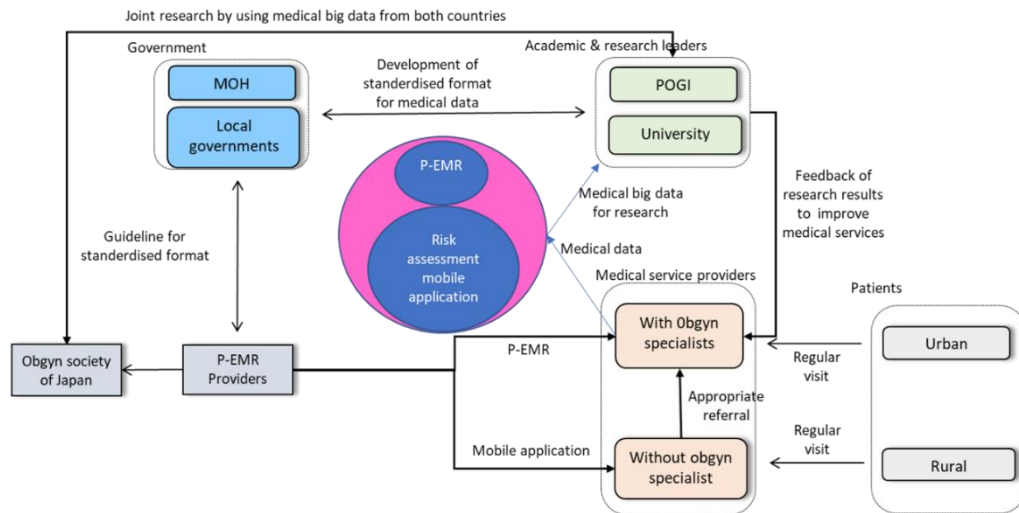**Figure 8 Proposal of medical cooperation mechanism**

UNPAD is a member school of the Academic Health System, which is an academic organization consisting of four leading university medical schools nationwide with a mission to promote cooperation between university medical schools and medical service facilities. HBP will definitely be able to contribute to the strengthening of their activities through UNPAD.

ATTACHMENT: OUTLINE OF THE SURVEY

Indonesia

Verification Survey with the Private Sector for Disseminating Japanese Technologies for Electronic Medical Record and Hospital-Clinics Linkage to Care Pregnant and Parturient Women
Mitla Co., Ltd., Kagawa Pref. Japan

Concerned Development Issues in Indonesia

- Maternal mortality rate is high compared to nearby countries
- Medical data are not well shared in referral system
- Disparity of maternal medical services is vast among urban and remote areas.

Activities to be implemented in the Survey

- Customize HBP to Indonesian context
- Training for doctors, midwives, nurses and administrative staff
- Implement pilot activities in RSHS and clinics
- Provide monitoring activities
- Strengthen referral system
- Develop business model & plan

Proposed Products/Technologies

Perinatal Electronic Medical Record System
「Hello Baby Program：HBP」

HBP to store accurate time-series medical data of pregnant women and fetus and to share among doctors in separated places

Survey Overview

Name of Counterpart：
Padjadjaran University
Survey duration：
June 2018 to June 2021
Survey Area：Bandung, Indonesia

Impact on the Concerned Development Issues in Indonesia

- Maternal mortality rate decreases by identifying high risk pregnant women in the earlier stage.
- Disparity of maternal medical services among urban and remote areas is corrected.
- Duplication of medical examination is eliminated by sharing medical data among hospitals and clinics.

Outputs and Outcomes of the Survey

- HBP Indonesian version is completed.
- It proves that HBP can contribute to quality improvement in maternal medical services.
- It is confirmed that HBP can be disseminated in Indonesia.