Provincial Department of Health in Hoa Binh

Summary Report

Vietnam

Verification Survey with the Private Sector for Disseminating Japanese Technologies for Promoting Prompt Diagnosis and Treatment of Neonatal Jaundice in Vietnam

September, 2017

Japan International Cooperation Agency

APEL Co., Ltd.

1. BACKGROUND

In Vietnam, healthcare standards have been largely improved along with rapid economic growth after launching Doi Moi, a political and economic renewal campaign, in 1986. Several challenges, however, still have been pointed out, one of which are maternal and child healthcare including neonatal healthcare and the Government of Vietnam continues to focus on improving neonatal health as neonatal mortality rate remains high amongst under-five infant mortality. The gaps in health indicators between rural and urban as well as between ethnic groups indicate the gaps of accessible healthcare service standards, which are also among the challenges for the Government of Vietnam.

Jaundice in newborn is usually benign, but in rare cases the potential toxicity of "bilirubin" in blood might cause central nervous system damage and develop serious prognostic symptoms. In developed countries including Japan, therefore, neonatal jaundice is included as part of the required examination during the medical checkup to be managed and treated for newborn infants. Measurement of bilirubin levels in blood is indispensable for proper assessment and diagnosis of neonatal jaundice. Lack of equipment to examine properly and skilled medical staffs in district-level hospitals contribute to delayed treatment and overloading of the higher-level hospitals.

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

(1) Purpose

The Survey aims to promote prompt diagnosis and treatment of neonatal jaundice through training of medical workers and introduction of Bilirubin Meters along with therapeutic equipment (hereinafter collectively referred to as "the Products"), which enable Vietnam's district-level hospitals to complete diagnosis and treatment of mild neonatal jaundice. Through educational activities for mothers and families of newborns, the Survey will also promote early detection of neonatal jaundice at home and early check-up at district-level hospitals. Improving the level of diagnosis and treatment of mild neonatal jaundice at district-level hospitals will contribute to improve newborn healthcare standard of those hospitals at district level. This may further optimize the number of patients referred to province-level hospitals from district level and reduce the workload of the province-level hospitals. Medical workers' views and comments obtained during the Survey will accelerate improvement and localization of Bilirubin Meter.

(2) Activities

a. Training of medical staffs who engage in neonatal care at district-hospitals in the Target Area

1-1. Development of training program and teaching materials that meet participants' needs
1-2. Assignment of participants to the training courses in Vietnam and activities conducted in Japan
1-3. Execution of training courses in Vietnam and in Japan
1-4. Assessment, analysis and reporting the effectiveness of the above activities

b. Introduction of the Products to district-level hospitals in the Target Area

1-5. Assignment of public hospitals in the Target Area that participate in the Survey

1-6. Transportation and installation on the Proposed Products
1-7. Instruction and practical training for usage of the Proposed Products
1-8. Implementation of maintenance and management procedures of the Proposed Products

c. Education and edification of mothers and families of newborn infants, who visit district level hospitals

2-1. Development of education and edification materials to meet clinical needs of district-level hospitals in the Target Area
2-2. Assistance for education and edification activities for mothers and families of newborn babies by medical workers of district-level hospitals in the Target Area
2-3. Assessment, analysis and reporting the effectiveness of the above activities

d. Verification of effectiveness of training and implementation of the Proposed Products

1/2-1. Review of the current status and recognize challenges regarding diagnosis and treatment of neonatal jaundice
1/2-2. Review of the current status and recognize challenges regarding referral system among public hospitals in the Target Area
1/2-3. Discussion on data acquisition procedures for verification
1/2-4. Acquisition of data necessary for verification
1/2-5. Collection, analysis and reporting of the data acquired

e. Improvement and localization of the Proposed Products

3-1. Interview with related parties concerned MOH and medical workers at the Target Area to collect request for improvement of the Proposed Products
3-2. Consideration of measures to improve and localize the Proposed Products based on the interview

f. Development of a market penetration strategy of the Proposed Products in Vietnam

4-1. Review of market needs for the Proposed Products in Vietnam
4-2. Information collection to create distribution and sales network in Vietnam
4-3. Identification of risks related to penetration into Vietnam's market
4-4. Conduct of promotional activities utilizing the result of verification activities
4-5. Development of a market penetration strategy in Vietnam

(3) Information of Product/ Technology to be Provided

- Total Bilirubin Meter for Neonates (BR-5200P)*
- Hematocrit Centrifuge (HC702)*
- LED Phototherapy Unit (Bili-Therapy)

*Products manufactured by APEL

	Item		
Description	BR-5200P 	HC702 	Bili-Therapy 
Manufacturer	APEL Co.,Ltd.	APEL Co.,Ltd.	Atom Medical Corporation
Power requirements	100-240VAC, 50/60Hz, AC adapter	110VAC or 220VAC, 50/60Hz	VAC100-240
Dimensions	262(W)x214(D)x109(H) mm	290(W)x320(D)x245(H)mm	Stand Type: 45(W)x71(D)x190(H)mm
Weight	1.7kg(main body)	8kg(main body)	Stand Type: Approx. 12kg
Power Consumption	4.5W	180W	30VA
Light source	White high bright LED	-	Blue LEDs
Other specs	-Method: Dual Wavelength -Measurement Range: 0-30mg/dL (Total bilirubin) -Sample container: Hematocrit capillary tube -Display: Large LCD display -Printer: Thermal serial dot method	-Max. speed: 12,000rpm (Fixed) -Max. centrifugal force: 15,000xg -Max. capacity: 24-places -Brake system: Manual brake system	-Irradiance level: At least 30 – 40 uW/cm2/nm

(4) Counterpart Organization

Provincial Department of Health in Hoa Binh

(5) Target Area and Beneficiaries

a. Target Area: Hoa Binh Province

b. Beneficiaries

- Direct beneficiaries: Newborn infants, their mothers and families in the Target Area who can receive improved diagnosis and treatment for neonatal jaundice
- Indirect beneficiaries:
  - ✓ Inhabitants of the Target Area who can receive improved medical treatment for newborn babies at provincial and district-level hospitals.
  - ✓ Patients who can receive proper and prompt medical treatment at upper-level hospitals in

the Target Area or other areas where congestion is relaxed as lower-level hospitals in the Target Area improved their medical level.

(6) Duration

From September 2015 to October 2017

(7) Progress Schedule

Assignment	2015			2016												2017											
	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. Training of medical staffs who engage in neonatal care																											
(1) Training in Vietnam																											
(2) Training in Japan																											
2. Education and edification of mothers and families of newborn infants																											
3. Implementation of the Products																											
4. Verification of effectiveness of training and implementation of the Products																											
5. Localization of the Products																											
6. Development of a market penetration strategy in Vietnam																											

: Activities in Japan (Plan)
: On-site Activities (Plan)
: Activities in Japan (Record)
: On-site Activities (Record)

(8) Manning Schedule

Survey Schedule and Assignment Schedule

	Assignment	Name	Organization*	2015 10	11	12	2016 1	2	3	4	5	6	7	8	9	10	11	12	2017 1	2	3	4	5	6	Man/Day On-site	Japan
On-site Activities	Project Manager	Mitsuru Kashiwada	APEL																						68	-
	Verification, Localization of the Products	Nobuya Suzuki	APEL																						68	-
	Verification, Dissemination	Koichiro Ikegai	APEL																						14	-
	Verification, Dissemination and Coordination of On-site Activities	Tetsuya Hasegawa	APEL VINA																						79	-
	Verification, Dissemination, Localization of the Products and Coodination of On-site Activities	Nguyen Van Hoang	APEL VINA																						79	-
	Chief Advisor	Norio Teratani	DIR																						68	-
	Verification, Dissemination and Logistical coordination	Reiko Minami	DIR																						68	-
	Verifiation, Training in Vietnam and in Japan	(To be confirmed)	NCGM																						21	-
																								Total	444	
Activities in Japan	Project Manager	Mitsuru Kashiwada	APEL																						-	26
	Verification, Localization of the Products	Nobuya Suzuki	APEL																						-	14
	Verification, Dissemination	Koichiro Ikegai	APEL																						-	10
	Verification, Dissemination and Coordination of On-site Activities	Tetsuya Hasegawa	APEL VINA																						-	5
	Verification, Dissemination, Localization of the Products and Coodination of On-site Activities	Nguyen Van Hoang	APEL VINA																						-	5
	Verifiation, Training in Vietnam and in Japan	(To be confirmed)	NCGM																						-	11
	Verifiation, Training in Vietnam and in Japan	(To be confirmed)	NCGM																						-	15
	Chief Advisor	Norio Teratani	DIR																						-	60
	Verification, Dissemination and Logistical coordination	Reiko Minami	DIR																						-	67
																								Total		213
Assignment Schedule	1. Training of medical staffs who engage in neonatal care																									
	(1)Training in Vietnam																									
	(2)Training in Japan																									
	2. Education and edification of mothers and families of newborn infants																									
	3. Implementationt of the Products																									
	4. Verification of effectiveness of training and implementation of the Products																									
	5. Localization of the Products																									
	6. Development of a market penetration strategy in Vietnam																									
	Reporting Schedule																									
	Monthly Report			△ Implemetation Plan	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△		
	Progress Report							△ Progress Report								△ Progress Report										
	Draft Final Report																			△ Draft Final Report						
	Final Report																					△ Final Report				

Training in / Training InVietnam, Inplementation of the Products / 媒体作成、印刷 / 機器輸送、通関等

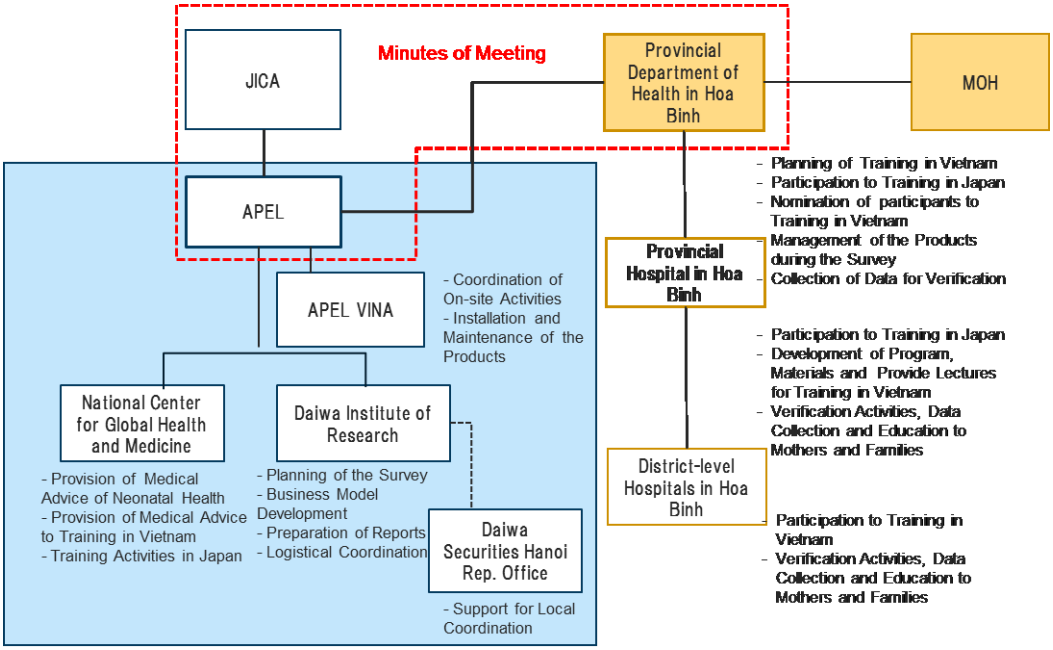
: On-site Activities

: Activities in Japan

* APEL: APEL Co., Ltd. / DIR: Daiwa Institute of Research Ltd. / NCGM: National Center for Global Health and Medicine

(9) Implementation System

APEL, the leader of JICA Survey Team, managed the whole survey to achieve the Objectives as well as the Expected Outputs of the Project, and provided instruction of the Products aiming to improve usage of the medical devices and to localize them based on the interview to the public hospitals in Vietnam. Additionally, APEL also planned and conducted promotional activities to penetrate into Vietnam's market. In between these activities, APEL VINA, APEL's subsidiary in Vietnam, coordinated on-site activities such as arrangement of appointment and information gathering. During the Survey, maintenance of Total Bilirubin Meters and Hematocrit Centrifuges were performed mainly by APEL VINA. Simultaneously, National Center for Global Health and Medicine (NCGM) provided specialized knowledge of neonatal health and experiences of international cooperation activities in healthcare. Training Activities in Japan for medical staffs was held at NCGM to provide state-of-the-art healthcare for neonatal including newborn jaundice. Daiwa Institute of Research Ltd.(DIR), an experienced consulting firm, supported APEL not only to plan and perform the Survey but also to prepare relevant documents including reports. Upon necessity, Daiwa Securities Hanoi Representative Office, a group company of DIR in Vietnam supported JICA Survey Team.



3. ACHIEVEMENT OF THE SURVEY

(1) Outputs and Outcomes of the Survey

Outputs:

a. Training of medical staffs who engage in neonatal care at district-hospitals in the Target Area

- A training course was conducted at NCGM in Tokyo to gain experience in medical treatment for newborn infants in Japan during 25-29 January 2016. An official from the Department of Health in Hoa Binh and a doctor who was responsible for neonatology at the Provincial Hospital

in Hoa Bin attended the training course.

- A training course for medical staff engaged in neonatal care and medical technologists of 11 District-level hospitals and General Hospital of Hoa Binh was conducted during 24-26 May 2016. 22 doctors and nurses as well as 19 medical technologists attended the training.

b. Introduction of the Products to district-level hospitals in the Target Area

- Sets of the Products, which consist of a Bilirubin Meter, a hematocrit centrifuge and two LED Phototherapy Unit were introduced to 11 District-level hospitals in Hoa Binh and the Provincial Hospital in Hoa Binh. While each District-level hospital was provided a set of the Products, the Provincial Hospital in Hoa Binh was provided 2 sets of the Products.
- Before the Survey, 6 out of 12 hospitals were provided a Bilirubin Meter and a hematocrit centrifuge in 2014 by APEL. The other 6 hospitals have not used Bilirubin Meter.
- APEL, after introducing the Products, visited the hospitals for 3 times to check the conditions of equipment and to confirm the operating procedures.

c. Education and edification of mothers and families of newborn infants, who visit district level hospitals

- C/P and the Survey Team worked together to develop a leaflet as an educational medium for mothers and families of newborn infants. Medical staff were trained how to provide guidance to mothers and families to find newborn jaundice at their homes.
- 10,000 leaflets were printed and distributed to the District-level hospitals.

d. Verification of effectiveness of training and implementation of the Proposed Products

- Data to verify the effectiveness of the trainings in Japan and in Vietnam as well as the effectiveness of the Products were acquired.
- The comprehension of medical staff' in Vietnam was reviewed.
- The effectiveness of education and edification of mothers and families of newborn infants were reviewed through interviews.

e. Improvement and localization of the Proposed Products

- Requests and comments by medical staff and medical technologists in Vietnam to improve and to localize the Products were collected.

f. Development of a market penetration strategy of the Proposed Products in Vietnam

- The Survey Team gathered information about public health insurance in Vietnam, which is a key to be accepted by public hospitals for the Products.
- The Survey Team, in cooperation with C/P, applied for approval to be covered by Vietnam's public health insurance.
- A market penetration strategy in Vietnam was developed by APEL.

Outcomes:

Expected Outcome 1: Diagnosis and treatment standards of neonatal jaundice at district-level

hospitals are improved.

- The number of patients who were examined as total bilirubin was 1,091 prior to the training and the introduction of the Product, but the number increased to 1,349 (+23.6%) after the training and the introduction of the Product.
- The number of examination of total bilirubin increased from 1,516 to 1,846(+21.8%). The number of examination using Bilirubin Meters increased from 503 to 737 (+46.5%). A total number of examinations of 5 out of 12 hospitals which did not own Bilirubin Meters until introduced by the Survey significantly increased from 0 to 162, which clearly demonstrate the results of the introduction of the Products and the training program.
- The rate of examined newborn infants over births increased from 20.6% to 22.1% (+1.5pt).
- The number of phototherapy increased in 9 hospitals among 12.
- Medical staffs' knowledge regarding newborn jaundice, which was measured by the average test performance before and after the training course, improved from 6.5 to 8.5.
- The effectiveness to promote proper operation of the referral system was unable to be verified due to the difficulties in collecting data.

Expected Outcome 2: Early detection of neonatal jaundice at home and early check-up at district-level hospitals are promoted.

- The effectiveness of education and edification for mothers and families was also unable to be verified due to difficulties in collecting data.
- The effectiveness of training of medical staffs to increase awareness about the importance of mothers and families to detect jaundice was observed during the training program in Vietnam.

Expected Outcome 3: Improvement and localization of Bilirubin Meter are accelerated.

- Some comments and ideas to improve the Bilirubin Meter were suggested by medical staff as well as medical technologists, and APEL will take them into consideration for future improvement.

Expected Outcome 4: Market penetration strategy for Bilirubin Meter in Vietnam is developed

- Through the Survey, APEL promoted better understanding about the health care system and the market structure of medical equipment in Vietnam.
- The Survey Team and C/P worked together to apply for approval in order for the Bilirubin Meter to be covered by Vietnam's public health insurance. The application is expected to be approved by the end of 2017.

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

The C/P, Department of Health in Hoa Binh, recognized the importance of proper diagnosis and treatment of neonatal jaundice, improvement of neonatal care and improvement of healthcare service level provided in district-level hospitals. C/P, in cooperation with the Provincial Hospital in Hoa Binh, is expected to apply usage of the Product as well as the experiences of the Survey in the health care administration and the management of hospitals in the province in the future, in spite of financial constraints. Training of medical personnel of district-level

hospitals is a critical need.

Education and edification for mothers and families who can find the jaundice at home is also the key to early detection of neonatal jaundice. Consultation to mothers and families before they leave the hospital by medical staffs at district-level hospitals is expected to extend throughout the country, utilizing an educational medium as well as Maternal and Child Health Handbook.

4. FUTURE PROSPECTS

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

The Survey started with a hypothesis that lack of equipment to examine properly and skilled medical staffs in district-level hospitals resulted in delayed treatment of neonatal jaundice and dependence on higher-level hospitals. In order to verify this hypothesis, the Survey Team planned to introduce Bilirubin Meter and phototherapy units and to conduct training programs for medical staffs. Through the visits and interview prior to the introduction of the Products and training programs, the Survey Team visited district-level hospitals in Hoa Binh and confirmed that the most of those hospitals have little or no capacity to examine and treat neonatal jaundice because of insufficient medical knowledge. As a result of training, medical staffs in district-level hospitals gained knowledge and skills necessary for diagnosis and treatment of neonatal jaundice, which increased the effectiveness of simple, easy- to-operate and low-cost examination equipment. The Survey Team affirmed that the introduction of phototherapy unit along with Bilirubin Meter enabled district-level hospitals to complete the examination, diagnosis and treatment of mild neonatal jaundice. The Survey Team acknowledges that the Survey and the Product have made a modest contribution to improve the level of diagnosis and treatment of neonatal jaundice, which is merely a specific field to neonatal health, and to improve newborn healthcare standard of those hospitals in Vietnam.

In order to promote early diagnosis utilizing Bilirubin Meter, application of Vietnam's public medical insurance to the examination by the Bilirubin Meter is critical. APEL and the Department of Health in Hoa Binh have been working together on the procedures to apply for Vietnam's public medical insurance in order to achieve early approval.

(2) Lessons Learned and Recommendation through the Survey

Owing to various assistances by foreign countries, international organizations and NGOs, top-level hospitals and national hospitals in Vietnam are already well-equipped and have excellent medical staff. Vietnam, however, still has many challenges in public health system in rural areas due to many reasons including financial constraints. The idea of introducing simple, affordable medical equipment and devices which are suitable to Vietnam's medical institutions without relying on the assistances from other countries ought to be considered. Continuous efforts to develop human resources engaging medical services, who can utilize such

equipment and devices, are most important. Doctors can only diagnose and treat patients when they come to the hospital. Education and dissemination of healthcare to improve public awareness and knowledge are equally important, some of which can be done through guidance and instruction by medical staffs at hospitals and medical institutions.

ATTACHMENT: OUTLINE OF THE SURVEY

Vietnam

Verification Survey with the Private Sector for Disseminating Japanese Technologies for Promoting Prompt Diagnosis and Treatment of Neonatal Jaundice in Vietnam
APEL Co.,Ltd., Saitama, Japan

Concerned Development Issues in Vietnam

- In spite of significant improvement in healthcare, there remain challenges in maternal and child health / regional disparities in medical level
- Lack of testing equipment and skilled medical staffs in district-level hospitals contribute to delayed treatment and overloads at higher-level hospitals

Implemented Activities in the Survey

- Conduct training on neonatal jaundice and introduce Bilirubin Meters and Phototherapy equipment to district-level hospitals
- Educate mothers and families to promote early recognition of jaundice at home
- A major Japanese hospital joined the Survey to share expertise and provide professional advise

Proposed Products/Technologies


Bilirubin Meter (BR5200P)


LED Phototherapy Unit (Atom Medical)


Hematocrit Centrifuge

- Bilirubin Meter: Single-purpose medical testing equipment for developing countries
- Phototherapy Unit: treatment equipment for neonatal jaundice

Survey Overview
Name of Counterpart: Department of Health in Hoa Binh
Survey duration: Sep 2015 – Oct 2017
Surveyed Area: Hoa Binh Province

Impact on the Concerned Development Issues in Vietnam

- Diagnosis and treatment standards of neonatal jaundice at district-level hospitals are improved
- Improvement of newborn healthcare standard of district-level hospitals is accelerated, which may reduce disparities between large cities and rural areas
- Workload of upper-level hospitals may be reduced

Outputs and Outcomes of the Survey

Before the Survey
- Limited number of sales in Vietnam
- Little opportunity to contact to end-users in hospitals to recognize their needs

After the Survey
- Promote marketing activities in Vietnam, emphasizing that APEL can provide maintenance service in Vietnam
- Develop and improve products to satisfy requirements of doctors and hospitals in Vietnam
- Subsidiary of APEL in Vietnam will serve as an R&D base for the ASEAN market