

Gezira State Ministry of Health
Khartoum State Ministry of Health

Summary Report

The Republic of the Sudan

Pilot Survey for Disseminating SME's
Technologies for Mobile Car Clinic
(Doctor Car)

April, 2016

Japan International Cooperation Agency

AXIOHELIX Co. Ltd.

1. BACKGROUND

The health service field in Sudan is facing issues as listed below 1-4, which are causing lack of access to health services among Sudanese people.

- ✓ Issue 1: Lack of medical service infrastructure / medical service due to the country's demographic characteristics (scattered population in a large national territory)
- ✓ Issue 2: Chronic shortage of human resources for health and medical services
- ✓ Issue 3: High medical costs due to the lack of medical records leading to unnecessary medication
- ✓ Issue 4: Lack of maintenance system for medical facilities

In the National Health Sector Strategic Plan 2012-16 (NHSSP II), the government of Sudan has set the goal of “improved health status of the population of Sudan especially the poor, underserved, disadvantaged and vulnerable populations”, and set the strategic directions of “a) Strengthening Primary Health Care (PHC) coverage and quality”, “b) Improving quality and efficiency of hospital services”, and “c) Social protection with increased health insurance” to achieve the above mentioned goal (NHSSP II, p.vii). In accordance with the strategic directions, the effective means to deliver the solution to the country's goal are needed.

As the result of the “Feasibility Study and Pilot Project for Disseminating SME's Technologies to Developing Countries under the Governmental Commission on the Projects for ODA Overseas Economic Cooperation in FY 2012”, it was identified that Gezira State and Khartoum State had the high interests in providing health and medical services in remote areas utilizing Dr. Cars. In response to this, Gezira State Ministries of Health (GMOH) and Khartoum State Ministry of Health (KMOH) cooperated as the counterpart (C/P) organizations for “Pilot Survey for Disseminating SME's Technologies for Mobile Car Clinic (Doctor Car) (hereafter referred as “the Survey”) to conduct operational demonstrations of Dr. Car.

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

(1) Purpose

The Survey aims to demonstrate the possibility of Dr. Car to contribute to the issues of health service field in Sudan (especially issue 1 and 2 described above), and to identify the needs for improvement to enhance the applicability of Dr. Car to the local situation.

(2) Activities

1) Information collection and preparation for operation of Dr. Car

- Collection of basic information to prepare for the operation of Dr. Cars and business plan, such as health sector information and business related information including taxation system, licensing, and import procedures.
- Formulation of operation plans and evaluation method for the seven Dr. Cars to be introduced in Gezira state and Khartoum State with the supervision of the Steering Committee (SC) which was set up as the decision making body of the Survey (details are described in 2 (9) 3)).

2) Operation of Dr. Car and evaluation of the operation results

- Operation of 7 Dr. Cars for providing services including; mobile clinic, home visit services in remote areas, school health, specialized medical services, and health survey.
- Verification and evaluation of effectiveness, usability and local applicability of Dr. Car and the medical equipment for providing health service

3) Implementation of human resource development program

- Holding of training on operation / maintenance of Dr. Car and medical equipment for the personnel from operators of Dr. Cars and the Khartoum/ Gezira State Ministry of Health.
- Conduct of activities in Japan to receive further training and to learn the health service practice in Japan, inviting one each from both of the State Ministry of Health.

4) Implementation of dissemination activity

- Holding of dissemination seminar on Dr. Car to promote the understanding of Dr. Car and its effectiveness, targeting key personnel for future dissemination of Dr. Cars, including medical institutions and related governmental organizations and international donor agencies.

5) Formulation and evaluation of business development plan

- Formulation of business plan for Dr. Car based on the results of the Survey.
- Evaluation of feasibility of business development in Sudan.

(3) Information of Product/ Technology to be provided

“Dr. Car” refers to a mobile clinic which is designed to match the requirements for providing health services in remote areas in Africa, such as driving capacity, remote communication capacity and utility needs. It is composed of four-wheel-drive vehicle equipped with; medical devices and facilities necessary for providing health service, seats for health staff, and ICT tools which enable doctors to communicate with experienced / specialized doctors in distant locations during service in remote operation areas.



Pictures: Exterior and interior of Dr. Car Truck type (above) and Van type (below)

<Standard composition of Dr. Car>

- Vehicle : Truck type/Mitsubishi 4WD Canter, and Van type/Toyota 4WD Hi-Ace Super High Roof
- Utility : Power supply system, refrigerator, water server, side tents, cot beds, table, chairs / stretcher
- Medical equipment: Electrocardiograph (ECG), USB Diagnostic Ultrasound Imaging System (U/S), automatic blood-pressure gauge
- Remote communication system: ICT communication software, including Primary Health-care Record system (PHR) with biometric identification function, and TV conference system

(4) Counterpart Organization

Counterpart organizations are;

- Gezira: Gezira State Ministry of Health (GMOH) is the counterpart organization. As operators of Dr. Cars, GFMP (Gezira Family Medicine Project) and Makkah Eye Hospital were selected in charge of Dr. Car operations in Gezira State.

- **Khartoum:** Khartoum State Ministry of Health (KMoH) is the counterpart organization. As operators of Dr. Cars, NPO ROCINANTES (until the 2nd SC), Alzaeim Alazhari University (AAU), Makkah Eye Hospital, and Khartoum State Ministry of Health Primary Health Care School Health (KMoH PHC) (after the 2nd SC) were selected in charge of Dr. Car operation in Khartoum State.

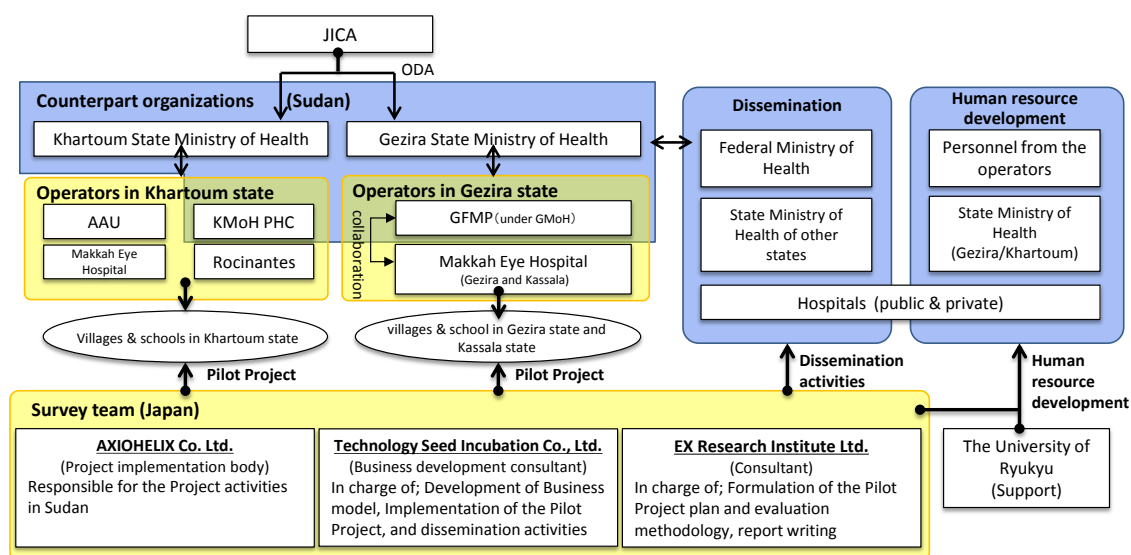


Figure 1. Operation framework of the Survey

(5) Target Area and Beneficiaries

The Survey aims a sum of approximately 70,000 people, such as residents of operation areas and elementary school students in Gezira State and Khartoum State, to be served with different health and medical services.

(6) Duration

From September 2013 to May 2016, of which operation period of Dr. Car was from December 2014 to December 2015.

(7) Progress Schedule

See Appendix 1.

(8) Manning Schedule

See Appendix 2.

(9) Implementation System

1) Survey team (Japan)

- AXIOHELIX Co. Ltd. (AXIOHELIX)

AXIOHELIX is responsible for the whole activities to be conducted in the Survey, and was in charge of supervision of the Dr. Car operations, implementation of human resource development program, and development of business model.

- Technology Seed Incubation Co., Ltd. (TSI)

TSI participate in the Survey as business development consultant, and is in charge of advising development of business model, provision of assistance for implementation of Dr. Car operation and dissemination program, and preparation of the Survey reports.

- EX Research Institute Ltd. (EXRI)

EXRI participate in the Survey as consultant, and is responsible for formulation of the Dr. Car operation plans, designing of evaluation methodology, and preparation of the Survey reports.

2) Other cooperating organizations

- The University of Ryukyu

Training for usage of distant diagnosis system was conducted in cooperation with the clinical simulation center of the University of Ryukyu.

- Nippon Medical School and NPO Humanitarian Medical Assistance (HuMA)

Support for training on distant diagnosis was provided from Nippon Medical School and HuMA.

3) Organization of the Steering Committee (SC)

To ensure the proper operation and management of Dr. Cars, and to provide advices during the Survey period, the Steering Committee (SC) was organized by AXIOHELIX. Three SC meetings were held during the Survey period (August 2014, May 2015, December 2015), which had functions including (i) reviewing and evaluating the operation of each Dr. Car, and (ii) making decisions regarding the operation of Dr. Cars when necessary. It is chaired by AXIOHELIX, and participated by GMoH, KMoH, and JICA Sudan office as committee members. Federal Ministry of Health (FMoH), Embassy of Japan in Sudan, and JICA headquarter participated as observer members.

3. ACHIEVEMENT OF THE SURVEY

(1) Outputs and Outcomes of the Survey

1) Overall results of Dr. Car operation

The overall operation result is shown in the Table 1. below. During the 12 months from December 2014 to December 2015, various health services were provided to a total of

64,000 beneficiaries utilizing 7 Dr. Cars.

Although the overall operation rate¹ during the period was limited to 26%, due to the delay in commencement of the operation caused by administrative interactions among the operators and consolidation of operation system, operation of Dr. Car was sustained thanks to the management of C/P organizations, along with each operator's effort to establish self-sustaining operation frameworks.

Table 1. Operation results

Operator	Period in charge of operation*1	# days in charge	# days operated	Operation rate	beneficiary number	Beneficiary per day
Rocinantes	Dec 2014 - May 2015	117	19	16%	1,959	103
AAU	Dec. 2014 - Dec. 2015	243	40	16%	2,877	72
KMOH PHC	May 2015- Dec. 2015	131	61	47%	4,730	78
Makka Khartoum	Dec. 2014 - Dec. 2015	243	84	35%	23,900	285
Makkah Gezira	May 2015- Dec. 2015	131	29	22%	10,614	366
Makkah Kassala	May 2015- Dec. 2015	131	49	37%	14,163	289
GFMP	2Cars : Dec. 2014 - Dec. 2015 2Cars : Dec 2014 - May 2015	355	64	18%	5,765	90
Total/average		1,351	346	26%	64,008	185

*1: The Dr. Car operated by Rocinantes was transferred to KMOH PHC based on the decision of the 2nd steering committee. Two Dr. Cars operated by GFMP were transferred to Makkah Hospital Gezira (operated in Gezira and Kassala state) after the 2nd steering committee.

From the activity, the purposes of the Survey was achieved including demonstration of usefulness of Dr. Car for providing each mode of health service, collection of operation data (number of beneficiaries, operation cost and human resource utilized for providing each mode of health service) utilized for evaluating the possibility of Dr. Car to contribute to the development issues of health service field in Sudan, verification of usability / local applicability of Dr. Car, and identification of the needs for improvement to enhance the usability / local applicability of Dr. Car which were useful for preparing business deployment plan of Dr. Car. The achievements mentioned above are explained in the following sections: 2), 3), and 4.(1).

¹ Calculated by dividing “number of days in charge” by “number of days operated” in the table.

2) Demonstration of various health service modes and collection of data on operation cost and medical personnel utilized for each service mode

The operators have successfully demonstrated different modes of health services utilizing Dr. Cars, including;

- Mobile Clinic for PHC service provision, such as maternal and child health care, vaccination, nutrition through mobile clinic in remote areas by Rocinantes and GFMP
- Health survey for a whole village in semi-urban area to be utilized for cohort study and medical student education by AAU
- Utilization for school health program in densely resided urban area by KMoH PHC
- Specialized medical service (eye-care mobile clinic and mass screening) in remote area by Makkah hospitals
- Grass-roots health service provision for geriatric care and terminal patients care through home visits in remote areas by GFMP

From the operation results, operation cost and medical personnel number utilized for the activity was collected for each mode of activities as in the Table 2. below.

Table 2. Operation cost and medical personnel number utilized

Operator	Main activities and operator names	Operation cost per patient (USD)*2,3		Service number per medical personnel (patients/man-day)	Medical personnel per 100 patients (man-day/100 patients)
		Not incl. initial cost	Incl. initial cost		
Rocinantes	Mobile Clinic in rural areas (Rocinantes)	0.6	3.0	17.2	6.8
AAU	Health survey in a village (AAU)	0.4	3.8	87.2	12.7
KMOH PHC	School health in a residential area (KMoH PHC)	1.0	2.0	8.6	11.6
Makkah Khartoum, Gezira, Kassala	Mass screening in urban/rural/school (Makkah hospital)	1.0	1.4	49.8	3.0
		0.8	1.3	73.2	2.2
		1.0	1.3	47.2	3.2
GFMP	Mobile clinic and home visits in rural (GFMP)	1.1	3.6	24.7	7.0
Average		0.9	1.7	34.5	4.5

*2: Operation cost includes initial cost as yearly depreciation value (7 years for vehicle and 5 years for medical equipment), personnel cost, and fuel cost

*3: Personnel cost is not included in AAU's operation cost as students and faculty member were mobilized

In addition to the above, it was demonstrated that collaboration between organizations with different service areas and capacity to be useful in terms of enhancing efficiency and quality of service. Specifically, it included collaboration among Makkah hospital, Alsaim hospital and GFMP to provide eye-care and general health care at one visit time, and collaboration

among GFMP, National Cancer Institute and Mycetoma hospital to jointly provide each organization's services while educating GFMP's general doctor for specialized cares.

3) Local applicability of Dr. Car

Feedback comments were given by the operation regarding advantage and limitation of Dr. Car and the medical equipment. Specifically, van type (Hi-Ace) Dr. Car was evaluated to be suitable for operation in residential and urban areas where mobility of the vehicle in narrow streets was necessary; while truck type (Canter) Dr. Car to be suitable for remote areas where driving capacity in off-road area and electricity supply utility of the car was advantageous. Other feedback comments included the needs for improving air conditioning and ventilation system of car interior, and medical equipment examination functions (higher resolution and calculation functions for U/S and result printing function for ECG). According to the feedback comments, improvement direction for the Dr. Car and medical equipment, and business development plan were prepared.

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

1) Gezira State

Out of 4 Dr. Cars managed by Gezira state, 1 car is operated directly by GMoH (GFMP), and the other 3 cars under the operators who collaborated during the Survey.

As the body responsible for managing Dr. Car, GMoH established "Outreach Unit" for the planning and monitoring the utilization of Dr. Car. The Outreach Unit is supposed to collect the operation results from each operator and report to the Director General meeting of GMoH for evaluation.

Operation plans approved at the 3rd steering committee were as follows;

- GFMP and GMoH PHC department: 1 truck type Dr. Car is utilized for GFMP's geriatric care program, mobile clinic, and campaigns by PHC department (vaccination, awareness, school health). Necessary operation cost is allocated from GMoH annual budget, which is listed in the 2016 budget plan.
- Makkah Hospitals: 1 truck type Dr. Car is utilized for free eye camps, health days and school eye health activities in Gezira state and Kassala state. The operation cost is allocated from Makkah hospital's own budget.
- Alsaim Hospital: 1 truck type Dr. Car is utilized for free eye camps. The operation cost is allocated from Alsaim hospital's own budget.

- National Cancer Institute (NCI): 1 van type Dr. Car is utilized for terminal patients' home visit care and blood donation program. The operation cost is allocated from NCI's own budget.

2) Khartoum State

Three Dr. Cars are continuously utilized by the same operators, and same activities are continued. KMoH continues periodical communication with the operators and check the utilization situation.

Operation plans approved at the 3rd steering committee were as follows;

- AAU: 1 van type Dr. Car is utilized for conducting health survey and providing rural program for medical students. The operation cost is allocated from the University budget. In addition, collaborations with NCD (non-communicable diseases) department and PHC department of KMoH are planned.
- KMoH PHC School Health: 1 van type based Dr. Car is utilized for school health program. During school holiday seasons, the car is utilized for maternal and child health services, and vaccination programs. The operation cost is allocated from the KMoH budget.
- Makkah hospital: 1 truck type Dr. Car is utilized for free eye camps and health days in Khartoum state. The operation cost is allocated from Makkah hospital's own budget.

4. FUTURE PROSPECTS

(1) Impact and Effect on the Concerned Development Issues through Business

Development of the Product/ Technology in the Surveyed Country

Based on the operation result of Dr. Car, it was demonstrated that Dr. Car was useful for providing different kind of health services, such as PHC service, school health, specialized service (eye-care), home visits, and health survey both in urban/semi-urban and rural setting. All of the case studies implied significant possibility of Dr. Car to deliver solution to the health sector in Sudan. Given that the government of Sudan is highlighting the "strengthening PHC coverage and quality" as one of the three strategic directions of its policy, this section tries to extract the possible impact and effect of introducing Dr. Car into public health service sector, especially focusing on PHC service provision.

According to the NHSSP II, 15.4% or 5.92 million of Sudanese population has no access to health facilities (population who has no health facilities within 5 km) in 2011. Given the annual population growth rate of 3%, the number of such population is expected to increase to 7.7 million in 2025 assuming the current access rate to health facilities is sustained.

The fact implies the need for accelerating the installation of health service infrastructure such as conventional health facilities. While as stated above, the health sector in Sudan is facing the issues of; (Issue 1) Lack of medical service infrastructure / medical service, and (Issue 2) Chronic shortage of human resources for health and medical services. Therefore, the solutions to increase the access to health service while overcoming those issues is necessary.

Based on the operation result, it is expected that using Dr. Car as mobile clinic could deliver solution to the above mentioned issues as it can sustain optimal budgetary and human resource efficiency even when population density is low in remote areas. Therefore, by taking the strategy to install health service infrastructure by combination of Dr. Car and stationary health facilities according to the demographic characteristics of each area, it is expected that the combination of Dr. Car and stationary health facilities could be provided for greater population rather than solely by stationary health facilities.

The followings show the possible effect of utilizing Dr. Car in terms of cost efficiency and human resource utilization efficiency in different population densities. It is estimated based on the data acquired from the operation results and other data and information drawn from related documents. For the purpose of calculation, service frequency of health facility is assumed to be 3 times/person-year², and 1-3 times/person-year for Dr. Car.

1) Cost efficiency by population densities

Utilization efficiency of budgetary resource and human resource of health facilities (referred as “HF” in the figures) and Dr. Car at different population density are analyzed as the below. The yearly installation cost referred hereafter includes initial cost (equivalent amount of yearly depreciation of health facility building, or Dr. Car purchase), human resource cost, and the fuel and maintenance cost (only for Dr. Car), but not includes consumable cost such as medical supplies and medicines.

As for yearly installation cost per beneficiary, cost for Dr. Car providing 3 times/person-year service and cost for health facility are calculated to be both approximately USD 3.9/person-year when the population density is 40/km² (Figure 2).

² This figure is drawn from NHSSP II that reports “average yearly outpatient visits are 1.926 per capita” and “urban dwellers use outpatient service 60% more than the person live in rural areas ”

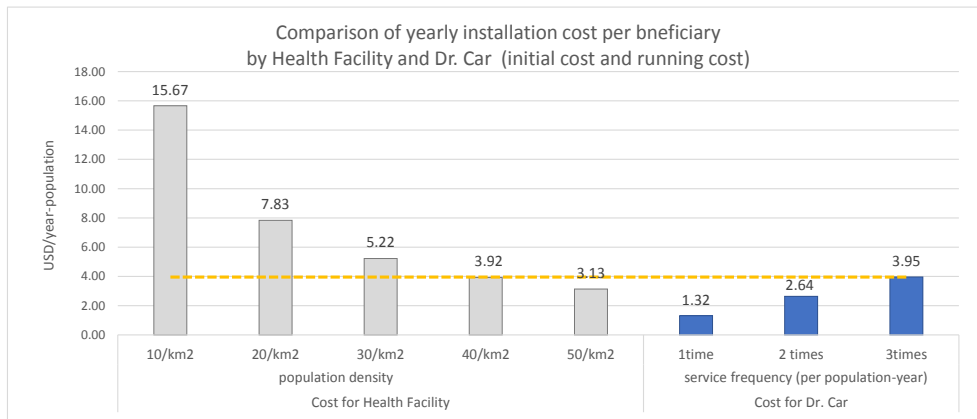


Figure 2. Expected yearly installation cost per person by Dr. Cars and Health facilities

With the equivalent amount of annual installation cost for 100 health facilities, 53 Dr. Cars can be installed. For the same amount of installation cost, the same number of beneficiaries are covered by Dr. Car providing service 3times/person-year, and by health facility when population density is 40/km² (310,000 people are covered and 930,000 times of service are provided) (Figure. 3).

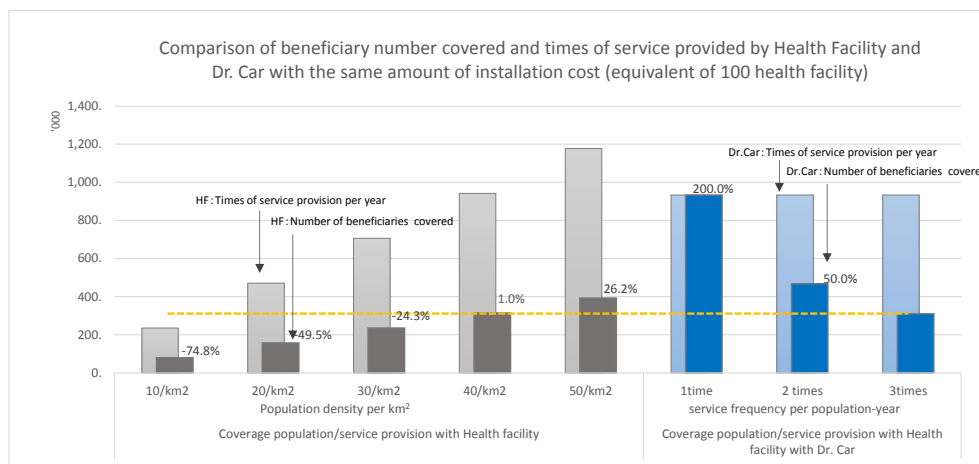


Figure 3. Expected beneficiary number covered and times of service provided by Dr. Cars and Health facilities with the same amount of installation

2) Human resource utilization rate by population densities

Expected number of covered beneficiaries and annual times of service provision per medical personnel by population densities are estimated as follows (Figure 4). At any population density lower than 74/km², Dr. Car is expected to be able to cover more beneficiaries and provide more times of service per medical personnel than health facility.

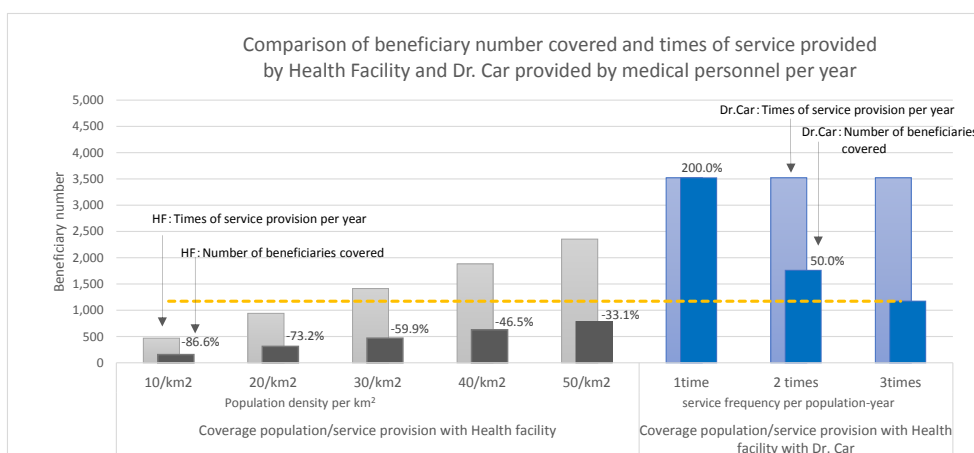


Figure 4. Expected beneficiary number covered and times of service provided by Dr. Cars and Health facilities per medical personnel per year

3) Expected contribution to development issues

As analyzed above, installation of Dr. Car is considered to be rational option both in terms of budgetary and human resource efficiency in areas with the population density lower than 40/km², although Dr. Car can be only a temporal means of infrastructure provision. While in areas with the population density greater than 40/km², health facility is consider to be more rational options than Dr. Car where not to mention, coverage of whole population with stationary health facilities is the ultimately desirable mode of health service infrastructure. Therefore, considering the actual availability of resources and population density, introduction of Dr. Cars in combination with health facilities at optimal balance is expected to contribute to the expansion of public health service coverage while overcoming issues.

Based on the above analysis, the advantage, limitation and the suitable usage of Dr. Car in comparison with health facility were summarized as in the Table 3.

Table 3. Advantage, Limitation and suitable usage: Dr. Car and Health Facility

	Dr. Car	Health facility
Advantage	<ul style="list-style-type: none"> - Optimal efficiency of facility and human resource utilization is sustained even in areas with low population density - Can provide health service to areas without infrastructure even temporarily or periodically - Quick response to emergent needs for health service in the event of natural disaster etc. - Can be used for different health service provision by changing the medical equipment 	<ul style="list-style-type: none"> - Can provide permanent service infrastructure accessible at anytime

	Dr. Car	Health facility
Limitation	<ul style="list-style-type: none"> - Temporal means of providing service, such as “mobile clinic”, but not permanent - Requires renewal after usable years of vehicle 	<ul style="list-style-type: none"> - Facility and human resource utilization is low in low population density areas - Requires certain time of period for construction
Suitable usage	<ul style="list-style-type: none"> - Complementary infrastructure for public health service provision in combination with health facilities especially in areas with low population density - Temporal service provision infrastructure as mobile clinic in doctorless villages, disaster affected areas, etc., - Specialized service provision in mobile clinic, such as eye-care, geriatric-care, and terminal patients care - Periodical health service provision, such as mother and child health, vaccination, and school health 	<ul style="list-style-type: none"> - Ultimately to-be-achieved means of health provision infrastructure for public PHC service (i.e. every population has HF in 5km, and at least 1 HF for 5,000 population/HF, as defined by FMoH)

(2) Lessons Learned and Recommendation through the Survey

By taking measures as follows, the efficiency and impact of utilizing Dr. Car will be enhanced.

1) Improvement of service efficiency and effectiveness through the collaboration of multiple organizations

To ensure efficient, effective and continuous usage of Dr. Car, joint ownership and operation under collaboration of multiple organizations is advantageous. In addition to sharing of human resource and operation cost, the benefit of utilizing Dr. Car under collaboration of organizations with different service capacity is enhanced service both in terms of quantity and quality. It was demonstrated from the experience of GFMP that different specialized services were provided along with the provision of PHC service by collaborating with Makkah hospital, National Cancer Institute and Alsaim hospital.

2) Utilization of junior-level medical force

Given the situation that Sudan is facing shortage of health force especially in the rural areas, utilization of human resource such as medical school students and doctors during the national service period can deliver solution to the situation. It can not only be the immediate response to the shortage of medical personnel, but also the human resource development opportunities of medical personnel who can work in rural areas in a medium- to long-term

perspective.

3) Choice of optimal use of Dr. Car according to the characteristics of operating areas

The modes of service provided with Dr. Car should be selected based on the characteristics of the area of operation to increase the number of beneficiaries and to better respond to the needs. For instance, in remote areas and low-income areas where reach to the health facility and service tend to be difficult, the service mode to provide screening and curative service on-site at Dr. Car is better suited to the needs. On the other hand, in urban areas where health facility is relatively reachable, service mode to provide mass screening with Dr. Car and referring patients who needs further investigation or curative care to close health facilities is more adequate to increase the number of beneficiaries to be served by Dr. Car.

Appendix

Appendix 1. Progress Schedule

Items	Period	2013				2014												2015												2016							
		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			
① Preparation																																					
①-1 Collection of basic information in Sudan		▬		▬		▬																															
①-2 Formulation of the outline of operation plans and evaluation methodology for Doctor Cars									▬			▬	▬																								
② Procurement, transportation, and setting-up of Dr. Car and equipment																																					
②-1 Ordering / production of vehicle and equipment		▬	▬	▬	▬	▬	▬	▬																													
②-2 Transportation of Dr. Car and equipment									▬																												
②-3 Setting-up of Dr. Car and equipment													▬	▬																							
③ Supervision of Doctor Car operation																																					
③-1 Operation of Dr. Car																																					
③-2 Recording of operation log																																					
③-3 Interim evaluation and modification of the Operation Plan (if necessary)																																					
③-4 Analysis of local applicability																																					
③-5 Steering Committee																																					
④ Implementation of dissemination activities																																					
④-1 Planning of dissemination program																																					
④-2 Implementation of dissemination program (seminar)																																					
⑤ Implementation of human resource development program																																					
⑤-1 Planning and preparation of human resource development program		▬																																			
⑤-1 Implementation of human resource development program] (in Sudan)																																					
⑤-2 Implementation of human resource development program (in Japan)																																					
⑥ Evaluation of financial viability																																					
⑥-1 (6) Evaluation of the operation result /improvement of local applicability																																					
⑥-2 Formulation of business plan																																					
⑥-3 Financial viability analysis of the business plan																																					
⑦ Discussion with the recipient government																																					
⑦ Discussion with Sudan Governmental organizations																																					
Preparation of survey reports																																					

Legend: ▬ In Sudan

▬ In Japan

ATTACHMENT: OUTLINE OF THE SURVEY

THE PILOT SURVEY FOR DISSEMINATING SME'S TECHNOLOGIES Pilot Survey for Disseminating SME's Technologies for Mobile Car Clinic (Doctor Car) in Sudan

Outline of the Survey

- Proposed by : AXIOHELIX Co. Ltd., Okinawa, Japan
- Counterpart Organization: Gezira State Ministry of Health, Khartoum State Ministry of Health, Sudan
- Target area and Beneficiaries : residents and primary school students in Gezira State and Khartoum State
- Duration : September 2013 to May 2016

● Concerned Development Issues in Sudan ● ← **match** → ● Proposed Products / Technologies ●

Need for improving access to health care service

- Issue 1: Lack of medical service infrastructure / medical service
- Issue 2: Chronic shortage of human resources for health and medical services
- Issue 3: High medical costs due to the lack of medical records leading to unnecessary medication
- Issue 4: Lack of maintenance system for medical facilities

Dr. Car; mobile clinic car that is equipped with facilities and equipment needed for providing health care service in remote areas in Africa

- Visit remote villages and schools and provide health care services
- Connection with doctors in hospitals through ICT system
- Patients data sharing and database creation through PHR (Primary Health-care Record) system

Implemented Activities in the Survey

- Verification of local applicability and usability of Dr. Car and equipment, and identification of need for improvement
- Implementation of human resource development activity for proper usage of Dr. Car and the medical equipment
- Implementation of dissemination activities in Khartoum



Outputs and Outcomes of the Survey

Health care services were provided to 64,000 beneficiaries through the Survey activity, and the followings are identified;

- Establishment of various modes of health care service provision using Dr. Car (mobile clinic, school health, mass screening, specialized medical service, health survey)
- Operation cost and coverage of beneficiaries for providing health care service using Dr. Car
- Local applicability and usability of Dr. Car and equipment, efficiency of Dr. Car, and need for improvement

Impact on the Concerned Development Issues in Sudan

- Dr. Car can provide solution to improve existing modes of health service provision infrastructure, such as complement to PHC facilities (e.g. family health care center) especially in remote and low density area, and providing separate health services such as school health, mass screening, specialized medical service, health survey, maternal and child health, vaccination etc.,