

Country Name	Implementation Plan for “Project for Promotion of Minimally Invasive Techniques Focused on TRI¹ Method” in Mexico
United Mexican States	

I. Project Outline

Background	In Mexico, as a result of the growing elderly population and changing lifestyles, non-communicable diseases (NCD) such as heart disease and diabetes surpassed communicable diseases as a cause of death, and all five leading causes of death in hospitals were NCD. The age-adjusted mortality rate ² for ischemic heart disease ³ (IHD) among non-communicable diseases was still increasing. The development of clinical techniques to improve outcomes in IHD and the training of medical professionals involved in cardiology were critical issues. In addition, there was a need to introduce high-level treatment techniques that would minimize the physical burden of IHD patients and shorten hospitalization days.												
Objectives of the Project	By training interventional cardiology specialists and chief residents on minimally invasive techniques ⁴ for IHD and institutionalizing the technique for specialist certification and renewal, the project aims at disseminating the examinations and the treatments with the technique, thereby contributing to improving the quality of life of the patients with IHD who underwent the examinations and the treatments with minimally invasive technique and to reduce related medical costs.												
	<ol style="list-style-type: none"> Overall Goal: Quality of life of the patients with IHD who underwent the examinations and the treatments with minimally invasive technique⁵ is improved and related medical costs are reduced in Mexico. Project Purpose: The examinations and the treatments with minimally invasive technique for IHD are disseminated in Mexico. 												
Activities of the Project	<ol style="list-style-type: none"> Project site: Whole Country Main activities: Baseline and the end-line survey on IHD, planning and implementation of TRI training, advocacy activities on TRI method, etc. Inputs (to carry out above activities) <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Japanese Side</td> <td style="width: 50%;">Mexican Side</td> </tr> <tr> <td>1) Experts: 6 persons</td> <td>1) Staff allocated</td> </tr> <tr> <td>2) Trainees received: 2 persons</td> <td>2) Facility: TRI Training Center, etc.</td> </tr> <tr> <td>3) Equipment: Puncture model, vessel model, video equipment, etc.</td> <td>3) Local cost: Expenses for water and electricity of the project office, etc.</td> </tr> <tr> <td>4) Local cost: hiring administrative staff, training expenses, etc.</td> <td></td> </tr> </table> 			Japanese Side	Mexican Side	1) Experts: 6 persons	1) Staff allocated	2) Trainees received: 2 persons	2) Facility: TRI Training Center, etc.	3) Equipment: Puncture model, vessel model, video equipment, etc.	3) Local cost: Expenses for water and electricity of the project office, etc.	4) Local cost: hiring administrative staff, training expenses, etc.	
Japanese Side	Mexican Side												
1) Experts: 6 persons	1) Staff allocated												
2) Trainees received: 2 persons	2) Facility: TRI Training Center, etc.												
3) Equipment: Puncture model, vessel model, video equipment, etc.	3) Local cost: Expenses for water and electricity of the project office, etc.												
4) Local cost: hiring administrative staff, training expenses, etc.													
Project Period	(ex-ante) June 2015 to June 2018 [36 months] (actual) January 2016 to April 2019 [40 months]	Project Cost (Japanese side only)	(ex-ante) 266 million yen, (actual) 214 million yen										
Implementing Agency	Ministry of Health												
Cooperation Agency in Japan	TA Networking Corp.												

II. Result of the Evaluation

1 Relevance/Coherence
<p>[Relevance]</p> <p><Consistency with the Development Policy of Mexico at the Time of Ex-Ante Evaluation></p> <p>The health sector was prioritized in the “National Development Plan” (2013-2018), and one of the issues was the “population access to health services” for reduction in mortality from noncommunicable diseases. The project was consistent with the development policy of Mexico at the time of ex-ante evaluation.</p> <p><Consistency with the Development Needs of Mexico at the Time of Ex-Ante Evaluation></p> <p>Percutaneous coronary angioplasty (PCI) and percutaneous transluminal coronary angioplasty are endovascular procedures performed worldwide for IHD. In Mexico, trans-femoral intervention (TFI) was the main treatment of choice for both procedures. However, compared to TRI, it imposed physical, mental, and financial burdens on the patient, including 24 hours of bed rest for hemostasis, risk of complications such as rebleeding at the puncture site, and increased hospital stay. The project was consistent with the development needs of Mexico at the time of ex-ante evaluation.</p> <p><Appropriateness of Project Design/Approach></p> <p>The project design/approach was appropriate. No problem attributed to the project design/approach was confirmed,</p>

¹ TRI stands for trans-radial intervention. In comparison, trans-femoral intervention (TFI) places a heavy physical, mental, and financial burden on the patient, including 24 hours of bed rest for hemostasis, risk of complications such as rebleeding at the puncture site, and increased length of hospital stay.

² The age-adjusted death rate is a weighted average of age-specific death rates in the observed population. The weight for each category is the proportion of people in the standard population.

³ Ischemic heart disease is a general term for diseases in which blood flow to the myocardium is obstructed due to occlusion or stenosis of coronary arteries, causing damage to the heart. It includes angina pectoris and myocardial infarction.

⁴ It means medical treatment that places a small burden (invasiveness) on the body and is also called “non-incisional medical treatment.” It is a treatment technique involving the insertion of catheters, so-called interventions.

<Evaluation Result>

In light of the above, the relevance of the project is ③⁶.

[Coherence]

<Consistency with Japan’s ODA Policy at the Time of Ex-Ante Evaluation>

In the "Country Assistance Policy for the United Mexican States" (2014), one of the priority areas was triangular cooperation, which aimed to strengthen bilateral relations and develop countries in the region by promoting the “Japan-Mexico Partnership Program” (JMPP). In the Latin American region, IHD was the third leading cause of death in hospitals, and it was expected that the results of this project could be utilized. In addition, the international expansion strategy of the “Revitalization Strategy for Japan”(2013) included as a goal the overseas development of medical technology that took advantage of Japan’s comparative advantage. Therefore, the project was consistent with Japan’s ODA policy to Mexico at the time of ex-ante evaluation.

<Collaboration/Coordination with JICA’s other interventions>

The collaboration/coordination between the project and other projects was planned at the time of ex-ante evaluation and implemented as planned, and the positive effects expected were confirmed at the time of ex-post evaluation. Technical networking with Terumo Corporation which had been developed through projects including the “Project for Promoting the Treatment of Ischemic Heart Disease by Transradial Arterial Catheterization” (2014-2016) was utilized in the project. Support from Terumo Corporation such as necessary equipment provision and technician dispatch for TRI training at the Ignacio Chávez National Institute of Cardiology (INC) has continued since the time of project completion.

<Cooperation with other institutions/ Coordination with international framework>

Any cooperation/coordination with other donors or organizations was not clearly planned at the time of ex-ante evaluation or during the project period.

<Evaluation Result>

In light of the above, the coherence of the project is ③.

[Evaluation Result of Relevance/Coherence]

In light of the above, the relevance/coherence of the project is ③.

2 Effectiveness/Impact

<Status of Achievement of the Project Purpose at the Time of Project Completion>

At the time of project completion, the Project Purpose was achieved beyond the plan. Among the hospitals where the attending doctors trained by the project worked, the number of hospitals with the TRI practice rate of more than 50% increased by 34% (11 hospitals) (Indicator 1). The attending doctors received training on TRI and applied the acquired technique in clinical practice, which was a learning opportunity for the chief residents and other physicians in the same hospital. In addition, among the interventional cardiologists certified by the Mexican Council of Cardiology (CMC), the number of specialists who conduct the TRI method increased to 191 (Indicator 2). According to the observation and knowledge of the project technical team, the specialists who participated in TRI training acquired advanced techniques and TRI application in difficult cases. This increased in the average weekly cases of TRI increased to 983 in total in the country (Indicator 3).

<Continuation Status of Project Effects at the Time of Ex-Post Evaluation>

By the time of the ex-post evaluation, the project effects have been continued and further developed. At the time of project completion, examinations, and treatments were provided with TRI method in 42 public health facilities, and the number continued to increase to 62 in 2022. Annually 35 interventional cardiologists have been certified by CMC on average, and the number of specialists who practice TRI method has continued to 471 as of August 2023. The weekly average cases of examinations and treatments with TRI for IHD have increased to 1,350. Training for certifying interventional cardiology specialists has been continuously implemented, including TRI training. The facility of INC in the capital has been available for TRI training.

<Status of Achievement of the Overall Goal at the Time of Ex-Post Evaluation>

At the time of ex-post evaluation, the Overall Goal has been mostly achieved as planned. The average hospitalization days of the patients who underwent PCI had been five days before the project, and this decreased to one day after 2021 (Indicator 1). As of August 2023, 13 hospitals have provided day treatment for IHD. The average medical costs of patients who underwent PCI decreased from 3,000 MXN in 2014 to 1,800 MXN in 2022 (Indicator 2) but did not reach the target (reduction of 2,000 MXN). The reason why the decrease in hospitalization days has not resulted in the reduction in medical costs as expected could not be confirmed. However, free medical services in public hospitals have been mandatory since December 2020, and it was presumed that the burden of medical costs on the patients of PCI would be reduced. Regarding satisfaction of the patients of PCI who underwent TRI treatment, according to the interviews conducted by interventional cardiology specialists, all of the patients were “very satisfied” or “satisfied” (Indicator 3).

<Other Impacts at the Time of Ex-Post Evaluation>

First, eight specialists from five neighboring countries were invited to TRI training in this project to exchange information on PCI, which led to the third country training “Promotion of Minimally Invasive Techniques Focused on TRI” (2019-2021). Members of the technical team of the project served as training instructors. Second, during the pandemic of COVID-19, INC was designated as a recipient of severely ill patients. Patients with mild cases of IHD were hesitant to visit the hospital to avoid the infection risk, which caused an increase in severe cases. INC decided to expand its day clinic and became the base of recipients, thereby increasing the number of daily clinic cases. This led to a reduction in the mental and physical anxiety of patients.

<Evaluation Result>

In light of the above, the effectiveness/impact of the project is ③.

Achievement of Project Purpose and Overall Goal

Aim	Indicators	Results	Source
(Project Purpose)	Indicator 1:	Status of the Achievement (Status of the Continuation):	Project
The examinations and the	The number of public hospitals	Achieved beyond the plan (continued and further developed)	Completion

⁶ ④ : very high, ③ : high, ② : moderately low, ① : low

treatments with minimally invasive technique for IHD are disseminated in Mexico	which provide the examinations and the treatments with minimally invasive technique for IHD is increased by 25% (11 hospitals).	(Project Completion) <ul style="list-style-type: none"> Among the hospitals where medical advisors trained on TRI work, the number of hospitals with the TRI treatment provision rate of more than 50% increased from 32 to 43 (increase by 34%). (Ex-Post Evaluation) <ul style="list-style-type: none"> The number of public health facilities that provide IHD examinations and treatments with the TRI method was 52 in 2020, 58 in 2021, and 62 in 2022. 	Report (PCR), INC.
	Indicator 2: Among the interventional cardiologists certified by the Mexican Council of Cardiology, those who can practice the examinations and the treatments with minimally invasive technique for IHD is increased from 66 (baseline) in 2015 to 166 (target) in 2018.	Status of the Achievement (Status of the Continuation): Achieved beyond the plan (continued and further developed) (Project Completion) <ul style="list-style-type: none"> The number of interventional cardiologists certified by CMC who practiced at least 50% of the TRI method increased to 191 by November 2018. (Ex-Post Evaluation) <ul style="list-style-type: none"> Among the interventional cardiologists certified by CMC, those who practice the examinations and the treatments with the TRI method for IHD were 226 in 2020, 261 in 2021, and 296 in 2022. 	PCR, INC.
	Indicator 3: The weekly average cases of examinations and the treatments with minimally invasive technique for IHD is increased from 330 (baseline) in 2015 to 730 (target) in 2018.	Status of the Achievement (Status of the Continuation): Achieved beyond the plan (continued and further developed) (Project Completion) <ul style="list-style-type: none"> The weekly average cases of examinations and treatments with the TRI method increased to 678 by the project last year. By adding the weekly average of TRI practice (305) of the specialists who answered the post-training questionnaire, it was 983. (Ex-Post Evaluation) <ul style="list-style-type: none"> The weekly average cases of examinations and treatments with TRI for IHD was 1,135 in 2020, 1,266 in 2021, and 1,350 in 2022. 	PCR, INC.
(Overall Goal) Overall Goal: Quality of life of the patients with IHD who underwent the examinations and the treatments with minimally invasive technique is improved and related medical costs are reduced in Mexico.	Indicator 1: The average hospitalization days of patients who underwent PCI is reduced by one day.	Status of the Achievement: Achieved beyond the plan (Project Completion) <ul style="list-style-type: none"> The average hospitalization days of the patients who underwent PCI was 5 in 2014, and it decreased to 3 in 2020 and 1 in 2021 and 2022. 	Questionnaires survey results conducted by INC.
	Indicator 2: The average medical cost of patients who underwent PCI is reduced by 2,000 MXN.	Status of the Achievement: Partially achieved (Project Completion) <ul style="list-style-type: none"> The average medical cost of patients who underwent PCI was 3,000 MXN in 2014, and it increased to 1,800 in 2020, 2021, and 2022. 	Questionnaires survey results conducted by INC.
	Indicator 3: Satisfaction of the patients who had TRI treatments is increased.	Status of the Achievement: Mostly achieved as planned (Project Completion) <ul style="list-style-type: none"> In the patients' satisfactory survey, 50% and 50% answered that they were "very satisfied" and "satisfied," respectively. 	Questionnaires survey results conducted by INC.

3 Efficiency

The project cost was within the plan (the ratio against the plan: 80%), and the project period slightly exceeded the plan (the ratio against the plan: 111%). Because the TRI Training Center established during the project was placed under the control of the Directorate General of Education in INC and the Cardiology Department planned and conducted training, training resources were efficiently utilized to reduce the project cost. The project period exceeded the plan due to the combined factors.

	Project Cost (Japanese side only, yen)	Project Period (months)
Plan (ex-ante)	266 million yen	36 months
Actual	214 million yen	40 months
Ratio (%)	80%	111%

Outputs were produced as planned.

In the light above, the efficiency of the project is ③.

4 Sustainability

<Policy Aspect>

In the "National Development Plan" (2019-2024), one of the goals of the health sector is to "promote and guarantee effective, universal and free access to public health services, social security and medicines to the population, based on the principles of social participation, technological competition, quality of care, cultural characteristics and non-discrimination." One of the related strategies is the fight against non-communicable diseases (formulation and implementation of policies for the prevention and control of non-communicable diseases such as diabetes, cardiovascular diseases, and cancer).

<Institutional/Organizational Aspect>

The Cardiology Department and the Directorate General of Education of INC have worked together as the organizational structure necessary to promote the examination and treatment of the TRI method for IHD, which was strengthened by the project. INC also has

conducted monitoring of the implementation of the TRI method by interviewing opinion leaders in the field of interventional cardiology (professors from universities with training courses in interventional cardiology, such as the National Autonomous University of Mexico) and physicians who have participated in TRI training. Technical exchange and collaboration among interventional cardiologists from hospitals under the Mexican Institute of Social Insurance, the Institute of Security and Services of State Servants, and the Ministry of Health, led by members of the technical team composed of participants in TRI training, have been sustained, too. For example, instructors and participating physicians from TRI training have participated in the Mexican Society of Interventional Cardiology and the American Society of Cardiology, and there has been a network of collaboration.

<Technical Aspect>

The skills and knowledge necessary to continue examinations and treatments of the TRI method for IHD have been maintained. TRI Training Center, which was renamed the Interventional Cardiovascular Training Center after the project completion, has continued to operate. Accordingly, INC has expanded the targets of training courses to cover the minimally invasive technique on cardiology in general, not only the TRI method. In addition, JICA's third country training "Promotion of Minimally Invasive Techniques Focused on TRI" was conducted at INC from 2019 to 2021. Training materials including the TRI Manual created by the project have been utilized.

<Financial Aspect>

TRI Training Center established in the project has been operated and maintained with INC's regular budget, although detailed budget data was not available in the ex-post evaluation. As mentioned above, training has been conducted every year, and INC answered that there would be a good prospect for further training in the future.

<Environmental and Social Aspect>

There was an outbreak of COVID-19 after the project completion, but during this period, the above-mentioned third-country training course was conducted in Mexico (November 2020 and November 2021). Appropriate care was taken as infection prevention measures were taken (social distancing, wearing masks, alcohol disinfection, PCR testing before the trainees' travel to Mexico, PCR testing during the training course, etc.).

<Evaluation Result>

In light of the above, slight problems have been observed in terms of the financial aspect of the implementing agency. Therefore, the sustainability of the project effects is ③.

5 Summary of the Evaluation

The project achieved the Project Purpose beyond the plan and mostly achieved the Overall Goal as planned. Interventional cardiology specialists have acquired the TRI method for IHD and it has been diffused. As a result, the hospitalization days of the patients have been reduced and their satisfaction has been increased, although the reduction in medical costs has not reached the target. Regarding sustainability, the network led by the interventional cardiology specialists trained by the project has been sustained, and INC has further expanded and continued the operation of the training center to promote the TRI method.

Considering all of the above points, this project is evaluated to be highly satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- Minimally invasive medicine which reduces the burden on patients has been a mainstay in the aging society. The TRI method will continue to be needed for cardiac diseases, and its further dissemination is desirable. To this end, it is recommended that MOH collect and analyze data on the number of PCI procedures and their contribution to patient's quality of life and further promote the TRI method as a policy based on scientific evidence.

Lessons for JICA:

- In this project, the Project Purpose of promoting examinations and treatments for IHD with the TRI method was achieved beyond the plan and has continued to develop further. One of the promoting factors is that specialists had been trained to perform the TRI method under the JICA private-sector partnership project implemented before this project. In addition, the fact that they belonged to diverse affiliations and formed a technical team to serve as trainers for TRI training in this project also facilitated the dissemination of the TRI method. Thus, in a project that aims to disseminate a certain technology in the country, it is effective to involve human resources already equipped with the said technology at the start of the project in technology dissemination activities. In such a case, the diversity of their affiliations leads to multiple bases for dissemination, and this can be a promoting factor for the nationwide expansion.
- Concerning the above, the project invited specialists from neighboring countries to TRI training to exchange information on PCI. This opportunity allowed the project to confirm the needs of neighboring countries and the demand for the technology enhanced by this project. After the project completion, this experience led to the implementation of the third country training programs, where human resources trained by the project served as instructors. When technical cooperation is carried out in a middle-income country, the possibility of regional development, such as the third-country training program, can be enhanced by considering the regional development from the project formulation stage and by having related personnel from neighboring countries participate in the project activities to understand their needs. This will also help the technology to take root and develop in the country where the project is implemented.



Opening ceremony of TRI Trainince Center (renamed the Interventional Cardiovascular Training Center)



TRI Training with the training equipment (vascular model)