Internal Ex-Post Evaluation for Technical Cooperation Project

conducted by Viet Nam Office: March, 2023

Country Name	The Project for Strengthening Capacity for Measles-Rubella Combined Vaccine Production
Socialist Republic of Viet Nam	

I. Project Outline

Background	In 1981, the Government of Viet Nam (GOV) launched the Expanded Programme on Immunization (EPI) and implemented the vaccinations of children against the 6 major infectious diseases (measles, polio, diphtheria, pertussis, tetanus, and tuberculosis) as an effective means of lowering both infant and under-five mortality rates as well as of curbing the spread of infectious diseases. The GOV also implemented initiatives for the domestic production of the vaccines used for the EPI, thereby to ensure a stable supply of the vaccines necessary for immunization. However, an increased incidence of rubella cases was observed in 2011. This not only posed a threat to the health of children but led to increased awareness of the previously underappreciated risk of congenital rubella in infants born to women who contract rubella during pregnancy. The GOV decided to incorporate Measles-Rubella combined vaccine (MR vaccine) into the EPI from 2015. Therefore, there was an urgent need to promote domestic production of the MR vaccine[1].
Objectives of the Project	Through (i) developing proper technical capabilities of Center for Research and Production of Vaccines and Biologicals (POLYVAC)[2] as a manufacturer of MR vaccine and (ii) enabling POLYVAC to produce the MR vaccine properly complying with WHO-current Good Manufacturing Practice (cGMP), the project aims to realize production of MR vaccine conforming to international standard (WHO-cGMP) by POLYVAC in Viet Nam, thereby contributing to decrease of spread of measles and rubella. 1. Overall Goal: Spread of measles and rubella in Viet Nam is decreased. 2. Project Purpose: MR vaccine conforming to international standard (WHO-cGMP) is produced by POLYVAC.
Activities of the Project	1. Project site: Hanoi. 2. Main activities: Technical transfer on production of rubella vaccine bulk, MR vaccine final production, and quality control of products, collection and examination of information for lowering unit production cost of MR vaccine, establishment of validation system and strengthening of validation skills of staff, establishment and implementation of quality assurance functions complying with WHO-cGMP standard, preparation and implementation of necessary standard operating procedures (SOPs), implementation of Performance Qualification (PQ)/Performance Validation (PV), clinical trial on MR vaccine under management of Vietnamese side, etc. 3. Inputs (to carry out above activities) Japanese Side 1) Experts: 36 persons 2) Trainees received: 46 persons 3) Equipment: Equipment for vaccine production, quality testing, breeding and rearing of Specific Pathogen Free (SPF) rabbits, upgrading of the final production line to accommodate MR vaccine single dose production etc. 4) Local cost: Cost for upgrading the existing facilities of POLYVAC for rubella vaccine production, etc. Vietnamese Side 1) Staff allocated: 70 persons 2) Building and facilities: POLYVAC's vaccine manufacturing facilities, office space for the project, etc. 3) Local cost: Cost for operation and maintenance of facilities, etc.
Project Period	(ex-ante) May 2013-March 2018 (actual) May 2013-March 2018
Project Cost	(ex-ante) 705 million yen, (actual) 987 million yen
Implementing Agency	Center for Research and Production of Vaccines and Biologicals (POLYVAC)
Cooperation Agency in Japan	Kitasato Daiichi Sankyo Vaccine (KDSV) Co, LTD.

II. Result of the Evaluation

<Special Perspectives Considered in the Ex-Post Evaluation>

- The target year of the Overall Goal was set to be 2021 because the ex-post evaluation is planned 3 years after the project completion as per the Ex-ante Evaluation Sheet.

1 Relevance/Coherence

[Relevance]

<Consistency with the Development Policy of Viet Nam at the Time of Ex-Ante Evaluation >

The project was consistent with the Five-Year Socio-Economic Development Plan (SEDP) (2011-2015), the development policy of Viet Nam at the time of ex-ante evaluation, which sets forth reduction of incidence of disease and includes vaccination of 95% of infants with at least 6 vaccines (measles, polio, diphtheria, pertussis, tetanus, and tuberculosis).

<Consistency with the Development Needs of Viet Nam at the Time of Ex-Ante Evaluation >

The project was consistent with the development needs of Viet Nam for the domestic production of the MR vaccine at the time of ex-ante

[1] The GOV initiated a vaccination campaign for the MR vaccine through use of imported vaccines in 2014. For the routine vaccination, the second vaccination for measles vaccine has been replaced with the MR vaccine.

[2] POLYVAC started domestic production of measles vaccine in 2009 under the JICA's "The Project for Strengthening Capacity for Measles Vaccine Production" (2006-2010). POLYVAC continued to produce the measles vaccine for use in the EPI programs in Viet Nam (9,207 thousand doses between 2009 and 2012).

evaluation as mentioned in “Background” above.
<Appropriateness of Project Design/Approach>
The project design/approach was appropriate. No problem attributed to the project design/approach was confirmed.
< Evaluation Result>
In light of the above, the relevance of the project is ③[3].

[Coherence]
<Consistency with Japan’s ODA Policy at the Time of Ex-Ante Evaluation>
The project was consistent with the Japan’s ODA policy to Viet Nam at the time of ex-post evaluation because tthe Country Assistance Policy for the Socialist Republic of Viet Nam (2012) included assistance for health care sector under one of the priority areas of “Response to Fragility”.
<Collaboration/Coordination with other JICA’s interventions>
The collaboration/coordination between this project and the grant aid “The Project for the Construction of the Facilities for Measles Vaccine Production” (2003) and the technical cooperation “The Project for Strengthening Capacity for Measles Vaccine Production” (2006-2010) of JICA was planned at the time of ex-ante evaluation and was implemented, and the positive effects were confirmed at the time of ex-post evaluation.
<Cooperation with other institutions/ Coordination with international framework>
The cooperation/coordination with WHO Viet Nam Office was planned at the time of ex-ante evaluation and was implemented, and the positive effects were confirmed at the time of ex-post evaluation.
<Evaluation Result>
In light of the above, the coherence of the project is ③.

[Evaluation Result of Relevance/Coherence]
In the light 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 as planned. Clinical trials using the MR vaccine produced in compliance with WHO-cGMP were conducted in 2016 and Drug Administration of Vietnam, Ministry of Health, the Vietnamese National Regulatory Authority (NRA) agency responsible for licensing, issued the marketing license for the MR vaccine POLYVAC produced (marketed as “MRVAC”) in March 2017.
< 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. POLYVAC has produced and sold the MR vaccine conforming to WHO-cGMP with the marketing license issued by MOH except for 2021, when POLYVAC sold the MR vaccine but did not produce it because of lack of the demand caused by the freeze or postponement of the routine immunization services due to the COVID-19 pandemic[4]. From 2018 to 2021, 15 million doses have been produced and 17 million doses have been sold[5] primarily to MOH for the EPI and to other organizations to lesser degree[6]. It is expected that POLYVAC will resume production of the MR vaccine once the routine immunization services are back to normal and the demand is recovered[7]. Utilizing the technology and equipment transferred under the project, POLYVAC has continuously produced the SPF rabbits, which has contributed to safe and proactive production of the rubella vaccine intermediate products. POLYVAC has also continued case studies (or trial production) on single-dose MR vaccine and, by July 2022, it is scheduled to complete the formula volume of 0.5ml and 0.4 ml per vial. After completing PQ and PV, POLYVAC will combine data and request approval from MOH for the official production. POLYVAC expects that the single dose MR vaccine would be approved and produced officially by the end of 2022.
<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 MR vaccine for the EPI has been changed from the imported vaccine to the domestically produced POLYVAC’s vaccine since 2018. In 2018-2020, the coverage rate of children immunized MR vaccine in Viet Nam with use of the POLYVAC’s MR vaccine was between 90-93% (95-98% of the target figure of 95%) and, in 2021 (the target year), it was 85% (89% of the target figure of 95%). In 2021, the coverage rate was dropped by 8 points from 2020 mainly because the most priority was given to the COVID-19 vaccination by the GOV. It is expected that the coverage rate will be returned to at least pre-2000 level once the COVID-19 pandemic is subdued (Indicator 2). The annual number of cases of children infected with measles and rubella has been largely deceased in Viet Nam compared to the average for 2007-2012 (2,017 for measles and 3,710 for rubella) except for measles in 2018 and 2019[8]. In 2021 (the target year), the number of cases of children infected with measles and rubella was 162 and 34 respectively. It could be said that the POLYVAC’s MR vaccine developed under the project contributed to the reduction in the number of the infected cases since availability of the domestically produced MR vaccine made it possible to implement mass MR vaccination and most of the infected cases were those children who were not vaccinated yet (Indicator 1).
<Other Impacts at the Time of Ex-Post Evaluation>
Other positive impacts have been observed. The SPF rabbits produced by POLYVAC have been sold to other organizations in Viet Nam.

[3] ④:very high, ③:high, ②:moderately low, ①:low * To be the same afterwards.

[4] With the COVID-19 pandemic starting in 2020, the demand for the MR vaccine decreased dramatically that led to decrease in production and sales, because the normal immunization services were almost suspended due to strict social distancing and a fear of contracting the COVID-19 in public spaces, particularly in 2021.

[5] Total sales exceeds the total production because validity of the MR vaccine is 2 years and the total sales includes the stock from 2017.

[6] From 2018-2021, 468 thousand doses of the MR vaccine have been sold to Centers for Disease Control and Prevention under MOH in 4 provinces, 3 hospitals/clinic, and one private company.

[7] In fact, MOH has decided to purchase 1.5 million doses for 2022. The private company mentioned in footnote 5 has already purchased 160 thousand doses in 2022.

[8] According to POLYVAC, the detected measles cases was highest in 2019 thanking to the operation of the early detection and testing activities conducted by the EPI in that year.

As of 2021, as many as 72 SPF rabbits have been sold to National institute for Control of Vaccine and Biologicals. All the female POLYVAC employees participated in the project were taught to increase their credentials and ability, and accumulated experience in vaccine manufacture. Meanwhile, negative impacts have not been observed.

<Evaluation Result>

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

Achievement of Project Purpose and Overall Goal

<table>
<tr><th>Aim</th><th>Indicators</th><th>Results</th><th>Source</th></tr>
<tr><td>(Project Purpose) MR vaccine conforming to international standard (WHO-cGMP) is produced by POLYVAC.</td><td>Indicator: Marketing license of MR vaccine is issued by Viet Nam NRA.</td><td>Status of the Achievement (Status of the Continuation): achieved as planned (continued)
(Project Completion)
-The Vietnamese NRA issued the marketing license for the POLYVAC produced MR vaccine in March 2017.
(Ex-Post Evaluation)
-POLYVAC has continuously produced and sold the MR vaccine conforming to WHO-cGMP except for 2021, when POLYVAC sold the MR vaccine but did not produce it because of lack of the demand caused by the freeze or postponement of the routine immunization services due to the COVID-19 pandemic (see footnote 3 for more details.)
-It is expected that POLYVAC will resume production of the MR vaccine once the routine immunization services are back to normal and the demand is recovered.</td><td>Completion Report, questionnaire and interview surveys to POLYVAC</td></tr>
<tr><td rowspan="2">(Overall Goal) Spread of measles and rubella in Viet Nam is decreased.</td><td>Indicator 2: Coverage rate of children immunized MR vaccine in Viet Nam is at or above 95% with use of MR vaccine produced by POLYVAC.</td><td>(Ex-Post Evaluation) mostly achieved as planned
<Coverage rate of children immunized MR vaccine in Viet Nam with use of MR vaccine produced by POLYVAC> (Unit: %)
<table>
<tr><th></th><th>2018</th><th>2019</th><th>2020</th><th>2021</th></tr>
<tr><td>Coverage rate</td><td>90</td><td>92</td><td>93</td><td>85*</td></tr>
<tr><td>Achievement rate of the target (=95%)</td><td>95</td><td>97</td><td>98</td><td>89</td></tr>
</table>
* The coverage rate was dropped by 8 points from 2020 mainly because the most priority was given to the COVID 19 vaccination by the GOV.</td><td>Questionnaire and interview surveys to POLYVAC</td></tr>
<tr><td>Indicator 1: Number of case of children infected with measles and rubella in Viet Nam is decreased compared with the average between 2009 and 2012 (Measles: 2,107 cases, Rubella: 3,710 cases).</td><td>(Ex-Post Evaluation) achieved beyond the plan
<Number of case of children infected with measles and rubella in Viet Nam >
<table>
<tr><th></th><th>(Baseline) Average 2009-2012</th><th>2018</th><th>2019</th><th>2020</th><th>2021</th></tr>
<tr><td>Measles</td><td>2,107</td><td>2,256</td><td>14,156*</td><td>846</td><td>162</td></tr>
<tr><td>Rubella</td><td>3,710</td><td>112</td><td>78</td><td>105</td><td>34</td></tr>
</table>
*See footnote 7 for a reason of the highest number of detected cases.</td><td>ditto</td></tr>
</table>

3 Efficiency

The project cost exceeded the plan (the ratio against the plan: 140%) and the project period was as planned (the ratio against the plan: 100%). (Because of combined factor, the project cost exceeded the plan). Meanwhile, Outputs were produced as planned. In the light above, the efficiency of the project is ③.

4 Sustainability

<Policy Aspect>

The SEDP (2021-2025) sets high priority for promoting and creating most favorable condition for the research and production of domestic vaccines.

<Institutional/Organizational Aspect>

The organizational structure of POLYVAC to produce the MR vaccine conforming to WHO-cGMP has been unchanged and functioning. POLYVAC has enough staff to produce MR vaccine. As of June 2022, the total number of staff directly involved in the production of the MR vaccine is 56. The cooperative relationship with KDSV established under the project has continued. In addition, POLYVAC has established a linkage with a private company for distribution of the MR vaccine in the Vietnamese free market (see footnotes 5 and 6).

<Technical Aspect>

POLYVAC has sustained necessary skills and knowledge to produce the MR vaccine conforming to WHO-cGMP through application in the related works, encouragement of the staff to improve them, and training. It has educational and training regulations that guide the types of training at POLYVAC, including periodic and special training as well as on-the-job training especially for new staff. The SOPs and other materials developed under the project have been utilized and the equipment/facilities provided under the project has been kept in good conditions and utilized by POLYVAC.

<Financial Aspect>

Between 2018 and 2021, the annual revenue of POLYVAC ranged from 17 to 28 billion Viet Nam Dong, which exceeded the annual expenditure. Since the project was completed, POLYVAC has secured the necessary budget from profits from the sales of the MR vaccine and the SPF rabbits that are leveraged to ensure the long-term viability and efficacy of the project[9].

<Environmental and Social Aspect>

No issue on environmental and social aspect has been observed and it has not been necessary to take any countermeasures.

[9] In addition, POLYVAC continuously plans to export the vaccines it produces and, as a first step, applied for WHO prequalification for its measles vaccine in 2021, which is required for export of the vaccines to international organizations. POLYVAC is the first manufacturer in Viet Nam to apply for the WHO prequalification so that it must study the required procedures and follow them step by step. The process is still ongoing.

<Evaluation Result>

In light of the above, no problem has been observed in terms of the policy / institutional/organizational / technical / financial/ environmental and social aspects. Therefore, the sustainability of the project effects is ④.

5 Summary of the Evaluation

The project achieved as planned the Project Purpose ("MR vaccine conforming to international standard (WHO-cGMP) is produced by POLYVAC") and mostly achieved as planned the Overall Goal ("Spread of measles and rubella in Viet Nam is decreased"). The effects of the project have continued. Regarding Sustainability, no problem has been observed in terms of the policy, institutional/organizational, technical, financial, and environmental and social aspects. The project cost exceeded the plan. Considering all of the above points, this project is evaluated to be highly satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- It is recommended that POLYVAC/MOH push forward the scheduled activities of PQ and PV for single-dose MR vaccine so that its target (MOH's final approval) would be achieved as early as possible.
- It is recommended that POLYVAC continue working on the guidance and instructions of WHO on necessary procedures for prequalification of its measles vaccine so that it can export it to other countries in the near future,

MR Vaccine produced by POLYVAC.

Labelling system, one of the steps in production line of vaccine.