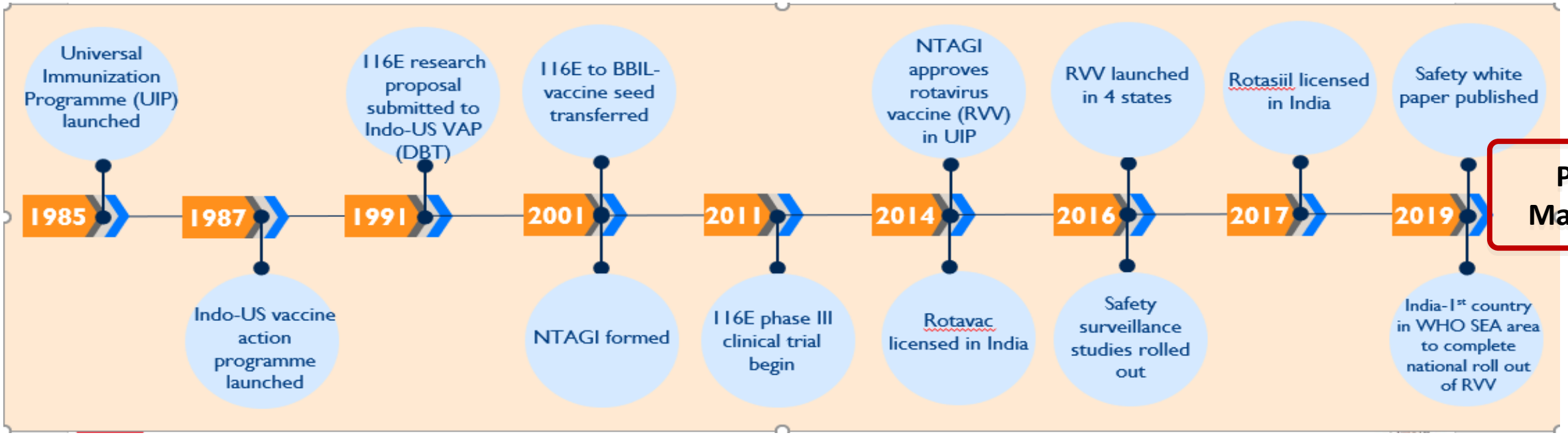
John Snow India Private Limited

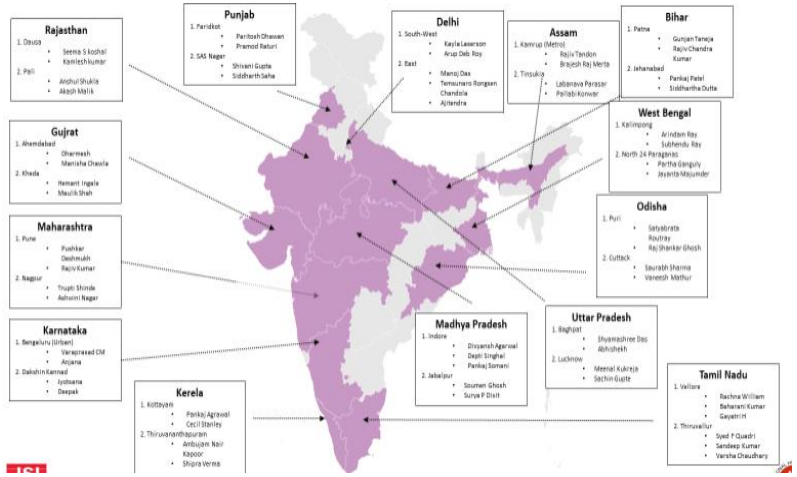
DIGITAL TOOL FOR POST INTRODUCTION EVALUATION (PIE) OF ROTAVIRUS VACCINE IN INDIA

Dr Arup Deb Roy

Project Director, JSI India

RVV introduction in India: key milestones





60 Evaluators
16 Partners
14 States
28 Districts

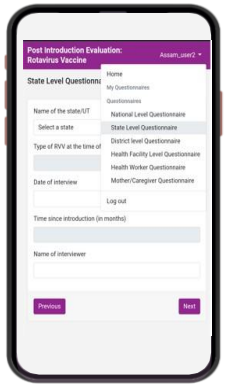
Rationale for developing a digital tool for PIE

Amidst the COVID-19 pandemic, process innovation was envisaged in the method of conducting the PIE survey. This led to the need for digitizing the process of data collection, synthesis and generation of insights with limited manual efforts.

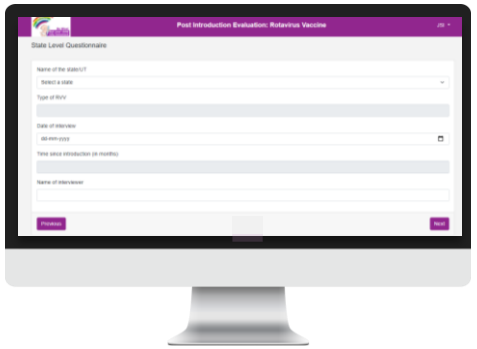
01	• Use digital solutions to modify the resource intensive method of conducting PIE
02	• Leverage the latest technology available to digitize and automate the process of data collection, analysis and visualization of results across various levels like national, state, district, facility, health worker and caregiver level
03	• Create a one-stop solution for multiple functions in order to reduce manual efforts and increase efficiency
04	• Protect data loss in transition and translation from survey forms to the analysis stage
05	• Enable standardization of inputs with enough validation checks to facilitate error-free data collection
06	• Enable robust monitoring of progress of PIE implementation across India

JSI INDIA

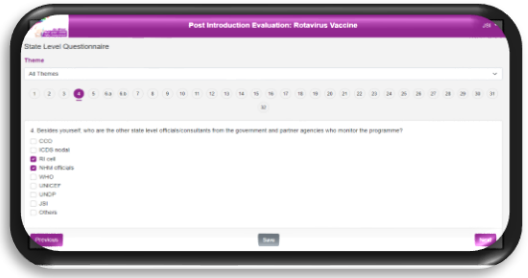
Digital RVV PIE tool



Mobile Phone



PC/Desktop



Tablet

For the 1st time: Digital RVV PIE Tool used for data collection & analysis

Key Features

- Questionnaire in story format, mix of subjective and objective questions with multiple choice options
- Multiple features to ensure error free recording of answers with ease
- Ability to monitor completion status with inbuilt features to ensure submission of completed forms only
- Automatic recording of data in a standardized master template with automated KPI analysis appearing on the dashboard
- Automatic Visualization of selected KPIs providing a comprehensive view of KPIs on the same platform

JSI INDIA

Mode of Recording Responses

Before

- Paper-based format for recording answers manually
- Manual copies of instructions and reference material carried for reference

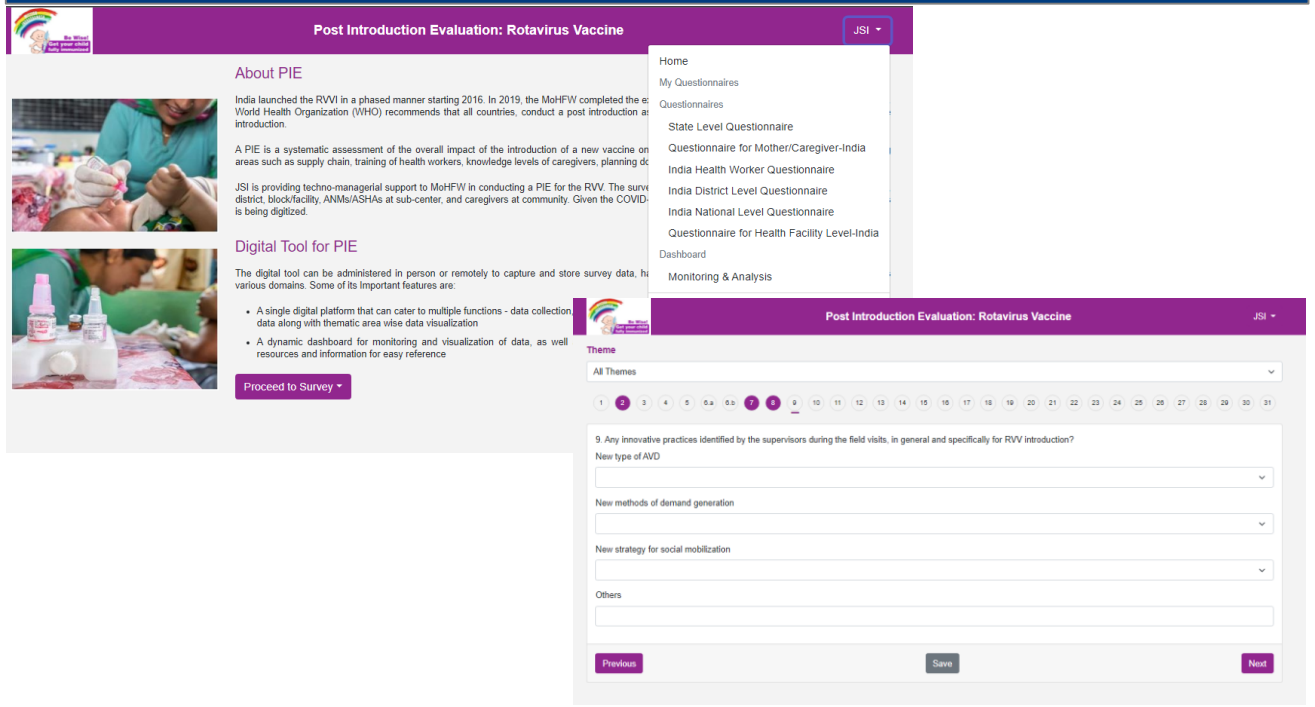
After

- Standardized single survey platform scripted with all questionnaires for conducting survey across multiple levels of stakeholders
- Multiple features to ensure error free recording of answers with ease:
- In-built skip-logic for maintaining flow of survey as per responses
- Functionality to ensure that only complete form can be submitted so that questions are not missed
- Standard data entry with data validation checks and built-in widgets
- Pre-population of publicly available data upon selection of a state/district
- Input of data in multiple formats like numeric, text etc.
- One stop solution for collection of data along with digital aids/resources for investigator's reference

Benefit

- Standard options enabling error-free recording of responses
- Automatic method of recording responses ensuring efficient survey administration
- Cost saving in the long-term due to the possibilities of expanding the platform to a greater number of states and expanding number of stakeholders being targeted
- Inter-operability of the PIE digital tool enabling customization of the same platform for any future PIE exercise

Example



Monitoring of Survey

Before

- Manual monitoring of survey without being sure about completeness
- Inability to monitor the survey real-time

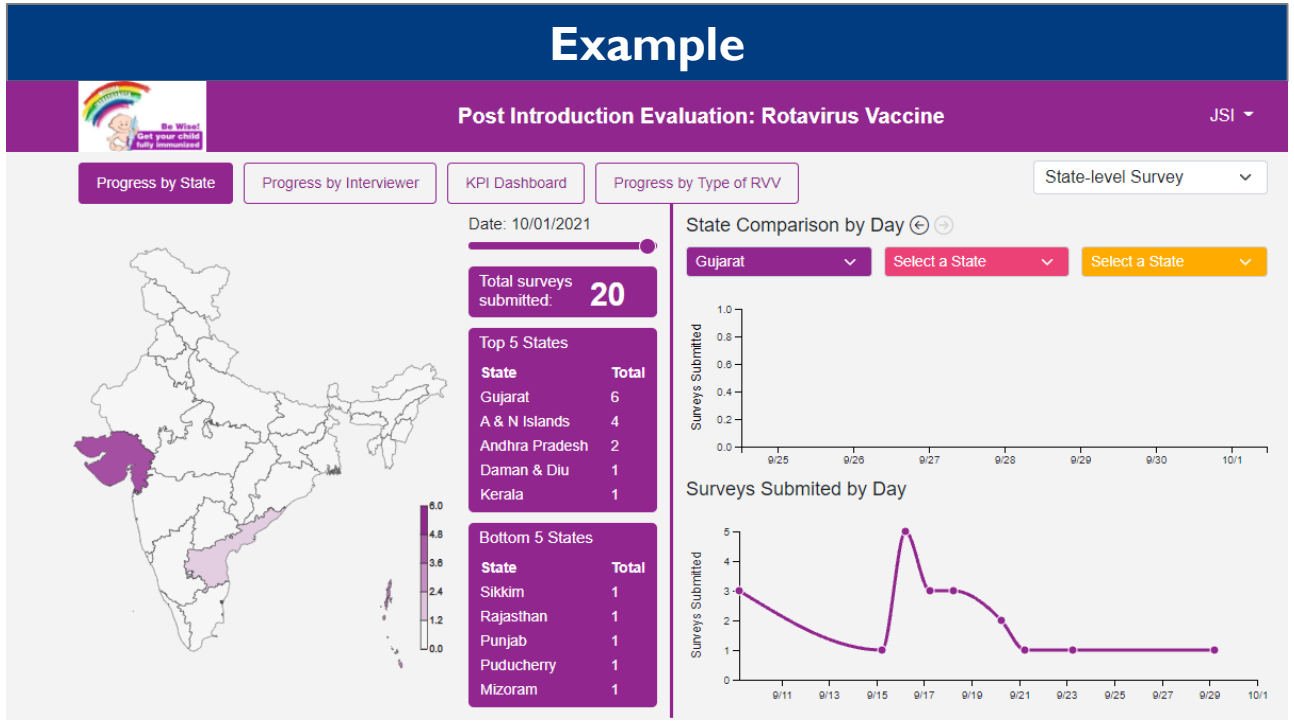
After

- Real-time monitoring of surveys across all levels on the same platform
- Inbuilt features to ensure submission of completed forms only
- Day-wise monitoring of survey completion to track survey-related KPIs which can serve as evidence for documentation or scientific publication or for designing similar future evaluations
- Online and offline recording of responses managed effectively by allowing easy merging of data collected online or offline in a single database
- Log-in based monitoring dashboard with multiple levels of access
  - Survey-monitoring tab will be accessible to the Central monitoring unit at JSI

Benefit

- Real-time monitoring of the survey enabling smooth co-ordination of the exercise
- Prevention of any data loss
- Restricted access with multiple levels of access to the dashboard
- Secured server and platform followed by a security audit

Example



Data Collation, Analysis and Visualization

Before

- Manual transcription of survey responses into a standardized data template
- Manual efforts for data analysis and visualization
- Inability to analyze subjective data for the first level of reporting

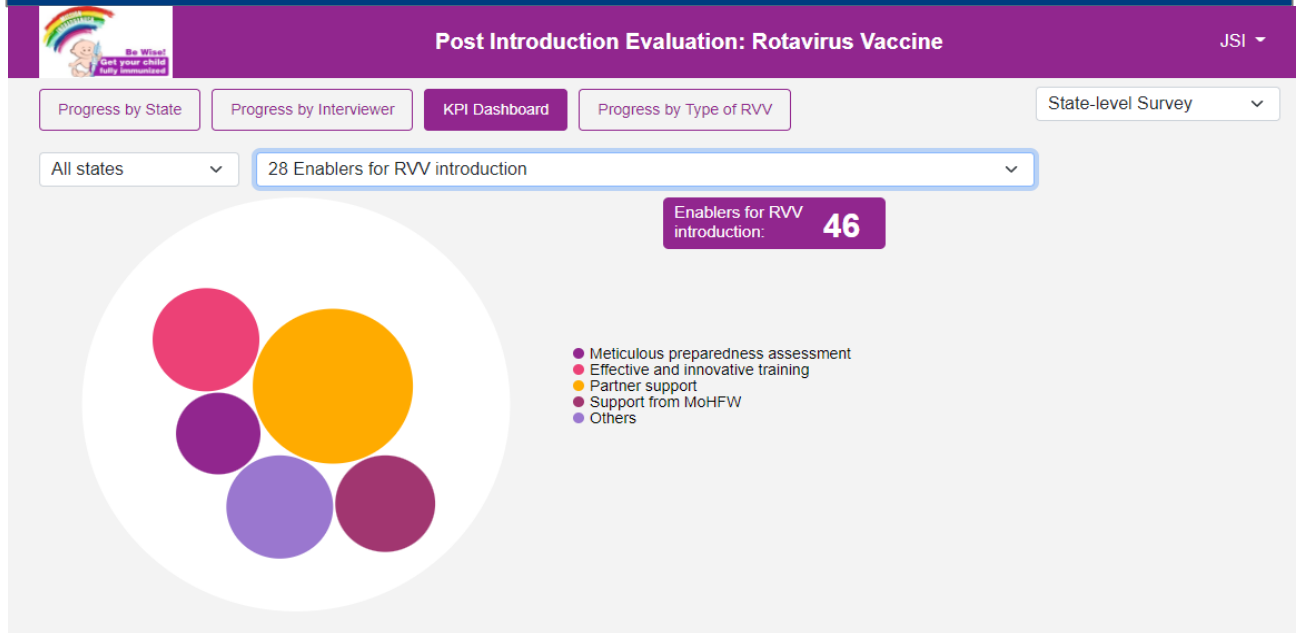
After

- Framework for data cleaning and real-time analysis of KPIs associated with quantitative data
- Synthesis and analysis of qualitative data using metadata tags or natural language processing techniques-TF IDF was used for the PIE (details on next slide)
- Log-in based survey analytics tab accessible to investigators and JSI team
- Visualization for all KPIs using multiple formats like geo-visualization, column charts, Gannt charts, sun-burst charts etc.
  - Ability to download data for each KPI in excel format

Benefit

- Safe transmission of data to the database on the cloud
- Easy retrieval of data for all KPIs without any loss in transmission
- Automatic analysis of subjective and objective responses for important KPIs
- Dynamic and diverse visualization for important KPIs enabling interpretation of responses across all stakeholder levels

Example



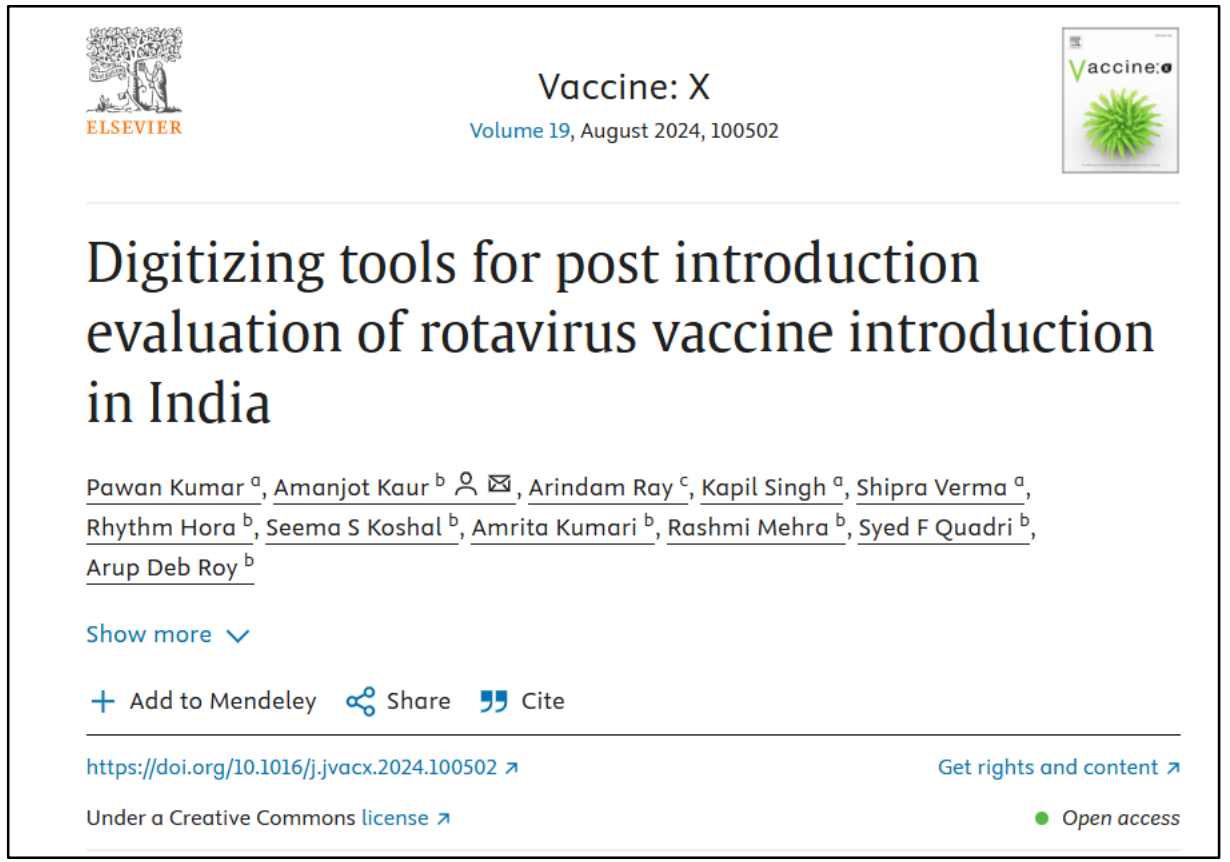
Technological Challenges faced in development of Digital PIE

	Challenges	Solution Implemented
1 User Interface of Survey Tool	• Responsiveness of survey tool to different screen sizes	• Used CSS media queries to change styles depending on the screen size
2 Offline Recording of Responses	• Recording of survey responses in an offline mode in remote locations, or anywhere a reliable internet connection is not available • Flexibility to save survey responses in case of intermittent internet connection	• Created three databases (consolidated, online, and offline) • Collect responses locally on the device (mobile, laptop, etc.) until internet connection is available to submit responses to the consolidated database
3 Submission of Completed Surveys	• Provision of submission of only completed surveys	• Developed an algorithm to highlight answered questions in the navigation bar and show "Submit" button only when all questions are answered
4 Survey Tool Connection with Dashboard	• Real-time connection of responses for all six questionnaires with the dashboard	• Developed multiple complex application programming interfaces (APIs) and connected each survey with every view of the dashboard
5 Analysis of Objective and Subjective Questions	• Requirement to analyze both objective and subjective questions on one single view	• Used natural language processing techniques and developed algorithms to track KPIs for objective and subjective questions

JSI INDIA

Summary

- ✓ Serve as a scalable digital tool for conducting PIE for other new vaccine introduction
- ✓ This tool can serve as a use case for digitizing the complete impact evaluation process for other programmes
- ✓ Additional features can be added to enhance the usability of the digital tool,
  - ✓ Geo-tagging for monitoring of the survey
  - ✓ Uploading feature for documents
- ✓ Published in Vaccine: X



ELSEVIER

Vaccine: X

Volume 19, August 2024, 100502

Digitizing tools for post introduction evaluation of rotavirus vaccine introduction in India

Pawan Kumar [a], Amanjot Kaur [b], Arindam Ray [c], Kapil Singh [a], Shipra Verma [a], Rhythm Hora [b], Seema S Koshal [b], Amrita Kumari [b], Rashmi Mehra [b], Syed F Quadri [b], Arup Deb Roy [b]

Show more

+ Add to Mendeley Share Cite

https://doi.org/10.1016/j.jvacx.2024.100502

Get rights and content

Under a Creative Commons license

Open access


We all can together fight against Coronavirus
MOTHER AND CHILD
OTECTION CARD
(MCP CARD)

Thank you