Techno-Economic Assessment of Electronic Vaccine Intelligence Network (eVIN)

Table of Content

Immunization Supply Chain

Universal Immunization Program of India, **largest in the world,** caters its beneficiaries **through ~27,000 CCPs**; with 95% CCPs situated below the district level (PHC, CHC, Urban Health Facility, Sub-centers)

An Effective Immunization Supply Chain Plays a Key Role in Improving the Immunization Coverage

eVIN has been designed **to provide visibility of real time stock & temperature patterns, to calculate vaccine requirement, to tackle emergency situations of temperature breach, to provide information on consumption patterns and possibilities of stock reallocation**

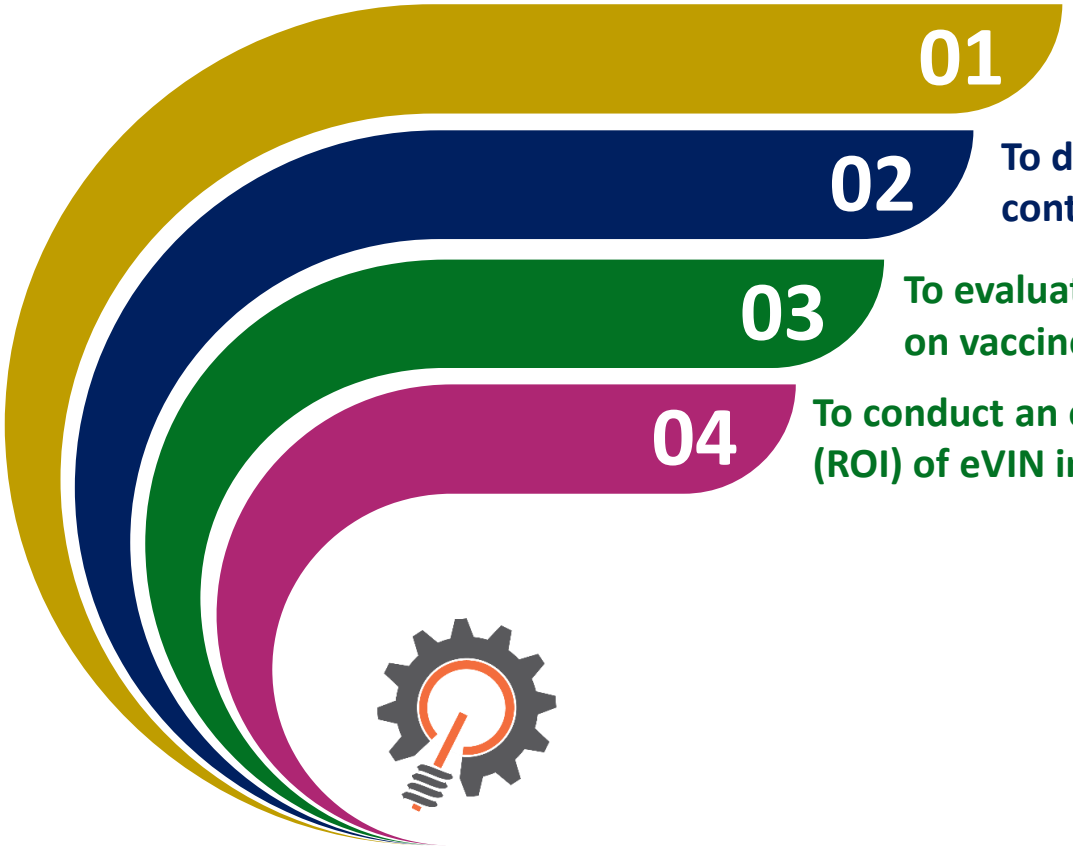
Rationale

- With the Gavi HSS1 support (2015-17), eVIN has been implemented in 12 out of 36 states and union territories. Gavi HSS2 support (2017-21) enabled the introduction of eVIN in the remaining 24 states and union territories. From the year 2018 onwards, state governments were expected to sustain its own implementation costs.

- Given the context, 'Techno-economic assessment of eVIN' was proposed to provide learnings for scale up of the progarmme in remaining states, and also pave a sustainable way forward for eventual transition of eVIN from UNDP/GAVI to GoI.

Source: VCCH 2016 Module

Study Objectives



01 To assess the programmatic usefulness of eVIN implementation, in areas of stock management and documentation, temperature monitoring and cold chain equipment

02 To document the program benefits and challenges of eVIN implementation, in contributing to system effectiveness and efficiencies

03 To evaluate the economic impact of eVIN implementation, including cost savings on vaccine and cold chain logistics management

04 To conduct an economic-feasibility assessment modelling the Return On Investment (ROI) of eVIN implementation

Study Design (Quasi Experimental Design)

Pre- and post- eVIN implementation assessment: To assess programmatic usefulness of eVIN

- A comparative analysis of key process indicators was done for all 12 eVIN states, based on a set of six-month data before eVIN implementation and another six-month data (Oct'17 to Mar'18) after eVIN implementation.

A **comparative assessment** in three eVIN and three Non-eVIN states:

- A comparative analysis of key performance indicators was done to assess enhanced outcomes in eVIN states as compared with non-eVIN states.

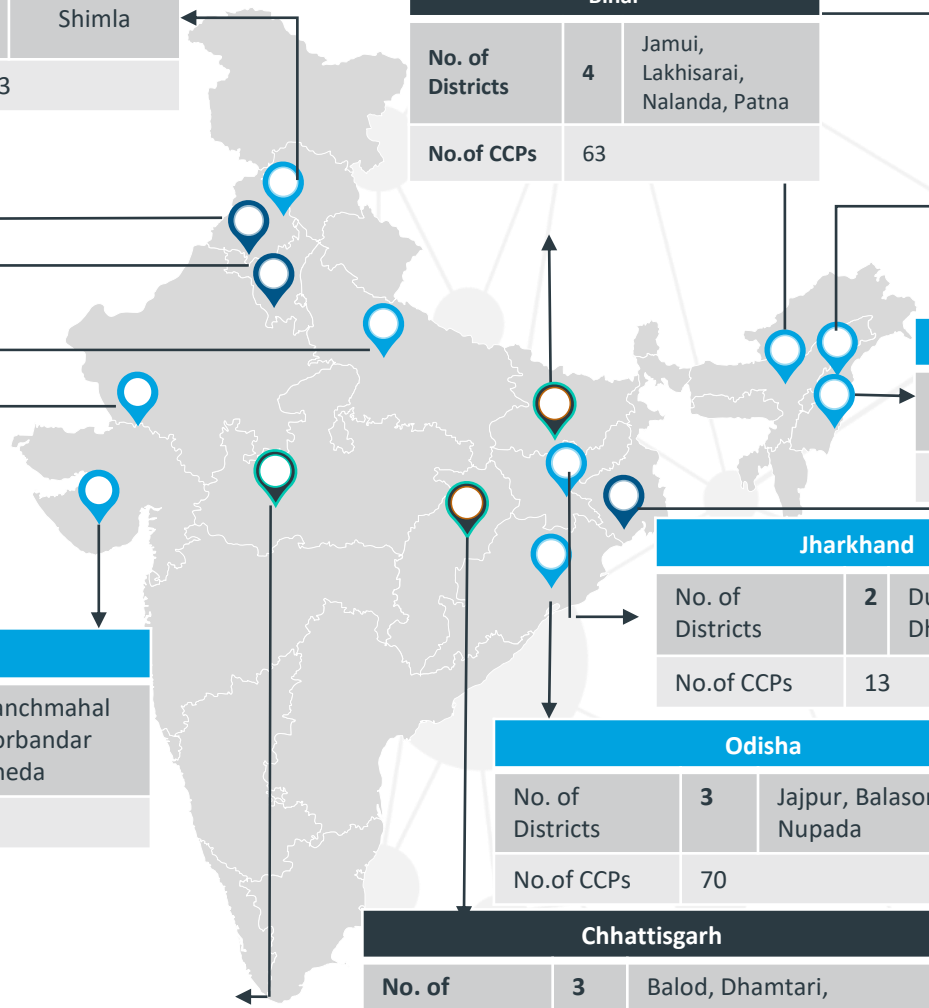
Economic assessment of eVIN implementation :

- Economic assessment was conducted in 7 states using a pre-post study design separately for one year before eVIN and one year from eVIN implementation.

Both quantitative and qualitative methods were applied for programmatic assessment, while economic assessment was purely quantitative.

Total 944 cold chain points were covered in programmatic assessment. Economic assessment collected data from 102 CCPs in 7 states.

Study Design (Quasi Experimental Design)



Haryana		
No. of Districts	2	Hisar Yamunanagar
No.of CCPs	60	

Himachal Pradesh		
No. of Districts	1	Shimla
No.of CCPs	23	

Bihar		
No. of Districts	4	Jamui, Lakhisarai, Nalanda, Patna
No.of CCPs	63	

Assam		
No. of Districts	3	Nagaon, Dhubri, Jorhat
No.of CCPs	44	

Punjab		
No. of Districts	3	Sangrur, Jalandhar Ludhiana
No.of CCPs	77	

Nagaland		
No. of Districts	1	Kohima
No.of CCPs	6	

Manipur		
No. of Districts	1	Imphal (W)
No.of CCPs	6	

Rajasthan		
No. of Districts	3	Bharatpur Chittorgarh Bikaner
No.of CCPs	132	

Jharkhand		
No. of Districts	2	Dumka Dhanbad
No.of CCPs	13	

West Bengal		
No. of Districts	2	24Pargana West Bardhaman
No.of CCPs	93	

Uttar Pradesh		
No. of Districts	8	Gorakhpur, Basti, Shravasti, Varanasi, Unnao, Shahjahanpur, Kushinagar, Ghaziabad
No.of CCPs	66	

Gujarat		
No. of Districts	3	Panchmahal Porbandar Kheda
No.of CCPs	124	

Odisha		
No. of Districts	3	Jajpur, Balasore, Nupada
No.of CCPs	70	

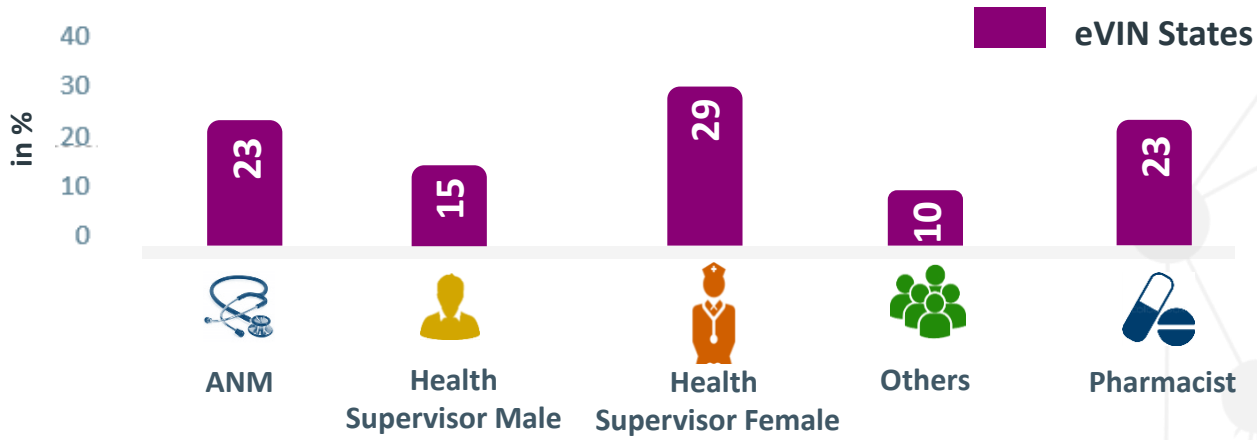
Chhattisgarh		
No. of Districts	3	Balod, Dhamtari, Kawardha
No.of CCPs	52	

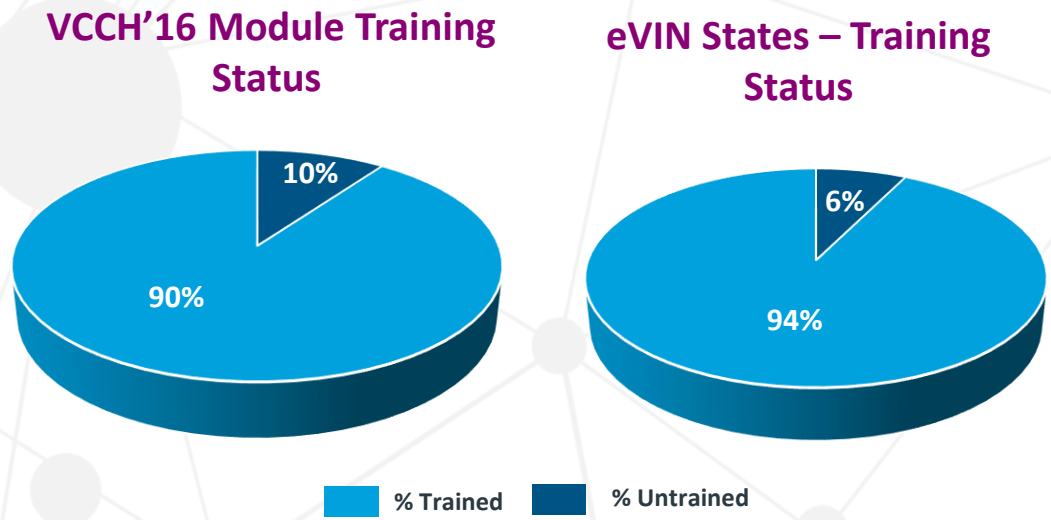
eVIN States

Non eVIN States

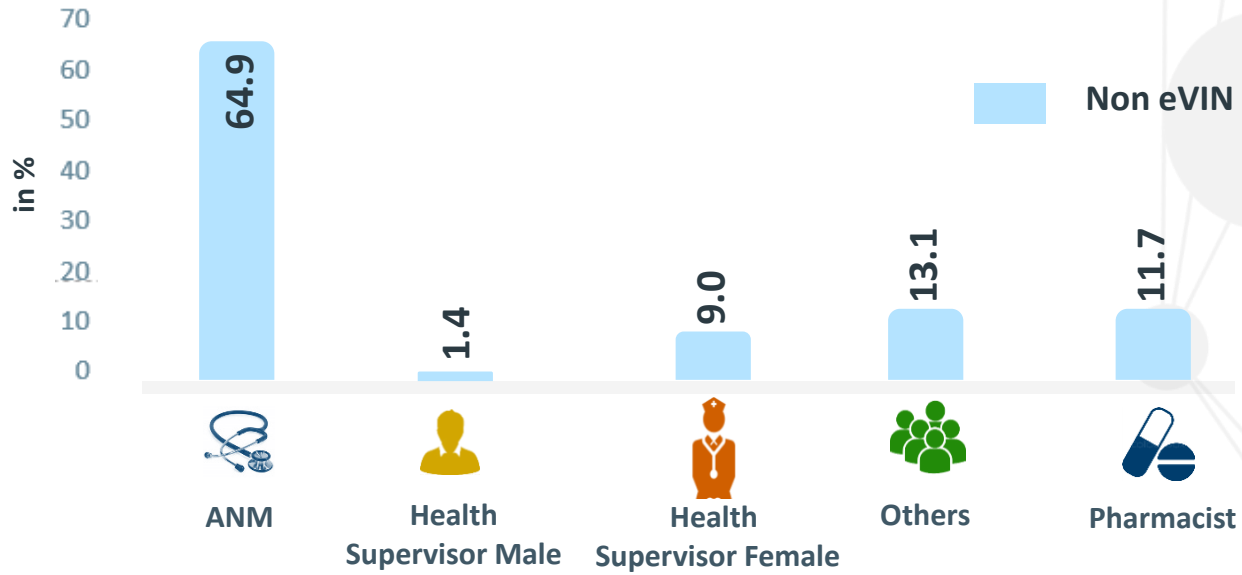
Comparative States

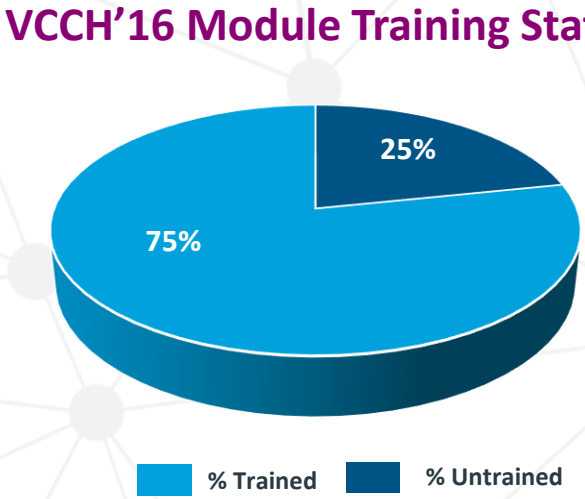
Designation and Training Status of Cold Chain Handlers



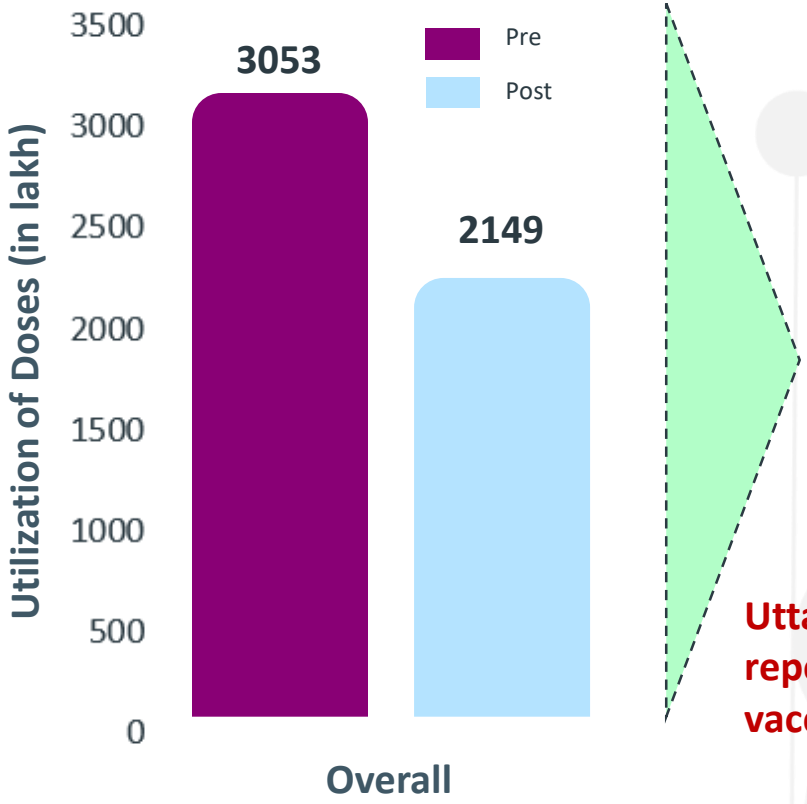


- 10 % of CCHs across 15 states belong to "others "category i.e. Class IV, Administrative, etc.
- Majority of CCHs are ANM and Pharmacist





Savings in Vaccine Utilization by eVIN States (Source: Immunization Division, MoHFW)



30% SAVING IN VACCINE UTILIZATION

Uttar Pradesh and Bihar reported maximum saving of vaccine doses (~80 %)

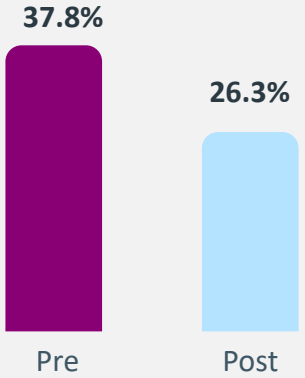
~900 lakh vaccine doses saved

- *Vaccine Utilization = Opening Dosage + Dosage Received – Closing Balance*
- *Pre eVIN period: 2015-16 for UP, MP and Raj as eVIN was implemented in early 2016-17; 2016-17- for remaining 9 states*
- *Post eVIN period: 2016-17 for UP, MP and Raj ; 2017-18 for remaining 9 states*
- **Vaccines Considered -Hep-B, DPT, BCG, Pentavalent, TT : for 12 states*
- *Measles in 11 states except HP because of introduction of MR*
- *OPV in 9 states except Uttar Pradesh, Madhya Pradesh and Rajasthan because of t-opv to b-opv switch and mop-up rounds in 2016-17.*

Facilities Reported Stock-out of any Antigen (%)

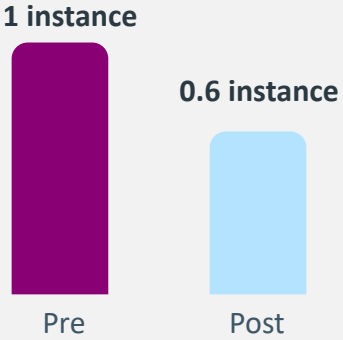
Facilities reported Stock-Out

30% reduction in facilities observed stock-out (statistically significant at 95% CI)



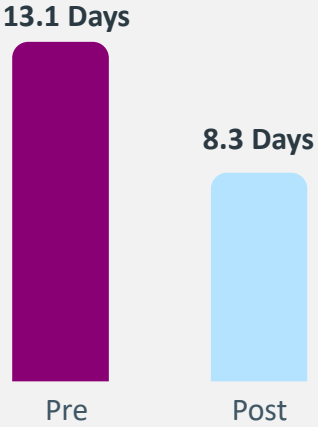
Instances per Facility

40% reduction in instances of stock out



Mean Duration of Stock-out Per Facility

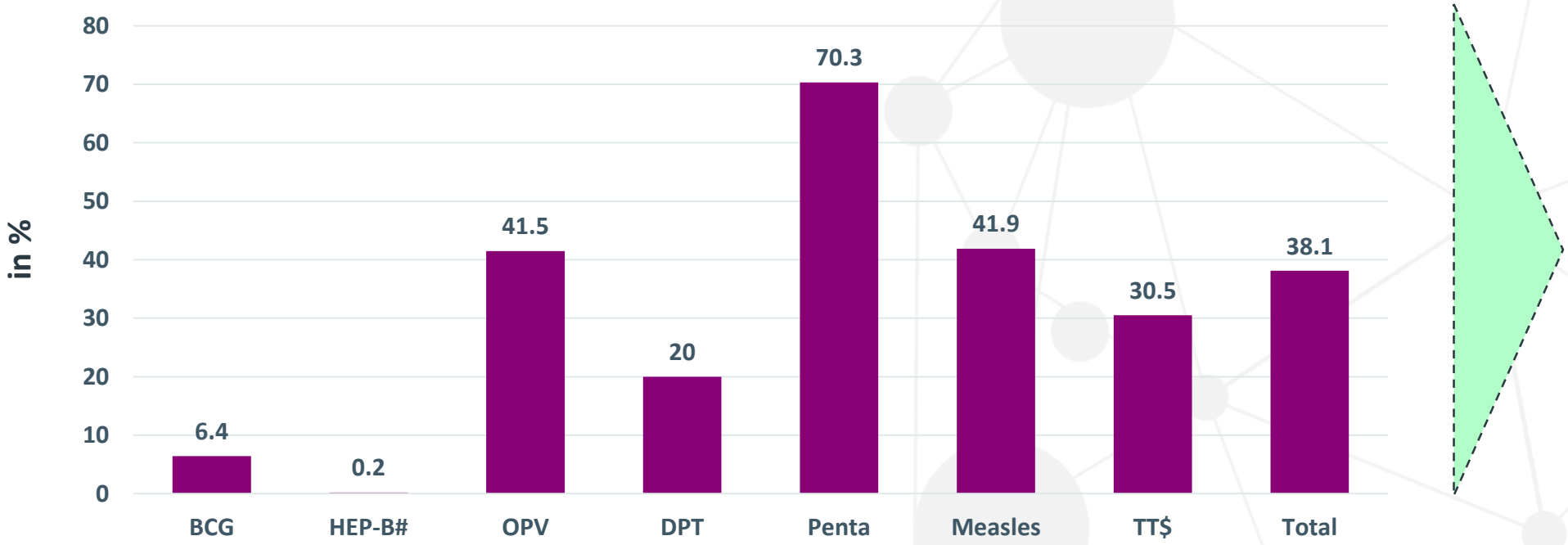
37% reduction in mean duration of Stock-out



There is no statistically significant difference in maximum and minimum stock of any antigen after introduction of eVIN.

**Reference period: Pre: 6 months prior to inception of eVIN , post: Oct'17 to Mar'18, Vaccines-Hep-B, DPT, BCG, Pentavalent, Measles, OPV & TT for 12 states except Measles not included for HP because of introduction of MR*

Percent Reduction in Missed Opportunity

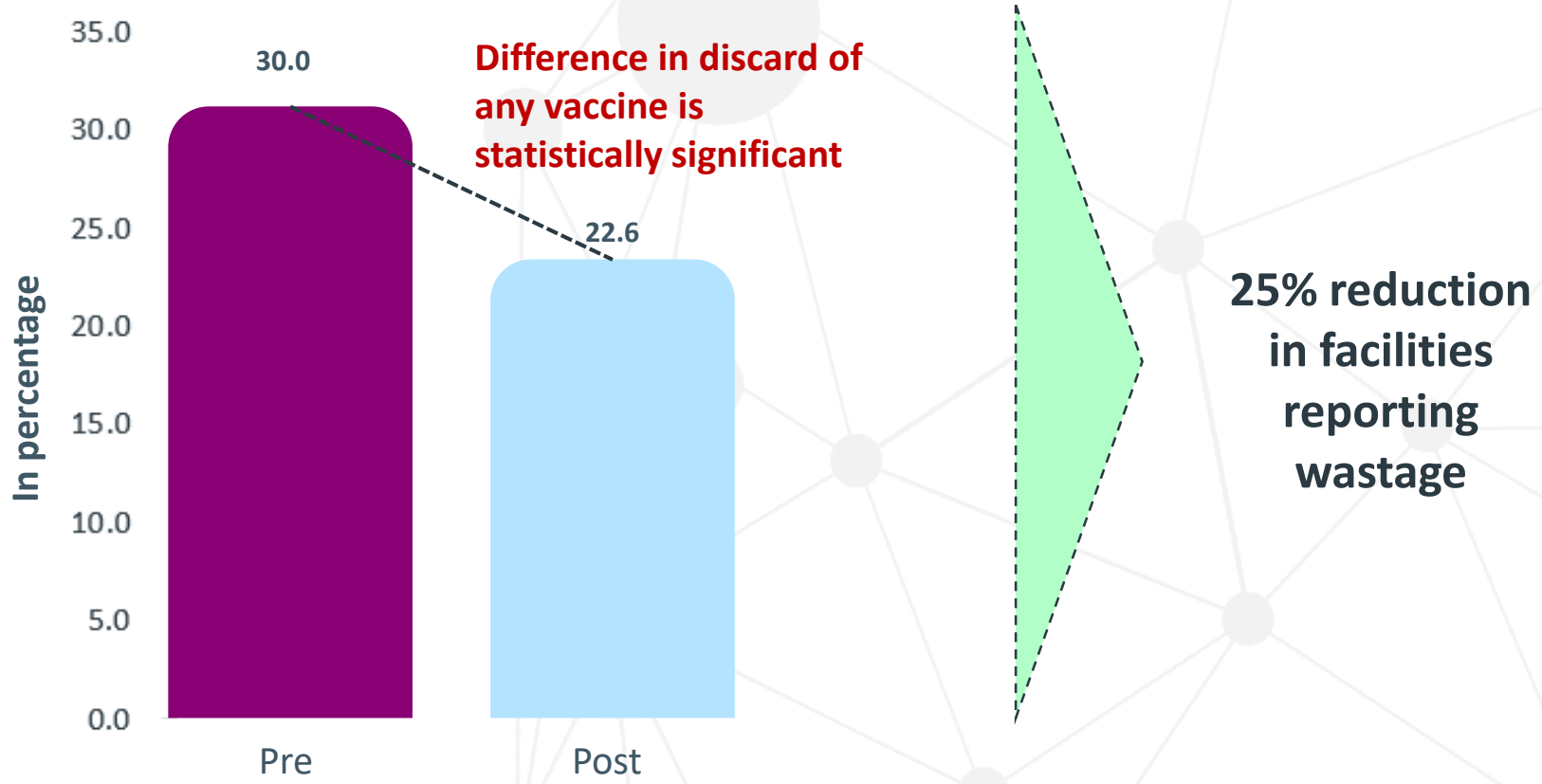


Significant reduction in instances of missed opportunities for most of the antigens

After eVIN implementation, an additional 4,01,438 antigens were administered to the due beneficiaries

**Missed opportunity has been calculated by number of sessions missed, multiplied by number of children immunized/facility in the pre/post period from the HMIS data for the sampled districts.*
 # Hep-B is in number of days of stock-out. To calculate missed opportunity, number of days of stock-out was multiplied with the number of children immunized with Hep-B in a facility in a day in the pre/post period from HMIS data for the sampled districts. $ includes children and women

Facilities having Discard of any Vaccine (Source: UNDP-India reported eVIN and VCCM records)

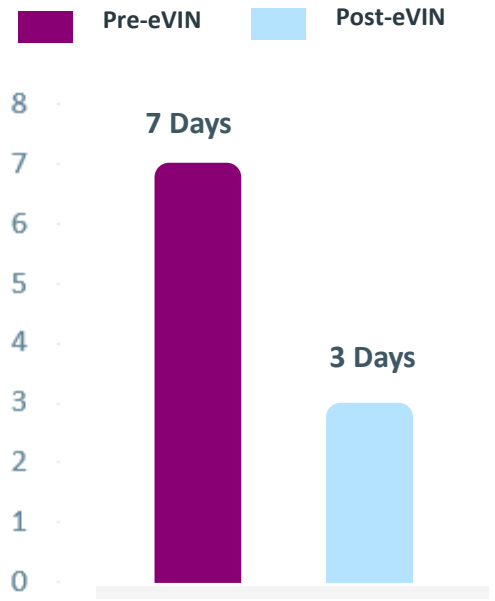


*Significance * p<0.05, ** p<0.01, *** p<0.001*
Significance test of proportion (prtest)
UNDP data considered, includes wastage due to VVM, freezing, expiry and broken vials

Doses Discarded: Projections

Antigen	Pre-eVIN	Post-eVIN	% reduction in doses discarded
BCG	128,751	25,750	80.0
DPT	801,670	10,668	98.7
HEP-B	64,209	33,442	47.9
MEASLES	34,278	6,688	80.5
OPV	192,626	150,489	21.9
PENTA	29,094	16,387	43.7
TT	37,121	6,688	82.0
Total	**12,87,749**	**2,50,112**	**80.6**

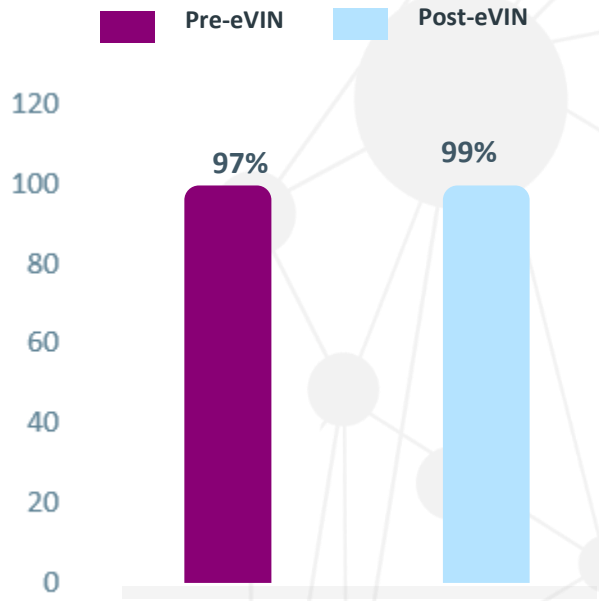
Vaccine Distribution Practices



Indent response Time#

57 % reduction

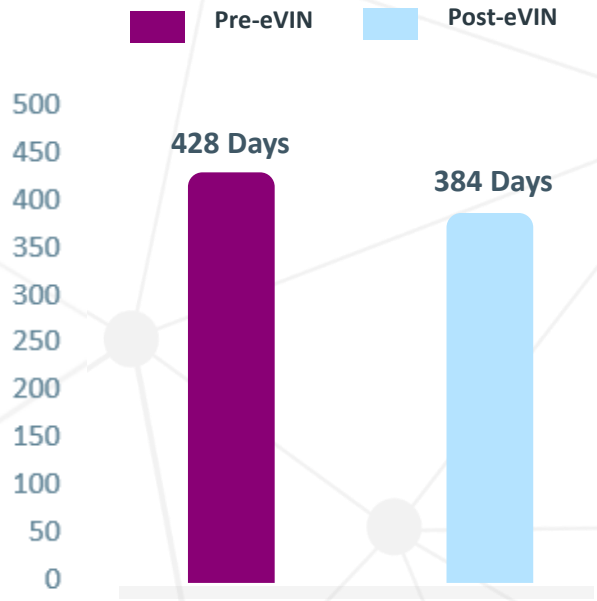
In post eVIN mean response time was 3 days in comparison with 7 days in pre-eVIN



Order Fill Rate*

2 % marginal increase

No significant change was observed. In post eVIN mean response time was 99% compared with 97% in pre-eVIN

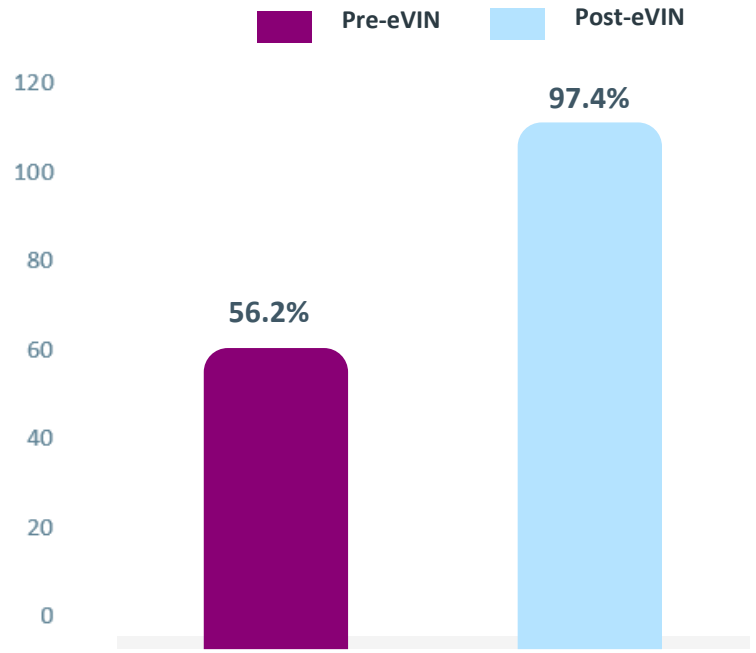


Days left in expiry

10 % reduction

In post eVIN mean response time was 384 days in comparison with 428 days in pre-eVIN

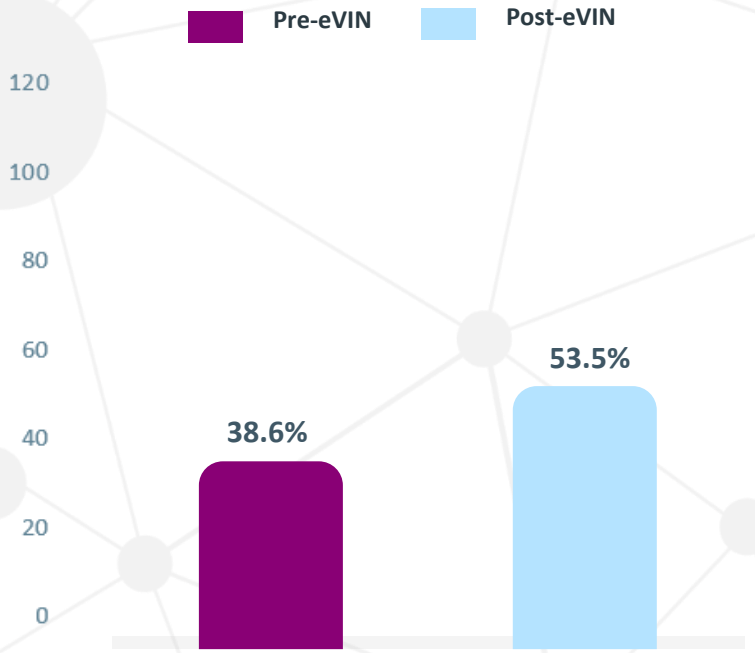
Vaccine Documentation Practices



Record Keeping Practices

Maintaining GOI register for record keeping has increased from

56.2% facilities in pre-eVIN to **97.4%** facilities in the post-eVIN period



Vaccine Stock Updating Duration

The daily updating of vaccine stock register daily has improved from

38.6% facilities in pre-eVIN to **53.5%** facilities in the post-eVIN period

Documentation: More Than 90% Completeness

Indent register

In pre-eVIN **26%** CCPs in comparison with in post-eVIN **69%**

Stock Register

In pre-eVIN **29%** CCPs in comparison with in post-eVIN **75%**

Temperature Logbook

In pre-eVIN **29%** CCPs in comparison with in post-eVIN **70%**

Above 90% completeness' indicates less than or equal to 10 instances missed out of 6 critical indicators- batch no, expiry date, VVM status, opening balance, closing balance, open vials (at CCP).

Accuracy in Documentation (across eVIN states)

94%

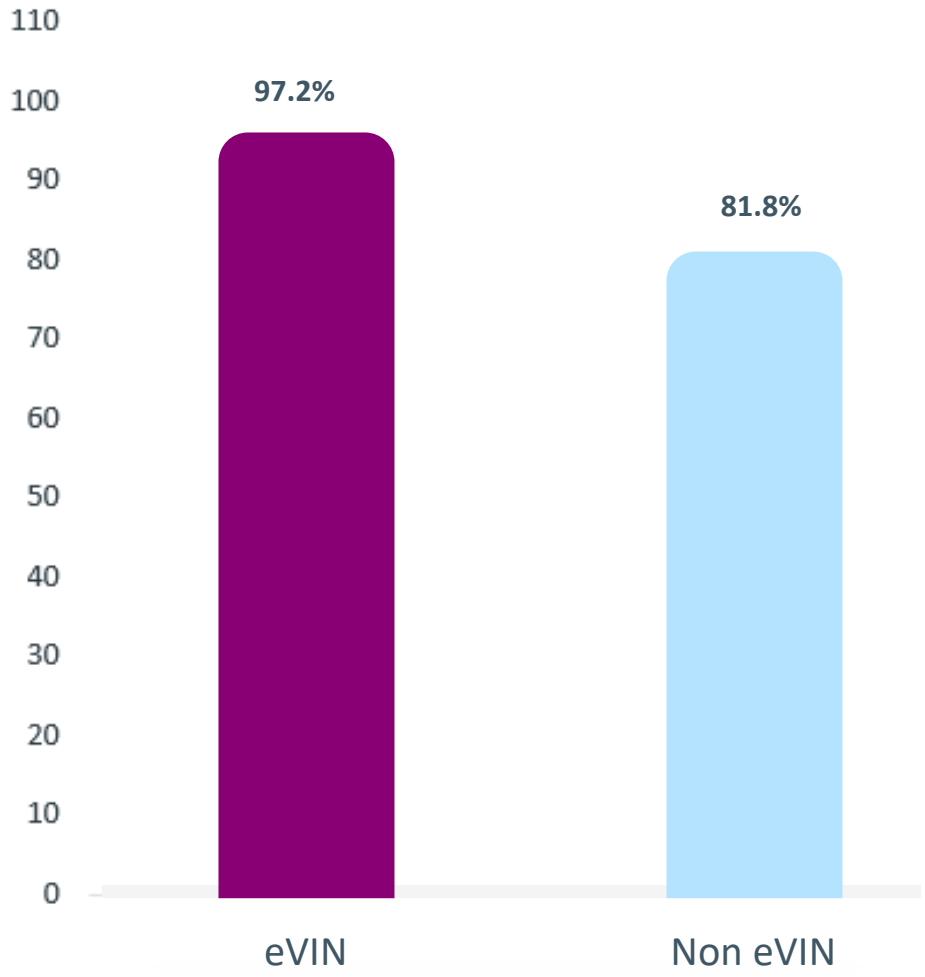
accuracy matched in stock registers and eVIN entries

92%

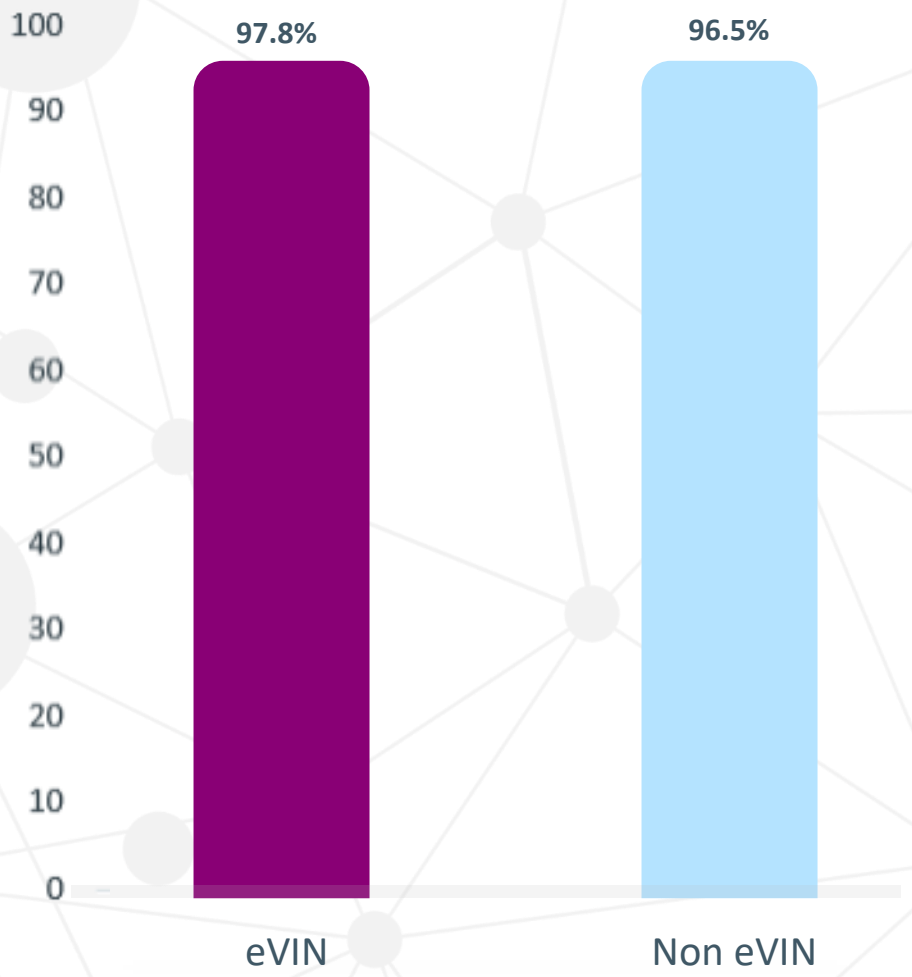
accuracy matched in physical counting of doses and eVIN entries

Temperature Monitoring

CCH Recording on the Same Day



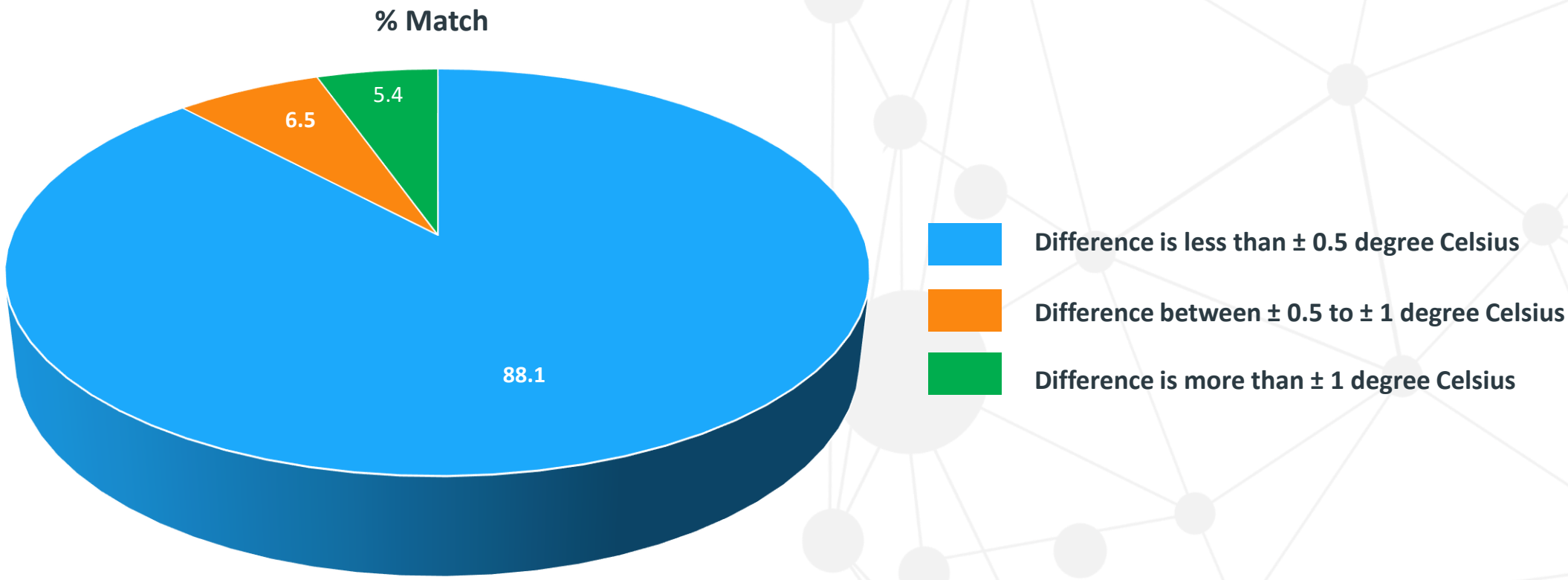
Observed Stem Thermometer Reading in the Recommended Temperature Range at the Time of Visit



Between 2 to 8 Degree

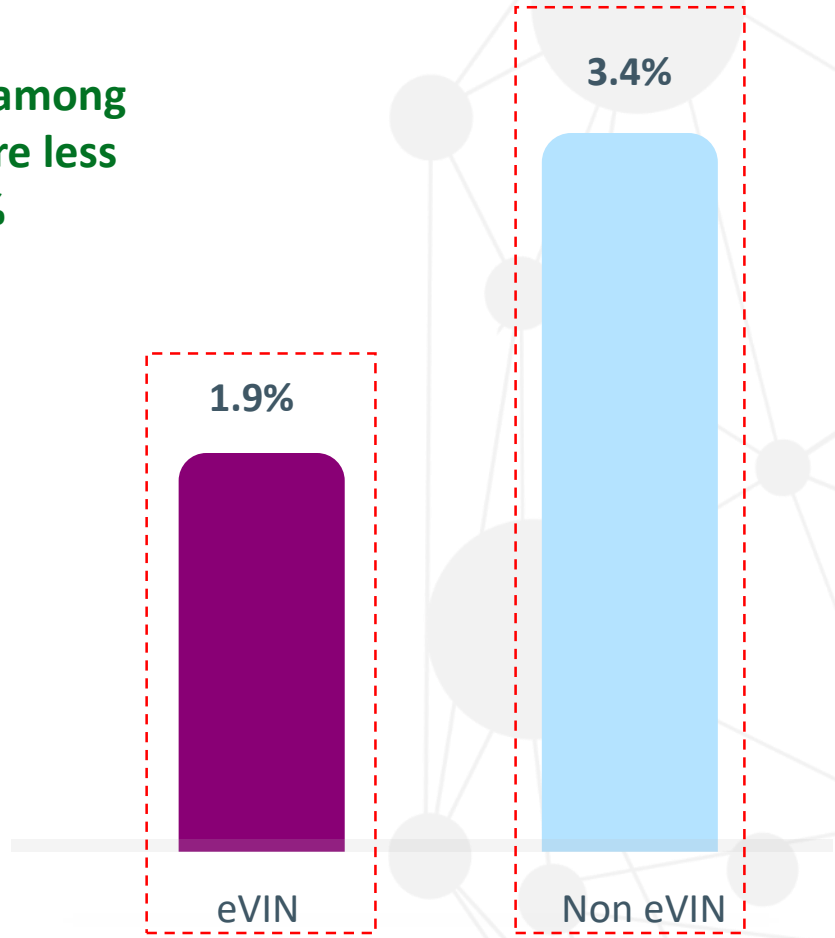
Accuracy of Temperature (%): eVIN Logger Matched with Stem Thermometer

88% accuracy



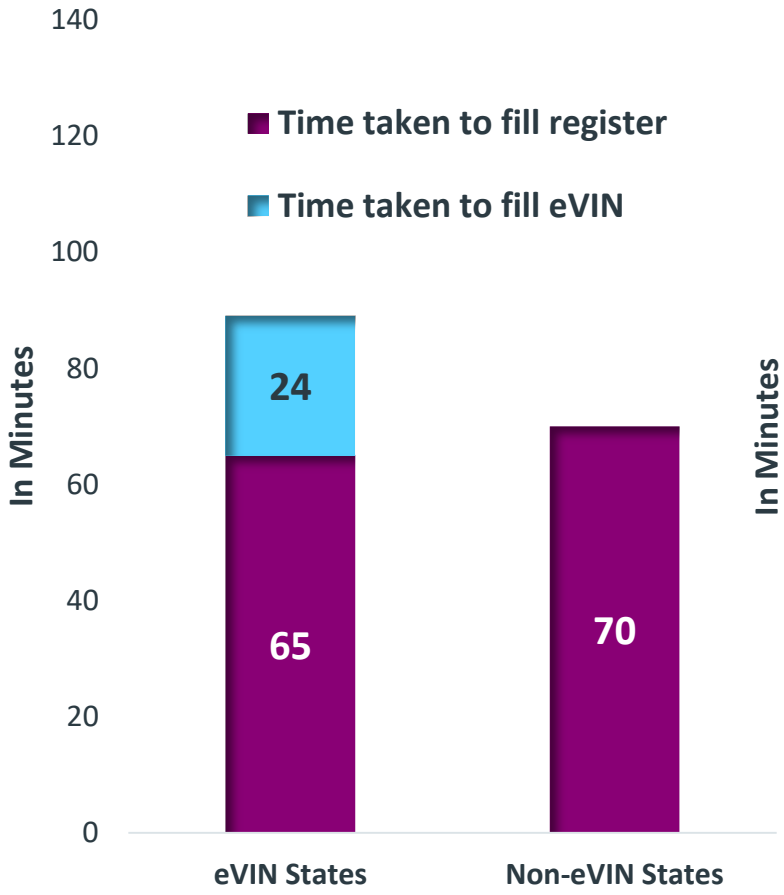
Cold Chain Equipment: Sickness Rate

Sickness rate among eVIN states are less than 2%

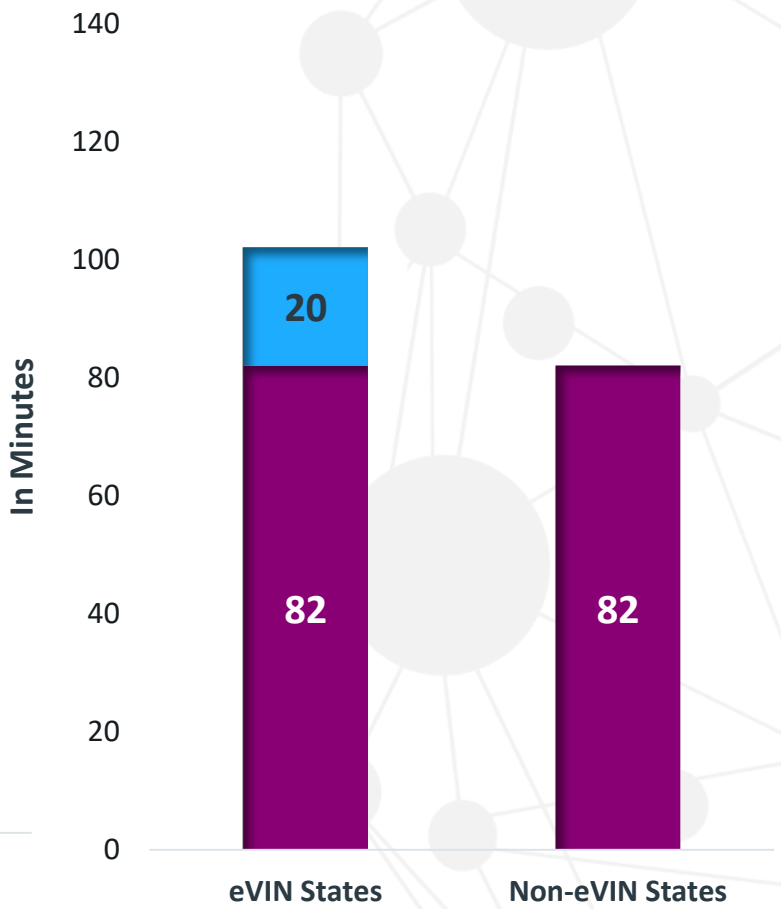


Time Required to: Prepare Vaccine Indent, After Vaccine Receipt, and in Updating Vaccine Distribution

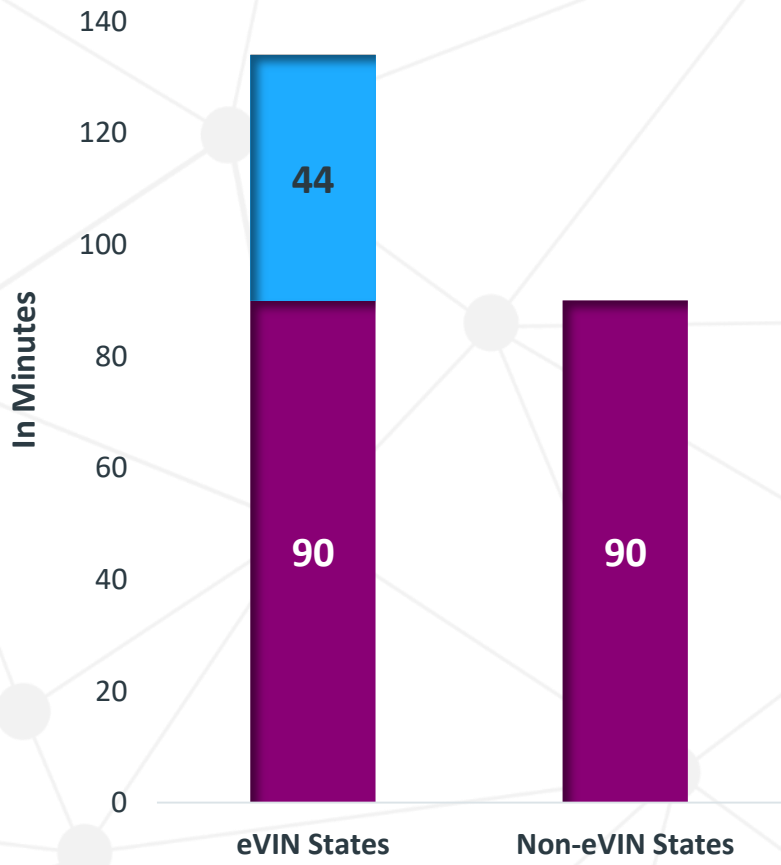
Vaccine Indent



After Vaccine Receipt



Updating of Vaccine Distribution



Challenges Addressed or Not

Stock Management

Addressed

- ✓ Stock Out
- ✓ Duration of Stock Out
- ✓ Vaccine Indent Response Time
- ✓ FEFO
- ✓ Lateral Sharing
- ✓ Wastage
- ✓ Stock Updation

Not Addressed

- ✗ Maximum Stock
- ✗ Order Fill Rate
- ✗ Lack of Indents
- ✗ Minimum Stock

Temperature Management

Addressed

- ✓ Knowledge of Temperature Trends
- ✓ Temperature Record Documentation
- ✓ Documentation of Breach Events

Not Addressed

- ✗ Temperature of Cold Box
- ✗ Placement of Sensor Position in Equipment

Cold Chain System Monitoring

Addressed

- ✓ Defined Key Areas of Monitoring
- ✓ Deployment of Additional Resource (VCCM) for Monitoring
- ✓ Involvement of State Officials in Monitoring

Not Addressed

- ✗ Strengthening of Monitoring at Regional, District and Sub District Level
- ✗ Frequent Transfer/ Change of Staff

Return on Investment (INR)

Current Saving

Investment
182.09 Crore

Total Saving
255.84 Crore

Return On Investment
1.41

Future Saving

Investment
87.81 Crore

Total Saving
255.84 Crore

Return On Investment
2.91


Thank You!