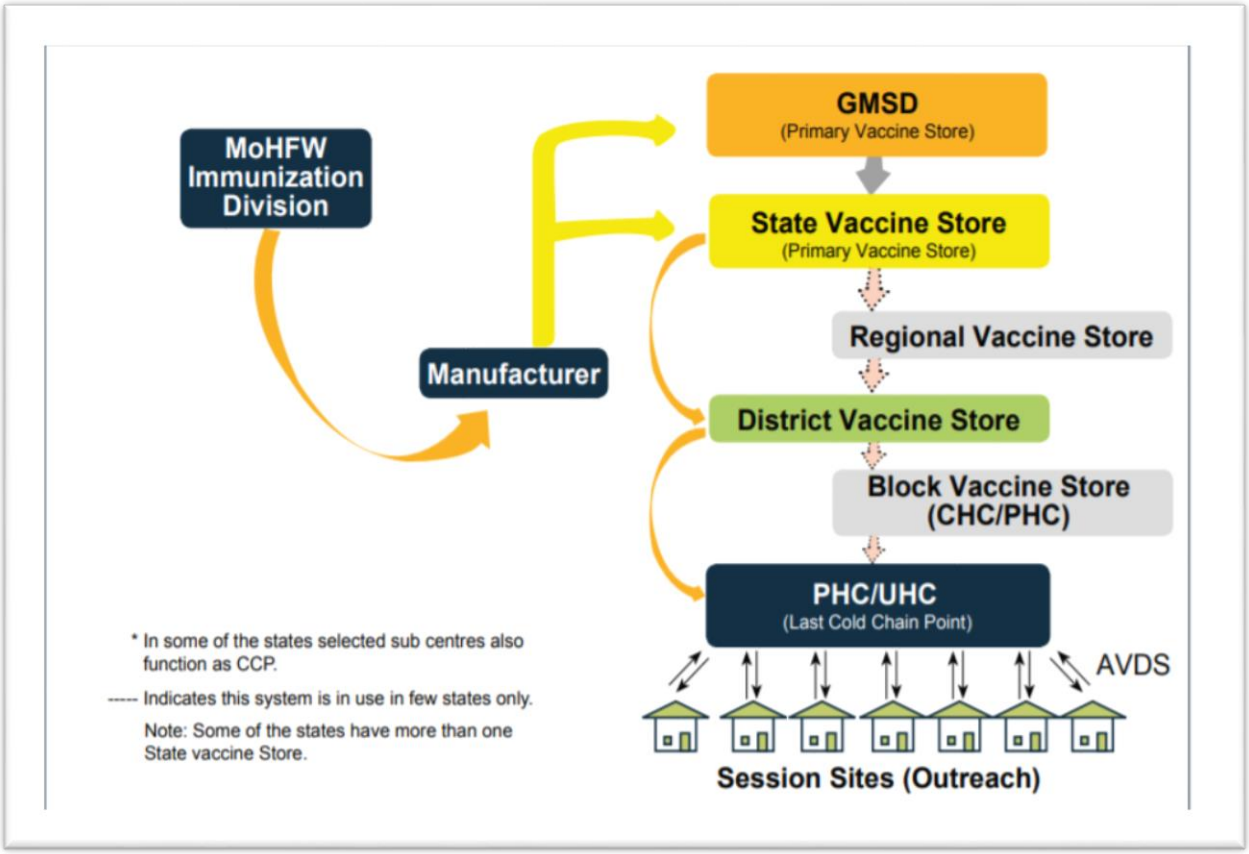
Structure of Health Facilities in India



Immunization services are provided through a vast health care infrastructure in two major ways

1. Through fixed sites/facility level consisting of District Hospitals, Community Health Centres (CHC), Primary Health Centres (PHC), Medical Colleges, Defence, Railway Hospitals, ESI Hospital and other central and state govt. health centres.

2. Outreach sessions In India, planned RI sessions are held at least once a week. However there are states where it is even held twice a week. Every year around 9 million RI sessions are planned in the country, out of which 2/3rd are outreach sessions and rest 1/3rd are at the facility level.

Since the inception of UIP, a wide network of cold chain stores have been created consisting of Government Medical Stores Depots (GMSD) and State, Regional, District and sub district Vaccine Stores. The sub-district vaccine stores are placed in health facilities like, Community Health Centre, Primary Health Centre, Urban Health Centre, Area Hospital, Army or Railway Hospital etc. In some of the states even Sub-centres complying the requisite criteria also serve as cold chain point.

The logistics has been managed through a cycle of storing and transporting vaccines in a pre-defined network. In India, there are 5 levels of vaccine stores

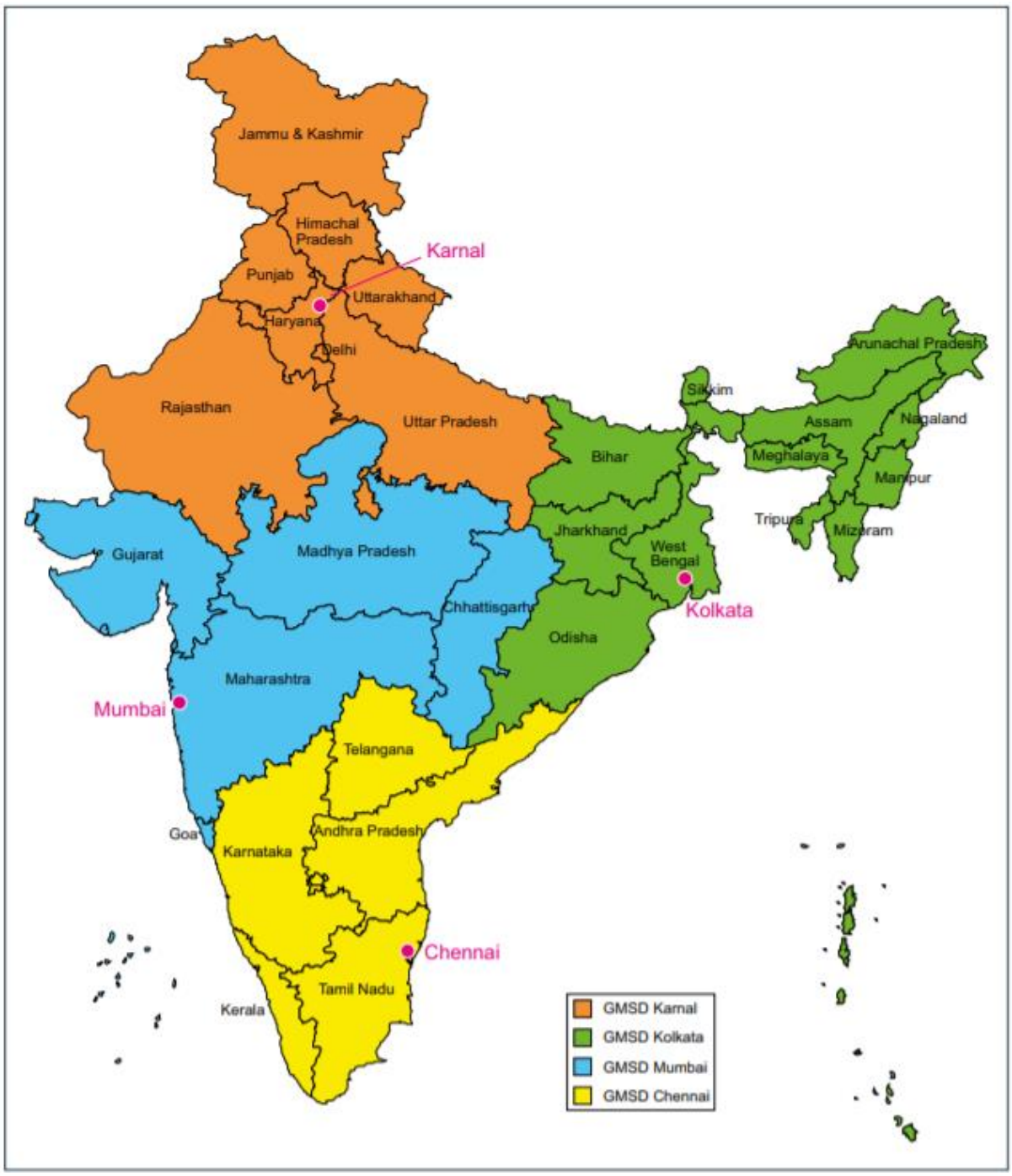
GMSD and State Vaccine Store (Primary Vaccine Stores):

Any facility that receives vaccine from the manufacturer is a Primary Store. Government Medical Store Depot (GMSD) and State Vaccine Stores (SVS) are Primary Stores and receive vaccine directly from manufacturers. The vaccine store in a state which receives vaccine either from a manufacturer or from a GMSD is a state vaccine store (SVS). A state may have multiple state vaccine stores which may be located beyond the state head quarter.

There are 4 GMSDs in the country, which store the UIP vaccines.

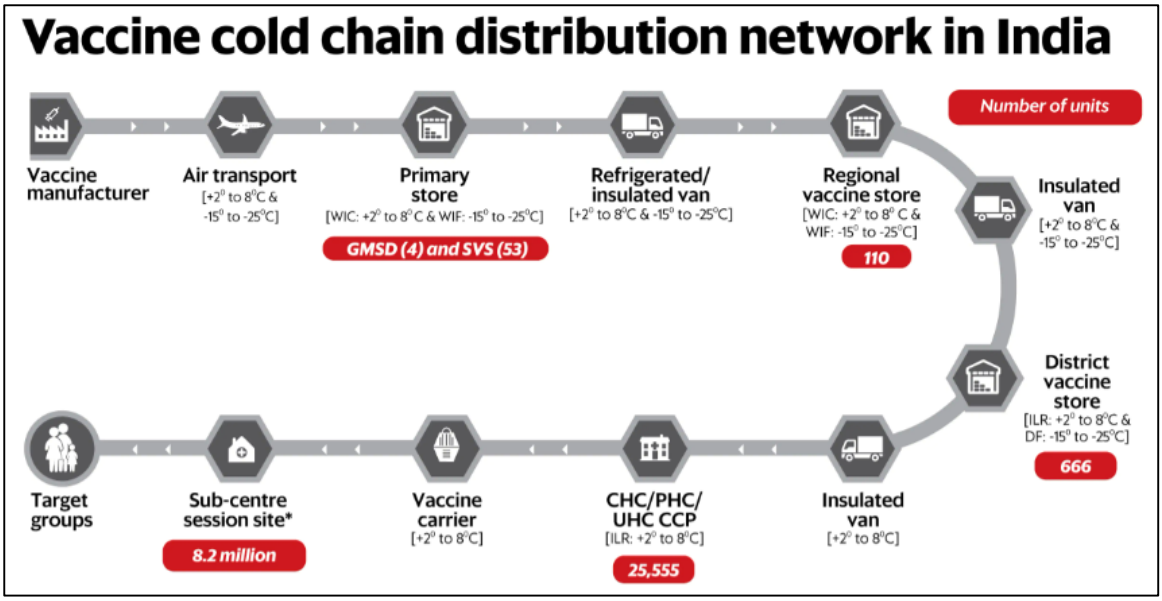
- GMSD Karnal – Northern states,
- GMSD Chennai – Southern states,
- GMSD Kolkata – Eastern states ,
- GMSD Mumbai – Western states.

The State Vaccine Store supplies vaccine to the Regional Vaccine Store and if their is no RVS the vaccine is supplied directly to DVS.



Regional Vaccine Stores:

Any facility that receives vaccine from a State Vaccine Stores (SVS) and distributes to districts is a Regional Vaccine Store (RVS). The existing Divisional Vaccine Stores of the states (wherever applicable) which receive vaccine from the SVS and distribute to the districts (DVS) will fall under this category and should be considered as Regional Vaccine Stores. Any facility that receives vaccines from a primary vaccine store (SVS) and distributes it to districts is a Regional Vaccine Store. The existing Divisional Vaccine Stores (wherever applicable) which receives vaccine from the primary store (SVS) will fall under this category and should be considered as Regional Vaccine Stores.



District Vaccine Stores:

These are the stores at district level which receive vaccine from state/regional vaccine stores and distribute vaccines to CHC/ PHC/UHC/ last cold chain point etc. These are facilities at District Headquarter level which receive vaccines from State/Regional Vaccine Stores and distribute vaccines to CHC/ PHC/UHC/last Cold Chain point etc.

Block Vaccine Stores (CHC/PHC):

These are facilities which receive vaccine from District Vaccine Stores and distribute to the last cold chain points. Any intermediary store between the district vaccine store and the last cold chain point fall in this category. These are facilities which receive vaccines from district vaccine stores and distribute to the last Cold Chain points. Any intermediary store between the district vaccine store and the last Cold Chain point fall in this category

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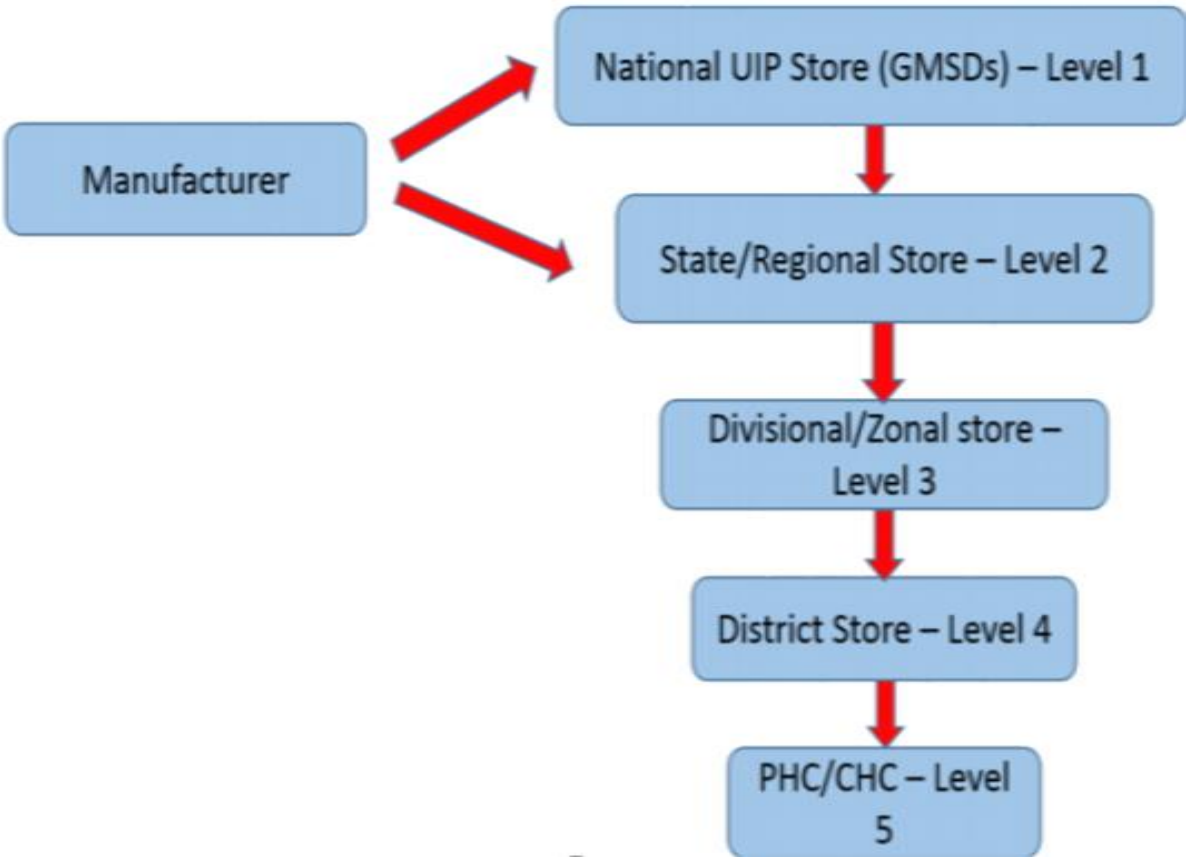
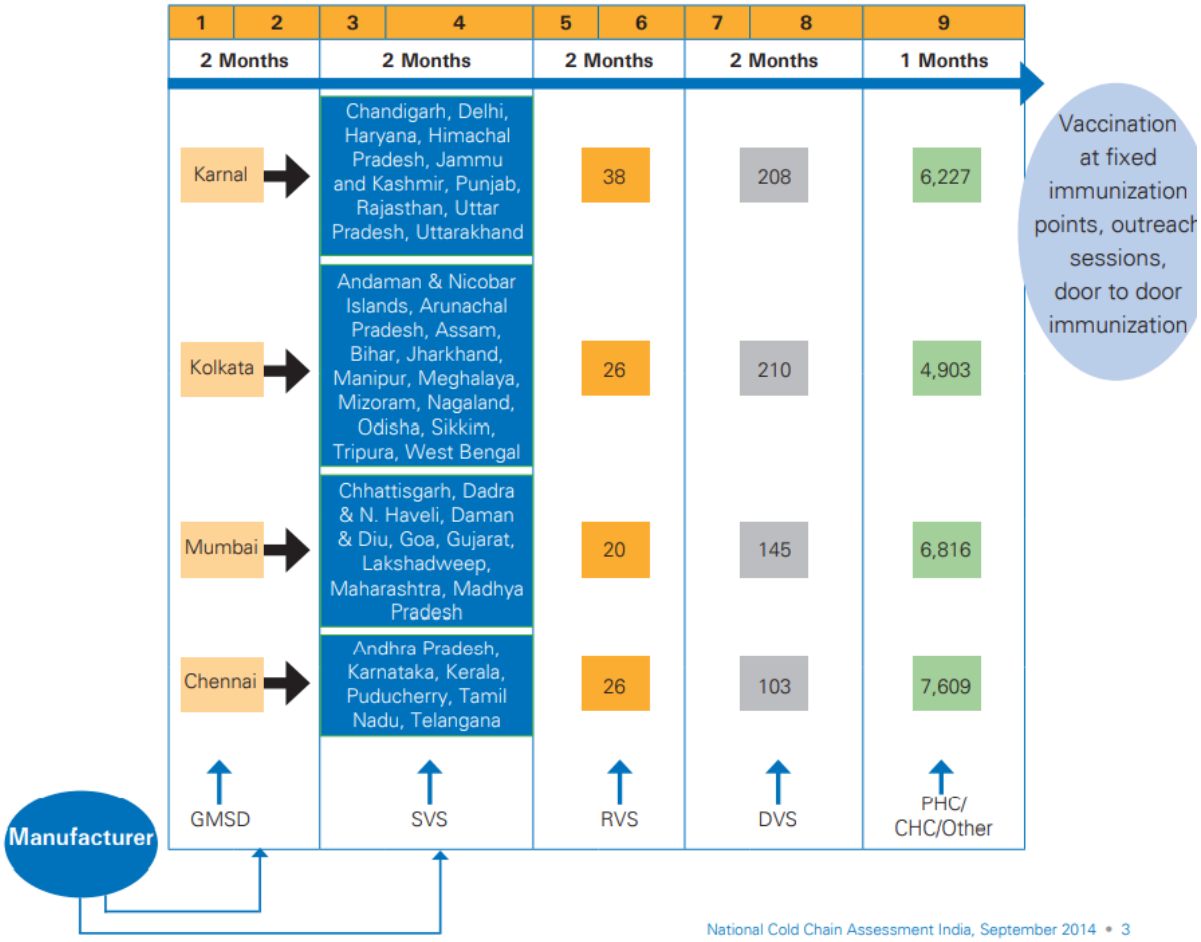


Last Cold Chain Point:

These are facilities which receive vaccines from District/Block level CHC/PHC Vaccine stores and distribute vaccines to the session sites on session days. These are facilities which receive vaccines from District/Sub-District Vaccine stores and distribute vaccines to the session sites on a session day using Alternate Vaccine Delivery System (AVDS). In the immunization supply chain network, this is the last point having vaccines storage facility and doesn't issue vaccines to any other vaccine store but for the immunization sessions. In some States, certain sub-centres also function as last Cold Chain point because of strategic location and fulfilling the requisite criteria of Cold Chain point

Figure 3: The flow of vaccine through the network with approximate duration of storage

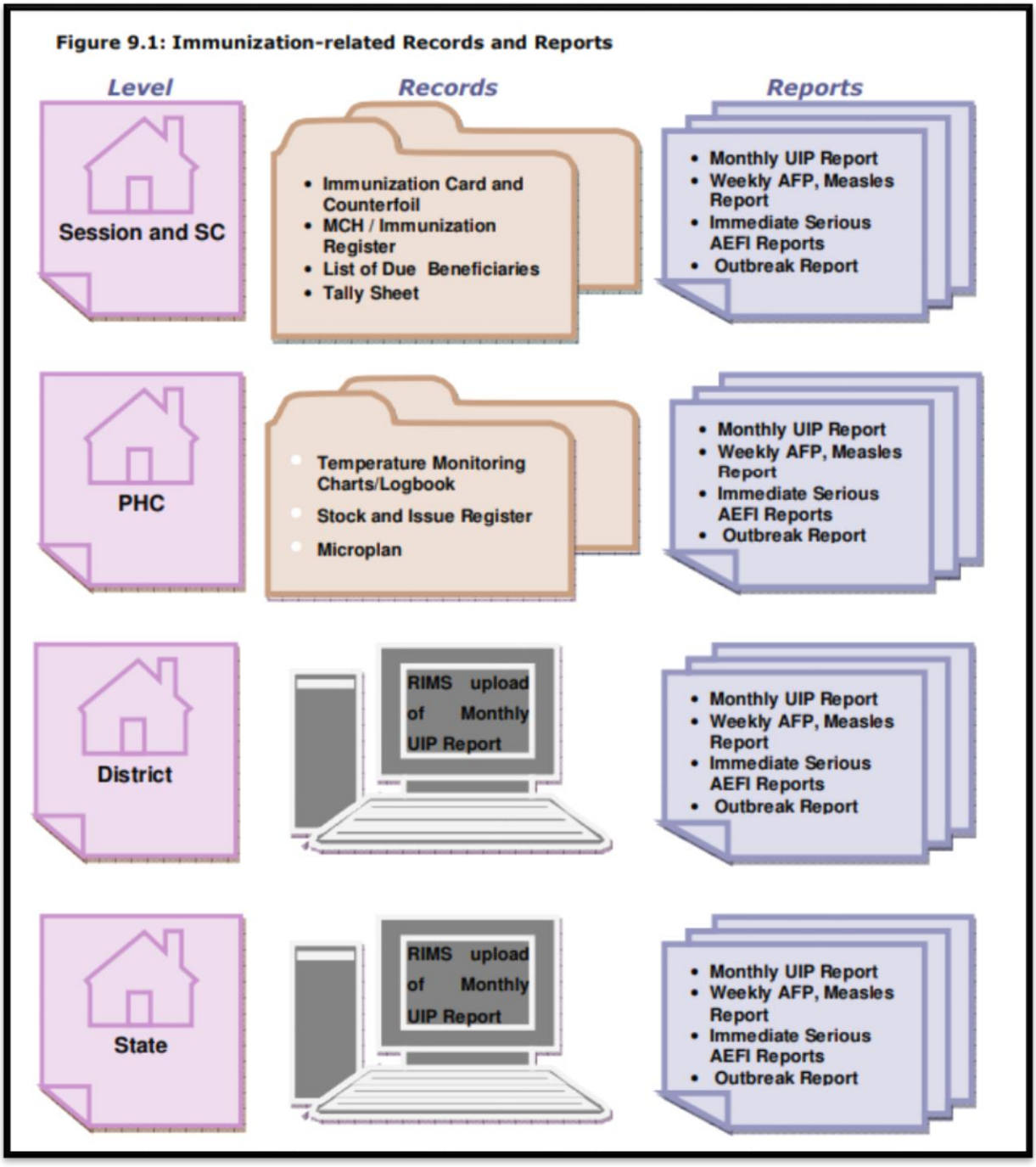


The health care infrastructure in rural areas has been developed as a three tier system as follows.

Sub Centre:
Most peripheral contact point between Primary Health Care System & Community manned with one HW(F)/ANM & one HW(M)

Primary Health Centre (PHC):
A Referral Unit for 6 Sub Centres 4-6 bedded manned with a Medical Officer Incharge and 14 subordinate paramedical staff

Community Health Centre (CHC):
A 30 bedded Hospital/Referral Unit for 4 PHCs with Specialized services



Population norms for rural healthcare infrastructure

The three tier infrastructure is based on the following population norms:

Centre	**Population Norms**	
	Plain Area	Hilly/Tribal/Difficult Area
Sub Centre	5000	3000
Primary Health Centre	30,000	20,000

Community Health Centre 1,20,000 80,000

The average population covered by a Sub Centre, PHC and CHCs are 5616, 35567 and 165702 respectively as on 31st March, 2019.

Rural Health care system in India

Sub Centres (SCs)

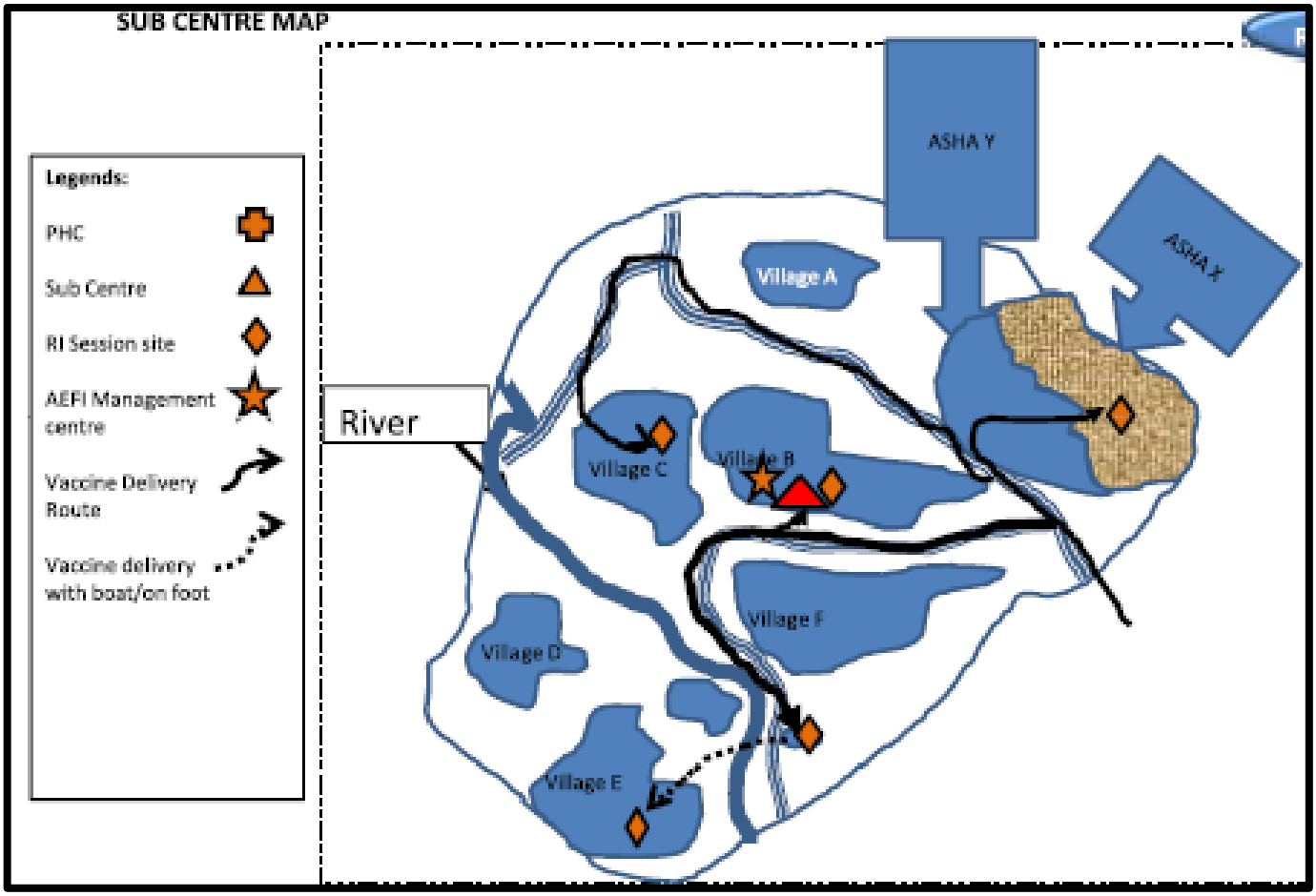
The Sub Centre is the most peripheral and first contact point between the primary health care system and the community.

Sub Centres are assigned tasks relating to interpersonal communication in order to bring about behavioural change and provide services in relation to maternal and child health, family welfare, nutrition, immunization, diarrhoea control and control of communicable diseases programmes.

Each Sub Centre is required to be manned by at least one auxiliary nurse midwife (ANM) / female health worker and one male health worker. Under National Rural Health Mission (NRHM), there is a provision for one additional second ANM on contract basis. One lady health visitor (LHV) is entrusted with the task of supervision of six Sub Centres. Government of India bears the salary of ANM and LHV while the salary of the Male Health Worker is borne by the State governments.

There are 7821 SCs which are upgraded as Health and Wellness Centre-Sub Centres (HWC-SCs) out of total 157541 SCs functioning in rural areas of the country as on 31st March, 2019. The significant conversion of SCs into HWC-SCs have been observed in the States of Tamil Nadu (985), Maharashtra (939), Gujarat (813), Uttar Pradesh (726), Chhattisgarh (650), Assam (628), Andhra Pradesh (612) and Karnataka (571). Significant increase in Sub Centres are recorded in the States of Rajasthan (3000), Gujarat (1892), Karnataka (1615), Madhya Pradesh (1352), Chhattisgarh (1387), Jammu & Kashmir (1146), Odisha (761) and Tripura (433).

Percentage of Sub-Centres functioning in the Government buildings has increased from 43.8% in 2005 to 75.3% in 2019.



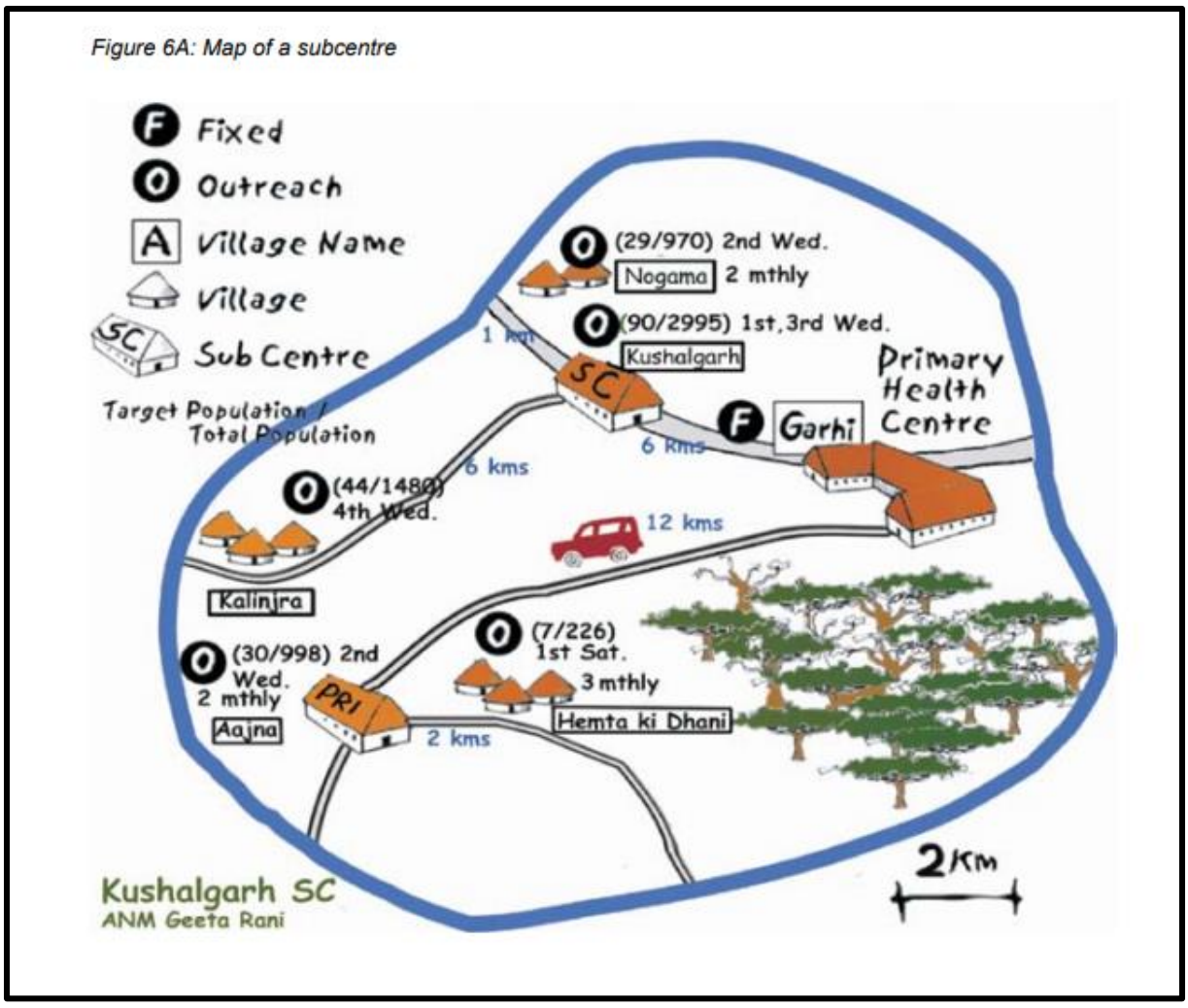
A map of sub-centre showing: l All villages and hamlets with their total population and annual target infants. l All Anganwadi centres, session sites and session days. l Distance from the ILR point and the mode of transport. l Landmarks as Panchayat Bhavan, School, Roads etc.

Primary Health Centre (PHC)

PHC is the first contact point between village community and the medical officer.

The PHCs were envisaged to provide an integrated curative and preventive health care to the rural population with emphasis on preventive and promotive aspects of health care. The PHCs are established and maintained by the State governments under the Minimum Needs Programme (MNP)/ Basic Minimum Services (BMS) Programme.

As per minimum requirement, a PHC is to be manned by a medical officer supported by 14 paramedical and other staff. Under NRHM, there is a provision for two additional staff nurses at PHCs on contract basis. It acts as a referral unit for 6 Sub Centres and has 4-6 beds for patients. The activities of PHC involve curative, preventive, promotive and family welfare services.

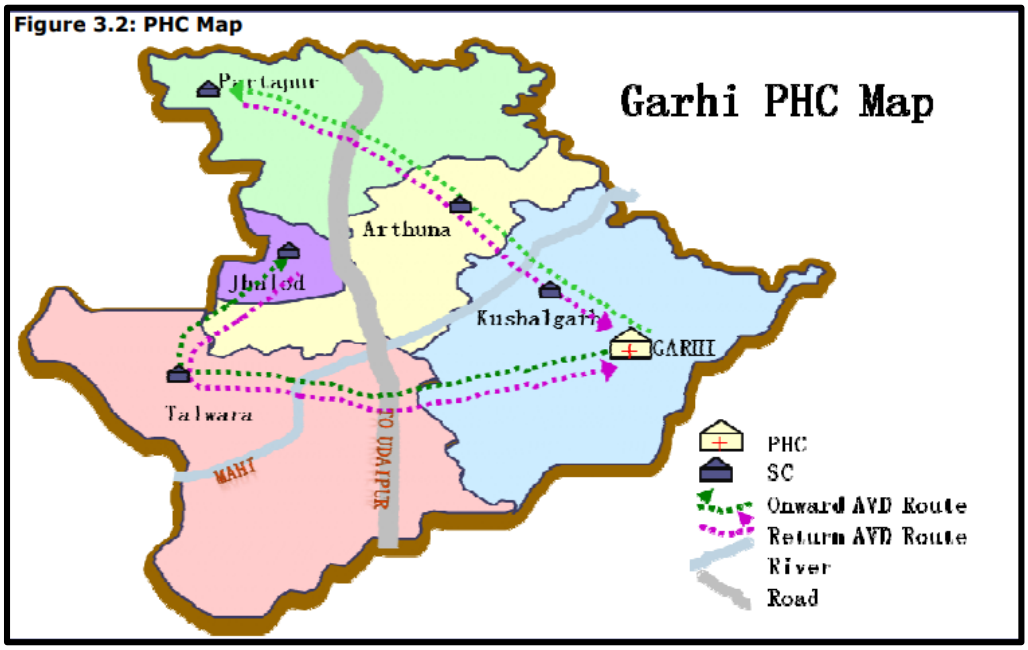


At the national level, there are 24855 PHCs functioning (i.e. 16613 PHCs and 8242 HWC-PHCs) in rural areas as on 31st March 2019. There is an upgradation of 8242 of PHCs as HWC-

PHCs. The significant number of conversion of PHCs into HWC-PHCs have been observed in the States of Andhra Pradesh (1145), Uttar Pradesh (946), Odisha (827), Gujarat (772), Tamil Nadu (716) and Telangana (636). Significant increases in the number of PHCs have been seen in the States of Karnataka (446), Gujarat (406), Rajasthan (369), Assam (336), Jammu & Kashmir (288) and Chhattisgarh (275).

Percentage of PHCs functioning in Government buildings has increased significantly from 69% in 2005 to 94.5% in 2019. For allopathic Doctors at PHCs, there is a shortfall of 7.6% of the total requirement for existing infrastructure as compared to manpower in position.

Figure 3.2: PHC Map



Community Health Centres (CHCs)

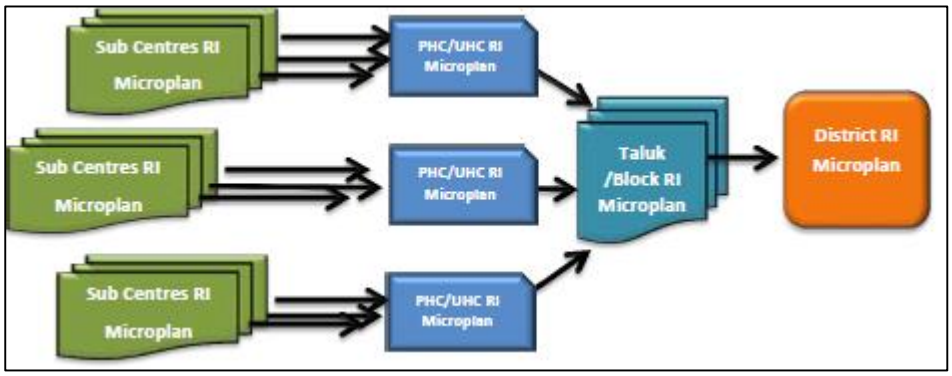
CHCs are being established and maintained by the State government under MNP/BMS programme.

As per minimum norms, a CHC is required to be manned by four medical specialists i.e. surgeon, physician, gynecologist and pediatrician supported by 21 paramedical and other staff. It has 30 in-door beds with one OT, X-ray, labour room and laboratory facilities.

It serves as a referral centre for 4 PHCs and also provides facilities for obstetric care and specialist consultations.

As on 31st March 2019, there are 5335 CHCs functional in rural areas of the country. Significant increase is observed in the States of Uttar Pradesh (293), Tamil Nadu (350), West Bengal (253), Rajasthan (245), Odisha (146), Jharkhand (124) and Kerala (121).

The % of CHCs in Govt. buildings has increased from 91.6% in 2005 to 99.3% in 2019.



First Referral Units (FRUs)

An existing facility (District Hospital, Sub-divisional Hospital, Community Health Centre etc.) can be declared a fully operational First Referral Unit (FRU) only if it is equipped to provide round-the-clock services for emergency obstetric and New Born Care, in addition to all emergencies that any hospital is required to provide. It should be noted that there are three critical determinants of a facility being declared as a FRU:

Emergency Obstetric Care including surgical interventions like caesarean sections; New-born care; and blood storage facility on a 24-hour basis.

As on 31st March 2019, there are 3204 FRUs functioning in the country. Out of these, 95.7% of the FRUs are having Operation Theatre facilities, 96.7% of the FRUs are having functional Labour Room while 75.3% of the FRUs are having Blood Storage/ linkage facility.

Alternate Vaccine Delivery System and Alternate Vaccinators:

Alternate Vaccine Delivery System means that the vaccine carrier is delivered from PHC to the session site by an independent person and ANM(Auxiliary Nurse Midwifery) has to reach directly at the session site. It helps to start the session on time and the HW doesn't have to come to PHC to collect or return vaccine and other logistics to the PHC at the end of the session. Alternate Vaccinators (AVs) can be hired for:

- Urban Slums
- Areas with no ANM posted
- Areas where posted ANM is absent since 2 months (e.g. Sick leave, Maternity Leave of ANM)

In Urban Slums, 1 session per month should be planned for 10,000 population. In other areas mentioned above, sessions should be planned on existing guidelines based on monthly injection load. Competent Human Resources like retired ANMs or trained and well-qualified nurses, pharmacist can be hired as Alternate Vaccinators. If need be, train (as per the HW training handbook) these vaccinators prior to utilizing their services

Urban Health Care System in India

National Urban Health Mission
Urban health infrastructure
Urban Primary Health Center
Urban Community Health Centres (U-CHCs)
Urban - Health and Wellness Centres
Status of urban health care infrastructure

National Urban Health Mission
National Urban Health Mission (NUHM) was approved by the Union Cabinet on 1st May, 2013 as a sub-mission under an overarching National Health Mission (NHM) for providing equitable and quality primary health care services to the urban population with special focus on slum and vulnerable sections of the Society.

NUHM seeks to improve the health status by facilitating their access to quality primary healthcare. NUHM covers all the cities and towns with more than 50000 population and district and state headquarters with more than 30000 population.

Urban Health programme is being implemented through Urban Local Bodies (ULBs), in seven metropolitan cities, viz., Mumbai, New Delhi, Chennai, Kolkata, Hyderabad, Bengaluru and Ahmedabad. For the remaining cities, the State Health department decides whether the Urban Health Programme is to be implemented through health department or any other urban local body.

Urban health infrastructure
The health care infrastructure in urban areas consists of the Community Health Centres and Primary Health Centers.

Population norms for urban health infrastructure

Community Health Centres - 2,50,000 population (5 Lakh for metros)

Primary Health Centres - 50,000 population

Urban Primary Health Centre

In order to provide comprehensive primary healthcare services, the National Urban Health Mission aims to establish Urban Primary Healthcare Centers, not as a stand-alone health facility, but as a hub of preventive, promotive and basic curative healthcare for its catchment population.

Within its catchment area, the UPHC is responsible for providing the primary health care and public health needs of the population. The U-PHC is located preferably closer to slum or similar habitations.

The hours of operation may be such so as to enable the urban working population to conveniently access the UPHC services. States may opt for any suitable timing, providing 8 hours of services, which are convenient to the community. It is recommended that the UPHC operates preferably from12 noon to 8 pm or in dual shifts (i.e. 8am to 12pm and 4pm to 8pm); Dual shift timing of UPHC could be flexible with the ability to be modified according to the catchment communities.

The package of services envisaged at UPHC inclusive of preventive, promotive, curative, rehabilitative and palliative care. Further, in order to strengthen Comprehensive Primary Health Care across the country through “Ayushman Bharat-HWCs”, states are upgrading their Primary Health Care centers as Health and Wellness Centres (HWCs).

Urban Community Health Centers (U-CHCs)

Urban Community Health Centre (U-CHC) is set up as a referral facility for every 4-5 U-PHCs. The U-CHC caters to a population of 250000 to 5 Lakhs. For the metro cities, UCHCs may be established for every 5 lakh population with 100 beds. In addition to primary health care facilities, it provides inpatient services, medical care, surgical facilities and institutional delivery facilities. It is a 30-50 bedded facility.

Urban - Health and Wellness Centres

In order to ensure delivery of Comprehensive Primary Health Care (CPHC) services, existing U-PHCs would be converted to Health and Wellness Centres (HWC). Services could also be provided/ complemented through outreach services, Mobile Medical Units, health camps, home visits and community-based interaction, but the principle should be a seamless continuum of care that ensures equity, quality, universality and no financial hardship.

Status of urban health care infrastructure

As on 31st March 2019, there are 5190 U-PHCs are functional in the country. Out of these U-PHCs a total of 1734 PHCs has been upgraded as HWCs. There is a shortfall of about 44.4% of U-PHCs as per the urban population norms. About 70% of UPHCs are located in the government buildings, 27% located in the rented buildings and 3% are located in the rent free buildings.

As on 31st March 2019, there are 350 U-CHCs functional in urban areas of the India. About 96% of U-CHCs are located in government buildings and 4% in rented buildings.

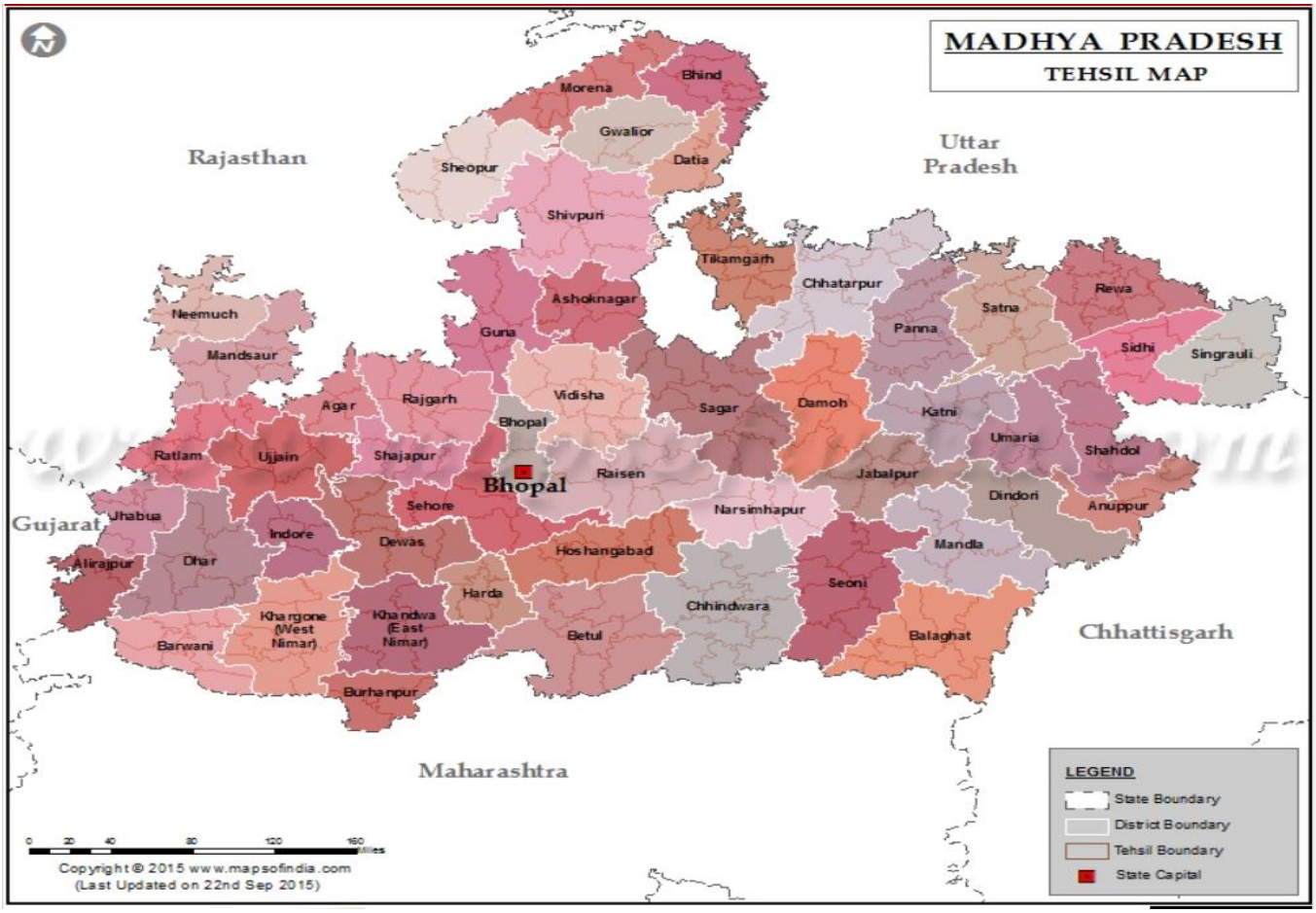
There are 16820 HW (female)/ ANM available at the PHCs & SCs level in urban areas. There are 4457 Doctors, 3549 Pharmacists, 1933 Lab Technicians and 5938 Staff nurses available at U-PHCs. As far as vacancy is concerned there is a vacancy of 16.9% of HW (F)/ ANMs at PHCs & SCs level. There is a vacancy of 19.1% of Doctors, 21.4% of Pharmacists, 29.8% of Lab Technicians and 21.7% of Staff nurses at the U-PHCs. At U-PHC level shortfall has been observed in all the posts. There is a shortfall of 44.3% ANMs at PHCs & 57 SCs. There is a shortfall of 16.7% of Doctors, 24.3% of Pharmacists, 50.9% of Lab Technicians and 22.2% of Staff nurses at U-PHCs.

At U-CHCs there are 1017 Specialists, 713 GDMOs, 192 Radiologists, 468 Pharmacists, 447 Lab Technicians and 4618 Staff nurses available at U-CHCs. There is a vacancy of 36.9% of Specialists, 28.8% of GDMOs, 30.2% of Radiographers, 13% of Pharmacists, 17.3% of Lab Technicians and 17.6% of Staff nurses at U-CHCs. There is shortfall of 45.8% of total specialist, 24.6% of GDMOs, 48% of Radiographers, 16% of Pharmacists, 13.4% of Lab Technicians and 21.3% of Staff nurses at U-CHCs.

CASE Study : MP

Storage And Distribution Location.

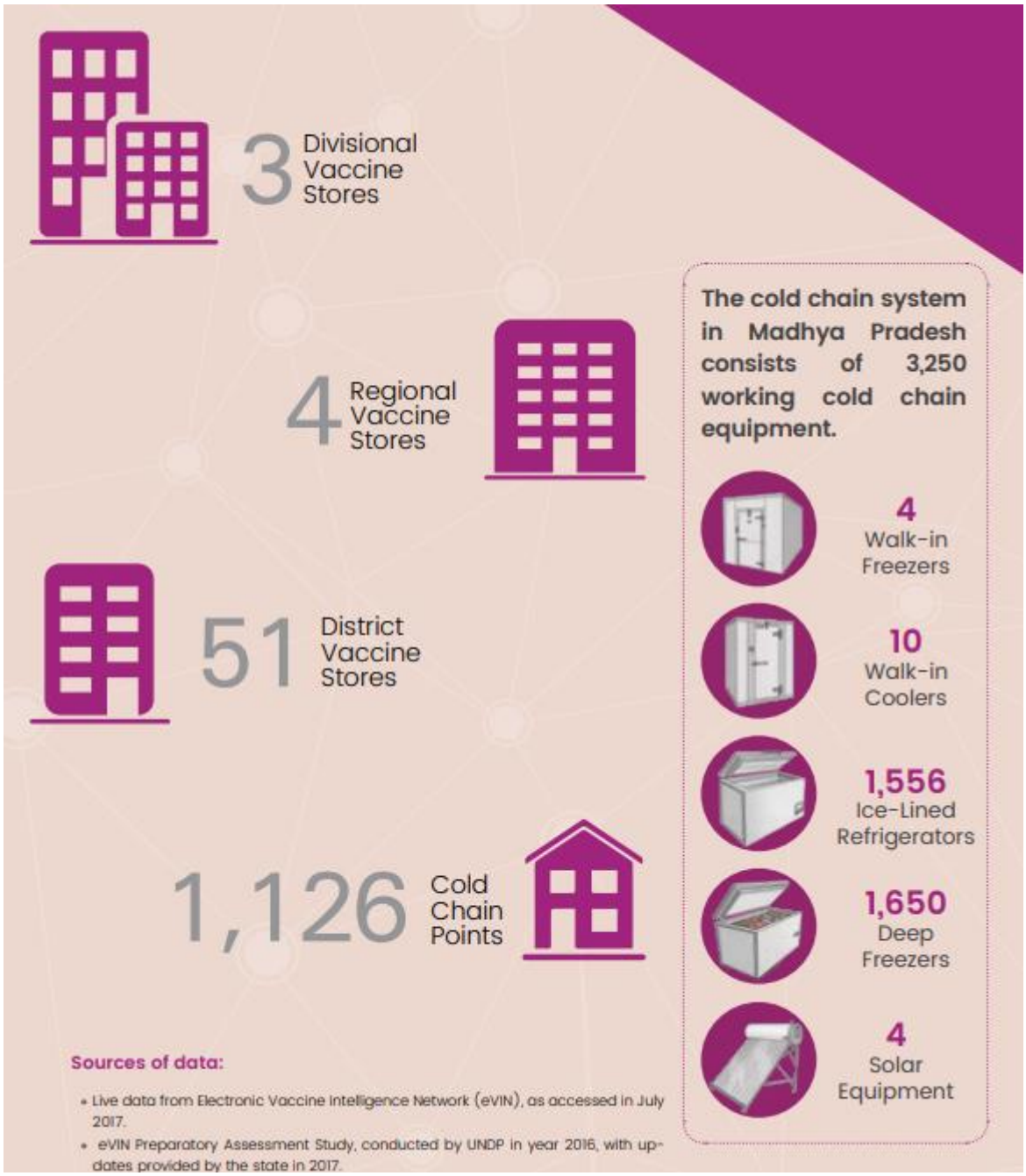
Currently, the number of districts in the state is 52. These districts are grouped into ten administrative divisions. The regions and district in Madhya Pradesh is shown below. In 2000, the state broke up into two, Madhya Pradesh and Chhattisgarh.



Madhya Pradesh the Universal Immunization Programme in Madhya Pradesh aims to immunize a target population of 18.45 lakh children and 21.65 lakh pregnant women, every year. The human resource network to manage vaccines in Madhya Pradesh consists of 58 vaccine store keepers and 1,126 cold chain handlers. They work under the guidance of the State Immunization Officer, the State Cold Chain Officer, Regional Directors, District Immunization Officers and Medical Officers in-Charge.

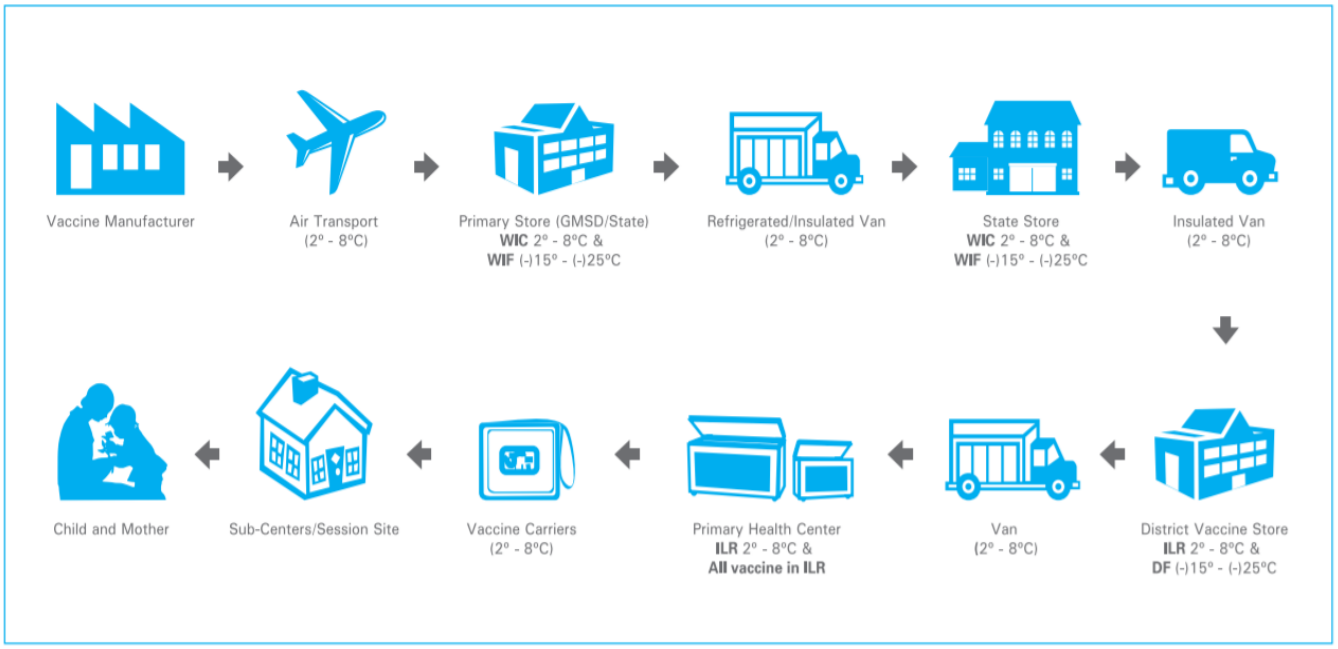
There are several vaccines in the universal immunization program example, BCG, DPT, ORAL POLIO VACCINE, diphtheria, tetanus, pertussis (whooping cough), hepatitis B and Haemophilus influenza type b - pentavalent, rotavirus, PCV13.MR vaccine (measles rubella vaccine.) The vaccines are transported from the manufacturing site to the required state. Coming from Airplane in -70 liquid, frozen nitrogen surrounded by insulating material.

The four regional vaccine stores located at Bhopal, Indore, Gwalior and Jabalpur responsible to the entire vaccine supply in the state. The supply chain is same for all the vaccines except for the Inactivated Polio Virus Vaccine. IPV is only supplied to RVS (Regional-Vaccine-Store) Bhopal, which further supplies it to other RVSs of the state. The buffer stock of all the vaccines is supplied from the government medical stores depot to all regional vaccine stores directly, or times only to RVS Bhopal.



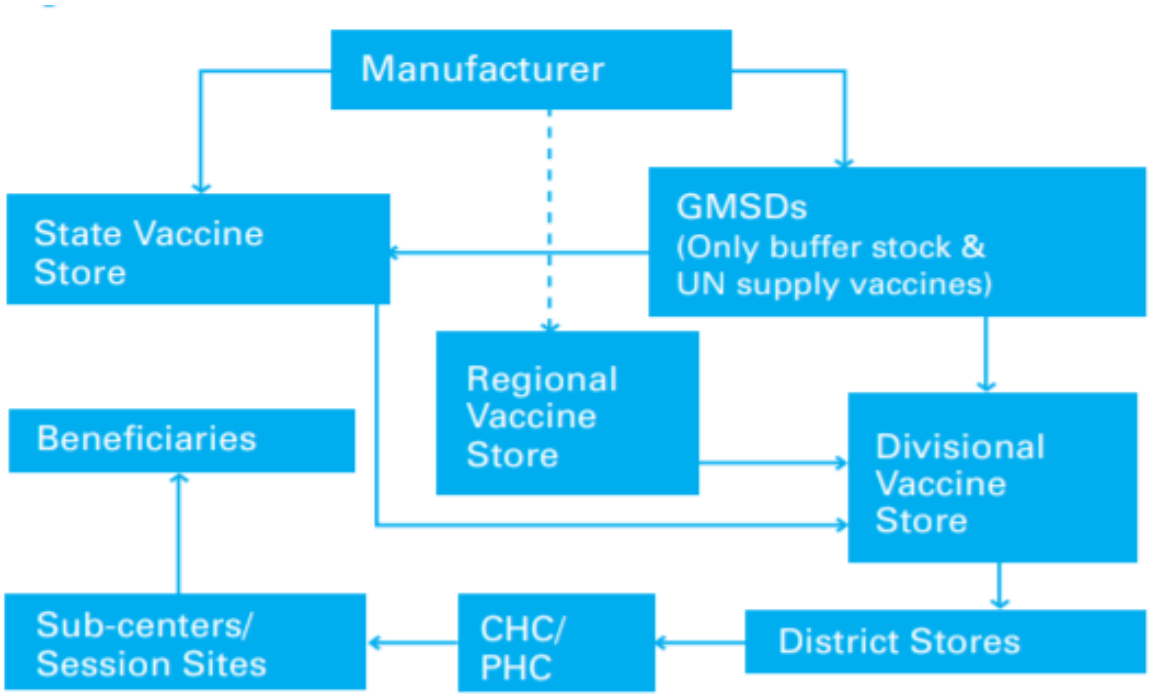
All RVSs supply vaccines to their respective divisional vaccine stores and to the district vaccine stores. The 51 district vaccines stores supply vaccines to the cold chain points located at the community health centres, primary health centres, urban health centres, civil hospitals, district hospitals and medical college hospitals in their respective areasFrom their Vaccine Van with huge cold boxes transport those vaccine to the state store/ Vaccine divisional store (In M.P Bhopal).

Madhya Pradesh have 52 districts which includes several cold storage point. This Cold Storage Point are inside this health facilities. Each district is divided into blocks/Tehsils which have Community Health Center and further in more rural area we have Primary health Center. And as per the population and rural area/villages in that area there are 4 to 8 Sub health Centers. In which Anganwadi/ (Integrated Child Development Services (**ICDS**)) are carried out for vaccination of children less than 6 years.



Anganwadi centre provides basic healthcare. It is a part of the Indian public health-care system. Basic healthcare activities include contraceptive counselling and supply, nutrition education and supplementation, as well as pre-school activities. A booth is created per 250 to 300 children .Where Asha workers bring village children for vaccination.

After receiving the vaccine at the state store. They are dispersed to the regional Vaccine district store. From *there* they are distributed according district vaccine store (CHC) to their needs. From there to PHC and Then SHC's according to their requirement Reported.Carriers are vaccine van with cold storage boxes filled with ice packs for transport between either of the store. Generally in each CHC 4 ILR and 4 deep freezer are maintained. And in each PHC 2 ILR and 2 Deep fridges are maintained, Further in SHC's one ILR and one Deep Fridges are maintained. By vaccine carrier boxes the vaccine reaches the booth, from Anganwadi Kendra.



Cold Chain is a system of storing and transporting vaccine at the recommended temperature range from the point of manufacture to point of use. In order to provide potent and effective vaccine to the beneficiaries a vast cold chain infrastructure is required, which should have a network of Vaccine Stores, Walk-in-coolers (WIC), Walk-in-freezers (WIF), Deep Freezers (DF), Ice lined Refrigerators (ILR), Refrigerated trucks, Vaccine vans, Cold boxes, Vaccine carriers and icepacks from national level to states up to the outreach sessions.

The cold chain system and vaccine flow in the country: - The vaccines are transported from the manufacturer through air transport under the temperature range of 2-8oC to the primary vaccine stores (GMSDs/State head quarter). The cold chain system and vaccine flow in the country: - The vaccines are transported from the manufacturer through air transport under the temperature range of 2-8oC to the primary vaccine stores (GMSDs/State head quarter).

Cold Chain Equipment

The immunization cold chain network of Madhya Pradesh runs on 3,224 working cold chain equipment installed across 1,184 vaccine stores and cold chain points. These include 4 walk-in freezers, 10 walkin coolers, 1,556 ice-lined refrigerators and 1,650 deep freezers. There are four solar equipment in Madhya Pradesh.

Table 1: Working Cold Chain Equipment in Madhya Pradesh

Type of Store	Type of Equipment				
	WIF	WIC	ILR	DF	Solar
Total	3,224				
	4	10	1,556	1,650	4
RVS	4	7	3	20	-
DiVS	-	4	16	10	-
DVS	-	1	233	149	-
CCP	-	-	1,302	1,501	4

Moreover, there are 600 cold chain equipment on stand-by and 183 cold chain equipment under repair. Additionally, around 500 ILRs and 330 DFs are under the process of procurement by the Government of India for strengthening the cold chain infrastructure in Madhya Pradesh.

Non-electrical cold chain equipment.

The state has 2,023 functional large cold boxes, 11,637 functional small cold boxes and 86,191 vaccine carriers currently in use for the transportation of vaccines from stores to CCPs and from the CCPs to beneficiaries.

Human Resource

- Madhya Pradesh has 58 vaccine store keepers and 1,126 CCHs across all CCPs. None of the cold chain points have vacant position for cold chain handlers.
- There is no dedicated position of cold chain handler in the state and it is an assigned responsibility. In Madhya Pradesh, around 90 per cent CCHs are ANMs, pharmacists, MPHWs, LHVs, MPSs or Health Supervisors.
- Nearly one-fourth of the CCHs are qualified upto 10th standard and another one-fourth are qualified upto 12th standard. Nearly 30 per cent of them hold a diploma or are graduates; the remaining hold post graduate qualification.
- All the CCHs have received the training for cold chain handler within the last three years, while 100 per cent of them have received the eVIN training.

Cold chain handlers are provided supportive supervision on a regular basis with emphasis on all significant aspects of the vaccine cold chain.

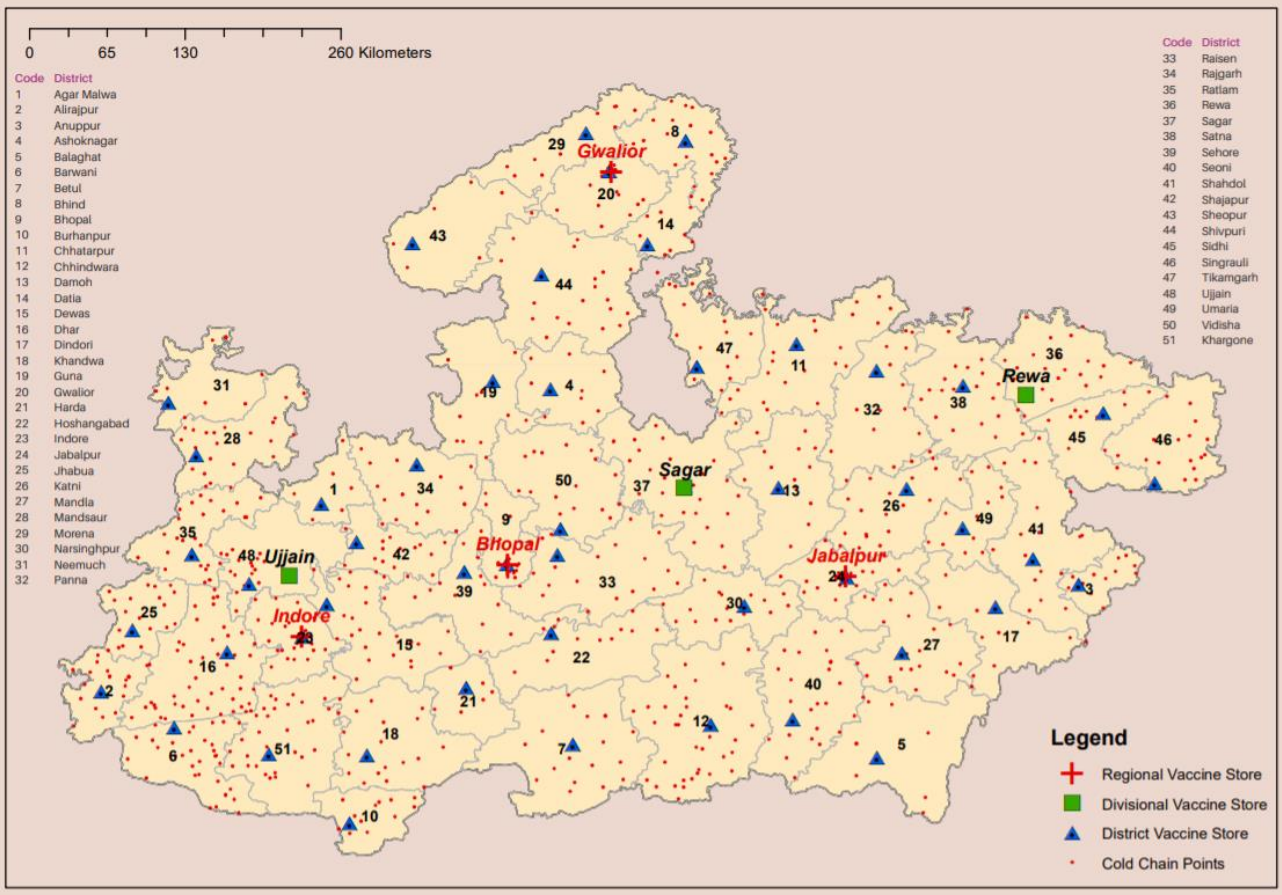


Figure 2: Map of Immunization Cold Chain Network in Madhya Pradesh

Madhya Pradesh: Vaccine Distribution Network