Summer Training Report

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PART 1

A COMPARATIVE STUDY ON THE ASSESSMENT OF ROUTINE IMMUNIZATION IN RURAL AND URBAN AREAS OF GUJARAT

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ACRONYMS

AEFI	Adverse Events Following Immunization
AHS	Annual Health Survey
ANC	Ante-natal Care
ASHA	Accredited Social Health Activist
AWW	Anganwadi Worker
BCG	Bacille Calmette-Guerin
CHC	Community Health Center
DNA	Deoxyribonucleic Acid
DPT	Diphtheria, Pertussis and Tetanus
FHW	Female Health Workers
IRL	Integrated Regional Labs
MDG	Millennium Development Goal
NFHS	National Family Health Survey
NHM	National Health Mission
OPV	Oral Polio Vaccine
PHC	Primary Health Center
RED	Reaching Every District
SDG	Sustainable Development Goal
SRS	Sample Survey Registration
UNDP	United Nations Development Program
UNICEF	United Nations Children Education Fund
VPD	Vaccine Preventable Disease
WHO	World Health Organization

CHAPTER 1- INTRODUCTION

Immunization is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine. Vaccines stimulate the body's own immune system to protect the person against subsequent infection or disease[1]. Immunization is a proven method to monitor and eradicate life-threatening infectious diseases and is expected to prevent 2 to 3 million deaths a year. This is one of the most cost-effective health initiatives, with validated approaches making it available to even the most disadvantaged and hard-to-reach communities. It has specifically identified target groups; it can be easily implemented by outreach activities; and vaccination involves no significant changes in lifestyle[1].

There are two types of Immunization,

- ★ **Active Immunization:**

  Active immunization can occur naturally, for example when a person comes into contact with a microbe. At the process, the immune system must produce antibodies and other microbe defences. Next time, the immune response to this microbe can be very effective; this is the case with many infections in childhood that a person contracts only once, but then is immune[2].

- ★ **Passive Immunization:**

  Passive immunization is when pre-synthesized immune system elements are passed to an individual in such a way that the body does not have to generate these elements itself. Antibodies can actually be used to treat passive immunization. This immunization method begins to work very quickly, but it is short-lived because of the natural breakdown of the antibodies, and if there are no B cells producing more antibodies, they will disappear[2].

Vaccination is an active form of immunization. Vaccination is the administration of a vaccine which helps the immune system improve disease protection. Vaccines include a microorganism or virus in a weakened state, live or destroyed, or the organism's proteins or toxins. They help to avoid sickness from an infectious disease by promoting adaptive immunity for the body. When vaccines have been made against a sufficiently large percentage of a population, the result is herd immunity. There has been thorough research and analysis of the efficacy of vaccination.

Vaccination is the most effective means of eliminating infectious diseases; widespread immunity resulting from vaccination is primarily responsible for the eradication of smallpox worldwide and the disappearance of diseases such as polio and tetanus from most of the world[3].

Vaccines can be broadly classified as attenuated (live) or inactivated vaccines,

- ➔ Live Attenuated Vaccines: Without being used in the vaccine, live vaccines are made using 'wild' viruses or bacteria that have been either attenuated or weakened. After immunization the vaccinated individual replicates (grows) the damaged vaccine viruses or bacteria. This means it can be given a fairly small dose of virus or bacteria to induce an immune response. In vaccine recipients who have a healthy immune system, live attenuated vaccines typically don't cause disease. Typically, it is milder than 'wild' illness when a live attenuated vaccine induces 'disease,' e.g. chickenpox vaccine. Live attenuated injection vaccines usually become effective after one dose. Those administered orally normally require three doses, however[2].

- ➔ Inactivated Vaccines: Inactivated vaccines are made with 'wild' viruses or bacteria grown in a culture medium and inactivated before being used in a vaccine, or produced with a virus or bacteria-derived toxin, protein or polysaccharide (sugar) fragment (subunit vaccines).None of that is active in an inactivated vaccine. The vaccine antigens cannot multiply (grow) or induce illness in the vaccinated person after immunisation. That means that a person with an abnormal reaction to the immune system can be given these forms of vaccine safely. Nevertheless, a person with a compromised reaction to the immune system may not receive the same level of protection as a stable person getting the vaccine following immunisation. Inactivated vaccines normally take multiple doses. Some inactivated vaccines may also need to increase periodic supplemental doses, or to 'boost' disease protection[2].

➔ Subunit Vaccines:

- ➢ Toxoid Vaccines: Diphtheria, pertussis and tetanus toxins are inactivated to create toxoid vaccines[2].
- ➢ Polysaccharide Vaccines: The molecules of polysaccharide (sugar) are obtained from the outer layer of the encapsulated bacteria[2].
- ➢ Conjugate Vaccines: Conjugate vaccines are obtained from the outer layer of encapsulated bacteria use polysaccharide (sugar) molecules and bind the molecules to carrier proteins[2].
- ➢ Recombinant Vaccines: The DNA section for a protein from the disease-causing organism believed to induce a defensive immune response (interest protein) is incorporated into another cell's nucleus, such as a yeast cell. When the cell replicates it has the same structure as the involved protein[2].

1.1 BACKGROUND:

Before vaccines were introduced, people could only become immune to an infectious disease by catching and sustaining the disease. But in recent years, global immunization has gone up measurably with more children being immunized than ever before. Around 86% of the world's kids received vaccines in 2018 that would shield them from polio, diphtheria, tetanus, pertussis, and measles. Currently, immunizations prevent 2 to 3 million deaths per annum[3].

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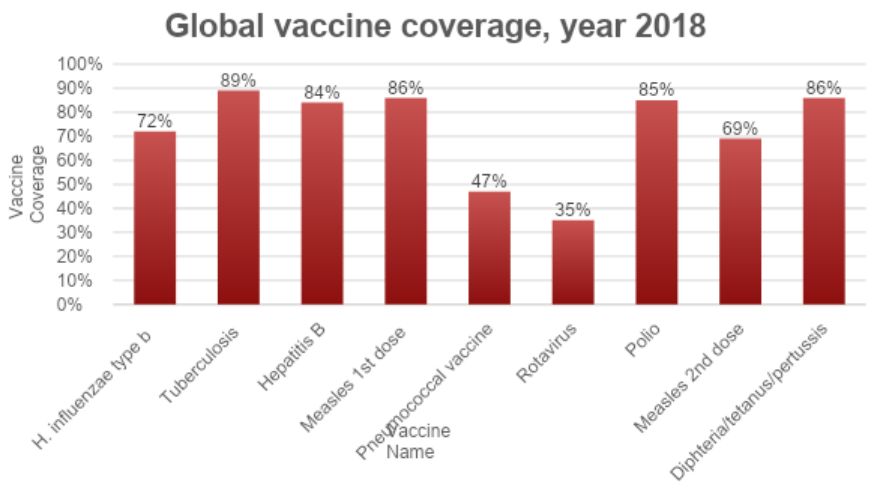
FIGURE 1- Global vaccine coverage, year 2018



(Source: WHO)

Despite this success, every year more than 1.5 million people die from vaccine-preventable diseases worldwide. As per WHO`s Global Immunization coverage report-2018, most-of African countries came across the lowest immunization rate. India`s Global Immunization rank is 127 out of 188 countries with 89% Immunization Coverage[4,11].

In recent years India has made great strides in increasing the coverage of immunization. Estimated coverage for diphtheria, tetanus, pertussis dose 3 (DTP-3) ranged from 59% to 65% between 2000 and 2007, which is widely used as a proxy for general immunization coverage. Since then, coverage of DTP-3 has gradually improved in India. In 2016, DTP-3 coverage was reported at 88% by the WHO. Although this is a major change, the Indian population still has pockets of considerably lower coverage of the immunization[5].

Gujarat, a state in western India, has a population of over 60 million people and is considered to be a medium-performing immunization coverage area. According to either vaccination card or mother's study in 2009, Gujarat reported immunization coverage (one dose of Bacillus Calmette – Guérin(BCG) vaccine, three doses of diphtheria, pertussis and tetanus(DPT) vaccine, three doses of oral polio vaccine(OPV) and one dose of vaccine-containing measles) of 56.6% for children aged 12–23 months[6].

1.2 OBJECTIVE:

The aim of the study is to compare the vaccination coverage in the rural and urban areas of Gujarat.

1.3 METHODOLOGY:

Secondary data was collected from the internet using Google, Medline and PubMed. A variety of data sources, including data collected from various governmental agencies that captured the coverage of immunization information. Some of the major sources that have been used include the Census India 2011, National Family Health Survey (NFHS) 2015-16, WHO/UNICEF joint report on immunization 2017, National Health Mission (NHM) Immunization Coverage.

CHAPTER 2- LITERATURE REVIEWS

The inclusion criteria for the selection of the literature for the purpose of this study are:

1. Research papers related to immunisation status in various geographic locations, economic condition and the possibile reasons for low coverage.

2. Immunization awareness.

Patel T, Raval D, Pandit N. Process evaluation of routine immunization in rural areas of Anand District of Gujarat. Healthline 2011; 2(1): 17

This was a cross-sectional observational study and the main objective of this study was to do an assessment of regular process components of Immunisation such as immunisation training Sessions, cold-chain management and logistics, Mobilisation of the Group, correct procedure of Vaccination etc. in Anand district, Gujarat. The study was conducted in Sub-centre or Anganwadi where immunization sessions are conducted and Primary Health Centres. And results show that about 46% of session sites did not have the list of successful mobilization beneficiaries. Number of mobilizers present during the immunization session was one and/or two in about 78.4% of sessions. Both vaccines were available at just 50% of session sites. 93.2% of Primary Health Centers did not have a formal immunization supervisory program. Sessions were not held as per micro-plan on the date of visit in 29.6% of PHCs out of 44 PHCs.This Survey concluded that if village has more than one AWW / ASHA, all ASHA / Anganwadi staff should mobilize infants from their respective region. BCG vaccine must be submitted at all meetings, irrespective of wastage issues. Problem of FHW or FHW vacant position on leave / deputation should be discussed.

Patel, N., Unadkat, S., Sarkar, A., Rathod, M., & Parmar, D. (2017). Assessment of cold chain maintenance for routine immunization in Jamnagar district, Gujarat. *International Journal Of Medical Science And Public Health*, 1. doi: 10.5455/ijmsph.2018.1130419112017

The key objective of this research was to evaluate cold chain management and logistics for routine immunization in PHCs and community health Centres (CHC).It was a cross-sectional study which took place in November 2013-November 2014 at 20 PHCs and 10 CHCs in the district of Jamnagar using a pre-structured and pretested questionnaire. The finding reveals that at 15 out of 20 PHCs a single person was assigned to run the cold chain, all were qualified and 9 out of 10 CHCs were qualified, with just four of them. 56.7% of cold chain machinery was locked at the time of inspection. Digital thermometers had just 36.7 per cent cold chain appliances. Two PHCs and one CHC contained other sera or vaccines in refrigerators (ILRs) filled with salt. Ultimately, cold chain control was perfectly fine for daily immunization Visited Jamnagar PHCs but some aspects need to be improved, such as internal monitoring, training of all cold chain handlers and alternative energy sources in the event of power failure.

Bhatt GS, Mehariya VM, Dave RK, Mahavadiya M, Rana M, Sharma R, Kumar P. Immunization Coverage in Rural and Urban Field Practice areas of a Medical College of Gujarat. Ntl J of Community Med 2015; 6(3):398-404.

The study 's objective was to classify proportions of fully / partially / non-immunized children, classify/comparison reasons for partial / non-immunization, and recommend corrective steps. Type of this study Based on sample size determined as per District Level Household Survey 3, research included 1749 and 1102 children (2 to 35 months) respectively in urban and rural areas. House to House Monitoring Format for Routine Immunization (WHO) was used with necessary modifications, and Microsoft Excel was used to analyse data. Result of this study shows that among 2851 children, 45.3%(urban) and 32.8%(rural) vaccination cards were available. The proportion of completely immunized children (12-23 months) was 86.4% (urban) and 83.4% (rural) And those "not being vaccinated at all" were 2.3% (urban) and 1.6% (rural). DPT / OPV booster

coverage (24 – 35 months) was 87.5 percent (urban) and 74 percent (rural) were major obstacles when immunization was complete. Reasons for missing doses were childhood sickness, no felt need, fear of adverse after-immunization effects (AEFI), lack of awareness about session site etc. The survey concluded that coverage was higher than national surveys but need to tackle the causes of no / partial vaccines by different measures to take coverage to a level.

Jariwala Priyanka D. Study on Identification of Determinants of Childhood Immunization Uptake in the Urban Slum Population of Nadiad city of District Kheda, Gujarat. International Journal in Management & Social Science 2015; 6(3):114-137.

This was a cross-sectional observational study and the primary purpose of this study was to determine the coverage of immunization, reasons for non-immunization, and determinants of immunization in the urban slums of Nadiad City, Kheda District, Gujarat. Random selection of respondents was achieved with a sample size of 462 women who had children aged 12–23 months. Survey data were gathered by questionnaire accompanied by analysis of Univariate and Bivariate. The finding reveals that children's overall complete immunization status in Nadiad's urban slums is 72%, with 20% partially immunized and 8% immunized. 81 percent mothers had an immunization pass. 91% of children 12–23 months of age received Bacillus Calmette Guerin (BCG) vaccine, 76% received 3 doses of Oral Polio Vaccine (OPV), 77% received 3 doses of DPT (Diphtheria, Pertussis and Tetanus), 78% received measles and 75% received vitamin A. The decrease between BCG and Measles was found at around 14%, while OPV 3 is 11% and DPT3 is 9%. The factors such as the place of delivery, the education of parents, the profession of father, the caste of family have been closely correlated with the children's immunization status. It was found that either partially immunized or non-immunized 28 per cent of the babies. The mothers cited three main reasons: "Unconscious of the need for immunization" (31%), "Unconscious of the need to return for the 2nd and 3rd dose" (20%) and "No faith in Immunization (16%). The study revealed that 28 percent of children in Nadiad City's urban slums are not completely immunized, and that demographic and socioeconomic factors such as literacy, place of delivery, occupation,

caste influence the child's immunization. In order to improve the immunization coverage, the government and the implementing body should take into account the reasons for non-immunization.

Montgomery, J. P., Ganguly, P., Carlson, B. F., Shrivastwa, N., & Boulton, M. L. (2018). An evaluation of immunization services, using the reaching every district criteria, in two districts of Gujarat, India. ***Global health research and policy*****,** ***3*****,** **5.**

This study describes a qualitative assessment of the provision of clinical level immunization services at ten primary health centers (PHCs) located in two districts of Gujarat , India. Assessment requirements are drawn from the policy of Reaching Every District (RED), which seeks to establish a basis for the provision of childhood immunizations. In April 2013, staff from the PHCs were interviewed. Interviews uncovered many obstacles to the delivery of immunization services, including: 1) vaccine and supply storage facilities; 2) Hard to reach communities; 3) Unreliable Internet access; 4) Cold chain equipment malfunctions; 5) Inconsistent immunization records and registries maintained and used. This study concluded that Immunization Service Delivery is a dynamic mechanism that at several stages can encounter barriers. In Gujarat, India, a RED-based assessment of the vaccine delivery system established many points where the system was performing sub-optimally and potential solutions to overcome these problems successfully.

Chintu C. Chaudhari, Geet Gunjana, Khushboo Kiritbhai Modi, Manali Prashantkumar Patel, Nisarg Rajivbhai Thakker, Nilesh Thakor. Immunization status of 24-35 months old children in urban slums of Ahmedabad, Gujarat, India: a cross sectional study. 2016; 4(2): 548-552.

The main objective of this study was to evaluate immunization coverage in the urban slums of Ahmedabad city , India, in children aged 24-35 months. The approach used in

this research is the purposeful sampling process, during July-November 2014 a cross-sectional community-based analysis was conducted in Ahmedabad City's urban slum district (Vadaj district). All 214 children from the area's 24-35 month age group were included after their parents or guardians had taken orally informed consent. The children's vaccination status was reviewed using the Immunization Card. Under situations where the Immunization Card was not available, the mother/parents were asked about the vaccination site to confirm the vaccines being given. Study analysis was done using suitable statistical software. It surveyed a total of 936 households. There were 214 children in the age group of 24 to 35 months. Mamta card or immunization record was available with 145 (73.6%) children's age group mothers aged 24-35 months. In the age group of 24-35 months old babies, vaccine coverage was high for first dose BCG and OPV (96.7%) followed by first dose Pentavalent (95.8%) and second dose OPV (95.3%). Overall, 75.7% of children in the age group of 24-35 months were fully immunized while only 6 children were unimmunized. Dropout rate percentage for the 1st dose of Pentavalent to the 3rd dose of Pentavalent was 3.44 percent, while the 2nd dose of BCG was 19.75% The study concluded that 75.7 percent of full immunization coverage was higher than the national surveys and need to discuss the reasons of no / partial vaccinations.

Khan MF, Kotecha I, Rathod M. Coverage Evaluation of Immunization Services Provided to Children of Age Group (12-23 months) in Urban Slum of Western Gujarat. Natl J Community Med 2019;10(2):108-113.

There are two aims of this research 1) the study was planned to assess the immunization status of 12-23 age group children in Jamnagar urban slum. 2) To ascertain the causes for partial or un immunization and to recognize the specific determinants of immunization. This was a cross sectional study carried out in the Jamnagar urban slums. Two stage sampling methodology was adopted, first stage 30 anganwadi was selected by systematic random sampling and in second stage 7 children (12-23 months) were selected randomly from selected anganwadi. The data were entered and analysed in Epi details 7. The outcome of this study shows that 93.3% of children had an immunization card. Most common place of immunization was a mamma session (93.6%), 3.9% in a private hospital, 2.5% in a government hospital.66.7% of children were fully immunized, 30.5%

were partially immunized. Maternal education, socioeconomic status and order of birth were found to be determinant of low status of immunization. Maximum coverage was observed for BCG (96.67 percent) and lowest for measles (71.4 percent). A lack of awareness was the most common explanation for partial / un immunization. This study concluded that to achieve universal immunization coverage, sustained contact between the health worker and community is required.

Kapoor, R., & Vyas, S. (2010). Awareness and knowledge of mothers of under five children regarding immunization in Ahmedabad. The Journal of Indian Association of Preventive & Social Medicine, 01(01), 12–15.

The main objective of this research was to determine the immunization tolerance and knowledge of Under Five mothers. This was a cross sectional descriptive study. Research carried out in Post-Partum Unit Immunization Centre, VS General Hospital, Ahmedabad. Sample size of this study was 100 Under Five mothers surveyed from March 2009 through May 2009. Result of this study indicates that the respondents' mean age was 28.4 years.72 percent were housewives and 65 percent were Hindus. Of the literate daughters, 83 per cent had some knowledge of VPDs. Of the respondents, 85 percent knew of poliomyelitis and only 15 percent knew of hepatitis B. Vitamin A was not reported to 80 per cent of respondents. Mother's main sources of information on VPDs were 47% Anganwadi Worker & 35% Television. This study concluded that many mothers don't routinely come for their children to be vaccinated. As a result they are missing vaccination due date. Mum's poor level of literacy is a matter of concern. Many of them don't know about the diseases their child is immunized for. While many mothers are not comfortable with the timing of vaccination, some of them adopt the immunization card and come accordingly. There is also a urgent need to plan health education system sessions for mothers under the age of five with an emphasis on vaccination & vaccine preventable diseases (VPDs). The two most important sources that can be used to spread health education messages were the Anganwadi staff and Television.

TABLE- 1 SUMMARY OF REVIEWED LITERACTURE

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YEAR PUBLISHED	PLACE	OBJECTIVE	SAMPLE SIZE/ SOURCE OF DATA	KEY FINDINGS
2011	Anand District, Gujarat.	Assessment of regular process components of immunisation	44 PHC, 88 immunization sessions evaluated	There is a short supply of vaccines with the concern for wastage, which needs to be avoided. Short staffed healthcare facilities
2017	Jamnagar District, Gujarat.	To assess the cold chain maintenance of immunization	20 PHCs, 10 CHCs	5 PHCs and 1 CHC had unqualified personnel in-charge for the maintenance of cold storage. Internal storage required better management even though most fit for daily immunization in the district
2015	Ahmedabad District, Gujarat.	To find fully/partially and non immunized children in the rural and urban areas along with the reasons and measures	2851 Children	Coverage seen in the study was better than that shown in National surveys, yet issues such as partial and no coverage need to be assessed and steps taken accordingly
2015	Kheda District, Gujarat	To find the immunization coverage of the region and the reasons associated	462 women with children aged between 12 and 23 years	28% of the children were either partially or not immunized due to 3 main reasons given my mothers, which are-

		with lack there of.		Lack of awareness about immunization, or the second and third boaster dosage.
2018	Gujarat	To assess clinical level immunization provision in the 2 districts of Gujarat	10 PHCs	Obstacles in immunization included; vaccine storage facilities, reach to communities, poor internet access and cold chain equipment malfunction
2016	Ahmedabad District, Gujarat	To evaluate immunization coverage in Urban slums.	214 children between 24 and 35 month age group	Vaccination coverage higher for 1st dose of BCG and OPV, while dropout rate was higher for the 3rd dose. Overall, 75.7% of Children between the said age group were fully immunized
2019	Jamnagar District, Gujarat	1) To evaluate vaccination coverage in the urban slums 2) Ascertain causes of partial and non immunization	Two stage sampling. First stage- 30 Anganwadi Second stage- & children (12-23 months)	Maternal education, socio-economic factors influenced immunization rate. Partial and non immunization was reasoned with lack of awareness by the mothers.
2010	Ahmedabad District, Gujarat.	To determine immunization tolerance and knowledge of mothers.	100 mothers with children < 5 years of age	Low literacy among mothers was a concern causing poor immunization coverage which could be remedied

				with the help of Anganwadi staff and television

CHAPTER 3- RESEARCH FINDINGS

3.1 Demography:

Gujarat is a state on the west coast of India, with 1,600 km of coastline and 60.4 million population of which male and female are 31,491,260 and 28,948,432 respectively, according to Census,2011. it is the fifth-largest Indian state by area and the ninth-largest state by population. The density of population is 308 km−2, lower than that of other Indian states. According to the 2011 census, for every 1000 males the state has a sex ratio of 918 females, one of the lowest (ranked 24) among the 29 states in India[7, 10].

42.60% of Gujarat 's total population lives in urban areas. The total population living in urban areas is 25,745,083, of which 13,692,101 are males and 12,052,982 are females. The urban population has risen 42.60 percent in the last 10 years. Sex Ratio was 880 females per 1000 males in urban Gujarat regions. For children (0-6) the sex ratio stood at 852 girls per 1000 boys for urban area. The total number of children (0-6 years of age) living in Gujarat urban areas was 29,52,359. 11.47% of total urban population were children (0-6)[8].

Of the Gujarat state's total population, about 57.40% live in rural villages. In actual numbers, 17,799,159 and 16,895,450 were males and females, respectively. The total rural population of state Gujarat was 34,694,609. This decade's population growth trend (2001-2011) was 57.40%. In rural regions of the state of Gujarat, the female sex ratio per 1000 males was 949 while 914 girls per 1000 boys is the same for the child (0-6 age). In

Gujarat there live in rural areas 48,24,903 children (0-6). Child population forms 13.91% of total rural population. The literacy rate for males and females in Gujarat's rural areas was 81.61 % and 57.78 %. Gujarat 's average rural literacy rate was 71.71 %. In rural areas the total number of literates was 21,420,842[8].

TABLE 2- Demographic findings of Mehsana, Ahmedabad and Dahod

Description	Mehsana	Ahmadabad	Dahod
Population	20.35 Lakhs	72.14 Lakhs	21.27 Lakhs
Sex Ratio (Per 1000)	926	904	990
Total Child Population (0-6 age)	237,932	842,518	414,798
Literacy	83.61%	85.31%	58.82%
population density/km2	462	890	584

(Source: Census 2011)[11]

TABLE 3- Demographic comparison between Urban and rural areas of Gujarat

Description	Rural	Urban
Population (%)	57.40 %	42.60 %

Total Population	34,694,609	25,745,083
Male Population	17,799,159	13,692,101
Female Population	16,895,450	12,052,982
Population Growth	9.31 %	36.00 %
Sex Ratio	949	880
Child Sex Ratio (0-6)	914	852
Child Population (0-6)	4,824,903	2,952,359
Child Percentage (0-6)	13.91 %	11.47 %
Literates	21,420,842	19,672,516
Average Literacy	71.71 %	86.31 %
Male Literacy	81.61 %	90.98 %
Female Literacy	57.78 %	70.26 %

(Source: Census 2011)[11]

3.2 Indicators:

The various indicators used for the purpose of this study is as follow:

- **Children age 12-23 months fully immunized (BCG, measles, and 3 doses each of polio and DPT) (%)**

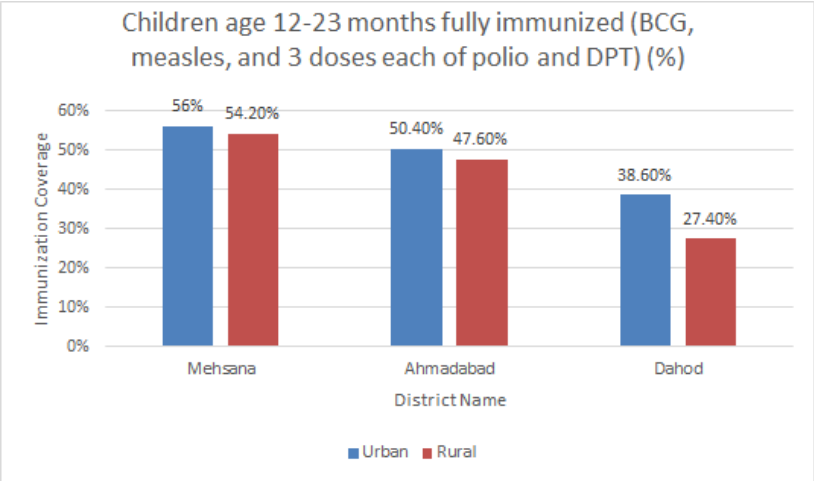
- **Children age 12-23 months who received most of the vaccinations in public health facility (%)**
- **Children age 12-23 months who received most of the vaccinations in private health facility (%)**

3.2.1 Children age 12-23 months fully immunized (BCG, measles, and 3 doses each of polio and DPT) (%) :

In Mehsana district of Gujarat there were children aged 12to23 months fully immunized including BCG, measles and three doses each of polio and DPT was 56% in urban areas and 54.20% in rural areas. In Ahmedabad district there were 50.40% in urban area and 47.60% in rural area and in Dahod district there were 38.60% in urban area and 27.40% in rural area[9].

Lack of awareness about immunisation is considered to be one of the contributing factors to low immunisation rates. Literacy rates in Mehsana, Ahmadabad and Dahod is 83.61%, 85.31% and 58.82% respectively. This could be the reason why Dahod has a lower IR as well as, that seen in rural when compared to Urban. Lack of awareness also leads to partial immunisation, because more often than not parents are not aware of the next schedule. Single one day immunisation camps do help in providing the first shot of vaccination but fail to sustain it in the long run.

FIGURE 2- Graph showing the comparison between the three districts of Gujarat in the rural and urban areas with respect to complete immunisation of children aged between 12 and 23 months of age (%)

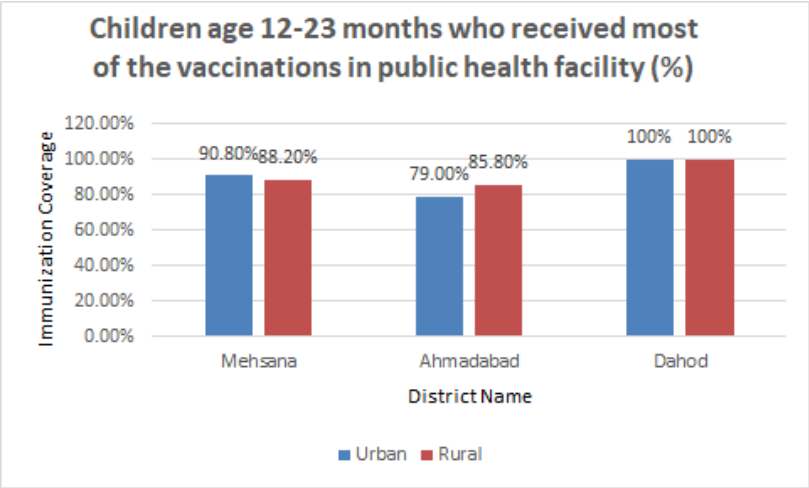


(Source: NFHS 4)

3.2.2 Children age 12-23 months who received most of the vaccinations in public health facility (%) :

The lesser developed city of Dahod depends on public healthcare facilities for the purpose of vaccination, while cities like Mehsana and Ahmadabad to a small extent get vaccination from private hospitals and healthcare facilities as well[9].

FIGURE 3- Graph showing the comparison between the three districts of Gujarat, rural and Urban, with respect to vaccination received in public health facilities (%)

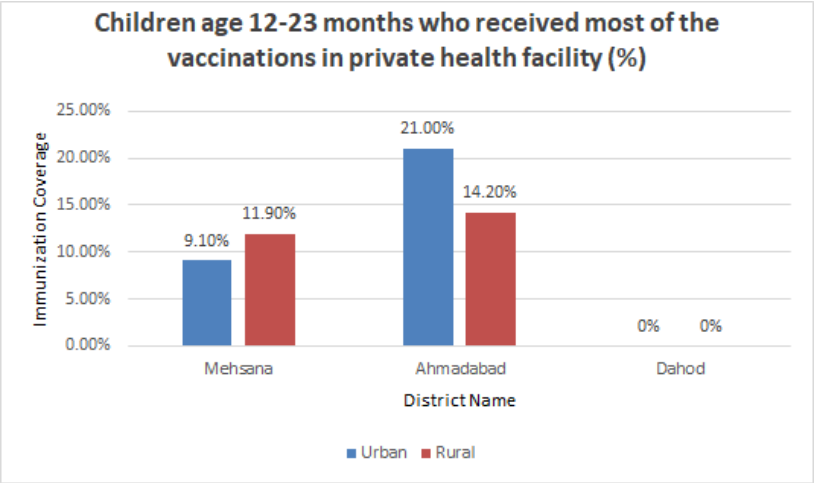


(Source: NFHS 4)

3.2.3 Children age 12-23 months who received most of the vaccinations in private health facility (%) :

Much of Gujarat is dependant on its public healthcare facilities. Due to private healthcare facilities being expensive for most middle-class population of Gujarat, public facilities are used more often by those who do get vaccination done. Reluctance to use public facilities and inability to afford private, could be a one of the contributing factors to low immunization rate[9].

FIGURE 4- Graph showing the comparison between the three districts of Gujarat, rural and Urban, with respect to vaccination received in private health facilities (%)



(Source: NFHS 4)

DISCUSSION

Significant obstacles faced by countries having low immunization rate are:

- **Weak health systems and lack of financial sustainability.**
  Some of the major problems facing countries are poor health services, insufficient facilities, lack of effective intersectoral cooperation and limited coordination for delivering vaccines to the people who need them most. Additionally, insufficient support for immunization programs & financial security frameworks and regular vaccine shortages are some of the other barriers.

- **Inequity gap in immunization coverage.**
  While some countries have managed to reduce the inequity gap, lower rates of schooling, lower incomes, increased distribution of country populations in rural areas, lack of community outreach to generate sustained demand, etc. have resulted in lower rates of immunization coverage among and within communities.

- **Fragile environment.**

Given the success of rising immunization coverage and implementing new and underused vaccines, the African continent still faces problems such as immunity and surveillance shortages, as well as instability in many countries.

CONCLUSION

While the difference in immunisation rates between urban and rural areas of the 3 districts of Gujarat is not staggering, and almost comparable, there is still a difference seen between the districts which could be due to various factors such as human development, literacy rates. Despite being the 4/5th richest state in India, The immunisation rate of Gujarat is in the bottom five being better than only Nagaland, Arunachal, D and N Haveli and Assam. The reason for this could be poor management of public health facilities, unavailability of doctors, disparity between vaccination reaching the public.

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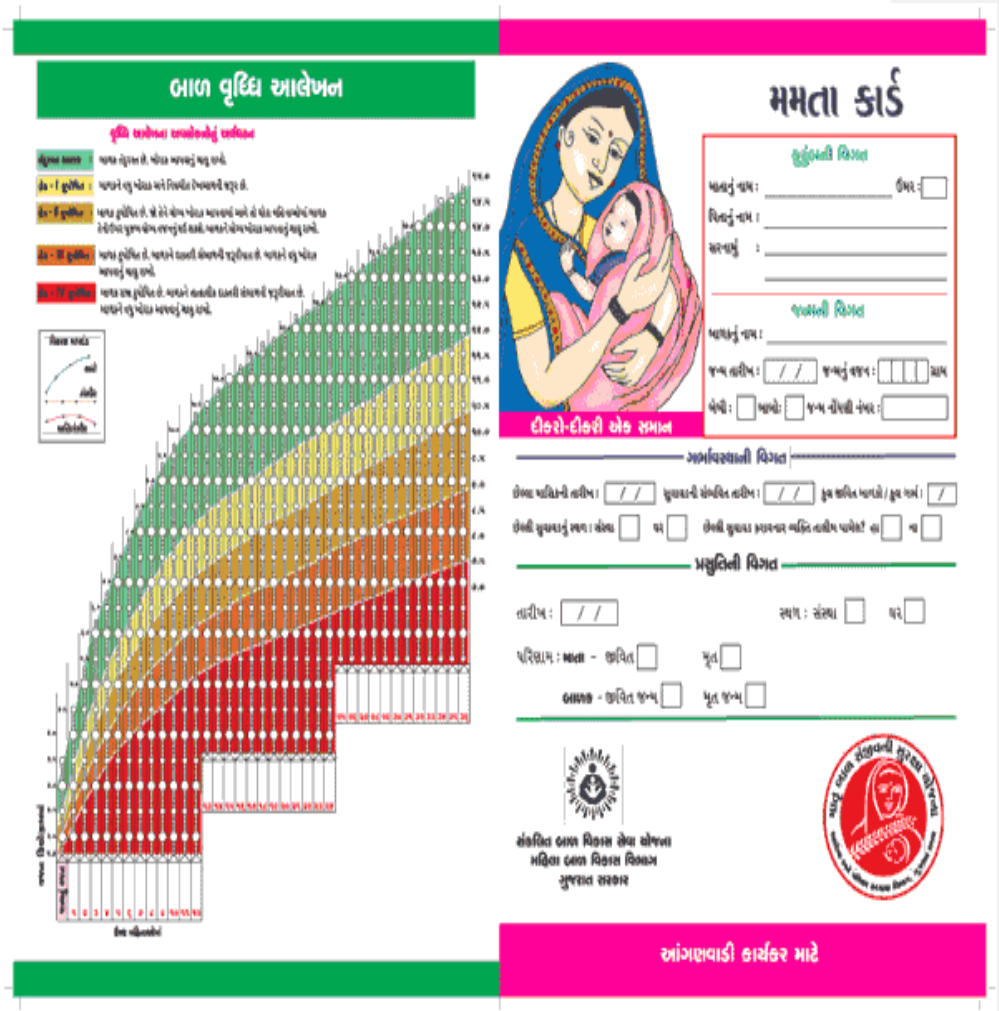
APPENDIX

National Immunization Schedule (NIS) for Infants, Children and Pregnant Women

Vaccine	When to give	Dose	Route	Site
For Pregnant Women				
TT-1	Early in pregnancy	0.5 ml	Intra-muscular	Upper Arm
TT-2	4 weeks after TT-1*	0.5 ml	Intra-muscular	Upper Arm
TT- Booster	If received 2 TT doses in a pregnancy within the last 3 yrs*	0.5 ml	Intra-muscular	Upper Arm
For Infants				
BCG	At birth or as early as possible till one year of age	0.1ml (0.05ml until 1 month age)	Intra-dermal	Left Upper Arm
Hepatitis B - Birth dose	At birth or as early as possible within 24 hours	0.5 ml	Intra-muscular	Antero-lateral side of mid-thigh
OPV-0	At birth or as early as possible within the first 15 days	2 drops	Oral	Oral
OPV 1, 2 & 3	At 6 weeks, 10 weeks & 14 weeks (OPV can be given till 5 years of age)	2 drops	Oral	Oral
Pentavalent 1, 2 & 3	At 6 weeks, 10 weeks & 14 weeks (can be given till one year of age)	0.5 ml	Intra-muscular	Antero-lateral side of mid-thigh
Rotavirus#	At 6 weeks, 10 weeks & 14 weeks (can be given till one year of age)	5 drops	Oral	Oral
IPV	Two fractional dose at 6 and 14 weeks of age	0.1 ml	Intra dermal two fractional dose	Intra-dermal: Right upper arm
Measles /MR 1st Dose$	9 completed months-12 months. (can be given till 5 years of age)	0.5 ml	Sub-cutaneous	Right upper Arm
JE - 1**	9 completed months-12 months.	0.5 ml	Sub-cutaneous	Left upper Arm
Vitamin A (1st dose)	At 9 completed months with measles-Rubella	1 ml (1 lakh IU)	Oral	Oral
For Children				
DPT booster-1	16-24 months	0.5 ml	Intra-muscular	Antero-lateral side of mid-thigh
Measles/ MR 2nd dose $	16-24 months	0.5 ml	Sub-cutaneous	Right upper Arm
OPV Booster	16-24 months	2 drops	Oral	Oral
JE-2	16-24 months	0.5 ml	Sub-cutaneous	Left Upper Arm
Vitamin A*** (2nd to 9th dose)	16-18 months. Then one dose every 6 months up to the age of 5 years.	2 ml (2 lakh IU)	Oral	Oral
DPT Booster-2	5-6 years	0.5 ml.	Intra-muscular	Upper Arm
TT	10 years & 16 years	0.5 ml	Intra-muscular	Upper Arm

(Source: NHM)[12]



(Source: Unicef IEC)

PART 2

Report on Online course-

E-health: More than just an electronic record

By The university of Sydney

1.Name of the Course:

- E-Health: More than just an electronic record
  By. The University of Sydney

2. Course Description:

- This massive open online course "E-Health: More than just an online record!" is multidisciplinary in nature and seeks to empower the global public of health practitioners, teachers, executives, administrators and researchers to focus on the potential effect of eHealth on the transformation of treatment. It discusses the scope of technology use, current and emerging developments, and highlights eHealth practice and research both at the local and international levels.
- The whole E-Health Course consists of 5 modules and is completed for around 5 weeks. Certificates of completion are given after participation of all 5 modules. Completing the health practice assignment in Module 5 entitles you to advanced standing in some of the E-Health courses run by the University of Sydney's Faculty of Health Sciences.

3. Objectives of the Course:

- The fundamentals of E-Health.
- What Kind of Health data we are currently collecting & how it will transform healthcare in future?
- How new technologies are helping health consumers participate in their own healthcare.
- How E-Health can improve the coordination and efficiency of healthcare.

4. Course Contents:

- Week 1 - What is E-Health?
    - In this Module 1, Key question: "What are the eHealth fundamentals, and where are they heading?" you will need to view the video lectures for each lesson to complete this introductory module and complete the four listed ungraded learning activities. It's also suggested that you review the reference module and additional tool list to refine your learning.

- Week 2 - Health in our Hands
    - In This Module 2, Key question: "How are emerging innovations helping customers 'participate' in healthcare?" You will need to watch the video lectures for each lesson and complete the two mentioned ungraded learning activities to complete this module. As per the assignment instructions, you are also expected to complete the graded Peer Review Assignment 1 (40%) for submission.

- Week 3 - Data and the "Quantified Self"
    - In This Module 3, Key question: "What kind of health data are we gathering now and how is it going to transform health care in the future?"

- Week 4 - Interacting with Health Professionals using New Technologies
    - In this Module 4, Key question is "How can E-Health enhance healthcare communication and efficacy, and what are the barriers?"

- Week 5 - E-Health in Professional Practice
    - In the Module 5, key question: "How can the principles and techniques of E-Health be implemented in my own job practice?"

5.Learning Methodology used in the course:

- In this course, online learning provided by following:

- Lecture Videos
- Reading Materials
- Quizzes
- Assignments

6. <u>Key Learnings from the Course</u>:

➢ <u>Week 1 - What is E-Health?</u>

- E-Health is the cost-effective and secure use of ICTs in support of health & health-related fields.
- According to me, E-health is the use of internet & other healthcare technologies to increase access, effectiveness, efficiency & quality of service used by healthcare agencies, patients, healthcare practitioners & customers use HIT to enhance patient health status.
- E-Health is exciting as it helps us to provide our patients with the best possible treatment by allowing all members of the care team to access patient information wherever and wherever they are.
- Consumers are very enthusiastic about the technology, and they use apps to help them track their health, control their health, engage with systems and processes.
- E-Health is essentially the use of technology in medicine and engineering, and any area related to helping people with their wellbeing.

➢ <u>Week 2 - Health in our Hands</u>

- Lots of information that will come out over the next five to ten years will help patients become self-empowered. And being able to get their own

knowledge at their disposal and being able to take it to the various types of health care professionals they see, not just conventional experts.

- Wearables collecting your own data-Now-a-day people use their phones to click blood pressure stats, pulse, weight, BMI connecting via Wi-Fi gets BP results that motivates them to look after their health. Wearable devices which communicate with apps are one of the bigger trends.
- Using apps, mobile devices, sensors, etc. is commonly referred to as mHealth or Mobile Health and some examples of mHealth in education and awareness using it as a help line for providing evaluation, and remote monitoring and data collection support for treatment. These can also be used for monitoring disease and infection outbreaks.
- Governments use the social media to encourage health awareness and to collect data. It can also be used to provide useful knowledge about a number of conditions or to address medical questions. This can also help in interactions between patients, or between patients and health providers, and can also be used to gather data on patient perceptions and views.

➢ Week 3 - Data and the "Quantified Self"

- Digitizing paper records is clearly beneficial. It enables a patient's medical history to be tracked over time. To alert patients for routine or follow up consultations, to monitor patients' vital signs. And overall, to improve the quality of care.
- Predictive Medicine and Precision
- Use E-Health can ensure we can obtain the recorded patient results from patients effectively. We should evaluate and test certain steps in order to achieve a result that is useful to physicians.
- Privacy & Security of patient`s recorded data with encryption.

➢ Week 4 - Interacting with Health Professionals using New Technologies

- Improving health-care coverage.
- Support of health care Professionals by bringing the health communities together.

➢ Week 5 - E-Health in Professional Practice

- There are lot of E-health examples in professional practices:
  - ✓ Medlife
  - ✓ My Physio App
  - ✓ My Home Dialysis
  - ✓ Aarogya Setu App