

Summer Training

Report Part – 1

On

**A REVIEW OF PPTCT PROGRAMME SERVICE DELIVERY IN
INDIA: CURRENT UNDERSTANDING AND FUTURE NEEDS**

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ACKNOWLEDGMENT

Education is not preparation for life; Education is life itself.

“Tell me and I will forget; show me and I may remember; involve me and I will understand.

I am;therefore, I should learn!”

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ACRONYMS

S.No	Acronym	Full-Form
1.	ANC	Antenatal Care
2.	AIDS	Acquired Immune Deficiency Syndrome
3.	ART	Antiretroviral Therapy
4.	ARV	Antiretroviral
5.	ARSH	Adolescent Reproductive & Sexual Health
6.	AZT	Zidovudine
7.	BCC	Behavior Change Communication
8.	CPT	Cotrimoxazole Prophylactic Therapy
9.	DBS	Dried Blood Spot
10.	EBF	Exclusive Breast Feeding
11.	EID	Early Infant Diagnosis
12.	E-MTCT	Elimination of Mother to Child Transmission
13.	ERF	Exclusive Breast Feeding
14.	EPI	Expanded Programme of Immunization
15.	HBV	Hepatitis B Virus
16.	HCT	HIV Counseling and Testing
17.	HEI	HIV Exposed to Infant
18.	HIV	Human Immunodeficiency Virus
19.	ICTC	Integrated Counselling and Testing Centre
20.	MTCT	Mother to Child Transmission of HIV
21.	NACO	National AIDS Control Organization
22.	NRHM	National Rural Health Mission
23.	PPTCT	Prevention of Parent to Child Transmission of HIV
24.	RCH	Reproductive and Child Health
25.	NVP	Single dose Nevirapine
26.	SRH	Sexual and Reproductive Health
27.	UNICEF	United Nations International Children's emergency Fund
28.	VCT	Voluntary Counselling and Testing
39.	WBS	Whole Blood Specimen
30.	WHO	World Health Organization
31.	WFBPT	Whole Blood Finger Prick Test

Part-1

Report on Work from Home Assignment

INTRODUCTION:

With the help of advancing technology and large-scale interventions within the antenatal, intranatal, and postnatal periods, the risk of MTC (vertical) transmission of HIV AIDS can be cut down to as little as two percent. With the acceptance of efficient and potent measures like Antiretroviral remedy or ARV prophylaxis to the HIV infected mother's, avoidable caesarian segmentation and evasion from breastfeeding, etc. In developed nations, this transmission has already reached a negligible front, but the aforementioned techniques are not usually possible in developing nations thereby marking a risk of almost 95 percent chances of vertical transmission. There are demanding situations of availability, affordability, duration and everlasting protection of optimal ARV agents in pregnant women and early neonatal life and the major problem being the transmission of infection during breastfeeding to the newborns where options to breastfeeding are not possible at the field level remains a major challenge for developing countries.^[1]

“Around 13,768 babies infected with HIV are born to an estimated 18,240 HIV-infected pregnant women in India”.^[2] (NACO Annual Report 2018-19). MTCT of HIV, which can occur in the course of childbirth, pregnancy, or by means of breastfeeding, amounts for approximately “4.7% of overall HIV transference in the country,”^[3] (NACO Annual Report 2013-14)” thereby acquiring a major stake in routes of HIV-transmission among children, establishing the necessity of providing comprehensive care of PMTCT services to pregnant mothers to scale down transmission of HIV to their babies. The battle is to reach all pregnant women who use antenatal (ANC) services in all healthcare sectors and to encourage them to reach early in pregnancy, particularly in accordance with the WHO guidelines which requires women to participate in ANC as soon as possible.^[4]

Without any kind intervention procedure, transmission rates of HIV from MTC ranges between 15% to 45% and this rate can be decreased to below 5% with successful strategies during pregnancy, infancy and breastfeeding. These interventions principally involve ART for the mother and a short course of ARV drugs for the infant along with measures to prevent HIV infection in the pregnant woman and proper breastfeeding practices.^[5]

In resource-poor locations even with significant progress in developing and implementing potent interventions to prevent vertical transmission, nearly every day 2,000 infants are infected with MTCT of HIV. The usage and reliability of the robust PMTCT program should be monitored in areas where the prevention of mother-to - child transmission of HIV-1 operations is in effect.

Despite competent and efficient Strategies to end vertical HIV transmission, the execution of such strategies still comes out to be a big challenge for developing countries. In India, there has been an improvement in this domain since 2005. However, the program reaches only a small proportion of pregnant women, and their comprehensive effectiveness is very low.

The PPTCT program has been endorsed in India by the National AIDS Control Organization (NACO) as part of the national AIDS Control Program (NACP) to tackle the prevention, regulation or reversal of the HIV epidemic. The initiative began in 2002 and has now shown a remarkable improvement in HIV diagnosis, testing and treatment. The previous policy recommended the use of only one dose of nevirapine as the drug of choice, as this could minimize the risk of transmission to 12%-15%. Subsequently, on the basis of the WHO's guidelines NACO in September 2012, introduced the triple-drug ARV regimen (option B), first in the four southern high prevalence states of Andhra Pradesh, Telangana, Tamil Nadu and Karnataka, later mushroomed to the entire country. Planted in compliance with the recommendations for all women who live with HIV, irrespective of CD4 counts or the WHO clinical level, to initiate lifelong ART (triple drug regime) to improve their health and prevent HIV transmission to the infant.^[4]

Advancement towards the achievement of worldwide targets for the elimination of perinatal and pediatric HIV treatment and care are a fundamental part of the global and national HIV & AIDS response. This research reports the growth and delivery of the national PPTCT program, its achievements and remaining challenges. A study of the development of PPTCT programs, undertaken since 2010–2019 using current published literature and considering improvements in the HIV care guidelines of the World Health Organization, international HIV goals and priorities, programmatic innovations and the need for strategic collaborative partnership.

This study aims at systematically recapturing and updating existing HIV PPTCT literature and research in India, focusing on research and studies relevant to service requirements and the gaps

in the delivery of the PMTCT program, so as to understand the loopholes which will ultimately enhance program implementation and effectiveness.^[6]

RESEARCH QUESTION?

What is the present scenario of the PPTCT program concerning its service delivery and where do we stand?

OBJECTIVES:

To enhance the performance of India's PPTCT program and achieving the objectives of virtual elimination of pediatric HIV in the country, it's fundamental and essential to come up with acceptable evidence-based ways and therefore it's a prerequisite to analyze the existing released health literature on the PMTCT front in India. This review presents the findings of the literature on PPTCT of HIV in India. The objectives of the review are:

- To assess the functioning of the PPTCT Program service delivery cascade through existing literature.
- To assess the counseling services provided to prevent the transmission.
- To assess the present condition of PPTCT/MTCT of HIV AIDS.
- To study the barriers to treatment access.

METHODOLOGY:

A document review of the existing literature on PPTCT services in India, millennium and sustainable development goals, UNGASS, UNAIDS, WHO fact sheets and estimations, NACO's annual reports as well as NACO's projections and fact sheets were conducted to contextualize the basis and mechanism for the introduction of PMTCT and pediatric HIV care and tracking systems for treatment. Published M&E guidelines on PPTCT and pediatric HIV care and treatment were considered to assess the functioning, regulation, monitoring, and evaluation system. An analysis of recent literature on programmatic innovations was carried out to determine progress on the results and effect of the PPTCT program.

Inclusion criteria for the study on PPTCT of HIV in India were to consider studies relevant for review if:

- The research is HIV linked and the sample population includes pregnant women or children exposed to HIV.
- The stated purpose of the study was specifically related to the service requirements of a PMTCT program, such as counselling and HIV testing, ARV, obstetric care, infant feeding.
- The research target is linked directly to PMTCT services preparation, enforcement or monitoring.
- The research had been carried out in India.

Articles and papers published in the last fifteen years are reviewed for the same.

We plan to exclude studies that do not meet our set objective thus refraining from deviating from the topic.

INTRODUCTION ABOUT PPTCT PROGRAM:

Medical science has triumphed overastounding challenges. The physician's obstinatedesire & wish and the capability of state-of-the-art medicine has conquered the most unmanageable illnesses. However, there are a few obstacles left unconquered. Of such, HIV / AIDS is the most intimidating. India is one of the biggest victims and the mother and child among India's population are the most affected. Medicine; however, is implacable in its pursuit. MTC's transmission of HIV is a grim manifestation of that. Under the aegis of NACO, the 'Prevention of Parent-to-Child HIV Transmission (PPTCT) Program' is a perfect example of the importance of medicine to scale down the rate of HIV in India and eventually eradicate it. The elementaryroot sourceof HIV infection among children is the perinatal transmission of HIV midst pregnancy, delivery, or breastfeeding. The possibility of infected mother transmitting HIV to her childin the absence of any intervention is between 20% and 45% and thatcan be reduced to less than 5 per cent with appropriate interventions in breastfed children.

Government of India is devotedin stamping out HIV and syphilis amongst newborns through universalscreening of pregnant women for HIV as an indispensableelement of the ANC service package. To achieve thisobjective, on-going PPTCT services are being executed in close alliance with the Reproductive and Child Health (RCH) Program of the National Health Mission (NHM).

Even pregnant women coming direct-in-labor and breastfeeding women should be tested for HIV and syphilis, if not tested during pregnancy.^[7]

The Goals of the PPTCT Program is in tandem with World Health Organization specification for a synoptic strategy. “The National PPTCT program recognizes four components important and integral to preventing HIV transmission among women and children. These are:

Prong 1: Primary prevention of HIV, principally amid women of childbearing age.

Prong 2: Preventing inadvertent pregnancies among women living with HIV.

Prong 3: Preventing HIV transference from pregnant women infected with HIV to their children.

Prong 4: Offer care, support, and treatment to women living with HIV, her children, and family in women in childbearing age i.e. providing the overall package of PPTCT services ^[8] (National Guidelines for PPTCT)

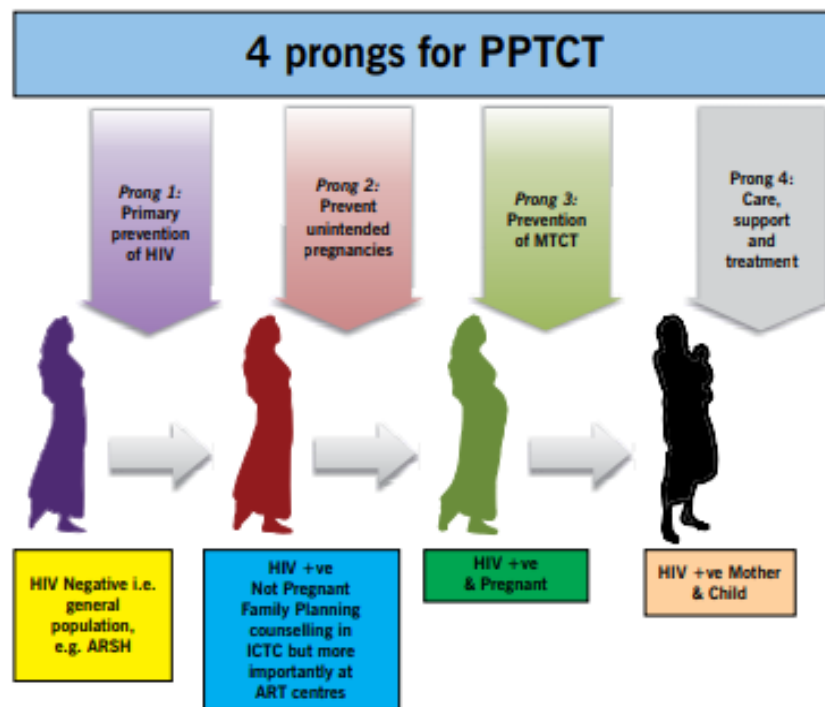


Fig 1: Four Prongs for PPTCT

The PMTCT-services promote safe birth and proper infant feeding practices and offers virologic surveillance to infants exposed to HIV post-birth and breastfeeding and ART for HIV prevention and successful treatment.

PPTCT program was started in India in the year 2002. As on March 2019, 29,977 ICTCs in the country offer PPTCT assistance. The program aims to introduce HIV testing and treatment to cover all pregnant women in the country systematically, to cover all expected HIV positive pregnant women and to eradicate vertical HIV transmission. NACO decided to implement EID service through all (fixed) SA-ICTCs across the country during fiscal year 2015-16. This serviceability is currently accessible over all SA-ICTCs (5,412).

The PMTC assistance is administered through the Integrated Counselling and Testing Centre's (ICT). After the release of National HCTS Guideline in Dec 2016 the terminology of ICTC has been changed to HCTC Centre's with a vision and mission of universal coverage of HIV testing & counselling in the country, to supplement the detection of all HIV-positive pregnant women and to wipe out parent-to-child transmission. Different

type of HCTC's include: Mobile ICTC, Public-Private Partnership ICTCs (PPP ICTCs), Facility Integrated Counselling and Testing Centre's (F-ICTCs) and Case Based HIV Surveillance (CBS) including Village Health Nutrition Day (VHND)

1. Stand-alone ICTCs: These are NACP-backed HIV testing and treatment serviceability in the form of personnel (Counsellor & Lab Tech), and appropriate resources for preparation and scheduling. These centers perform confirmatory and confirmed HIV tests. In general, these centers are in Medical Colleges, District Hospitals, Taluk Hospitals, and Community Health Centres.

2. Facility Integrated ICTC(F-ICTC): The centers only perform HIV screening tests with Whole Blood Finger Pricks, and a stand-alone ICTC will be assigned to any patient who has shown a positive sign. These centres are found at PHCs these types of centres. Within this model both the private / NGO facilities run.

3. Screening Centre's: These are health facilities, which provide advice on counselling and HIV screening with whole blood finger-prick tests in existing healthcare facilities. Through the WBFPT, these centers only administer an HIV check and any patient who has been confirmed to be positive is transferred to a Stand-Alone ICTC for evidence. These centers are usually stationed at Primary Health Care Centres and Sub-Centers.

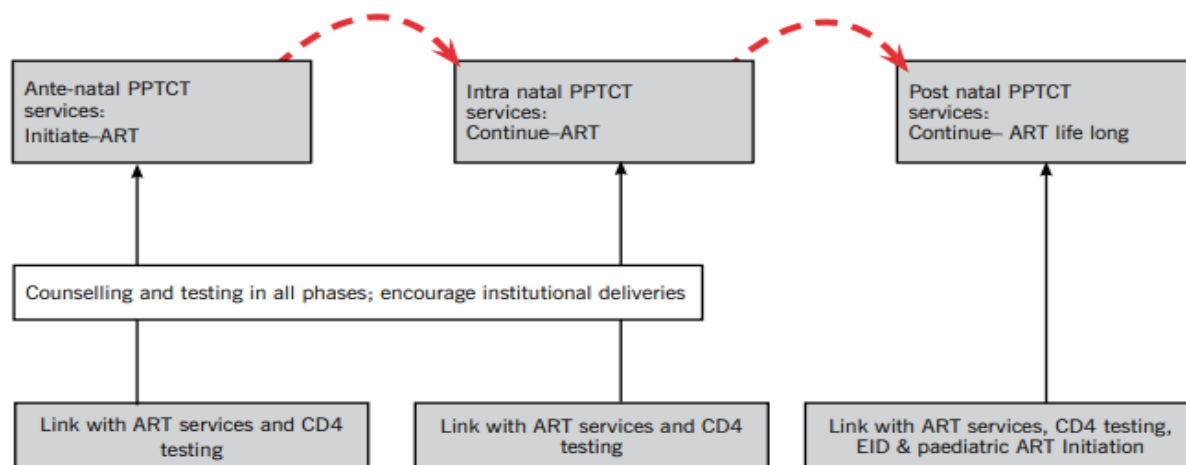


Fig 2: Sequence of care for HIV infected pregnant women

A substantial reduction of new pediatric infections can be accomplished by a high coverage of highly qualified PPTCT therapies, a substantial documentation is present for it. In 2013, the World Health Organization (WHO) laid down new guidelines which proposed that all pregnant women living with HIV should receive lifetime triple ART regardless of the number of CD4 cells. The new (B+) option resulted in a significant decrease in vertical HIV transmission and maximum coverage for those needing health and durable & stable survival treatment. This strategy has also prevented 'stopping and starting ART' with repetitive pregnancies, catering early protection in future pregnancies from MTC transmission, reduced the risk of transferencetoserodiscordantmale partners of these women and diminished drug resistance. Choice B+ also granted additional advantages, including streamlined choice of ART regimes and the provision of resources and compliance with existing ART programs.^[4]

Since first recognized, HIV/AIDS amain public health challenging problem all over the world has claimed more than 34 million lives. A 35% drop in new HIV infections has been contributed by successful and efficient treatment, early diagnosis and public awareness campaigns and a 24% scale down in AIDS-related deaths between 2000 and 2015.^[9]

Overview of the HIV/AIDS Epidemic:

“In 2017, there was an estimated adult (15-49 years) prevalence of 0.22% [0.16-0.30] in India. Around 21.40 lakh PLHIV were living in the country. Almost 97% of the total PLHIV comprised of the 15+ years, age group. Females constituted 42% of estimated PLHIV (15+ years).

87.58 thousand people were newly infected with HIV in 2017, while 69.11 thousand PLHIV died from AIDS-related causes in the same year. Adults (15+ years) constituted around 96% of new HIV infections and AIDS-related deaths. Females constituted 40% of new HIV infections (15+ years) and 31% of AIDS-related deaths among them (15+ years)”. (NACO Technical Report 2017)

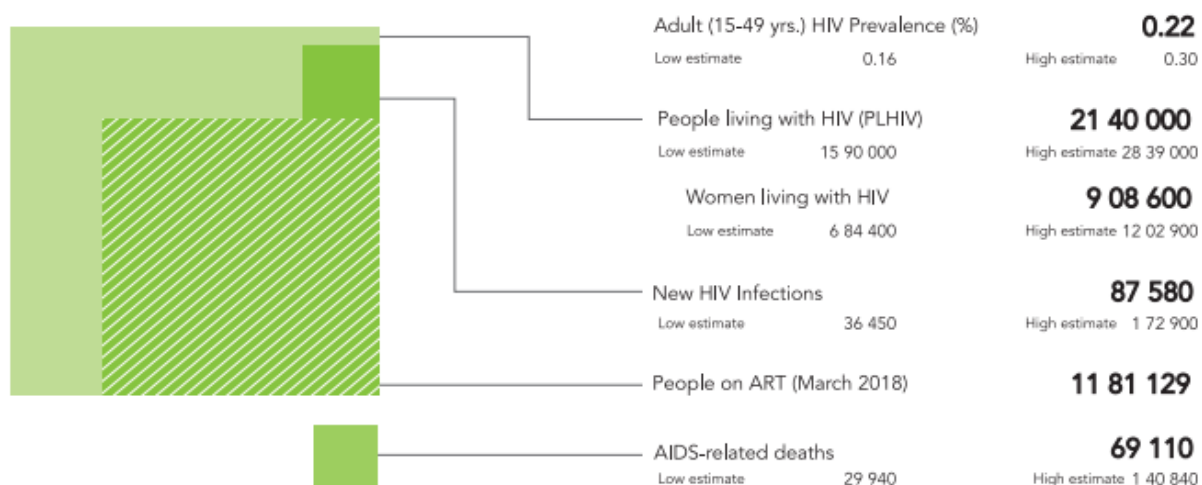


Fig 3: Outline of AIDS in 2017. (Source- NACO Technical Report 2017)

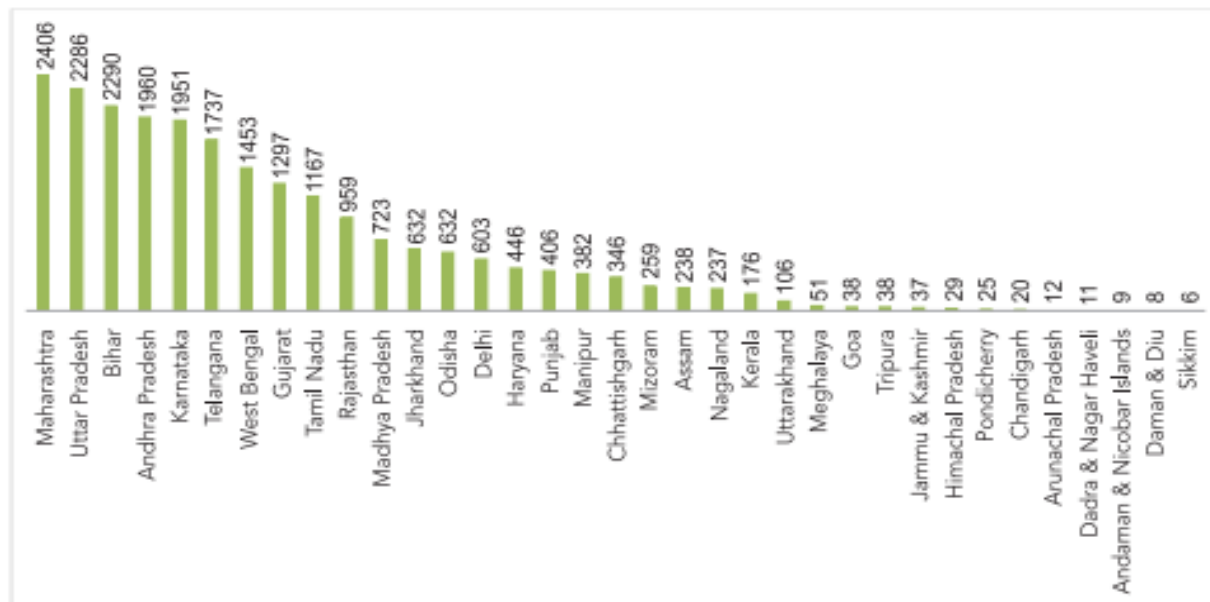


Fig 4: State/UT Wise PMTCT need in India in 2017, HIV Estimations 2017 (Source- India HIV Estimations 2017 technical report)

From January 2018 to March 2019, India is predicted to have had around 18240 (11,839 - 6,401) HIV positive women who gave birth during this period and required prophylaxis for PMTCT of HIV. State-wise, PMTCT service were needed maximum in Maharashtra followed by Uttar Pradesh, Bihar, Andhra Pradesh, Karnataka, Telangana, West Bengal, Gujarat, Tamil Nadu, and Rajasthan. These 10 states together make up nearly 3/4 of the total country's PMTCT needs.

MTCT of HIV rates has been shown to have an extensive diversification in different populations. In the USA and Western Europe in crude population, the transmission rates have ranged between 15% and 20% on the contrary in developing countries percentage as high as 40 percent have been reported. In comparison to HIV – 1, transference of HIV – 2 from MTC turns up to below with not many reports on pediatric HIV – 2 infections from MCT. Incidentally MTCT of HIV can occur antenatally (in utero) accounting for 25-35% of the total transmission of infection, intrapartum (during labor and delivery) accounting for 70-75%, or postpartum (breast-feeding). “Dunn et al in a meta-analysis estimated that the rate of transmission attributable to breastfeeding worldwide from HIV is 14% (95%CI 7% to 22%)”.^[17]

A Joint Guidance from the NACP and the NRHM articulated the idea that compulsory HIV screening should be included in the routine prenatal care program, ensuring that pregnant women with HIV-diagnoses are paired with HIV-related health services, avoiding transference to their child. WHO proposes providing lifetime ART for all HIV-positive pregnant and lactating women, which not only leads to elimination of perinatal transmission but also greatly increases the health aspect of women and avoids the spread of diseases to their partners. It remains a challenge to meet this in the risk group. As many as half of all women who are pregnant in India do not give birth in the institutional setting, especially in poor rural areas, and therefore, although hospitals offer HIV services, they can probably never access the HIV test.

Guidelines released by WHO in 2016 recommends that MLHIV who are on medication and are completely assisted to accommodate the care should only breastfeed their children for the beginning of 6 months of life, and then harbor, during breastfeeding for at least 12 months, and up to 24 months or longer, appropriate complementary food. (comparable to the general population).

Where the ARV medications are not ready or available immediately, the WHO guidelines still recommend that mothers breastfeed exclusively for the first 6 months of a child's life and proceed with alternative food unless natural / social conditions are healthy or supportive. This decision must be positioned on global guidelines and debate on:

- Social and cultural backgrounds of demographic groups and areas served by health services for mothers and children.
- The availability and accessibility of quality of health services
- Native disease epidemiology, including pregnant women with HIV
- Key causes for mothers and children's under-nutrition and infant and child mortality.^[10]

Due to the wide access to formulation feed, clean and boiled water, most high-income countries advise women not to breastfeed even if they are virally suppressed or not. Therefore, danger has been reduced if polluted water or malnutrition exists. However, in low and middle-income countries these risks are far greater, ultimately expressing the need for different policies for different regions.

HIV exposed infants are 75 percent or less likely to die from an AIDS-related illness if the infant is administered with ART within the first twelve weeks of life.^[11] This is one of the reasons the World Health Organization recommends that children born to mothers who have HIV should be screened in four or six weeks of birth, generally referred to as the 'Early Infant Diagnosis'.^[12] WHO also recommends the second HIV test at 18 months, in addition to the preliminary examination, for the final diagnosis of child who is breastfeeding.^[13]

All infants testing HIV positively should receive treatment immediately in accordance with the WHO guidelines. The treatment should be paired with the moth which can be as follows:

- Breastfeeding: from birth to six weeks, nevirapine should be given once daily to the infant.
- Replacement feeding: nevirapine (or zidovudine twice daily) should be given once a day before four to six weeks from birth.^[14]

“As PMTCT is not 100% effective, elimination of HIV is defined as downsizing the final HIV transmission rate to 5% or less amid breastfeeding women and to 2% or less among non-breastfeeding women by 2020”. (World Health Organization)^[15]

The Sustainable Development Goals (SDGs) are formulated to achieve the elimination of AIDS as a threat to public health by 2030. India is committed to this aim by its NACP as a supporter. National Health Policy (NHP 2017) and National Strategic Plan 2017-2024 reiterate the goal of achieving the elimination of AIDS through a well-designated road map. “The 2020 targets are: -

- (i) To attain a reduction in new HIV infections by 75% from the standard value of 2020
- (ii) To attain the treatment target of 90-90-90,
- (iii) To eliminate vertical transmission of HIV and Syphilis by 2020, and
- (iv) To eliminate HIV/AIDS-related stigma & discrimination by 2020.

These targets are in step with global fast track targets accelerating to end the AIDS epidemic by 2030.”(NACO Technical report 2017)^[16]

Presumably, in few states of India, the proportion of HIV infection among women and children is increasing due to complex socio-cultural problems which limit the effectiveness of prevention

programs. The social, mental and economic implications of HIV-positive women remain a challenge in India. Gender inequality and women's low status limit access to resources. Women are helpless and unable to defend themselves because they cannot discuss safe sex either within or outside marriage.

The most important form of HIV transmission among children in India is Vertical transmission. Therefore, the package of PPTCT services must be given to these infected pregnant women to reduce the spread of HIV into the child. However, the biggest challenge is to reach all health care centres where the infected pregnant women are having the antenatal care (ANC), and to reach at appropriate time in pregnancy, especially in line with the WHO guidelines.^[4]

As India is a country that cultivates breastfeeding, and a significant number of infants are breastfeeding until the age of two, it poses a challenging front for healthy HIV breastfeeding practices.

The misconception that HIV only affects men who have sex with men, sex workers and drug users is a stigma that has no bounds for the women with the diagnosis of HIV. Off times women are also kept liable for infecting the remainder of the family, they are ostracized and shunned from families, communities, workplaces and faculties with their children. Stigma and discrimination also quite common inside the health sector. “Negative attitudes amid healthcare employees forestall individuals from revealing their status or seek treatment (Solomon et al, 2016)”.

There are problems with incompetent and meager healthcare's' training, which leads to high stigmatization against HIV / AIDS individuals, dispiriting women from revealing their status and from attempting to seek treatment.

Development in the PMTCT of HIV:

Several countries have now accomplished the elimination brink for MTCT of HIV and syphilis. “These are Belarus, Cuba, Thailand and Malaysia, Anguilla, Antigua and Barbuda, Bermuda, Canada, etc.”. Armenia has progressively eliminated vertical HIV transmission, and the Republic of Moldova has eliminated vertical syphilis transmission.^[18] (UNAIDS (2018)

Improvement in the key planning areas are outlined below:

A) Preventing new HIV infections among women of reproductive age:

Globally new HIV infections have depreciated overall in women of reproductive age by just two percent between 2010 and 2015 and 6 percent in adolescents and young women (15 to 24 years), an age group with the main risk of HIV.^[19]

The documentation has highlighted a cycle of HIV infection among the elderly and young people who may be active in many high-value situations: young women usually get HIV from adult men and then transmit it to adult men in a peer group as these young women become older, thus repeating the cycle. Gender disparities and detrimental gender norms establish this cascade. Economic dependency, a scarcity of knowledge and abuse against intimate partners diminish women's desire to participate in healthier sex and maintain body autonomy.

This infection cycle is being tackled by various HIV prevention programs. For instance, the SAMPARK in India, SheConquers in South Africa which are established with an aim to reduce the number of new HIV infections, youth pregnancy and sexual violence between young boys and girls, to increase and retain and young girls in schools and to increase economic opportunities for young girls, especially young women.

Also important are HIV and contraceptive learning. Research shows that specific sex education initiatives with a focus on sexual rights and the dynamics of social dominance are five times more potent and powerful than those that do not reduce HIV and STIs.

B) Preventing accidental pregnancies among WLW HIV:

One of the paramount factors for PMTCT is family planning. The number of children born with HIV can be reduced when women living with HIV are encouraged to consider family planning if women do not have children, also a pregnancy-related complication in HIV-positive women poses a greater risk than women who are not positive. In 2015, the World Health Organization reported that a total of 4,700 maternal deaths were indirectly from diseases linked to AIDS.^[20]

Sub-Saharan Africa is the leading country in the world in the area of HIV pregnancies as well as in unmet need for contraceptives.^[21]

Studies have shown that women living with HIV have higher unmet need for family and reproductive health services, than for the general population because of their lack of involvement and engagement in comprehensive family planning and services.

Over the last decade, significant progress has been made in the collaboration of HIV services with family planning services, which is one of the main approaches for the elimination of HIV. In 2017, a systematic review of the literature documented the increased incorporation of family planning into HIV treatment and counseling services using modern methods like contraceptives and education among women living with HIV. The effect was nevertheless more limited in fulfilling the unmet family plan needs and even at the integrated sites the level of need was extreme.^[22]

C) Preventing vertical HIV transmission:

In the 23 UNAIDS priority countries, since 2010, 1.4 million infections among children have been prevented.^[23] In 2017, however, the number of children infected with HIV increased to 180,000, with a broad majority by vertical transmission.^[24]

80 percent of pregnant WLW HIV were administered with ART in the same year. Nine of the 23 priority countries of UNAIDS have met or have almost achieved the target of placing 95 percent of pregnant WLW HIV on lifelong ART.^[24]



Fig 5: Percentage of Pregnant Women in Priority Countries Receiving ART (Source-UNAIDS 2018 Estimates)

Components under basic services of NACO division includes:

1. Early Infant Diagnosis (EID)

2. Quality Improvement Initiatives

2.1. Supervision and Monitoring Mechanism:

2.2. Quality assurance and EQAS: Internal and External Quality Assurance Scheme (EQAS) monitors the diagnostic services provided by ICTC's

2.3. Supply Chain Management: A strong monitoring mechanism for inventory management also plays a role. At the national level, the inventory requirement for all items is tracked weekly, quarterly and annually.

2.4. PLHIV ART Linkage System (PALS): NACO has established the PALS system in India for HIV positive individuals, pregnant women, and their children to track, monitor and monitor services offered to them. All states / UTs have PALS and software documents data in it.

2.5. Community Based Screening Approach: CBS is an effective tool for improving early diagnosis and targeting first time clinicians and people with limited use of health services, particularly those in high-value regions and HRG groups. CBS OF HIV is being carried out through a variety of strategies to increase HCTS connectivity and coverage, such as-1) Mobile HCTS; 2) Screening by ancillary health providers (ANC).

2.6 Achieving Elimination of Mother to Child Transmission of HIV (EMTCT): An estimated 10.4 Lakh women who live with HIV become pregnant every year around the world, and 15-45% of the virus can spread to children during pregnancy, childbirth, and lactation without any intervention. This risk decreases to only 1 percent if both mothers and children receive ARV medications at appropriate and sufficient stages. Because treatment is not 100 percent successful for preventing MTCT, the removal of transmission has been characterized as a reduction in transmission to a low level that no longer involves a problem with public health. India is an authority to complete the HIV and Syphilis EMTCT by 2020. An agenda and roadmap were drawn up and continuously built under the new NACP to achieve EMTCT.^[2]

RESULTS AND FINDINGS: -

1. Barriers to the uptake of PMTCT programs:

In tandem with the scale-up of PPTCT services, several barriers that restrict the services also need to be addressed to enhance access to these services. The association between HIV and MTCT awareness and the use of related services has been identified in several studies. For example, research in Togo has shown that 92% of participants have taken HIV tests where:

- 77% of pregnant females accept that the risk of HIV transmission to their children has risen through unprotected sex.
- Sixty-one percent accepted that their child had a higher risk of HIV transmission for mixed breastfeeding than exclusive breastfeeding. ^[25]

Factors associated with competent HIV knowledge includes higher education, higher income, urban living, HIV knowledge, HIV testing or knowledge of where to search for HIV.

- **Knowledge of HIV status**

For pregnant women to have access to proper treatment for themselves and their infants, knowledge about HIV status is critical. Being unaware of the status of an adult HIV acts as an obstacle to PMTCT services. If the test is positive, the time when women get an HIV screening also affects their journey through PMTCT.

- **Confusion over exclusive breastfeeding**

There is some ambiguity about the best way of breast-feeding among women who live with HIV. This generally stems because women follow the recommended feeding approach of national or sub-national advice.

- **Demographic and economic factors**

Poor or inadequate education, the economic dependency of women, and lack of support from partners especially to women who have HIV uninfected partners.

- **HIV stigma, discrimination, and PMTCT**

Stigma and prejudice linked to HIV impact the decision of a pregnant woman to choose and support for PMTCT service. The snowballing effects of stigma worldwide have been estimated to be responsible for over 50 per cent of vertical HIV transmissions.^[26]

Another impediment is due to the psychological challenges of an adult HIV diagnosis, such as a shock, a disease negation, depression or concern of side-effects management, and a lifetime engagement to care, etc. which ultimately hinders ARV uptake.

At the community level stigma and fear of telling people plays a major role. Lack of partner support also ultimately paves for non-accessibility and adherence as women generally experienced violence and separation and abuse after sharing the result with their partners. A survey of 60 people working with PMTCT in Maharashtra highlights the stigma as the primary and most persistent issue faced by HIV positive women in pregnancy and breast-feeding.^[27]

Trained peer support from fellow mothers has shown to have a positive influence on overcoming these issues, including anxiety and loneliness, maternal breakdowns and mental health.

- **Stigma in healthcare settings**

Women living with HIV experience stigma, discrimination, and abuse even in healthcare settings, when they seek maternal healthcare. These included physical abuse, treatment without consent, non-confidential care, disapproval of care, delay in care, and facilities.

The International Community of Women Living with HIV reports about how HIV women are discriminated against by service providers by extra glove and bleach, when they negotiate with them and when they ask them not to approach suppliers, etc. Such activities generate anxiety and cause many women to avoid ongoing treatment and access to PMTCT services.^[28]

- **Hard to reach populations**

Stigma and injustice in healthcare services, opposing policy environments gender inequality, and accessibility affordability to PMTCT services for women play an important role in treatment unacceptability.

- **Country and clinic resources**

In resource-destitute settings, scarcity of the clinical as well as non-clinical personnel, the shortfall in counseling services, delays in care and procurement and logistics of medical equipment, all act

as obstacles to PMTCT services. These factors generally lead to long waiting times for post-test counseling time, overcrowding, and many women, therefore, leave without getting their HIV test results.

Bad management and tracking of PMTCT facilities by health staff also contributes to low treatment retention.^[29]

Inadequate resources for point of care testing together with poor knowledge among healthcare providers and mothers & caregivers hamper the importance of virologic testing, especially EID. HIV treatments for mothers and children are tracked separately in many healthcare settings instead of as a couple, which presents a further obstacle to successful EIDs.

- **Cultural belief and gender dynamics**

In various settings especially in a patriarchal country like India, traditional gender roles and cultural beliefs portray men as the decision-makers of the family therefore the decision of women's participation in HIV testing and wider SRH services often lies with them.

This lack of access to HIV and SRH delivery services puts women in a position to weaken the safety of their sexual and reproductive health and rights (SRHR). Where HIV and SRHR are available, they are mainly intended for married women and do not address the specific needs of any unmarried women, especially young women and girls. Gender differences often lead to discrimination based on perspectives on sexuality among service providers.

- **Male involvement**

In many communities, pregnancy is perceived as a 'women's affair' or stated as 'it's her responsibility', with a man's role in providing mainly financial support. Increased involvement of men in PMTCT programs will also considerably improve retention and support for women's care.

The testing or screening of partners plays a major role in determining whether male partners are HIV positive and risk women, thus increasing the condom use. Voluntary male medical circumcision (VMMC) has demonstrated a reduction of 60 percent in female to male sexual HIV transmission.

Most men refuse to accompany their wife for PMTCT services because of fear that they would know their HIV status, which could ultimately lead to stigma, discrimination, domestic abuse or, if positive, abandonment of their wife. This shows that men need further HIV education and BCC services to tackle issues related to awareness of their HIV status.

1. Prevention of HIV in women & reducing transference to children

- **Management Goals:**

The immediate concerns of HIV-positive women include support and counseling about their health, chances for fetal infection, prevention methods and revealing status to their partners. This pregnancy is classified as high-risk and handled by a multidisciplinary team. The main objective is to reduce the risk of infection to mother and fetus from vertical transmission of HIV-related diseases and their care, while more general goals concentrates on nutrition, social monitoring, professional guidance etc.

- **Antenatal Investigations**

These especially include monitoring of disease progression by the CD4 count and viral load along with the routine antenatal investigations.

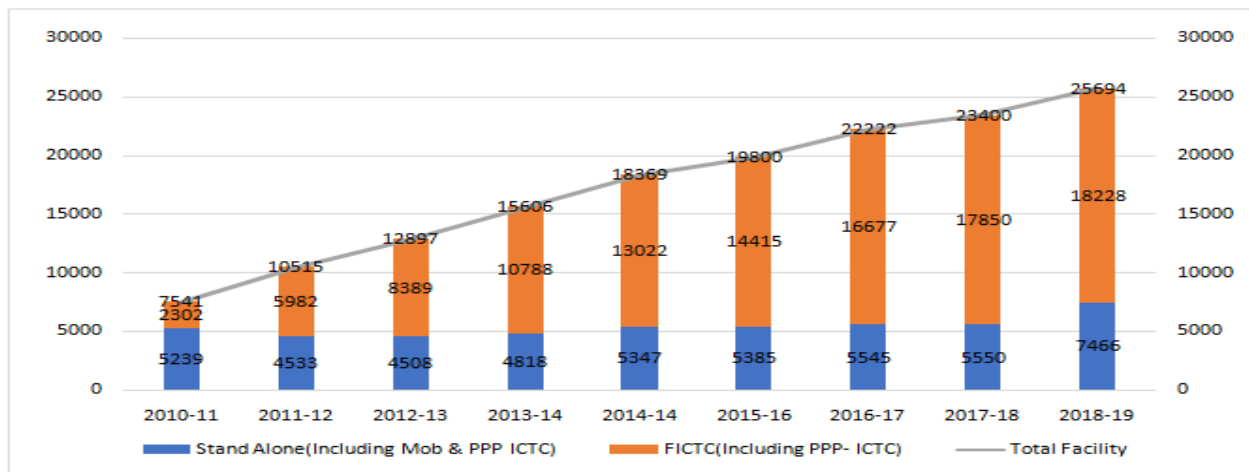
- **Strategies to prevent perinatal HIV transmission**

Earlier, the only way to prevent transmission was probably by ending pregnancy because of limited treatment options to prevent vertical transmission. Although this opinion still stands today, most HIV-positive mothers in the country prefer to continue pregnancy due to improvements in medications, healthcare, social restrictions and maternity care.

The strategies for preventing vertical transmission can be broadly grouped into:

- Antenatal ART– Correction of risk factors
- Intrapartum ART- Optimizing obstetric practice
- Postnatal ART-Breastfeeding / Substitutes
- Antiretroviral Therapy (ART)- The mechanism used by ART to prevent vertical transmission lies in the ability of ART to reduce maternal viral load and thus to reduce the fetal viral exposure. The highly active antiretroviral treatment in resource-rich countries reduced vertical transmission rates to approximately 1–2%. However, due to

the lack of HAART availability, simpler and lower-cost ART schemes are provided for low- and medium-income countries.^[17] The main pillars of reducing children's HIV infection are preventing infections in women and treating people infected. In India the vertical transmission route during pregnancy, delivery and breastfeeding is named parent to transmission to highlight and focus the role of the fathers, both in virus transmission and in management of infected mother and child.



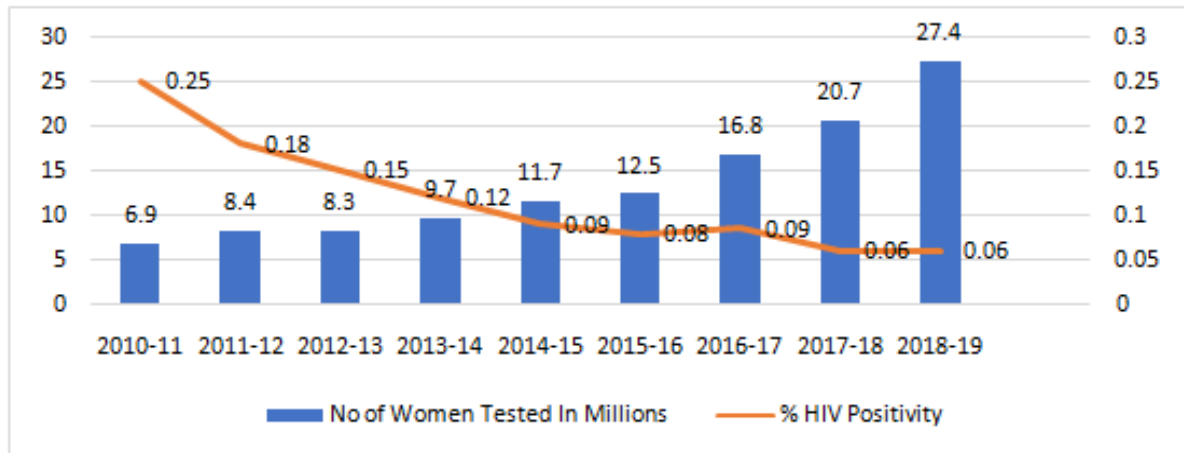
• **Fig 6: Scale-up of ICTC'S and FICTC'S during the period from (2010-2019)**

The number of ICTC's in India is growing, clearly illustrating partnership between general health services and counseling and testing services, an increase in their regional distribution below block level, increased accessibility and sustainability management.

Financial Years	No of Women Tested in Lakhs	HIV Positivity	Lifelong ART	HIV Exposed Live Births	ARV Prophylaxis	Early Infant Diagnosis (DNAPCR Test-6-24 Weeks)
2018-19	274	18240	16604(91%)	13768	11870(86.2%)	7491
2017-18	207.7	14342	13276(93%)	11409	9926(87%)	2485
2016-17	165.6	14350	13059(91%)	10715	9429(88%)	3472
2015-16	53.2	5856	5711(97.5%)	4202	4088(97%)	4011
2014-15	42.49	8624	7934(92%)			
2013-14	97.52	12008	10085(84%)			
2012-13	57.09	9451	9108(96%)			
2011-12	70.87	13213	11074(84%)			

Table 1: Showing Improvement in Pregnant Women Testing and Administration of lifelong ART from 2011-2019

“From January 2018 to March 2019, around 274 Lakhs of pregnant women were tested** for HIV, and a total of 18,240 (11,839 new cases & 6,401 known cases*) HIV positive cases were reported, out of which, 91% (16,604) were initiated lifelong ART*. During Jan 2018 to Mar 2019, around 13,768 HIV exposed live birth were reported, out of which 11,870 (86.2%) babies have received ARV prophylaxis”. (ANNUAL REPORT NACO- 18-19)



- **Fig 7:Scale-up of Pregnant Women Tested and positivity in ICTCs during the period from 2010-2019**

“Around 1.4 million children's HIV infections were prevented by the PPTCT program between 2010 and 2018”. (WHO)

The measures that have been taken for maximizing the scope of PPTCT are improvements in universal counselling and testing, attainment of the target number mother child pairs to be given single dose NVP, increase in the institutional delivery rates for seropositive women, adequate accessibility and follow up services.

DISCUSSION & CONCLUSION:

Studies analogous to experiences of the PPTCT Program Delivery, implementation and monitoring have shown that efforts were made to consider the cost-effectiveness of PMTCT programs, and the barriers or obstacles, particularly in counseling and testing of HIV. The number of drops out from the program particularly among women diagnosed with HIV should also be considered before they are able to access ARV and efforts should be made to address this issue. One way of overcoming it is by integrating the PPTCT program with other services such as RCH etc. There are indeed great number of obstacles in access to counseling and testing services, but the inadequate and insufficient knowledge of women's access to HIV testing facilities and the interest of healthcare providers holds a major stake. Also, the program should be implemented at all the healthcare delivery settings starting from grass root level up to big private settings.

The key emphasis should be on (a) on the provision of treatment and HIV testing facilities (b) increasing their access by treating discrimination in health care facilities, training and sensitization and (c) raising awareness and expertise, with the goal of providing universal access to PMTCT 's services for the eradication of pediatric HIV in India.. Building a bridge between public and private facilities could increase PMTCT resources for infected women 's accessibility. The current scenario for PMTCT services however shows that PPP models for these services lack knowledge. PMTCT services need more robust and rapid protocols for rolling out the dropouts and to increase the efficacy. Studies have also stated about the incapacity of proper analysis & representation of the program data which has a major stake in deciding the implementation policies as well-planned health research is principal to the improvement of health services. In order to effectively plan and execute the PMTCT programs in India, systematic research generation on the public health front must be developed. This should include issues of performance and needs of different health systems, geographical, social and psychological factors influencing the access of women to services, for the proper planning and implementation of these programs should be ruled out.

Although the Indian PPTCT system has a wide scope, there is a lack of full and detailed knowledge of the context-driven factors that affect its performance. PMTCT programs need more systematic and focused studies on the role of the private sector in delivery of PMTCT services in improving maternal and child health indicators and the issues related to dropouts etc.

Working with the broader Rural Health Mission for HIV screening services is a promising opportunity to improve the delivery of the PPTCT program. Nevertheless, growth, assistance and capacity creation are essential to optimizing the PPTCT 's coverage in India and elsewhere and the wise use of the available resources.

The 'opt-out,' provisionally implemented HIV Testing and Counseling (PITC) strategy is expected to boost the coverage. Testing methods should now switch from voluntary, patient-initiated testing to routine provider-initiated testing that involves pre-test counseling, a rapid HIV test, individual post-test counselling, community motivation and encouragement for spousal participation.

A formal reorganization of tasks among health care workers comes out to be another method for improving and enhancing the services. International bodies such as the WHO and the United

States President's Emergency Plan for AIDS Relief (PEPFAR) support and promote substitutive models of delivery care that rely more on nurses and lay health workers than physicians.^[32] Addressing records and the gaps in service delivery, mobilizing traditional and opinion leaders, and constructing robust relationships with the government will offer a continuous and sustainable scale-up in the capacity and uptake of services.

The results of the last two rounds in the HIV estimations indicate a decreasing trend in new HIV infections and AIDS-related deaths, although the figures do reveal that some areas in the country are stable to rising with new HIV infections. Consequently, continuous commitment and more effective and dynamic actions are needed to reach the defined prevention and treatment objectives for ending AIDS by 2030.

A lot is required to further advance the 90-90-90 goals, especially improving HIV testing, ART treatment as well as the retention of PLHIV, as the overall coverage of the ART system in India is still just around 56 percent, against the global goal of putting 82% PLHIV on ART. Government of India under the aegis of NACO has launched several schemes and missions with a vision and aim to monitor the PLHIV and retaining the lost follow-ups again in the treatment and fostering their adherence to ARV regimen, for example, mission 'Sampark' (i.e. Contact). The major challenges still prevail with states like Bihar, Jharkhand, Uttar Pradesh, and Telangana where the PMTCT coverage is still significantly lower than the national average where more robust actions are required. Under the new 'Prevention Coalition Framework' several collaborative coordinated initiatives are going on with the prevention of infection as the top agenda.

Another major step in the improvement of accessibility which is taken by the government of India is the integration of the HIV program with the TB program. The national AIDS and TB Response shall have a catalytic impact, because of improved communication and cooperation with health care practitioners' systems and the private health sector.

As Hippocrates said wisely, "Healing is a matter of time, but it is sometimes also a matter of opportunity." There is a chance now. Let this motivate physicians to pool their interests, skills, knowledge and resources and integrate renewed agility, enthusiasm, and hope with their patients.

"The time starts now"

RECOMMENDATIONS:

Empowering women with the help of creating awareness and increasing knowledge about HIV will make them self-confident enough to encounter the social, sexual, and gender norms that make them vulnerable to HIV. It is crucial to allow women to be able to monitor their exposure to HIV prevention services, such as contraception barriers or treatment as prevention. The study on 'HIV and AIDS in India gender impacts' clearly shows that programs are necessary to empower women to negotiate safe sex with husbands, and to have access to HIV information. There is thus an extremely important element in AIDS campaign to address the issue of equality, human rights, knowledge propagating and positive behavior.^[30]

HIV & AIDS 'Global Health Strategy promotes improving health systems through the implementation of cost-effective, coordinated methods of delivery of services based on increasing access to quality HIV services. ^[7] MCH interventions are one of the key fields of health programs, particularly in developing countries like India, and PPTCT must be incorporated with these initiatives to produce better results.^[31]

Studies on performance-based schemes of healthcare workers showed that a set of incentives could help in introducing and scaling up of effective PPTCT program. It also stated that the 'Performance Improvement Model should be used in low and middle-income settings.^[32] Considering India's epidemic heterogeneity, trends and patterns should be monitored. Improvement in HIV prevention calls for a more focused and better-tuned approach to systematic prevention and strategic data management systems.

The power of choice of treatment should always ultimately lie with the patient. In India, where varied and multiple factors play a role at patients' end for availing the treatment, services, and programs should be formulated keeping in mind individual healthcare settings and environment. In such situation, a "Cafeteria Approach Strategy" or 'Offer and Accept Program' wherein the patient is made aware of the interventions and the ultimate choice lies with him/her is info will be much favorable and would give better results as compared to 'Prescribe and Take Protocol'. Lastly, while developing approaches, the most important concept should be to avoid diseases that are largely preventable. A significant burden of mortality and morbidity is thus reduced, and thus a major social stigma is reduced.^[17]

Although there has been extensive research in the PMTCT program, there are still many shortcomings: reliable, more accurate and rigorous education and guidance for women who test HIV positive while pregnant are required before ART begins to increase their adherence levels. The ultimate goal is to provide community and peer resources to assist women in overcoming HIV stigma and in optimizing their care compliance. Enhancement in this matter can be achieved through further exacerbated efforts to identify infants and children living with HIV by the collaboration of HIV services with MCH services, immunization and nutrition, are also needed.^[23]

EID should become an important focus for the rapid development of point of care, particularly as the escalated programs are now being introduced. A stronger support for the target for elimination of AIDS by 2030 through programs to address unique susceptibilities and challenges facing young women with HIV is also required.^[24]

Above all, there is a need to shift the mindset that reproductive health is mainly the domain of women, through BCC, and address stigma issues. More emphasis should be given on promoting, motivating, and aiding couple testing and male involvement in PMTCT programs for ultimately paving the way for an AIDS free India.

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PART- 2

REPORT ON ONLINE COURSE

eHealth

More than just an electronic record

**Course Offered by
The University of Sydney**

COURSE DESCRIPTION:

This massive open online course (MOOC) focuses on the overall effect of eHealth on integrated treatment and service delivery and aims at educating a large community of health care professionals, physicians, students, management, administrative staff and researchers. It

discusses the breadth of technology implementations in healthcare, current and evolving developments and illustrates eHealth practice both locally and internationally.

The length of the course is of self-paced 5-week duration, the study time commitment needed is 3 hours per week. There are two assessable components in the course: assignment 1 in Module 2 carrying 40% weightage, where we were asked to share our critical thinking, experience and research on using a health-related app carrying and assignment 2 in Module 5 with 60% weightage where we were asked to reflect a case-based example.

Course Type –MOOC

Course Language – English

COURSE METHODOLOGY:

To maximize the learning this course provides knowledge and field experience of various top healthcare professionals through one and one interaction of the course instructor with these professionals, captured and later shared with the students in the form of videos.

1. The main source of learning is pre-recorded videos on various topics related to eHealth.
2. Apart from these videos, we had MCQs at the end of each video related to the content of that video.
3. Case Studies were shared that instilled an in-depth knowledge.
4. Discussion questions – one of the most attractive parts of the course, wherein we not only got a platform to share our viewpoints related to the topic, but we also gained much in-depth insights through the views and ideas shared by other students as well.
5. Readings – At the end of each chapter reading sources have been shared to enhance our learning experience.

OBJECTIVES:

- 1) A multidisciplinary approach to educate health professionals, physicians, students, executives, administrators and researchers for the global audience to explore the effect of online health care has had on care assimilation.
- 2) Evaluating the present and emerging fashion of the technology application.

OUTCOMES:

- 1) The fundamentals of eHealth, how it functions and where it is progressing.
- 2) What kind of health data are we actually gathering and how health care can become innovative in the future.
- 3) How new advances and technology allow the health customers to engage in their own health care, i.e. how people's wellbeing has become their own. and
- 4) How eHealth can improve the harmonization, efficacy and what are the barriers to access ehealth care.

COURSE CONTENTS

S.No	CONTENTS
1	What does eHealth mean to you? • Activity 1- Learn about current and futuristic examples of eHealth technologies in practice • A model for eHealth • Activity 2- Learn about the eHealth model via examples from clinical practice. • Challenges • The Future
2	Health in our Hands • Health not Healthcare • Current trends in internet and Communication Technology (ICT)

3	Data and the "Quantified Self" • Wearables: Collecting your own data • Clinical use of personal health data • Mobile apps for health • Social media for health • Health information online • Activity 3 - How have you (or someone you know) used mobile technology for health or healthcare? • Co-design of eHealth solutions • Evaluating health apps
4	Interacting with Health Professionals Using New Techniques • Improving care: Ten eHealth advantages • Face-to-face versus online • Telehealth and new models of healthcare • When healthcare & social media intersect • Using apps to personalize healthcare • eHealth enabled professional development • How do we enable interdisciplinary eHealth? • Activity 4- Learn about how health professionals are using technology to interact • Activity 5 – How are doctors using ICT in their clinical practice now
5	eHealth in Professional Practice • Case study 1 - Electronic records supporting remote care 2 - Physios Online 3 - The 'My Home Dialysis' program 4 - Synergy' online hub for mental health & wellbeing 5 - Supporting wellness after cancer treatment

KEY LEARNINGS FROM COURSE

To summarize the key learnings from the entire course we will hereby list all the learnings module wise with apt explanations to focus and discuss all the objectives about each chapter.

❖ Module 1- What is eHealth?

This module was taken by Professor Tim Shaw.

In this module we gained insight about the fundamentals of eHealth and where it is progressing.

- ◆ The way we use technology to support communication between health professionals and consumers is an expanding area of eHealth. It reduces both practitioners' and healthcare consumers' travel times in rural practice. However, now a days it is used in different health settings more and more. Health in the hands of consumers is the fastest growing and revolutionizing area of eHealth. This includes the use of applications, sites, wearables and social media.
- ◆ eHealth helps us to deliver coordinated care in a smoother manner improving the overall quality.
- ◆ There are three pillars to eHealth: First-Health in the Hands of consumers which comprises the increasing use of wearable devices, apps and social media to monitor and record and present information on our health and wellness. Second- the effect of new technologies on how health professionals interact with patients, as well as with each other Third- Recording data in the quantified or measurable self. This includes how we store data in conventional medical records to how we store data associated with devices and apps.
- ◆ Denmark has a centralized electronic database, available now for 98 percent of primary care doctors, all hospitals and all pharmacists.

❖ **Module 2 - Health in our Hands**

This module was addressed by Jordan Andersen and Dr. Teresa Andersen from university of Sydney.

This module gave knowledge about how new technologies are helping consumers participating in healthcare. The key practice of this area is how technologies racing ahead of the evaluation and understanding of the impact of mobile health on health outcomes.

- ◆ Applications(apps), wearable devices, online health information, and social media all are being used to encourage healthy behaviors and to monitor existing conditions. This accounts for the rapidly expanding area of eHealth having the potential to transform healthcare delivery.
- ◆ Approximately, one in ten households in Australia now already owning wearable fitness devices and this is growing at a rapid pace
- ◆ The real benefit of keeping the health in the hands of customers is in the behavior change perspective.
- ◆ The use of apps, mobile devices, sensors, etc. is commonly referred to as mHealth or Mobile Health and it represents a significant and ever-changing component of eHealth
- ◆ Data collected from personal devices is set to rapidly increase the potential to remotely monitor treatment.
- ◆ An article by IMS Healthcare in 2015, stated that there are: “More than 165,000 mHealth Apps available all over the world”.
- ◆ A survey in 2015 by the international consulting company Accenture found that more than 40% of patients globally either already wear or are willing to wear technology to track fitness and vital signs.
- ◆ Today, there has been a shift from healthcare to health and wellness.
- ◆ Health records are most likely to be owned by institutions, governments, or privately owned service entities. Control to data by individual patients is not yet accepted as a model for a health record system.

❖ **Module 3 - Data and the Quantified Self**

This module was taken by Melissa Brunner (The University of Newcastle, and Sydney University) and Prof. Jane Burns and Dr. Robert Birnbaum (Harvard Business School / Partners Healthcare).

This module offered insights into the type of health data we are gathering today and how health care can be transformed.

- ◆ The use of health data has great significance for how healthcare is delivered and how we manage our health. The whole healthcare industry is going through a huge transformation, whereby access and use of a huge amount of data are becoming more and more accessible.
- ◆ The digitalization of paper records is useful. It facilitates a patient's medical history to be tracked over time and to alert patients for routine or follow up consultations to improve the overall quality of care.
- ◆ The effect that e-health is having on the distribution of healthcare right now is quite breathtaking, and in some ways very disruptive as well.
- ◆ The Australian government adopted a system that they call the PCEHR, the Personally Controlled Electronic Health Record. It's now being renamed to the MyHealthRecord.
- ◆ Predictive and precision medicine- Genome analysis adds a new data thickness to individual health data.
- ◆ Sweden is currently rolling out a national eHealth system giving patients access to their health records and online communication for all health needs.
- ◆ Color

❖ **Module 4 - Interacting with Health Professionals Using New Technologies**

This module was taken by Josh Zadro (The University of Sydney) and Professor Tim Shaw.

This section focuses on how eHealth strengthens communication, productivity and barriers to health care.

- ◆ The use of technology in facilitating communication is how virtual consultations can be incorporated into collaborated eHealth programs and new models of care, for example, telemedicine, telehealth, mobile health, teleconferencing, and video conferencing.
- ◆ An online triaging and referral system are currently available through the Australian Government's "Health direct" website.
- ◆ According to the Physiotherapist, Karen Fennin, the most critical aspect of successful online treatment is to look at all self-treatment therapy options.
- ◆ According to Neurologist Dr.JelleDemeestre, the most critical element in a telehealth diagnostic education program is to collect and share diagnostic data.

❖ **Module 5 - eHealth in Professional Practice**

This module was addressed by Professor Stephen Simpson and Professor Leanne Togher(The University of Sydney)

This section focuses on the implementation of eHealth concepts and technology in medical practice.

- ◆ Breast Reader Assessment Strategy (BREAST) is funded by the Cancer Institute of New South Wales, the National Breast Cancer Foundation, and the Federal government. Essentially what it does is- it explores to improve the performance of radiologists when they're reading and analyzing mammograms.
- ◆ Commercially legal drones are already making deliveries in the US, Australia, and New Zealand including pharmaceuticals.
- ◆ The Garvan Institute in Australia is currently using the strategy in which an app that turns personal mobiles into supercomputers to contribute to cancer research to further its cancer research.
- ◆ In the future, there would be electronic tattoos that can monitor the health and pay for healthcare.

CONCLUSION:

The word eHealth includes several aspects, including health, technology and trade. Technology is regarded both as a process / feature / service implementation tool as well as the basic symbol of eHealth. The opportunity to share health data electronically and eHealth records will continue to enhance the quality and safety of patient care while allowing tangible and meaningful changes. EHRs help providers better regulate patient care and ultimately improve the quality of healthcare.

eHealth aims to provide vigilant, up to date and accurate patient information at the point of care that enables easy patient access, makes diagnosis more effective, reduces medical errors and provides more reliable treatment.

Efficiency, improving quality of care, proofs based on facts, empowerment of customers and patients, support, education, capacity building, enabling, growth, ethics and equity are the 10 E's in eHealth.

Adopting such technology reduces documentation and paperwork, reduces duplication of testing,etc. and provides accurate streamlined coding & billing. However, the privacy and security of patient data is a big issue which needs more attentionto facilitate better and safe sharing to the patient as well as other healthcare providers.

Awareness of the socio-economic impact of eHealth is limited, and findings from the analysis are often difficult to transfer to other settings.