Research Paper Statistics

INDIA - HIV/AIDS Statistics

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ABSTRACT

Over the last one and half decade, India has developed a robust system of HIV Sentinel Surveillance to improve tracking of HIV trends and understanding on the epidemic's pattern at national, state and district levels and amongst key population groups. The 12th round of HSS (HIV Sentinel Surveillance) was conducted during 2010-11 with introduction of key strategies for improving the quality and comprehensiveness of data. The number of sentinel sites increased from 1,223 in 2008-09 round to 1,359 in 2010-11 round with major expansion in sites for high risk groups (HRG) and bridge population.
This article describes an overall view of the effect of HIV and AIDS on population size, Growth Rate, Trend lines, characteristics and well-being in projected year 2015.Because the epidemic continues to spread in India despite having prevention efforts and successes in a few States.

KEYWORDS | Growth Rate, Trend Lines, Sentinel Surveillance

INTRODUCTION:
HIV Sentinel Surveillance (HSS) in India since its inception in 1998 has evolved into a credible and robust system for monitoring HIV epidemic and acclaimed as one of the best in the world. Sentinel surveillance provides essential information to understand the trends and dynamics of HIV epidemic among different risk groups in the country. It helps in refinement of strategies and prioritization of focus for prevention care and treatment interventions under the National AIDS Control Programme (NACP). HIV estimates of prevalence incidence and mortality developed based on findings from HIV Sentinel Surveillance enable the programme in assessing the impacts at a macro level.

During NACP-IV HIV Sentinel Surveillance will be conducted once in two years so that adequate time can be spent on in-depth analysis and modeling epidemiological research and use of surveillance data for programmatic purposes. The 13th round of sentinel surveillance was conducted during 2012-2013.

NACO (National AIDS Control Organisation) releases HIV figures each year based on data gathered from HIV Sentinel Surveillance sites. In 2010 surveillance was conducted at 1359 sites and 358797 samples were tested for HIV. The sites carry out tests among the high-risk groups and among antenatal clinic attendees. Data gathered from the antenatal clinics are then used as a surrogate for the general population.

Across the India, HIV prevalence appears to be low among the general population but disproportionately high among high-risk groups such as IDUs female sex workers men who have sex with men (MSM) and STD clinic attendees.

The key risk groups are – (Year 2011-12)
- **High Risk Groups (HRG)**
  - Female Sex Workers (FSW)
  - Men who have Sex with Men (MSM)
  - Transgender (TG)
  - Injecting Drug Users (IDU)
- **Bridge Populations**
  - Truckers
  - Migrants

HIV positive cases such as, Heterosexual accounts for 88.2%, mother to child transmission 5.0%, Infected Syringe and Needle 1.7%, Homosexual 1.5% and contaminated blood and blood products account for 1.0% of HIV infections were detected during 2011-12.

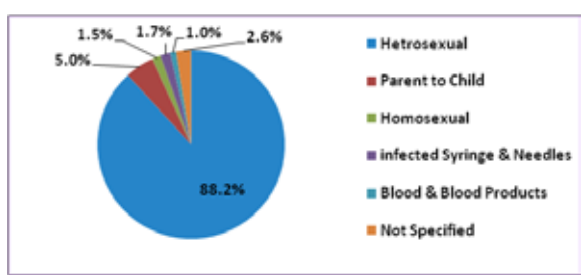

Figure 1:HIV Positive CasesRisk Groups

Objective of the Study:
The main purpose of this study is to search what exact scenario would be in India regarding how many no. of people living with HIV by year ending 2015 and what National Estimates of Key indicators for the projected year 2015.

Methodology:
Estimated last five years (2007 to 2011) data collected from the sentinel surveillance round 2010-11 fromNational AIDS Control Organisation (NACO) and the growth rate has been obtain from said data. And finally projected years 2012 to 2015 have been calculated.

Growth Rate Formula is :

Results and Analysis :

$$\text{Growth Rate} = \left[\left(\frac{\textit{Ending Year}}{\textit{Beginning Year}} \right)^{\frac{1}{n-1}} - 1 \right] * 100$$

$$\textit{where } n = \text{no. of years}$$

Table 1 :National Estimates of Key indicators

Years	ESTIMATED YEARS					GROWTH RATE (%)	PROJECTED YEARS			
	2007	2008	2009	2010	2011		2012	2013	2014	2015
Estimated No. of PLHIV										
Total	2252253	2192511	2141706	2106227	2088642	-1.87	2049631	2011349	1973782	1936916
Adults (15+)	2109601	2046578	1994190	1958962	1943196	-2.03	1903688	1864982	1827064	1789917
Children (<15)	142652	145933	147516	147265	145446	0.49	146153	146863	147577	148295
Male	1393391	1350104	1313513	1287193	1272663	-2.24	1244152	1216280	1189033	1162395
Female	858862	842407	828193	819034	815979	-1.27	805597	795347	785228	775237
Estimated Adult HIV Prevalence (%)										
Total	0.33	0.31	0.3	0.28	0.27	-4.89	0.26	0.24	0.23	0.22
Male	0.4	0.37	0.35	0.34	0.32	-5.43	0.3	0.29	0.27	0.26
Female	0.26	0.25	0.24	0.23	0.22	-4.09	0.21	0.2	0.19	0.19
Estimated No. of Annual New HIV Infections										
Total	143856	134776	132033	130594	130978	-2.32	127943	124978	122082	119253
Male	87997	82418	80810	79980	80280	-2.27	78459	76679	74940	73240
Female	55859	52358	51223	50614	50697	-2.39	49483	48298	47141	46012
Adults (15+)	123890	116731	115285	115051	116456	-1.54	114668	112908	111175	109468
Children (<15)	19966	18045	16748	15543	14522	-7.65	13411	12385	11437	10562
Estimated No. of Annual AIDS-related Deaths										
Total	206671	192314	180960	164625	147729	-8.05	135835	124899	114843	105597
Adults (15+)	194669	180796	169869	153948	137516	-8.32	126072	115580	105961	97143
Children (<15)	12002	11518	11091	10676	10213	-3.95	9809	9421	9049	8691
Estimated ART Need										
Adults (15+)	568498	588092	732291	755589	785117	8.41	851110	922650	1000204	1084276
Children (<15)	45974	48570	51150	74443	75481	13.2	85442	96716	109479	123926
Estimated No. of Mothers needing PPTCT										
Mothers needing PPTCT	51375	47122	43788	40767	38202	-7.14	35475	32942	30591	28407

Using the above Table 1 (National Estimate of Key indicators), we have calculated different trend equations (Linear, Exponential, Logarithmatic) and Residual Square (R2) for the Estimated No. of PLHIV, Estimated Adult HIV Prevalence (%), Estimated No. of Annual New HIV Infections, Estimated No. of Annual AIDS-related Deaths,Estimated ART Need and Estimated No. of Mothers needing PPTCTin Table 2 (National Estimates of Key Indicator with Different Trend line equation).

In the trend line equation mentioned xis stands for year and from different value of x,the value of projected year 2015 have been obtained. Which shown in Table 2.

Table 2 :National Estimates of Key Indicator with Different Trend line equation

Years	LINEAR		EXPONENTIAL		LOGARITHMATIC	
	Y	R^2	Y	R^2	Y	R^2
Estimated No. of PLHIV						
Total	y = -41351x + 2E+06	R^2 = 0.9597	y = 2E+06$e^{-0.019x}$	R^2 = 0.9633	y = -1E+05ln(x) + 2E+06	R^2 = 0.9933
Adults (15+)	y = -42043x + 2E+06	R^2 = 0.9516	y = 2E+06$e^{-0.021x}$	R^2 = 0.9557	y = -1E+05ln(x) + 2E+06	R^2 = 0.994
Children (<15)	y = 692x + 143686	R^2 = 0.3164	y = 143673$e^{0.0048x}$	R^2 = 0.3186	y = 2239.9ln(x) + 143618	R^2 = 0.5355
Male	y = -30437x + 1E+06	R^2 = 0.9655	y = 1E+06$e^{-0.023x}$	R^2 = 0.9696	y = -76802ln(x) + 1E+06	R^2 = 0.9932
Female	y = -10914x + 865637	R^2 = 0.9415	y = 866013$e^{-0.013x}$	R^2 = 0.9441	y = -27863ln(x) + 859574	R^2 = 0.9914
Estimated Adult HIV Prevalence (%)						
Total	y = -0.015x + 0.343	R^2 = 0.9868	y = 0.3457$e^{-0.05x}$	R^2 = 0.9891	y = -0.037ln(x) + 0.3333	R^2 = 0.9612
Male	y = -0.019x + 0.413	R^2 = 0.9704	y = 0.4163$e^{-0.053x}$	R^2 = 0.9786	y = -0.048ln(x) + 0.4016	R^2 = 0.9868
Female	y = -0.01x + 0.27	R^2 = 1	y = 0.2715$e^{-0.042x}$	R^2 = 0.9994	y = -0.024ln(x) + 0.2632	R^2 = 0.9473
Estimated No. of Annual New HIV Infections						
Total	y = -2993.8x + 143429	R^2 = 0.7386	y = 143487$e^{-0.022x}$	R^2 = 0.7457	y = -8264ln(x) + 142360	R^2 = 0.9092
Male	y = -1787.2x + 87659	R^2 = 0.7234	y = 87687$e^{-0.021x}$	R^2 = 0.7301	y = -4957ln(x) + 87043	R^2 = 0.8991
Female	y = -1206.8x + 55771	R^2 = 0.7613	y = 55801$e^{-0.023x}$	R^2 = 0.769	y = -3307ln(x) + 55317	R^2 = 0.9238
Adults (15+)	y = -1654.8x + 122447	R^2 = 0.5127	y = 122412$e^{-0.014x}$	R^2 = 0.5123	y = -4926ln(x) + 122200	R^2 = 0.734
Children (<15)	y = -1339x + 20982	R^2 = 0.9846	y = 21342$e^{-0.079x}$	R^2 = 0.994	y = -3338ln(x) + 20161	R^2 = 0.9883
Estimated No. of Annual AIDS-related Deaths						
Total	y = -14557x + 222132	R^2 = 0.995	y = 227148$e^{-0.083x}$	R^2 = 0.9866	y = -34843ln(x) + 211822	R^2 = 0.9209
Adults (15+)	y = -14115x + 209706	R^2 = 0.9947	y = 214771$e^{-0.086x}$	R^2 = 0.9857	y = -33769ln(x) + 199693	R^2 = 0.9197
Children (<15)	y = -442x + 12426	R^2 = 0.9993	y = 12491$e^{-0.04x}$	R^2 = 0.9992	y = -1074ln(x) + 12129	R^2 = 0.9537
Estimated ART Need						
Adults (15+)	y = 60074x + 505697	R^2 = 0.8977	y = 519565$e^{0.0896x}$	R^2 = 0.8884	y = 148178ln(x) + 544037	R^2 = 0.8823
Children (<15)	y = 8488.7x + 33658	R^2 = 0.8476	y = 37726$e^{0.1419x}$	R^2 = 0.8642	y = 19492ln(x) + 40461	R^2 = 0.722
Estimated No. of Mothers needing PPTCT						
Mothers needing PPTCT	y = -3270.1x + 54061	R^2 = 0.9907	y = 54906$e^{-0.074x}$	R^2 = 0.9972	y = -8098ln(x) + 52005	R^2 = 0.9816

Discussion :

National Estimate of Key Indicators shown in Table 1. In this table Estimated years (Year 2007 to 2011), Growth Rate and Projected years (Year 2012 to 2015)has been stated.

Key indicator of India (Projected Year):

1. Estimated No. of PLHIV

Total number of People Living with HIV is 2252253 in 2007 and it has decreased by 2049631 in 2012. It is estimated that over a last six years the growth rate is -1.87% and it would have decreased around 1936916 at the end of 2015. In gender wise distribution male and female growth rate are -2.24% and -1.27% respectively. Estimated no.of children (<15 years) 142652 in year 2007 and it has slowly increased 145446 in end of the year 2011. The growth rate of estimated no. of children (<15 years) during the period of 2007 to 2011 is 0.49%.

- The number of child PLHIV <15 years is slightly increasing with 0.49% the Expected number is 1.48 lakhs in year 2015.
- The number of adult PLHIV 15+ years decreasing with -2.03% the Expected number is 1.79 lakhs in year 2015.

2. Estimated Adult HIV Prevalence (%)

Total (Male + Female) estimated adultHIV Prevalence(%) decreasing growth rate is -4.89% and Male & Female have -5.43% and -4.09% respectively.

3. Estimated No. of Annual New HIV Infections

Total (Adults & Children) Growth Rate is -2.32%. It is showing the decreasing Growth Rate. In Year 2007 Total (Adults & Children) are 143856 & in Expected Year 2015 it would be 119251.

Genderwise decreasing Growth Rate in Male is -2.27% and in Female is -2.39%.

a) In Adults(15 +) Growth Rate is -1.54% and in Child (<15) Growth Rate is -7.65%the decreasing rate is showing the good treatment of Antiretroviral therapy among prevent the child of new HIV infections.

4. **Estimated No. of Annual AIDS-related Deaths**
   Estimated no. of annual AIDS-related Deaths have decreasing growth rate which is -8.05% for the year 2007 to 2011. And it is expected around 105597 deaths in year 2015.
5. **Estimated ART Need**
   Around 1084276(adult) and 123926(Children) will take the ART in expected year 2015 and growth rate is 8.41%& 13.2% for the adult and children respectively.
6. **Estimated No. of Mothers needing PPTCT**
   Estimated no. of mothers needing PPTCT have decreasing growth rate which is -7.14%. It is the good sign and around 28407 mothers will needPPTCT in expected year 2015.

Conclusion:

- The estimated no. Of PLHIV shows that the children growth rate is slightly increasing0.49%. However the Adult growth rate is decreasing by -2.03% and total growth rate is decreasing by -1.87%.
- Estimated Adult HIV prevalence is decreasing -4.89%.
- Estimated no. of Annual new HIV Infection is decreasing. Because of the treatment of ART among Adult & Children, the growth rate is increasing by 8.41% & 13.2% respectively.
- Estimated no. Of Annual AIDS related deaths are decreasing.
- Overall Estimated no. of PLHIV is in under control as well as its decreasing which is good sign.

REFERENCES

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