

# Economic Burden of HIV/AIDS Infection in Iran; a Modelling Approach

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## Research article

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## **Economic Burden of HIV/AIDS Infection in Iran; a Modelling Approach**

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## **Economic Burden of HIV/AIDS Infection in Iran; a Modelling Approach**

### **Abstract:**

**Background:** HIV/AIDS infection is a leading cause of mortality and morbidity in developing and poor countries. It may potentially lead to economic burden on health system. Prevalence of HIV/AIDS infection in is a debatable issue among researchers, and as our best knowledge, there is lack in economic evidence in this regard in Iran. The purpose of this study is calculating the economic burden of HIV/AIDS infection in Iran in 2016.

**Methods:** We used a societal perspective to capture the direct and indirect costs attributed to HIV/AIDS infection in Iran until end of 2016. We used a prevalence model based approach to estimate the costs of the infection in Iran. For developing our model, we used the Iran Ministry of Health National Guideline for Managing of the infection of HIV/AIDS, by health and medical practitioners. We analysed the HIV/AIDS Surveillance System in three base case, optimistic and pessimistic approaches as our sensitivity analysis.

**Results:** The base case scenario showed that total direct costs and indirect costs attributed to the HIV/AIDS infection were 7,946,530 and 1,288,586 US\$ until end of 2016. In addition, the total cost is 8,785,116 US\$.

**Conclusions:** Approximately, 85% of total costs of HIV/AIDS infection is attributed to direct costs in Iran. However, we should consider that these costs have been estimated just for 14.3% of diagnosed people who are under Antiretroviral Therapy, therefor if the government wants to scale up ART to large proportion of the population, costs expectedly will raise.

**Keywords:** HIV/AIDS infection, Antiretroviral Therapy, Cost of Illness, Economic Burden,

## **Background**

There is no doubt that in recent years HIV/AIDS infection is not just a health problem, however it is recognized as a social problem. Because of the challenges in transmission of the infection and its association with drug using and sexual relationship, HIV/AIDS is realized as a social challenge (1, 2). Since HIV/AIDS infection diagnosis in 80s decade to now, the prevalence has changed globally and regionally. The Global Burden of Diseases for 2018 has reported the total number of infected people about 36,822,200 [34,794,900- 39,199,800]. This shows a growth rate about 4.1% for men, and 3.4% for women, between 1990 to 2017 (3).

Although the HIV/AIDS ranked as nineteenth leading cause of early mortality in 1990, but it is ranked as eighth in 2017. In addition, the prediction of the main leading causes of the early mortality, shows that HIV/AIDS will be ranked as twelfth in 2040 (4).

It looks the main challenge of the infection prevalence associated with the high rate of acquisition among young adults. In this regard the young men between 25- 29 years, and young women between 20- 24 years have constructed 4.2% and 3.8% of the global prevalence of the infection. Although these figures may be not notable at the first glance, however the 10.3% and 9.3% of new infected population are young men and women in these ages range, respectively (5).

Furthermore, the highest rate of the deaths are associated with men and women in age 25- 54 years. This implies on the excessive degenerative impact of the infection on the economic outcomes of countries (6). According to the GBD 2016, the number of people who are living with HIV/AIDS infection in Iran has been reported 11,490 [5,780- 21,260], that about 1,130 people [620- 2060] have been added to them in 2016 (6).

However, there are different statistics for prevalence of HIV/AIDS infection in Iran. Official bodies affiliated to Iran Ministry of Health have stated more than 28,000 registered People Who Lived with HIV/AIDS (PWLHs) until September 2014 (7).

The Antiretroviral Therapy (ART) prescribed as an effective therapeutic regimen in managing the HIV/AIDS infection. ART consists of different regimens according to the condition of the People who live with HIV/AIDS (PWLHs). The protocol of the treatment has been recommended by World Health Organization (WHO), and then each country has developed its

local guidelines. ART is mainly relies on a combination of drugs for a long-term management, and then one of the major problems associated with it is the patients adherence (8, 9).

This means that the direct cost of the HIV/AIDS infection management depends on ART. This is the main part of the total cost of the illness. Alongside the attributed costs to ART, the indirect costs associated with early deaths and disabilities, can lead to notable economic burden on health systems and societies.

A review study in 2006 demonstrated that with progression of infection the monthly direct costs (US\$ 2001) attributed to the Highly Anti-Retroviral Therapy (HART) will increase (10).

In a study in Colombia, the mean annual cost per patient with HIV/AIDS has been estimated  $11,505 \pm 18,658$  (US\$) for 2014. The study concluded that the main part of the costs attributed to the drug regimens, which including about 65% of the total costs (11).

In a systematic review, the results showed that mean of the annual direct costs (in 2010 based on country- specific Gross Domestic Product deflator and World Bank Purchasing Power Parities indicator) for Spain, Germany, France, Italy and United Kingdom were 11,638€ (3,756), 32,109€ (6,960), 14,821€ (1,896), 6,399€ (2,503), and 25,399€ (14,548). The annual mean of indirect costs have been estimated for Spain, Italy and United Kingdom: 5,661€(1,871), 1,535€ (609,90), and 10,347€ (7.448) (12).

Regarding to the prevalence of HIV/AIDS infection in Iran, and the lack of a comprehensive economic analysis through a cost-of-illness methodology, we aimed to calculate the economic burden of HIV/AIDS infection in Iran until end of 2016 through a model-based approach.

## **Methods**

### **Data Settings and Sources**

This is a cost of illness study in societal perspective. Therefore, it includes all direct and indirect costs. These costs attributed to providing health and social care through ART regimen, and loss of productivity costs for Iranian population through a prevalence based costing approach. We obtained data of prevalence, morbidity and deaths from free access on-line published reports of Iran Infectious Diseases Surveillance System that is associated to country's Ministry of Health from 1986 to 2016. This data are released through national annual reports by medical universities within each province around the country. After establishing the National Infectious Diseases Surveillance System in 2009, all the data are gathered in a central system within Iran Ministry of Health (IMoH) (13). We extracted the data for costs of drugs, and health and medical practitioners from Ministry of Health Iran Food and Drug

Administration, and Deputy for Curative Affaires. In addition, we used Iran Supreme Labor Council (affiliated to Iran Ministry of Labor and Social Welfare) approval for minimum wage in labor market of country for calculating the indirect costs.

### **Model Description**

We used Iran National guideline for assigning the relevant activities for managing care and services for HIV/AIDS infected people. Iran Ministry of Health has developed this Guideline as a national document for health and medical practitioners around the country. The guideline has a comprehensive approach to Anti-retroviral Treatment (ART) and used as a Standard of Operating Procedures (SOPs) by Iranian practitioners. A team of public health workers and technicians, social workers, General Practitioners, health promotion experts and infectious diseases specialists, work together to provide services to patients and their families. In this guideline upon to progression of the infection, the associated actions provided.

Therefore, nowadays, according to this guideline, for each person who goes to a IMoH's health or clinical center (these centers usually called Behavioral and Infectious Diseases Center) , the HIV/AIDS diagnostic test (the primary and confirmatory tests), will be done free of charge. After confirmation of the positive results of Infection in both mentioned tests, PWLHs entered in ART. At the first stage, the primarily assessment including explanations of profits and probable harms of the treatment discussed with patients, and relevant supportive consultancy advice provided to his/her family by members of team. If patient has been under treatment in another center, then all history of him/her will be collected from previous provider. Physical exam and taking comprehensive explanations in this stage are substantial. This includes a team working between GP, health workers and technicians and infectious specialist. In this stage in addition to assessing the patients' circumstance, s/he will be trained for preventing and controlling the harmful and risky behaviors (of course these educational actions are provided to PWLHs in an organized approach after each visit).

During the treatment, all patients' responses monitored and then any required adjustments will be carried out by team. One of the most common problems in managing the infected persons are their adherence to treatment. Adherence to treatment is major determinants of drug resistance, and may lead to failure in treatment. Therefore, at least two subsequent visits allotted to making sure about the commitment and accountability of patients and their families for starting and continuing the treatment prior to starting the treatment.

In addition, the team of providers predict any other complementary actions for avoiding drug resistance. These visits including some educational advice for patients in taking the drugs. Team of providers prescribe medical laboratory and pathological tests in different points of treatment. These tests carried out, specifically for diagnosing HIV infection, and in cases of co-morbidities for Hepatitis B and C, and

Tuberculosis. Some additional laboratory tests carried on in cases of drug resistance and treatment failure.

Anti- Retroviral therapy prescribed for all patients. However for some groups including who are pregnant, CD<200, suffering from co-infections, nephropathy and opportunistic infections, it is highly recommended. Currently there are two ART regimens in Iran: preferred and alternative. In addition for patients who are suffering from co-infections including Hepatitis B and C, and tuberculosis, the regimens contain some adjustments. The progression of the treatment should be monitored in a routine base especially for the first month. This is because of ensuring about the sufficient response of patient to the treatment. Based on the virologic response, or staging that provided by World Health Organization the progression of treatment checked.

### **Estimating Costs:**

For calculating the direct costs, we used the formula (1) in below:

$$DC = \text{costs of health and social care} + \text{HIV diagnostic tests costs} + \text{Drugs costs} + \text{Nutrious Supplements Costs} + \text{Transprotation costs} + \text{Hotel Costs}$$

In this formula, DC is direct costs, and right side of the formula are clearly the broken down elements. In addition, we used Human Capital approach; for calculating the indirect cost. Formula (2) presents how to calculate the indirect costs.

$$IC = (YLL \times \text{Minimmum Salary}) + (\text{JobAbsent day} \times \text{Minnimum Salary})$$

In this formula, IC is indirect costs; YLL is years of life lost due to premature deaths. Minimum salary is approved defined monthly salary and payments for a worker by Iran Ministry of Labour and Social Welfare in 2016. Finally, the total costs attributed to HIV/AIDS infection in Iran calculated through summing up the formulas 1 and 2 with together.

For calculating the direct and indirect costs, we used the different parameters. Table (1) presents these parameters. Because of all calculations are for same year (2016), we have considered the discount rate equal to zero. The main struggling aspects of the HIV/AIDS infection within the country is the prevalence of it and the number of PWLHs who are under ART regimen. Therefore, we performed calculations in three approaches and this is our sensitivity analysis. We approached this issue through considering three scenarios for HIV/AIDS prevalence in the country and the number of under ART regimen patients. In this approach, we used the current official statistics of IMOH as our base case scenario and through

exploring other previous reports and published studies two other scenarios added: first the optimistic and second the pessimistic.

**The model parameters:** All parameters for performing the cost-of-illness modelling, presented in table (1) at the end part of the paper

Table (1): Model Parameters for Estimating the Costs of HIV/AIDS Infection in Iran

## Results

At the end of 2016, according to HIV Surveillance System, totally 34,820 PWLHs registered. The major proportion of the registered HIV/AIDS positive infection are men (84% of cases). The prevalence is more common among young population. The age group 21 through 35 constructs about 53% of registered patients. However, only 6,848 patients underwent the Anti-Retroviral Therapy against HIV/AIDS infection, which included about 19.66% of all registered cases. Almost of infected people are Drug Users (66.9%).

The costs associated with providing the ART regimen to PWLHs are presented by different aspects of the management of the illness in three likelihood, optimistic and pessimistic through tables (2) to (7) separately.

Table (2): Anti-Retroviral Outpatients related Services Costs 2016 in Iranian Rial\*

Services	Base case	Optimistic	Pessimistic
<b>Infectious Specialists</b> (Visits and Consultancies)	9,634,125,000 (229,384)	11,812,800,000 (281,257)	8,487,000,000 (202,071)
<b>General Practitioner</b> (Visits and Consultancies)	17,201,800,000 (409,567)	21,091,840,000 (502,187)	15,153,600,000 (360,800)
<b>Public Health Workers</b> (Consultancies)	12,510,400,000 (297,867)	15,339,520,000 (365,227)	11,020,800,000 (262,400)
<b>Nutritionist</b> (Consultancies)	1,787,200,000 (42,552)	2,191,360,000 (52,175)	1,574,400,000 (37,486)
<b>Social Workers</b> (Consultancies)	4,468,000,000 (106,381)	5,478,400,000 (130,438)	3,936,000,000 (93,714)
<b>Clinical Psychologists</b> (Consultancies)	9,299,025,000 (221,405)	11,401,920,000 (271,474)	8,191,800,000 (195,043)
<b>Medical and Pathological Tests</b>	210,847,935,900 (5,020,189)	258,529,393,920 (6,155,462)	185,742,496,800 (4,422,440)
<b>Vaccination Costs</b>	12,398,884,305 (295,212)	15,202,758,984 (361,971)	10,922,562,360 (260,061)
<b>Total Costs</b>	278,147,370,205 (6,622,556)	341,048,019,904 (8,120,191)	245,028,659,160 (5,834,016)

\* US\$=42000 I.R. Iran Rial

Outpatients services costs for managing HIV/AIDS infection is an important part of the total costs. This is because of some expensive primary and confirmatory tests of HIV/AIDS infection, and then need to take several routine medical laboratory and pathology tests during

the management of the infection. In addition, the costs of the visits and consultations are considerable in this infection.

The main proportion of HIV/AIDS treating costs in current ART regimen in Iran, is laboratory and pathological tests (75.8%) and then visits and consultancies provided by the medical and health practitioners (19.7%). Table (3) provides the details of Anti-Retroviral Drugs costs, according to current recommended regimens.

Table (3): Anti-Retroviral Drug Regimens Costs for Patients who are Under ART 2016 in Iranian Rial\*

Drug Regimen	Base case	Optimistic	Pessimistic
<b>Efavirenz+ Lamivudine+ Zidovudine</b>	2,302,513,987 (54,822)	2,208,356,100 (52,580)	2,283,207,840 (54,362)
<b>Nevirapine+ Lamivudine+ Zidovudine (For Pregnant)</b>	80,279,550 (1,911)	57,677,480 (1,373)	111,738,691 (2,660)
<b>Tenofovir+ Lamivudine+ Efavirenz (in case of co-infection with HBV)</b>	57,177,372 (1,362)	100,761,128 (2,399)	111,116,534 (2,646)
<b>Tenofovir+ Lamivudine+ Efavirenz+ Zidovudine (in case of co-infection with HCV)</b>	1,561,779,094 (37,185)	1,963,261,696 (46,744)	1,096,718,602 (26,112)
<b>Tenofovir+ Efavirenz+ Lamivudine+ Rifampin (HIV and TB co-incident)</b>	287,573,037 (6,847)	211,644,609 (5,039)	600,396,389 (14,295)
<b>TDF (Tenofovir)+ 3TC(Lamivudine)/FCT (Tenofovir)+ LPV/r (Lopinavir+ Ritonavir) or ATV/r (Atazanavir) in cases of failure initial regimen</b>	475,660,227 (11,325)	499,369,109 (11,890)	617,604,469 (14,705)
<b>Total ARV Costs</b>	4,764,983,267 (113,452)	5,041,070,122 (120,026)	4,820,782,525 (114,781)

\* US\$=42000 I.R. Iran Rial

According to the base case, the major part of ARV regimens related to managing the HIV/AIDS infection through the first regimen (48.32), then con-infection with HCV (32.77).

Hospitalization as an outcome for HIV/AIDS infection may be common especially because of opportunistic infections. Table (4) shows the costs of provided services in hospital.

Table (4): Costs of Hospitalization Services for Patients who are under ART 2016 in Iranian Rial\*

Service	Base case	Optimistic	Pessimistic
<b>Inpatients Visits and Consultancies</b>	6,278,018,076 (149,477)	7,697,738,189 (183,280)	5,530,501,152 (131,679)
<b>Hoteling</b>	24,097,443,120 (573,749)	29,546,873,856 (703,497)	21,228,186,240 (505,433)
<b>Other Costs</b>	1,566,445,056 (37,296)	1,920,683,213 (45,731)	1,379,930,112 (32,855)
<b>Total Hospitalization Costs</b>	31,941,906,252 (760,522)	39,165,295,257 (932,507)	28,138,617,504 (669,967)

\* US\$=42000 I.R. Iran Rial

These figures show that the main part of hospitalization costs is hoteling (costs attributed to bed the hospital bed occupancy). It constitutes about 75% of costs and then physicians' visits and consultancies constitute about 20% of total hospitalization costs.

Table (5): Direct, indirect and total Costs of HIV/AIDS Infection for who are under ART 2016 in Iranian Rial\*

<b>(a) Direct Costs</b>			
Costs Type	Base case	Optimistic	Pessimistic
<b>Outpatients</b>	278,147,370,205 (6,622,556)	341,048,019,904 (8,120,191)	245,028,659,160 (5,834,016)
<b>ARV</b>	4,764,983,267 (113,452)	5,041,070,122 (120,026)	4,820,782,525 (114,781)
<b>Hospitalization</b>	31,941,906,252 (760,522)	39,165,295,257 (932,507)	28,138,617,504 (669,967)
<b>Total</b>	314,854,259,724 (7,496,530)	385,254,385,283 (9,172,723)	277,988,059,189 (6,618,763)
<b>(b) Indirect Costs</b>			
Costs type	Base case	Optimistic	Pessimistic
<b>Premature Deaths</b>	20,356,763,650 (484,685)	11,873,096,632 (282,693)	31,765,542,986 (756,322)
<b>Work Absence Days</b>	33,763,862,129 (803,901)	12,983,363,879 (309,128)	45,852,109,653 (1,091,717)
<b>Total</b>	54,120,625,779 (1,288,586)	24,856,460,511(591,820)	717,617,652,639 (1,848,039)
<b>(c) Total Costs</b>			
Costs type	Base case	Optimistic	Pessimistic
<b>Direct costs</b>	314,854,259,724 (7,496,530)	385,254,385,283 (9,172,723)	277,988,059,189 (6,618,763)
<b>Indirect costs</b>	54,120,625,779 (1,288,586)	24,856,460,511(591,820)	71,617,652,639 (1,848,039)
<b>Total</b>	368,974,885,503 (8,785,116)	410,110,845,794 (9,764,544)	349,605,711,828 (8,323,945)

\* US\$=42000 I.R. Iran Rial

Total direct costs for PWLHs is sum of above-mentioned expenditures. Table (5-a) presents the total direct costs for ART. Hospitalization services costs are the main part of direct costs that have been spent on ART in Iran. It contains about 88% of costs, in likelihood approach.

Another important aspect of the cost of illness for managing the HIV/AIDS infection is indirect cost. It is associated with financial loss that caused by decreasing in labour productivity. During receiving the ART regimen, patients cannot have attendance in their economic activities and working absence is a common event among them. This also includes the premature deaths and losing the opportunity to participate in the country's economy. Table (5-b) indicates how much costs imposed to them and society during management of their illness. work absence days impose the major part of the indirect costs to society (62%). Eventually, table (5-c) shows the grand total costs of sum of direct and indirect costs associated with HIV/AIDS in Iran. As we can see in table (5-b) the major proportion of the infection total costs attributed to direct costs (about 85%).

## **Discussion**

HIV/AIDS infection has imposed 8,785,116 US\$ to Iran until end 2016, according to likelihood approach. Direct costs of HIV/AIDS infection is the major part of the economic burden of it (85% of total costs). This figures just implied on costs for patients under ART regimen. Of course, nobody can ignore the possible considerable direct costs of the infection. These costs are associated with health, social, and psychological care, alongside costs that have been spent for drugs, hospitalization services and other relevant services. Indirect costs constitute about 15% of total HIV/AIDS infection costs in Iran.

In a study in Bogota, Colombia, results showed that, average annual costs of HIV/AIDS infection per patient was 11,505 ±18,658 (US\$ 2014). According to this study the main part of this cost is related to drug costs (mean annual cost of 8,616 US\$, 75% of the total), and then productivity costs 1,044 (10%) (11).

Another study in Nepal, calculated 30.2 US\$ as the average monthly costs of HIV/AIDS infection. The direct cost was 20.4 US\$, and the indirect cost was 9.7 US\$ in 2017(19). In

Spain, the cost-of-illness for HIV infection in asymptomatic and symptomatic, and AIDS stages were 10,351 €, 14,489 € and 15,750 € respectively in 2003 (20).

In case of Iran, because of unavailability of a comprehensive and systematic data sources for HIV/AIDS infection, we should consider that we are facing with an Ice-Berg phenomenon(21). This means that the major proportion of infected people have not been identified and registered via official bodies and then any estimations of the attributed costs to the infection should be addressed this issue.

Therefore, in this study we have tried to run our estimations in three mentioned approaches. Of course, Iran Ministry of Health established a Surveillance System from 2009 to monitor and register new diagnosed cases of the HIV/AIDS infection through its affiliated Medical Universities around the country (22).

However, we have to consider other complementary policies and plans for controlling the indirect cost of the infection. This means the government must focus on the social, mental and psychological needs of HIV/AIDS infected people, and try to give them mental and social rehabilitation services. This may lead to reduced burden of depression and give them a better venue to be involved in economic activities (23).

**Study Strengths:** As our best knowledge, this is the first cost-of-illness study of HIV/AIDS infection in Iran that calculate both direct and indirect costs. We used three approaches for estimating the total costs of HIV/AIDS infection in the country, to mitigate the current partial and uncomprehensive data sources for calculating the economic burden of HIV/AIDS infection in Iran. In addition, through a model based cost-of-illness study we have tried to calculate the imposed costs of HIV/AIDS for the country as a whole.

**Weaknesses:** Estimating the costs of HIV/AIDS infection by WHO's staging definitions, and CD4 numbers may have more implications for managing the budgets and financial impact of the infection. We did not calculate the costs by these criteria in this study. In addition, the statistics of labour market participations for calculating the productivity costs has been obtained from previous cross-sectional studies.

**Conclusions:** HIV/AIDS is a challenging aspect of current Iranian health system. It is a priority in the country's public health issue, and in recent years, a comprehensive surveillance system developed by IMOH to produce valid and reliable data set for the infection. In addition, several risky behaviours centres are now actively providing the free of charge services to identified patients. Nevertheless, the real prevalence of the HIV/AIDS infection within the country has remained as a main problem for the country. Consequently, estimating the costs associated with HIV/AIDS infection may face with underestimating bias. However, in the current study we tried to run our estimations in three scenarios to mitigate this problem. The current pattern of cost of illness for HIV/AIDS infection is just for those patients who are registered and receiving the services. Therefore, the main concerns on the real amount of the associated costs remain as a potential question.

## **Abbreviations**

HIV: Human Immunodeficiency Virus; AIDS: Acquired immunodeficiency syndrome; CD4: cluster of differentiation 4; GBD: Global Burden of Disease; ART: The Antiretroviral Therapy; PWLHs: People Who Live with HIV/AIDS; WHO: World Health Organization; HART: Highly Anti-Retroviral Therapy; SOPs: Standard of Operating Procedures; US: United State; YLL: Years of Life Lost due to HIV; IMOH: Iran Ministry of Health; HCV: Hepatitis C Virus; IC: Indirect Costs; DC: Direct Costs.

## **Declarations:**

**Ethics approval and consent to participate:** All procedures performed in this study were in accordance with the ethical standards of the Ethics Committee of University of Social Welfare and Rehabilitation Sciences. Ethical approval code: IR.USWR.REC.1396.386.

**Consent for publication:** Not Applicable

**Availability of data and materials:** Data on prevalence and treatment rates of HIV/AIDS infection in the country are available based on the official request to Iran Ministry of Health, Centre for Infectious Diseases Control. Data on the costs of procedures, drugs, hospitalization,

medical services, are available from first and corresponding author and accessible upon to the request.

**Competing interests:** The authors declare that they have no competing interests.

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**Authors' contributions:** HG and AB conducted of the study; HG and JS contributed to the conduct of the data gathering and data analysis; HG and JS contributed to interpretation of results and conclusions; all authors contributed drafted the manuscript and also the manuscript revision. All authors confirm the final draft of the manuscript.

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Table (1): Model Parameters for Estimating the Costs of HIV/AIDS Infection in Iran

<b>Parameter</b>	<b>Base Case</b>	<b>Optimistic</b>	<b>Pessimistic</b>	<b>References</b>
Number of PWLHs	32,418	30,772	76,100	(14)
Number of PWLHs under ART	5,585	6,848	4,920	(14)
Number of PWLHs adhere to ART	4,730	5,585	3,950	(14)
Number of PWLHs with ART Failure	1,342	984	2,134	(14)
Number of PWLHs with HBV	484	385	615	(14)
Number of PWLHs with HCV	2,653	1,863	3,335	(14)
Number of PWLHs with incident TB	106	95	234	(14)
Anti HBV Vaccination	3	NA	NA	(9)
Flue Vaccination	1	NA	NA	(9)
Tetanus, Diphtheria, and Pertussis (TD) Vaccination	1	NA	NA	(9)
Measles, Mumps, and Rubella (MMR) Vaccination	1	NA	NA	(9)
Small Pox Vaccination	1	NA	NA	(9)
Pneumococcal Vaccination	2	NA	NA	(9)
Number of PWLHs Deaths	845	652	939	
Number of Infectious Diseases Specialist visits per patients	5	NA	NA	(9)
Number of Visits and Consultations by General Practitioner	14	NA	NA	(9)
Number of Consultations by Public Health Workers	14	NA	NA	(9)
Number of Consultations by Nutritionist	2	NA	NA	(9)
Number of Consultations by Social Worker	5	NA	NA	(9)
Number of Consultations by Clinical Pathologists	9	NA	NA	(9)
Length of Hospitalization (days)	16	NA	NA	(15)
Number of Consultations by Clinical Pathologists	9	NA	NA	(9)
No. of CD4 count	6	NA	NA	(9)
No. of Virulence tests	3	NA	NA	(9)
No. of Resistance Tests	2	NA	NA	(9)
HLA-B5701	1	NA	NA	(9)
HBsAG	2	NA	NA	(9)
HCV Ab	2	NA	NA	(9)

Biochemistry tests	6	NA	NA	(9)
AST, ALT, Bil	6	NA	NA	(9)
CBC/dif	6	NA	NA	(9)
Lipid Profile	7	NA	NA	(9)
FBS, HbA1C	6	NA	NA	(9)
Urine test	4	NA	NA	(9)
Minimum Salary (I.R. Iran Rial)	9,600,000	NA	NA	(16)
Hospitalization services(Hoteling cost per night in a public first class hospital) (I.R. Iran Rial)	1,582,000	NA	NA	(17)
In-patients medical visits and consultancy (public hospital) (I.R. Iran Rial)	88,000	NA	NA	(17)
Lamivudine 150mg Tab. (I.R. Iran Rial)	4,445	NA	NA	(18)
Zidovudine (I.R. Iran Rial)	8,100	NA	NA	(18)
Nevirapine (I.R. Iran Rial)	2,500	NA	NA	(18)
Tenofovire 300 mg (I.R. Iran Rial)	14,500	NA	NA	(18)
Efavirenz 600 mg tab. (I.R. Iran Rial)	16,500	NA	NA	(18)
Isoniazid (I.R. Iran Rial)	1,250	NA	NA	(18)
Rifampicin (I.R. Iran Rial)	3,000	NA	NA	(18)
Streptomycin (I.R. Iran Rial)	47,000	NA	NA	(18)
Pyrazinamide (I.R. Iran Rial)	1,100	NA	NA	(18)
Ritonavir 100 mg (I.R. Iran Rial)	9,743	NA	NA	(18)
Atazanavir 400 mg (I.R. Iran Rial)	5,251	NA	NA	(18)
Lopinavir 400 mg (I.R. Iran Rial)	12,765	NA	NA	(18)