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PUBLIC EXPENDITURES ON HIV PREVENTION, TREATMENT, CARE, AND SUPPORT SERVICES IN IRAN, 2004

par

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RÉSUMÉ

Cette étude vise à déterminer le montant des dépenses publiques allouées à la prévention, au traitement, aux soins et aux services reliés au VIH en Iran en 2004. Depuis 1987, l'épidémie du VIH en Iran s'est transformée d'une épidémie de faible niveau à une de niveau important *(concentrated epidemic)*. Les dépenses reliées au VIH en Iran peuvent être catégorisées en sept programmes: les soins ambulatoires, les hospitalisations, les médicaments antirétroviraux, les tests sanguins et le dépistage, l'éducation de la population, la réduction des méfaits ainsi que le contrôle du VIH dans les forces armées.

Les coûts pour les hospitalisations et les soins ambulatoires ont été estimés par l'agrégation des dépenses de niveau micro (*bottom-up approach*). Les dépenses associées aux cinq autres programmes ont été estimées à partir des coûts macro (*top-down approach)*. Les dépenses totales estimées en 2004 sont de 12 841 974 $US. L'analyse de sensibilité indique que le montant de ces dépenses pourraient se situer entre 11 058 967 $US et 20 381 000 $US.

Cette étude recommande, entre autres, que l'Iran améliore les systèmes d'informations médicales de ses établissements de santé. Un système de suivi et d'évaluation commun à plusieurs sites, collectant des données de façon prospective et systématique permettrait d'améliorer la gestion des patients ainsi que le suivi et l'évaluation des services de santé.

Mots clés : VIH, SIDA, coûts, dépenses, Iran, soins ambulatoires, hospitalisation, soins, prévention, services d'éducation, suivi, évaluation.

ABSTRACT

The main objective of the current study was to determine public expenditures on HIV prevention, treatment, care, and support services in Iran in 2004. Since 1987, the HIV epidemic in Iran has extended itself and changed from a low level to a concentrated epidemic. The total country expenditure areas on HIV in Iran in 2004 comprised seven main programs including inpatient care, outpatient care, provision of antiretroviral drugs (ART), blood testing and screening, public education, harm reduction, and armed forces HIV control.

Using a bottom-up approach we estimated inpatient and outpatient costs and used them as a proxy for estimating national expenditure on treatment and care. The 5 other areas of expenditure were estimated using a top-down approach.

Total expenditures for the 7 programs were estimated to be 12 841 974 US $.Based on the sensitivity analyses, the lower and upper limit of direct public medical expenditures on HIV ranged between 11 058 967 US$ and 20 381 000 US$, respectively in Iran in 2004.

One of the 15 recommendations presented in this report is that Iran needs to improve medical record systems in health facilities. This might be aided by setting up a multi-center prospective monitoring and evaluation system with data gathered systematically in health facilities collecting information to improve patient management and health service monitoring and evaluation.

Key words: HIV, AIDS, cost, expenditure, Iran, outpatient, inpatient, care, prevention, educational services, monitoring, evaluation.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1: IRAN AND HIV & REVIEW OF LITERATURE

CHAPTER 3: RESULTS

CHAPTER 4: DISCUSSION

LIST OF FIGURES

LIST OF BOXES

TABLES IN APPENDIX 1

LIST OF ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
ART	Anti Retroviral Therapy
BTO	Blood Transfusion Organization
CD4	CD4-positive T Lymphocytes
CDC	Center for Disease Control
CI	Confidence Interval
CMH	Commission on Macroeconomic and Health
DIC	Drop-in Centers
ELISA	Enzyme-Linked Immunosorbent Assay
EMRO	Eastern Mediterranean Regional Office (WHO)
GDP	Gross Domestic Product
HAART	Highly Active Antiretroviral Therapy
HH	Health House
HIV	Human Immunodeficiency Virus
HP	Health Post
IDU	Injecting Drug User
IEC	Information, Education, Communication
IRIB	Islamic Republic of Iran Broadcasting Agency
MENA	Middle East and North Africa
MOE	Ministry of Education
MOH	Ministry of Health
MOHME	Ministry of Health & Medical Education (the same as MOH in Iran)

n.d.	No Date (in references)
NGO	Non-governmental Organization
PLHIV	People Living with HIV
PPP	Purchasing Power Parity
S.D.	Standard Deviation
STD	Sexually Transmitted Disease
TUMS	Tehran University of Medical Sciences
UN	United Nations
UNAIDS	United Nations AIDS Programme
UNICEF	United Nations Children's Fund
UNFPA	United Nations Population Fund
UNGASS	UN General Assembly Special Session
VCT	Voluntary Counseling and Testing
WHO	World Health Organization

To my husband, Amir

My mother and father

My children, Sharareh; Hengameh; Mohammad

My Son in law Saeed

And my grand daughters, Saba and Yasna

For their unconditional love, patience and support

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INTRODUCTION

According to UNAIDS 2006 report on the global AIDS epidemic, important progress has been seen in tackling the HIV epidemic in recent years, but in many countries the epidemic continues to outpace local responses, with HIV new infections continuing to increase in certain regions and countries (UNAIDS, 2006). An estimated 39, 6 (33, 4 - 46) million people lived with HIV worldwide in 2005(UNAIDS, 2006). Approximately 4,1 million people became newly infected with HIV, while approximately 2,9 million people died of AIDS-related illnesses in 2005. In the key area of financial resources, the 8,3 billion US $ available for the AIDS response in 2005 is more than five times the funding available in 2001, and is currently well within the Declaration of Commitment target range (Declaration of Commitment on HIV/AIDS,2001). Global resources for the AIDS response have grown from 1,6 billion US$ in 2001 to 8,3 billion US$ in 2005, a significant increase that highlights the need to coordinate, monitor and evaluate spending to ensure maximum impact for people in need (UNAIDS, 2006). In addition to donor funding, domestic public expenditure in heavily impacted countries grew to 2,5 billion US$ in 2005. At the same time, the report notes that the funding gap continues to increase and it is estimated that over 22,1 billion US$ will be needed annually as from 2008 (UNAIDS 2006).

In an encouraging development, six of 11 African countries reported declines of 25% or more in HIV prevalence among 15-24 year-olds in capital cities. Rates of

sex among young people declined in nine of 14 sub-Saharan countries. Condom use with a non-regular partner increased in eight out of 11 sub-Saharan countries, although overall use of condoms remains below 50%. Use of HIV testing and counseling, an important tool for facilitating both treatment and prevention, quadrupled to 16,5 million people tested in 2005 (UNAIDS, 2006). Fifty eight countries reported that 74% of primary schools and 81% of secondary schools now provide HIV education. While this progress is notable, the HIV prevention response falls short in many areas. The 2001 Declaration of Commitment calls for 90% of young people to be knowledgeable about AIDS by 2005, yet surveys indicate that fewer than 50% of young people achieved comprehensive knowledge levels. An area of exceptional concern is the ongoing shortfall in care to prevent mother-to-child HIV infection, in which just 9% of pregnant women were covered (UNAIDS, 2006).

From 1987 till present, the HIV epidemic in Iran has changed from a low level epidemic, with no population group having a prevalence greater than 5%, to a concentrated epidemic. In a concentrated epidemic, the prevalence among pregnant women is below 1% in urban areas, but some most at risk groups have prevalence rates greater than 5%. A cumulative figure of 4846 reported HIV infected people were officially recorded by the end of 2002 but the real number of people living with HIV (PLHIV) in Iran was estimated to be around 20 000 in that year (Iran Ministry of Health, CDC report, 2003).The number of PLHIV in Iran was estimated to have increased from 37 000 in 2003, to 66 000 (36 000-160 000) in

2005. These figures, however, are considered to be underestimates of the real number of people living with HIV in Iran (UNAIDS 2006).

In Iran, HIV infection affects different populations including injection drug users (IDUs), sexually active men and women, children of HIV positive women, and recipients of infected blood and blood products. The increasing number of HIV infected people, has resulted in increasing number of people requiring the use of health and social services. The HIV epidemic in Iran affects individuals, their families, and Iranian society as a whole. Although not a generalized health and development crisis so far, the epidemic may jeopardize the society and pose even greater and more severe hazards for the future.

The first person infected with HIV in Iran was diagnosed in 1987. The probable transmission mode was through contaminated blood transfusion. The epidemic that happened in a prison in 1995 attracted government's attention to the problem of HIV in the country, which was due to needle sharing (Country Report on UNGASS Declaration of Commitment, 2006). From than on, planning for HIV prevention and care has entered a new phase and nowadays HIV prevention, treatment, care, and support services are in the pilot phase to being integrated into the primary health care system of Iran.

The Voluntary Counseling and Testing (VCT) centers established in 1999 started with providing voluntary counseling and testing of HIV positive people and their families and included worried HIV negative people who would refer them. Some

centers subsequently started providing outpatient antiretroviral therapy for patients from 1997 and was revised in 2004.Triangular Clinics were also established, which focus on 3 important issues that are tightly related to each other including HIV, other Sexually Transmitted Diseases, and IDUs. Finally, in 2002 Harm Reduction centers, and in 2003 Drop-in centers and outreach services for IDUs were established (Iran Ministry of Health, 2006). Most of the earlier established 'VCT centers' now also provide some HIV-related outpatient services that overlap with the Triangular Clinics. Some of the Harm Reduction centers also started to provide services that overlap with the Triangular clinics. These three are mostly located in one place. Traditionally, most of the 'VCT centers' that provide services beyond the mere 'VCT' are still called 'VCTs' by the healthcare workers within the system and their activities are integrated with Triangular Clinics' activities. Nevertheless, these centers essentially provide HIV outpatient services, and hence we have retained the latter term in this report. However, to maintain the commonly used nomenclature of 'VCT center' with the health system, the term 'VCT center' or 'VCT' is used interchangeably, given the fact that the providers describe their centers as such .

Assessing the success of these programs in Iran is essential. Four criteria are often used to assess the success of health care provision including: efficiency, effectiveness, equity, and acceptability of the services. These criteria can be used to assess specific interventions, programs and models of care, e.g. the way service provision has been organized, be these preliminary hospital based, including

inpatient and outpatient care, or primary and community care services (Beck and Miners, 2001; Drummond et al., 1997).

In addition, relevant and accurate knowledge concerning diseases' burden, trends, risk factors, prevention modes, and treatment plays important role in appropriate decision making. With the increasing HIV case load in Iran, the need for HIV care services is increasing as are the resources needed. For better programme budgeting and resource allocation activities, the costs of HIV care in Iran needs to be estimated. Indeed, the decision makers need to know what resources are provided, what resources are needed, their costs, and the gap between available and needed resources.

To provide relevant data for Iranian policy makers, a comprehensive project titled "Burden of HIV Infection in Iran" was designed. This project comprises 3 phases:

Phase 1- "The public expenditures on HIV treatment, care, prevention, and support services in Iran in 2004" which would provide an overview about what the areas of HIV expenditure and monetary resources were in Iran .This study could clarify the next steps and the information gaps regarding use, cost, and outcome of service provision in Iran.

Phase 2- A full "costing study" on HIV in Iran to estimate the costs, including direct and indirect costs, from both public sector and societal perspectives. This

phase will clarify what resources are needed in Iran and how much these resources cost.

Phase 3- Monitoring and evaluation "the effectiveness, efficiency, equity, and acceptability of HIV health care provision in Iran" using a longitudinal prospective methodology.

For HIV service provision, it is ideal to collect data on an ongoing basis on the use of services, by stage and severity of HIV infection each time a patient is seen at the center, including information on specific opportunistic illnesses, treatment side-effects or other illnesses. Use of services in this context includes both hospital inpatient and outpatient services, tests and procedures performed as well the therapy received by these individuals. Where possible, this information should be combined with services received in the community or other institutions, such as hospices (Beck and Miners, 2001).

The performance of cost and expenditure studies in Iran are very new and few studies have considered the relevant scientific and methodological issues. The current study is the first study in the country, which addresses the cost and expenditure of HIV-related service provision in Iran.

The main areas of government expenditures on HIV service provision in 2004 were identified. In Iran, HIV expenditure covers the seven main programs:

1) Inpatient care (hospitalization);

2) Outpatient care;

3) Provision of antiretroviral drugs (ART);

4) Harm reduction;

5) Blood testing and screening;

6) Public and school students' education.

7) Armed forces HIV control.

The first 4 programs are performed and monitored by Iranian Centre of Disease Control (CDC), Ministry of Health. Blood testing and screening program is conducted by Blood Transfusion Organization, Ministry of Health. The sixth program is planned and performed by two organizations including Islamic Republic of Iran Broadcasting (IRIB) which provide education for all age groups and Ministry of Education providing education for students at pre-university levels. The last program is run in Army Health Care Centers with collaboration of Iran Ministry of Health, CDC .

Expenditures in each of these area were estimated to arrive at an estimation of total expenditure on HIV treatment, care, prevention, and support services in Iran.

Regarding inpatient costs, we used a bottom-up approach and estimated the inpatient cost per individual and hospitalization. For outpatients, we estimated the average outpatient cost per visit. These cost estimations were used as a proxy of

inpatient and outpatient expenditures in Iran. For other areas such as public education, blood screening ART, harm reduction, and armed forces HIV control programs we focused on the expenditures with a top down approach.

Imam Khomeini has been a university referral hospital since 1948, affiliated with Tehran University of Medical Sciences (TUMS). Regarding inpatient and outpatient's use, cost, and outcome of services, we focused on the data from Imam Khomeini hospital infectious disease ward and Imam Khomeini Triangular Clinic and VCT center which provided the most complete source of information about HIV in the country. We gathered additional outpatient cost data from five other VCTs around the country and calculated average cost per outpatient visit to estimate outpatient expenditures in the national level.

The study period was the year 1383 of the Iranian calendar, or from the 21st of March 2004 till the 21st March 2005 according to the Gregorian calendar.

CHAPTER 1

Iran and HIV

&

Review of Literature

1.1. General information about Iran

Iran is situated in south-western Asia and borders the three former Soviet states, the Republic of Armenia, the Republic of Azerbaijan, and the Republic of Turkmenistan, as well as the Caspian Sea to the north, Turkey and Iraq to the west, the Persian Gulf and the Gulf of Oman to the south, and Pakistan and Afghanistan to the east.

Iran is one of the world's largest oil rich countries and has the second largest gas reserves. Another special factor in Iran is that this country is a major route for drug trafficking, coming from neighboring Afghanistan and Pakistan, and destined for Europe, Central Asia and the Persian Gulf region. The large amount of drugs trafficked through Iran contributes to the drug problem in Iran (UNAIDS, 2005). In 2002, Iran accounted for a quarter of world opiate seizures. At this time, it was officially estimated that there were between 200 000 and 300 000 drug injectors in the country, and this is widely regarded as an underestimate (Nissaramanesh et al, 2005).

With a population of 67,2 million in 2001 and a GDP of 114,1 billions US$ in 2001, Iran is the second most populous country and the second largest economy in the middle-eastern region (UNAIDS, 2005).

Iran now has a significant rate of unemployment. Although this decreased from 14,7% in 2002 to 12% in 2004, Iran still has to create 700 000 jobs annually

(UNAIDS, 2005). In 2005, the unemployment rate was estimated at 12,1% and the majority (70%) of the unemployed were young people under thirty (Iran CDC report, 2006).

Table I Basic demographic and socioeconomic of Iran.

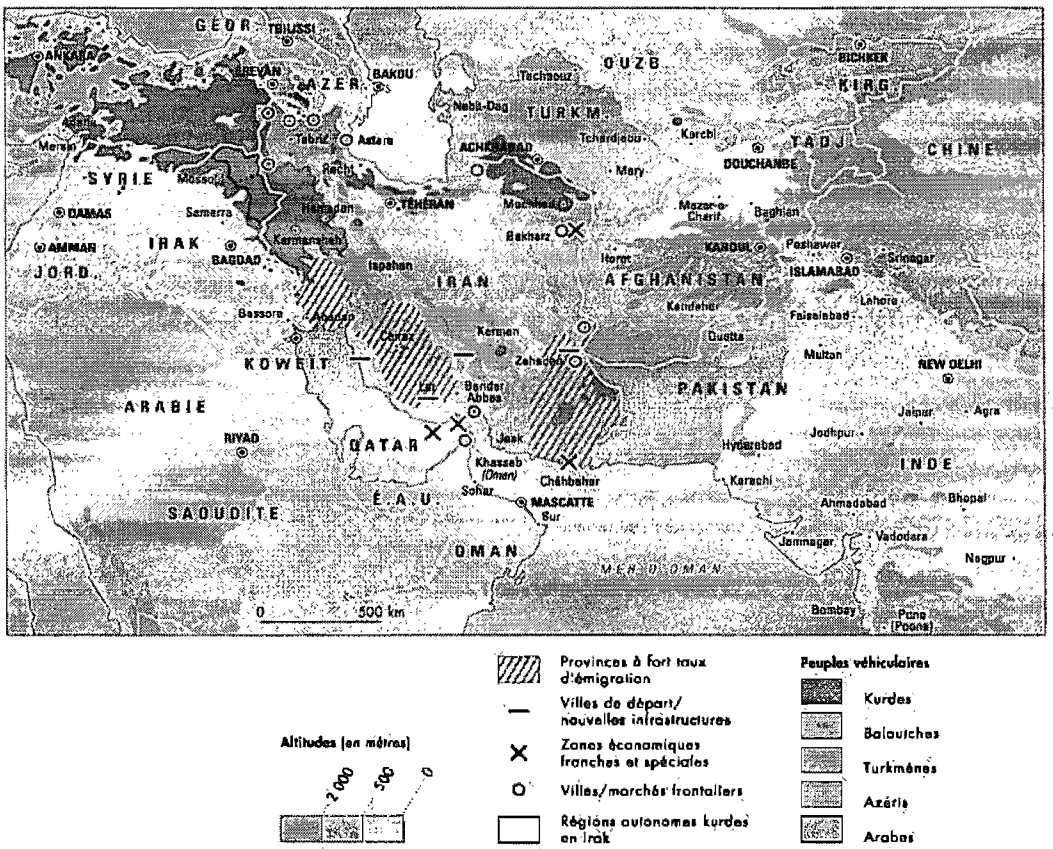
DEMOGRAPHIC DATA	YEAR	ESTIMATE	SOURCE
Total population (thousands)	2004	69,789	UN population division database
Female population aged 15-24 (thousands)	2004	8,617	UN population division database
Population aged 15-49 (thousands)	2004	39,678	UN population division database
Annual population growth rate (%)	1992-2002	1.4	UN population division database
% of population in urban areas	2003	66.2	UN population division database
Average annual growth rate of urban population	2000-2005	2.3	UN population division database
Crude birth rate (births per 1,000 pop.)	2004	20.8	UN population division database
Crude death rate (deaths per 1,000 pop.)	2004	5.3	UN population division database
Maternal mortality rate (per 100,000 live births)	2000	76	WHO (WHR2004)/UNICEF
Life expectancy at birth (years)	2002	69	World Health Report 2004, WHO
Total fertility rate	2002	2.4	World Health Report 2004, WHO
Infant mortality rate (per 1,000 live births)	2000	36	World Health Report 2004, WHO
Under 5 mortality rate (per 1,000 live births)	2000	45	World Health Report 2004, WHO
SOCIO-ECONOMIC DATA	**YEAR**	**ESTIMATE**	**SOURCE**
Gross national income, ppp, per capita (Int.$)	2002	6,340	World Bank
Gross domestic product, per capita % growth	2001-2002	4.2	World Bank
Per capita total expenditure on health (Int.$)	2001	422	World Health Report 2004, WHO
General government expenditure on health as % of total expenditure on health	2001	43.5	World Health Report 2004, WHO
Total adult illiteracy rate	2000	24	UNESCO
Adult male illiteracy rate	2000	17	UNESCO
Adult female illiteracy rate	2000	31.1	UNESCO
Gross primary school enrolment ratio, male	2000/2001	88	UNESCO
Gross primary school enrolment ratio, female	2000/2001	85	UNESCO
Gross secondary school enrolment ratio, male	2000/2001	81	UNESCO
Gross secondary school enrolment ratio, female	2000/2001	75	UNESCO

Source: Epidemiological Fact Sheets, 2004.

Iran's central position has made it a crossroads for migrants and it has emerged as a major transit area. The population is not homogeneous - although it has a Persian core that includes over half of the population. The Iranian population comprises several ethnic and linguistic groups: Persian and Persian dialects, Turkic and

Turkic dialects, Kurdish, Luri, Balochi, Arabic, and others. This ethnic diversity provides a need for especial educational and preventive plans for HIV positive and HIV negative groups in different provinces.

Figure 1 Ethnic groups in Iran



Source: UNAIDS , 2005

Health care policy makers need to be aware of this variation in ethnic groups, cultures, and languages of the Iranian population, which must be taken into account for HIV prevention and treatment programme planning.

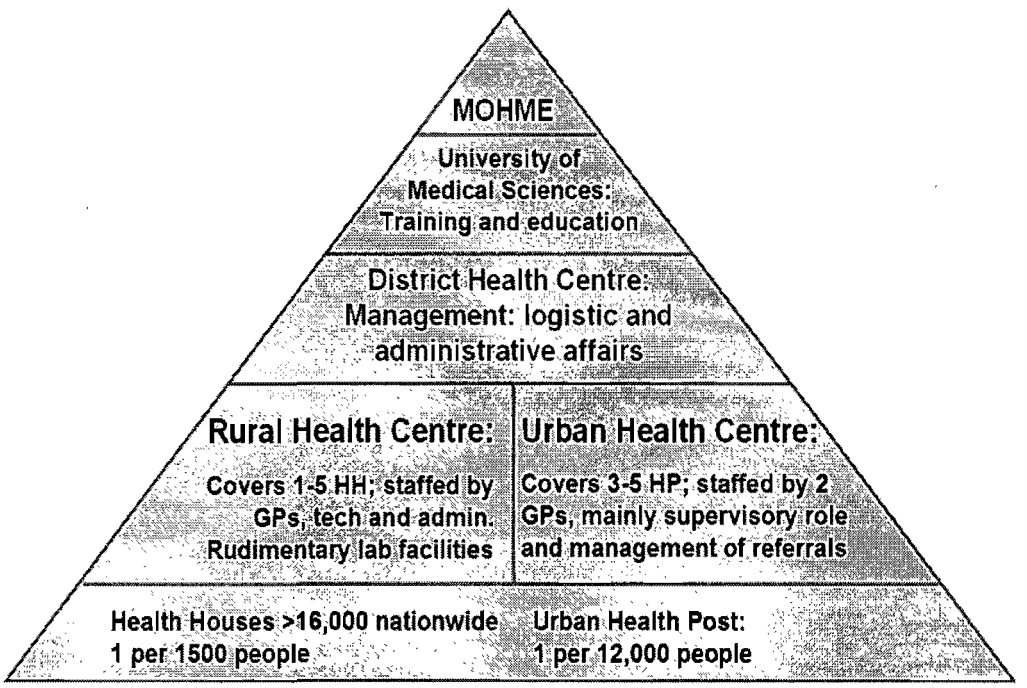
1.2. General healthcare structure and funding

In Iran, health care is provided by both private and public sectors but the majority of people, especially the ones in low socioeconomic level, use the public health care system. Iran's "Master Health Plan", adopted in the 1980s for the period of 1983-2000 accorded priority to basic preventive and curative primary care services as opposed to sophisticated hospital based tertiary care, and focused strictly on the population groups at highest risk, particularly in deprived areas (UNAIDS, 2005).

A Primary Health Care network was established in Iran in 1985 and has evolved since then. The most peripheral service delivery points are Health Houses in rural areas and Health Posts in urban areas. These are supervised by rural and urban health centers, and the District Health Department at the next level. The referral system then is related to district, province, and tertiary level hospitals (Figure 2). Healthcare service provision in each province is monitored by University of Medical Sciences located in the same province. If there are more than one University of Medical Sciences in a province, the region is shared among them. For instance three Medical Universities are supervising health care services in Tehran province including Tehran, Shahid Beheshti, and Iran University of Medical Sciences. Higher medical education is also the responsibility of the Universities of Medical Sciences, which all are supervised by the Ministry

of Health and Medical Education in Tehran. Integration at service provider and user levels, and stepwise referral are the main characteristics of the Primary Health Care network in Iran (Shadpour, 1994).As a result of the prioritization and effective delivery of quality primary health care in the Primary Health Care network, health outcomes in rural areas are almost equal to those in urban areas, with outcomes in terms of infant and maternal mortality nearly identical between urban and rural areas (UNAIDS, 2005).

Figure 2 Primary Health Care network in Iran



In 2003, per capita total expenditure on health at international dollar rate was 568.5 Int $. Per capita government expenditure on health at average exchange rate was 66.2 US$. Per capita government expenditure on health at international dollar rate was 278.5 Int$ (table II) (WHO, 2006).

Regarding funding in the health sector in 2003 and 2004, per capita total expenditure on health at average exchange rate was 135.2 and 157.8 US$, respectively (WHO, 2006).

Table II Funding in health sector in Iran in 2003

Total expenditure on health	6,5% of gross domestic product
General government expenditure on health	10,3% of total government expenditure
General government expenditure on health	47,3% of total expenditure on health
Social security expenditure on health	30,9% of general government expenditure on health
Social security expenditure on health	14,6% of total expenditure on health
External resources for health such as UN agencies	0,1% of total expenditure on health
Private expenditure on health	52,7% of total expenditure on health
Out-of-pocket expenditure	94,8% of private expenditure on health
Private prepaid plans	4,4% of private expenditure on health

1.3. HIV healthcare in Iran

The CDC in Iran's Ministry of Health has several common programs regarding HIV prevention, treatment, care, and support in Iran. A National

Committee to Combat HIV, chaired by the Minister of Health, was set up in 1988. This Committee provides policy guidance to the National AIDS programme. An HIV prevention program was devised by CDC targeting the following populations:

1- General population.

2- Risky population including:

a- Health workers and dentists;

b-Most-at-risk groups such as IDUs, prisoners, commercial sex workers, and men who have sex with men;

3- HIV positive people and AIDS patients.

The National Strategic HIV Plan of Iran's CDC, is based on multisectoral collaboration and co-ordination, and is mainly based on HIV prevention, care, support, and treatment services and contains the following major elements:

1. Providing patients and community with information, educational material and communication;
2. Serological and behavioral surveillance;
3. Voluntary testing and counseling;

4. Ensuing blood safety.

After the identification of the first case of HIV infection, Iran's national response to the epidemic began by the formation of the High Council on AIDS in 1988. In 2001 a 5-year National Strategic Plan was developed by the MoH together with other stakeholder institutions for the 2002-2006 period. It was presented with the relevant executive guidelines to the contemporaneous government of the time. The plan emphasized the participation of other sectors including governmental or non governmental organizations. The following 11 point strategy was developed to contain the spread of HIV (Box 1; Iran Ministry of Health 2006):

Box 1 Point strategies to confront with HIV in Iran, 2001

1. Education and information campaigns;
2. Provision of safe blood supplies;
3. Strengthening of the epidemiological care system;
4. Strengthening of the prevention system against virus transmission at Iran's diagnostic, health and treatment centers;
5. Counseling for at-risk individuals and voluntary testing for most-at –risk populations;
6. Harm reduction;
7. STI care and treatment;
8. Counseling, care and treatment for PLHIV and their families;
9. Strengthening and expansion of infrastructure and (financial, human and management) resources in all HIV related spheres;
10. Strengthening of applied research;
11. Social and financial support for PLHIV, their families and individuals most-at-risk.

In 2002 a document titled "Islamic Republic of Iran's Policies on HIV/AIDS" was compiled that included a detailed description of the country's key national strategy guidelines. Some of the main headings include the necessity for multi-sectorism, political support, accountability, leadership and unified coordination, transparency, flexibility, observation of the rights of people involved, participation of PLHIV, compliance with Iranian ratified UN goals on HIV, and the final objective was the need for evidence-based action (Iran Ministry of Health,2006).

Regarding public education and prevention, the government started a telephone counseling initiative (hot line) in 2005 and national distribution of 10 000 000 brochures on HIV for adolescents and most-at-risk population. It is also considering Information-Education-Communication (IEC) interventions in public spaces (UNAIDS, 2005). There are also TV and Radio programs to increase population knowledge on HIV infection. Iran Ministry of Education has also special plans for the education of adolescents and other pertinent age groups regarding HIV prevention.

In 2000, the government set up "Triangular Clinics" for IDUs in Kermanshah Province. IDUs constituent the major part of HIV positive persons in prisons and the first dramatic increase of cases was detected in a prison in Kermanshah province in 1995. Three main policies are the focal point of these clinics. These are:

1. Harm reduction among injecting drug users;

2. Treating people suffering from sexually transmitted diseases other than HIV;
3. Providing treatment and psychological support for HIV positive and AIDS patients.

In addition, these clinics provide integrated services to these patients. "Triangular Clinics" are recognized as representing "best practice" in the Middle East and North Africa for controlling and preventing HIV infection. These clinics have been so far established in all provinces where integrated services are being provided throughout the country (UNAIDS 2005). The integration of "Triangular Clinics" into the primary health system care of the country is now being piloted.

Target groups of the Triangular Clinics include:

- HIV positive people.
- Family members of HIV positive people.
- People who come for voluntary counseling and testing.
- IDUs or people with a history of high risk sexual contact.
- People with Sexually Transmitted Disease (STD).

Nowadays the outpatient HIV care sites established in 1999 play very important roles in HIV care provision in Iran. Outpatient services are provided by VCTs integrated in triangular clinics all around the country which are established and

supervised by Medical Universities. Actually, each Medical University supervises a number of VCTs in close with the HIV Office in CDC, MoH. They provide voluntary counseling and testing (VCT), educational, prevention, care, and treatment services to the target population and more than 150 sites were established up to the end of 2005. Figure 3, page 23, describes the process for people coming for counseling and testing in VCTs. After HIV health education for general and most-at-risk population, some people are self-referred or referred to VCT centers, either by themselves or by a professional. These clients could be divided into 3 groups as follow:

1- The persons who worry about being HIV positive without any high risk behavior or symptom. The VCT staff detects the eligibility of the person based on the guidelines and if he/she is eligible to be tested, sends him/her for testing. People at high risk through IDU or multiple partners, volunteers, and STDs are eligible for HIV test. The test is an ELISA test antibody and is confirmed with Western Blot.

   If he/she is not eligible, the VCT staff gives consultation and educates him/her regarding HIV and the process ends.

2- The people who only have had a history of high risk behavior and might be HIV positive or HIV negative. This person will receive consultation and then will be tested for HIV.

3- The people whose test is positive. They will enter into the process as shown in figure 4, page 24.

If the HIV test is negative, the clients are asked to return 6 months later to repeat the test. If he/she is still test negative 6 months later, he/she will enter into the process as shown in figure 5, page 27 they will also be consulted by a physician, or a specialist in infectious diseases.

Figure 3 Event pathway for HIV testing in Iran

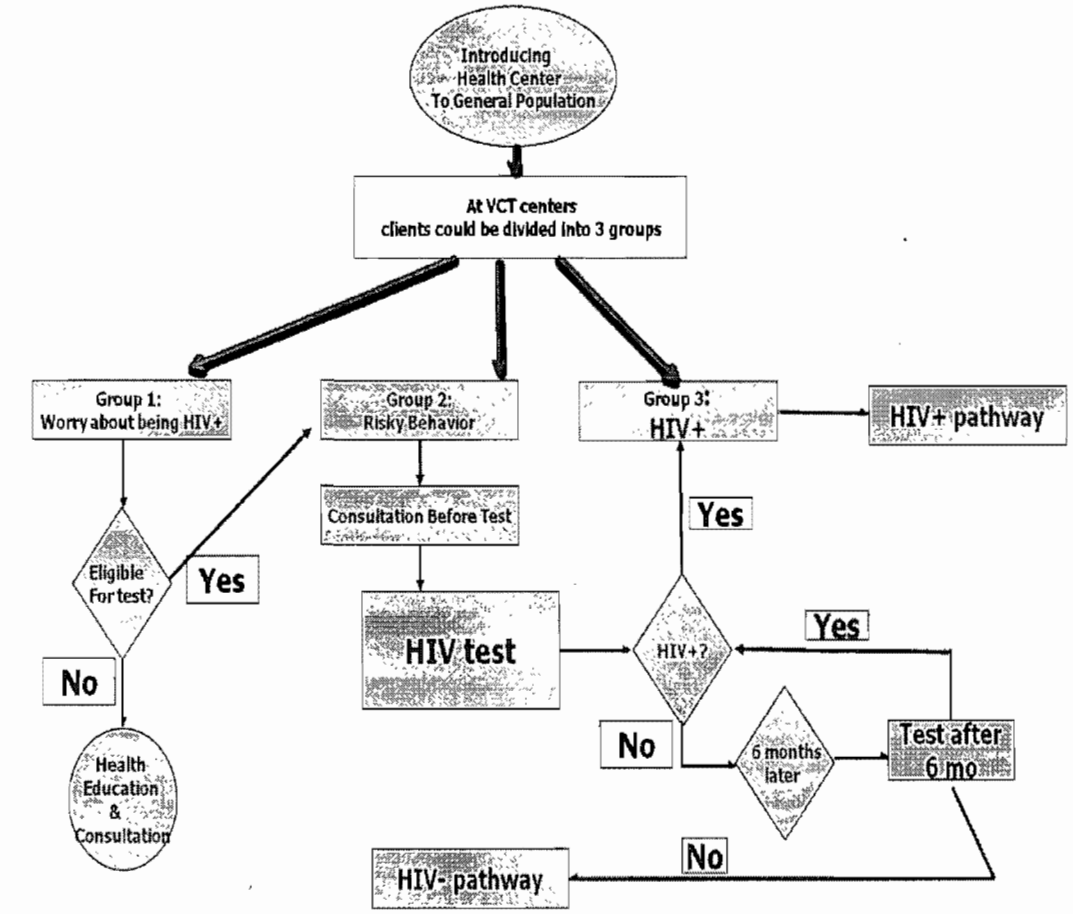
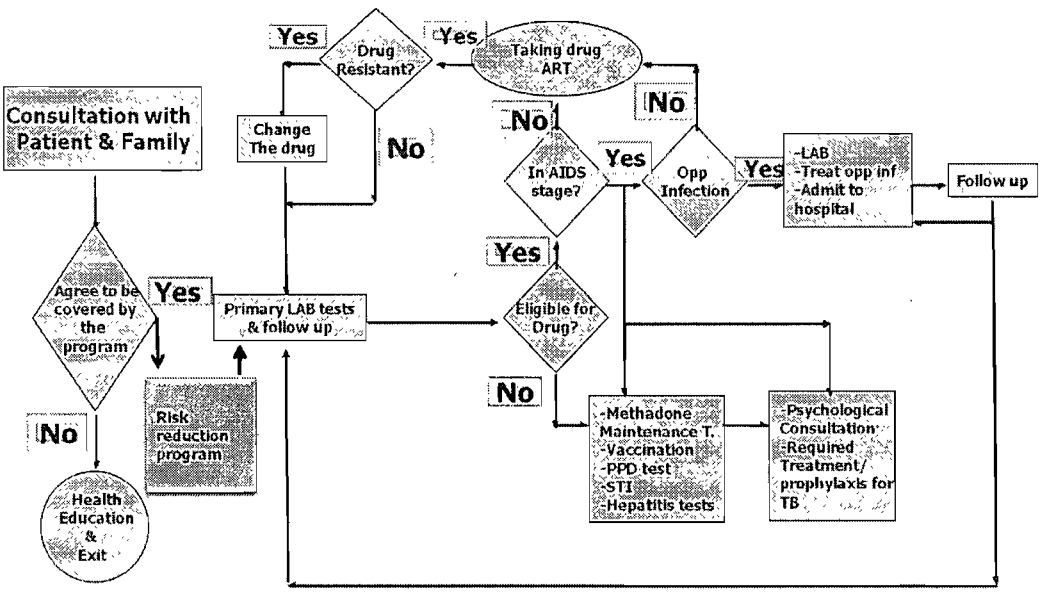


Figure 4 Event pathway for HIV positive people refer to Triangular clinics and VCT centers in Iran



Two groups of clients receive following services at VCT centers: The HIV positive people (asymptomatic or symptomatic) and the families of HIV positive people. All services are provided while maintaining strict confidentiality and security of personal information. For the HIV positive people, services described in Box 2 are generally provided:

Box 2 Services are planned to be provided for HIV positive people at Triangular clinics and VCT centers in Iran

- Active follow up by trained staff
- Data registry
- Consultation
- Clinical and paraclinical examination considering co diseases.
- Prophylaxis for tuberculosis, Pneumocystis Carinii Pneumonia (PCP), and mother to child transmission (for pregnant women)
- Vaccination (Hepatitis B, Diphtheria-Tetanus, Pneumococcus, Influenza)
- Drug therapy and outpatient care for people with tuberculosis, psychological disorders, and co-infections (if necessary)
- HAART including: Zidovudine, Lamivudine, and Nelfivavir, under the direct observation of the infectious disease specialist
- Referring to the care delivery or supportive organs (if necessary)
- Family planning
- Harm reduction organizing matched groups among diseased people
- Home care

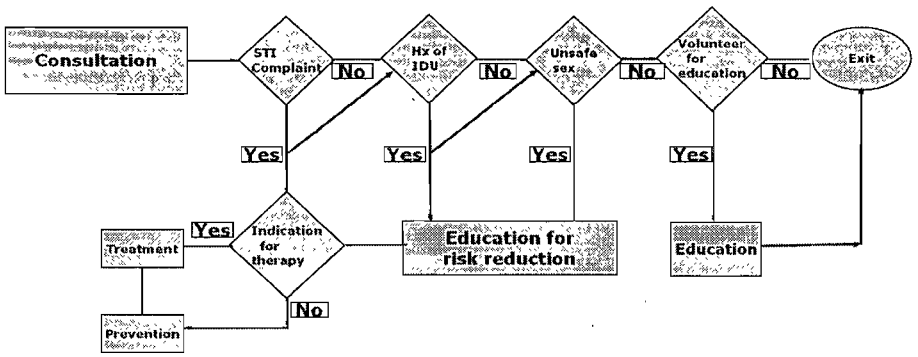
From VCT centers the HIV positive patients are referred to one of these following settings, according to necessity:

1. Hospitals or private clinics to be hospitalized or receive specialist advice.
2. Social support agencies such as the Iran Red Crescent Society (IRCS), Welfare Organization, and Imam Khomeini Help Committee.
3. Harm Reduction and drug dependency treatment agencies.

VCT staffs should also follow the referred people to be sure whether they are hospitalized or used the supportive activities.

For HIV negative VCT clients, consultation and education follow a different path (figure 5, page 27).

Figure 5 HIV event pathway for HIV negative VCT clients in Iran



1.4. Financing HIV healthcare in Iran

Almost all of the HIV inpatient care services are provided by the governmental health sector in Iran, and almost all of the incurred costs are paid by the government.

For a very small proportion of people living with HIV, inpatient care is delivered in the private sector hospitals. However, this amount of care is limited due to various reasons, including the reluctance of the private practice settings for admitting known HIV positive patients. Health insurance for such services is solely provided by governmental insurance agencies. Resources for outpatient HIV healthcare

services are mainly provided by the governmental sector. As HIV positive patients mostly prefer to refer to public clinics because all services are free of charge, the amount of expenditure on private health care is negligible compared with the public sector HIV-related expenditure.

Foreign financial assistance by UN and international agencies constitute less than 3 percent of total HIV healthcare-related expenditures, according to the Ministry of Health (Country Report on UNGASS Declaration of Commitment, 2006).

The last sector is the healthcare provided by Iranian Non Governmental Organizations (NGOs) at national and subnational levels. The first HIV related NGO was established in 2003 in south of Tehran. In general, the NGOs provide preventive services and outpatient healthcare, and their financial resources are provided either by Iranian charities, foreign NGOs, or to a limited degree, by UN agencies such as UNAIDS, UNESCO or UNFPA.

More than 95% of all HIV healthcare-related expenditure is estimated to be directly paid by the governmental health sector, originating from the national resources allocated centrally through the "Management and Planning Organization".

The Management and Planning Organization is the highest governmental source for distribution of financial resources to the ministries, governmental organizations and institutions, and governmental health insurance agencies. The limited control of the Ministry of Health (MOH), including the Center for Disease Control and the

National HIV office, on the financial and technical activities of the Medical Universities at the province level affect the activities of the Medical Universities. They directly receive their financial resources allocated through the Management and Planning Organization, and their legal obligations and actual incentives for reporting to the MOH headquarters are therefore limited. Alternatively if financial resources for disease control programs allocated by Management and Planning Organization would be distributed by the Center for Disease Control to Medical Universities, this could increase the Universities' responsiveness to the Center for Disease Control in terms of financial and programmatic performance.

1.5. Review of literature

This section provides an overview of some of the studies done in the area of costs and expenditures of HIV service provision in the world with the emphasis on the methodology.

1.5.1. Methodological considerations

1.5.1.1. Designing a costing study

There are several methodological issues that should be considered in doing studies on cost on HIV service provision in the country or at facility level. One important

point is that the researcher should have a holistic view on the context in which the HIV health care is provided. The context is also critical in the response to the HIV pandemic.

The health systems of affected countries are inevitably at the forefront of national responses to the HIV pandemic. The pandemic is deeply rooted in the social and economic conditions within and between nations. Thus, it would be misguided to offer a single, simple 'recipe' for an effective response, given the importance of each country's context (Beck et al., 2006).

In every costing study the research team should make decisions on the items they are willing to focus on. Their decision depends on:

a) Aims of the study;

b) Stakeholders' felt needs that prompted the research;

c) Availability of data; and

d) Availability of resources.

Cost estimates compromise direct and indirect costs. Direct costs represent the value of all goods, services, and other resources consumed in providing health care or dealing with side effects or other current and future consequences of health care. Indirect costs, sometimes known as "productivity losses" include the costs of lost work due to absenteeism or early retirement, impaired productivity at work, and

lost or impaired leisure activity. Indirect costs also include the costs of premature mortality (Goodman, 2004).

The viewpoint or perspective assumed in any economic evaluation study is important since an item may be a cost from one point of view ,but not a cost from another. Possible points of view include: society, Ministry of Health, other government ministries, the government in general, patient, employer, the agency providing the program and others.(Drummond et al., 1997).

The most common viewpoints used in economic evaluations are public health sector and societal viewpoints. Taking a societal perspective in economic evaluations leads to a higher number of cost items with a potential large impact on total cost estimates than in the case where the analysis is restricted to only health care costs (Barendregt et al ,1999 & Brouwer et al., 2001). When the analyst is in doubt of choosing the relevant perspective, he or she should adopts the societal point of view, which is the broadest one and is always relevant (Drummond et al., 1997).

Two ways of collecting costs are either 'top down' or 'bottom up' (also called microcosting). Top down studies use the total budget divided by the relevant denominator to produce average costs per patient. This method is the quicker one but assumes that all patients have the same diagnosis, severity of illness and treatment. The costs produced from this method are not sensitive to changes in treatment. Bottom up studies measure resource use by individual patients and so are

able to detect treatment differences between patients. This method produces much better quality costs, but can be time consuming and expensive. Also top down costs are often available from healthcare accounting systems, whereas bottom up costs may need to be collected especially for that economic evaluation (Elliot and Payne, 2005).

Considering the context and also above mentioned issues, direct cost estimations on HIV service provision are mainly focused on inpatient care, outpatient visits, and medication provided, with some variations in different studies. Drummond and colleagues and the Canadian Coordinating Office for Heath Technology Assessment (CCOHTA), have recommended the direct cost estimations to be divided into 4 broad categories: drugs, outpatient clinical care (including physician and laboratory costs), inpatient hospital care and community-based home care (Drummond et al. 1997; Baladi, 1996).

Rees used the cost extraction method to provide estimates of the cost of HIV infection to the National Health Service (NHS) in England and Wales in 1990. He extracted HIV costs from the global revenue cost totals of 3 NHS districts. Costs were broken down into AIDS inpatient and outpatient work, HIV inpatient and outpatient work, haemophilia work, counseling and testing, research and teaching, health education, drug misuse, infection control and administration (Rees, 1990). In another study, Mor and colleagues studied the number of outpatient visits, use of the emergency room, and inpatient admissions to assess the effects of

sociodemographic factors on health service use among people with HIV infection in nine communities across the US (Mor et al., 1992). Also McMurchy estimated the cost impact of ART for adults in Canada between 1985 and 1999.Direct costs included inpatient, outpatient, palliative and home-care costs, as well as the cost of ART and other medications (McMurchy,2000).

Some investigators have relied on the data gathered in one or mostly two facilities to perform a costing study. Based on these studies inferences are often made from small sample size to regional or national levels. De Graeve et al. calculated inpatient costs generated at one University Hospital in Belgium and outpatient costs generated at one institute/hospital of 213 seropositive patients without AIDS and of 48 AIDS patients, for the year 1991 (De Graeve et al., 1997). Paul and colleagues in 1999 collected information on all HIV-positive patients admitted to the New York Hospital-Cornell Medical Center in New York City. Data were collected from 1 January through 30 June 1995, and compared with the same 6-month time period in 1997(Paul et al., 1999). In 1996 a study was conducted by Decock and colleagues to measure the direct costs of HIV care in Belgium. Data on service use and costs were obtained through a care-cost diary kept over three months. Half out of 82 sequential outpatients returned a completed diary, which reduced the sample size considerably. Additional billing data were obtained from different sources and by calculating the time spent for certain services (Decock et al., 2001). Robins et al. used a retrospective cohort design to measure total medical costs for 1 year in a randomly selected sample of 280 patients treated for HIV

infection at an urban health care facility. Inpatient and outpatient costs were measured from the economic perspective of the health care provider. Hospital costs included ward, ancillary, and procedure costs. Ambulatory services included medications, primary and specialty care, case management, ancillary, and behavioral comorbidity treatment costs (Robins et al., 2006).

1.5.1.2. Indirect versus direct cost estimation

Indirect costs of HIV as well as direct costs should be estimated. Such information is very valuable for policy makers in the allocation of resources at country level. Mullins and colleagues (2000) estimated annual indirect costs of the HIV epidemic in England in 1997-1998 from both a public-sector and societal perspective. Estimated population-based indirect costs from the public-sector perspective comprised between 58% and 124% of direct treatment costs for triple drug therapy in England during 1997. From the societal perspective, estimated population-based costs comprised between 45% and 102% of direct treatment costs and cost of care, respectively, during 1997. Indirect costs from the public-sector perspective included statutory, community, and informal services; disability costs (including disability benefits); and loss of economic productivity. The difference between indirect costs estimated from public –sector and societal perspective presented separately arise from inclusion of disability costs in the public-sector estimations.

The authors believed since disability benefits represent actual costs to the English government, they could be included in the public-sector analysis. They also discussed that disability-related unemployment benefits should be excluded from societal perspective estimations considering that disability-related unemployment benefits are not truly indirect costs, since they merely redistribute wealth within society and therefore are transfer payments.

In another study by Beck and Mandalia in England in 1999 cost estimates ranged from 28% to 34% of total direct costs, assuming a 100% productivity loss and adapting a public health sector perspective. Corresponding figures assuming a 50% loss of production ranged from 20% to 25%. From a societal perspective, indirect cost estimates varied between 22% and 27% of total direct costs, assuming a 100% loss of production, and between 13% and 16% of total direct costs when assuming a 50% productivity loss (Beck and Mandalia, 2003).

1.5.1.3. Clues to design or appraise costing studies

Beck and colleagues reviewed published studies in English language journals between 1 January 1981 and 30 June 1999 on the costs of HIV service provision using a scoring system to screen for the acceptable studies in terms of their quality. They devised a set of 10 criteria as indicators of quality and comprehensiveness to assess the published cost studies (Table III).

Table III Review assessment criteria for published cost studies

Criteria	Score (maximum)[a]
1. Minimum of 10 patients in each study group	1(1)
2. Bottom-up costing:	
retrospective	1
prospective	2 (2)
3. Minimum period of 3 months follow-up	1
4. Unit costs:	
charges/prices by year	1
unit costs	2 (2)
5. Patient disease classification:	
disease categories (e.g. Centers for Disease Control)	
1	1
2	2
3	3
Case severity indices	1(4)
6. Cost components:	
total cost per	1
healthcare costs	1
drugs	1
tests (e.g. CD4count)	1 (4)
7. Number of treatment centers:	
1	1
more than 1	2 (2)
8. Standardized costs per time unit:	
no	0
yes	1 (1)
9. Analysis:	
point estimate (e.g. mean)	1
plus measure of variance (e.g. standard deviation)	2 (2)
10. Breakdown of final costs:	
no	0
yes	1 (1)

a Each study could score 5 to 20 points. A higher score was considered indicative of a combination of higher quality or completeness of study methods/results.

Source: Beck et al., 2001

Levy and colleagues reviewed published studies reporting the direct medical costs of treating HIV-infected people in countries using HAART between January 1996 and June 2005. They also suggested the following criteria to aid the costing studies to be comparable:

- Range of cost components that are considered in the study. This could include inpatient, outpatient, and medication costs.
- Stratification of cost estimates by prognostic laboratory variables such as CD4 cell count, HIV viral load, or by clinical disease stage.
- Sources for unit cost measurement used by the investigator. Economic theory suggests that unit cost should reflect the opportunity cost of resources used in providing a service to HIV-infected patients, although in practice, because of difficulties in quantifying this measure, charges or average costs are often used as a proxy for opportunity costs.
- Level at which cost estimates are reported. Reporting cost estimates at the lowest disaggregated level would help to the comparability of study results.
- The timeliness of published estimates as treatment patterns in HIV/AIDS continue to evolve (Levy et al., 2006).

1.5.1.4. Methods used for cost estimations at national level

Some studies extrapolated the individual cost data to the population data to provide information for policy making in the macro level. For instance, Cameron and

Tarantola extrapolated the costs to the global level by multiplying annual costs per AIDS patient by the estimated number of AIDS cases per country to estimate the global inpatient and outpatient costs of AIDS care in 1990 (Cameron and Tarantola, 1992). Petrou et al estimated total lifetime care costs for an individual with HIV or AIDS in England and Wales between 1992 and 1997.Questionnaires and monthly diaries were used to collate data on healthcare utilization from 235 patients with HIV infection over a 6-month period from 2 clinics in Greater London. Community care costs combined with information on hospital data obtained from providers of services were used to estimate the annual total direct costs of care and present and future total national care costs for England and Wales (Petrou S et al., 1996).

In a study performed by Beck and Tolley, contemporary cost estimates of treating HIV-infected individuals by clinical stage of HIV infection were linked to the number of diagnosed HIV-infected individuals using statutory medical services in England during 1996 (Beck & Tolley, 1998).In another study, Beck and colleagues calculated individual unit cost estimates based on 1997 activity data, and linked it to the number of diagnosed HIV-infected individuals using statutory medical services by clinical stage of HIV infection in England during 1997 to obtain population-based cost estimates (Beck et al., 1999).

On the other hand, using Medline database for 1990-1998 Rabeneck and colleagues reviewed 31 articles focused on adults with a spectrum of HIV disease in which the authors developed their own resource use and cost data. They found wide variations

in the estimates and identified three major sources for it: (1) patient samples that were restricted to subgroups of the national HIV-infected population; (2) utilization data that were limited in scope (e.g. inpatient care only); and (3) invalid methods for estimating annual or lifetime costs, particularly in dealing with decedents. They concluded that in order to estimate resource use and costs for HIV care nationwide accurately, a nationally representative probability sample of HIV-infected patients is required. Even in research that is not intended to provide national estimates, the scope of utilization data should be broadened and greater attention to methodological issues in the analysis of annual and lifetime costs is needed (Rabeneck et al. 1999).

1.5.1.5. Expenditure studies

Financial information forms an important component of "strategic information" needed to scale up interventions, programs, and services in each country. It falls into two broad categories: information on how much is spent on services that can come from the government sector or civil society and the actual cost of service provision. Expenditure refers to those funds, which are actually being spent at the various levels and which for government organizations varies from expenditure at central level down to facility or community level (Beck et al., in press). Costs refer to the monetary resources required to implement an intervention or provide a particular service and is estimated through costing or 'cost-of-illness' studies (Beck

et al.,2001). It is estimated by multiplying indices on the use of services by their respective unit costs (Beck et al., in press).

In general, there are fewer expenditure studies in the HIV area compared with HIV-cost studies. A study in 1998-1999 on national expenditures on HIV in 5 countries, describing the level and flow of health expenditures on HIV, reported that the National HIV Accounts constituted a powerful tool to describe the country's response to HIV (Izazola-Licea et al., 2002).

The Regional AIDS Initiative for Latin America and the Caribbean (SIDALAC) has served as a supporting body for a number of HIV expenditure studies based on the National Health Account (NHA) framework (Izazola-Licea et al., 2000; SIDALAC 1999). Studies for Brazil, Guatemala, Mexico and Uruguay have been completed as part of this work thus far (Izazola-Licea et al., 2000). The methodology adopted by these studies essentially revolves around defining a set of activities to be included in the HIV estimates and describe financial flows related to these activities in the form of three main types of matrices; ultimate financial sources and financial agents, financial agents and the providers of care, and financial agents and the main expenditure categories (prevention, treatment and the like). Izazola and colleagues (2000) illustrate this method using Guatemalan data (Odumosu et al. 2002).

Another study undertaken by the Harvard School of Public Health during 1996 and 1997, relied mainly on mailed questionnaires to collect information on HIV expenditures from 64 developing countries and transition economies of Eastern

Europe. It provided information on funds provided by government and donor agencies, while data on expenditure by households, employers and NGOs, and the entire private sector, were not captured by the study. The authors suggested that they underestimate national and international HIV spending by nearly one-third (Ernberg et al. 1999).

1.5.2. Trends of costs incurred on HIV service provision

In the studies done before advent of HAART, the majority of HIV costs were for inpatient care. Cameron and Tarantola estimated the global inpatient and outpatient costs of AIDS care in 1990. They undertook a review of the literature to gauge the annual inpatient and outpatient costs per AIDS case. They conducted also a survey in 37 countries which provided government expenditures on care of HIV-infected persons and those with AIDS. They stated that inpatient care represented 75% and 90% of total annual care costs in the US and Rwanda, respectively (Cameron and Tarantola, 1992).In Jebakumar 's study done in England ,the average lifetime cost per patient was 18 729 pounds comprising of 45% for inpatient care, 11% for outpatient care and 44% for drug therapy. Sixty per cent of patients died at home. They had examined the inpatient, outpatient and drug therapy costs incurred from initial presentation with HIV infection or AIDS to death, where death had occurred between 1990 and 1994 (Jebakumar et al., 1995).

In the study performed by Bozzette et al. in the US, data on service utilization for January 1996 to January 1998 were obtained, 43% of overall expenditure was estimated to be generated by hospital care, 40% by drugs, 15% for outpatient care and associated tests and 2%for emergency department care .They stated that the estimated annual direct expenditures for the care of the patients seen during the first two months of 1996 were 5,1 billion US$; the expenditures for the estimated 335 000 HIV-infected adults seen at least as often as every six months were 6.7 billion US$, which was about 20 000 US$ per patient per year (Bozzette et al, 1998).

Krentz and colleagues categorized and measured the direct costs of medical care provided to the entire HIV-positive population receiving care in southern Alberta between 1995 and 2001. Since 1995, the direct cost of providing medical care to patients with HIV has increased primarily as a result of increased antiretroviral drug costs both in absolute and in per patient per month (PPPM) terms. Mean PPPM expenditures increased from 655 US$ in 1995/96, that was, before the use of highly active antiretroviral therapy (HAART), to 1036 US$ in 1997/98 when HAART was widely used. During the following 3 years, mean overall PPPM costs remained stable. Antiretroviral drugs accounted for 30% (198 US$ PPPM) of the total cost in 1995/96 increasing to 69% (775 US$ PPPM) in 2000/01. Inpatient, outpatient and home care costs decreased in percentage and cost PPPM between 1995/96 and 2000/01 from 26% to 10%, 27% to 14% and 8% to 3% respectively (Krentz et al., 2003).

According to Beck and Mandalia, after the introduction of HAART in 1996, a 60% reduction in the number of annual inpatient days was observed in AIDS patients (CDC Group C) in England (Beck and Mandalia, 2003).Increasing HIV prevalence especially in non-industrialized countries, has increased overall costs but the advent of drug therapies controlling the impact of HIV on health has shifted costs from inpatient care towards greater drug, outpatient and social care costs (Beck, Miners, and Tolley, 2001 ; Beck and Mandalia, 2003; Levy et al, 2006).

1.5.3. Problematic issues in cost and expenditure studies

Even if the appropriate knowledge and skills of the research team are available, lack of data affects the quality of the studies in cost and expenditure studies. As Levy and colleagues stated, although economic evaluation is an important approach for establishing priorities for health interventions, in practice this type of evaluation has been of limited value in HIV area because of the paucity of accurate cost data (Levy et al., 2006).

The lack of data has a long history, as was mentioned in a study by Scitovskey et al. on the cost of care for AIDS as early as in 1988; information on costs has been very sparse, especially for children. According to their study, costs were expected to become more standardized in the future as clinical experience with AIDS treatment increases and costing methodology becomes more uniform (Scitovskey et al., 1988).

In a review of published cost studies by Beck and colleagues in 2001, many of the studies were based on small numbers of patients, usually drawn from a single centre, and often involving a 'top-down' costing exercise or using prices or charges rather than calculated costs. The authors stated the number of high quality studies from non-industrialized countries was very limited and another area, which similarly requires further attention, is the relative lack of recent data on indirect costs in either industrialized or non-industrialized settings (Beck, Miners, and Tolley, 2001).

Even in the last decade, lack of accurate data is remarkable in costing studies.

In Levy and colleagues' review of literature, of 543 potentially relevant studies, only nine provided adequate data to make a meaningful statement about costs. Only a small number of studies had been published that provided useful estimates of the direct costs (Levy et al, 2006).

Nowadays lack or inaccessibility of accurate data is more felt in developing countries where there is not enough access to basic data, which often are not systematically gathered. Beck and Miners point to this problem very clearly as follows. "Until recently assessing the use, cost and outcome of HIV service provision usually involved collecting information from a single centre through ad hoc retrospective studies. If national information was required, inferences would be made from the findings of a study performed in a single centre, raising serious concerns about the representative nature of the information" (Beck et al., 2001).

In a recent review on published cost-effectiveness studies, the literature gap in some areas related to HIV infection has been stated as a matter of great concern, especially in developing countries. This review concluded that lack of data might significantly affect study results (Harling et al., 2005). In addition, costing studies can be extremely complex and time consuming to perform. Often the main obstacles are scarcity of resources to perform the costing exercise and the lack or inaccessibility of data (Beck et al, 2000).

Lack of data is a considerable problem in expenditure studies as well.

Most of the expenditure studies do not reflect the exact expenditures incurred on HIV activities because of nature of this kind of studies. There might be possibility of double counting, inaccurate data and lack of data especially in developing countries. Odumosu et al. in 2002 published the "Plan of Action for a HIV Accounts for Nigeria" in which they had reviewed the literature on HIV accounts in developing countries. As they stated, in the early 1990s, two studies sought the estimation of expenditures on HIV in Asia; one in Thailand during 1991 and 1992 (Viravaidya et al., 1993), and the other in Sri Lanka on 1993 (Bloom et al., 1997). The Thai study had highlighted HIV expenditures by sources of funds; the government, donors and the private sector. Due to the possibility of double counting, the study was not particularly effective in yielding an accurate estimation of the expenditures on HIV.

In addition, they cited many coverage inadequacies in the Sri Lanka study, like failure to include any estimation of household expenditures on prevention and treatment. On the other hand, the Sri Lanka study had raised the possibility of double counting items listed under some of the expenditure categories, by not distinguishing between ultimate sources of funding and financial agents/intermediaries so there was also the possibility of double counting items listed under some of the expenditure categories (Odumosu et al., 2002).

Some believe that HIV expenditures are becoming more difficult to track even among the international institutions. In their opinion, questionnaires are much less efficient tools for gathering quality data on domestic resource allocations to HIV, because of scarcity of regularly updated information systems that makes it difficult for national HIV coordinating bodies to gather expenditure data in a country (Opuni et al., 2002). Besides, given the limited data available individual country characteristics has made the information provided by UN General Assembly Special Session (UNGASS) and Commission on Macroeconomic and Health (CMH) estimates, inapplicable to guide resource allocations at the national level (Opuni et al., 2002).

But in the Middle East region, and especially in Iran, studies regarding the cost and expenditure of HIV health care provision are even scarcer. Alaka and Jenkins in a World Bank publication stated that allocating public funds for an epidemic such as HIV involves a decision process quite similar to any other decisions about the use

of public funds, but in Middle East and North Africa (MENA) region, the HIV activities have been concentrated on medical issues, such as blood supply safety, mandatory testing, and increasingly, treatment of AIDS patients while the social and economic factors that drive an HIV epidemic have not been adequately addressed, either with research or with interventions in this region (Alaka et al., 2005).

In the case of Iran, except for the UNGASS report in 2006, literature search identified no published studies on the cost and expenditure of HIV health care provision.

The Iranian published studies fell into 4 groups including prevalence and potential risk factors of HIV infection, HIV prevention, attitude and knowledge towards HIV, and clinical aspects of HIV.

In the UNGASS 2006 report, which is based upon a project implemented from November to December 2005, the estimate of national funds disbursed by the government throughout the country in 2004 was calculated by the authors using data from the following sources as described in box 3.

Box 3 Measurement instruments in UNGASS report, Iran 2006

1. Review of the 2004-2005 fiscal budget bills
2. Review of Memorandum of Understandings among HIV/AIDS control programs in 2004-2005
3. Enquiries about expenditure from ministry officials and other organizations with budgetary allocations for HIV control activities.
4. Enquiries about HIV prevention and control expenditures from 40 medical universities

Total funds constituted of 14 items and the authors recommended implementing the National AIDS Accounts to provide more accurate estimations in this regard (Country Report on UNGASS Declaration of Commitment, 2006).

1.6. HIV situation in Iran

The first case of HIV in Iran was diagnosed in 1987(Iran Ministry of Health, 2006). The probable transmission mode was contaminated blood transfusion. In 1989, the first HIV positive woman was identified, and the first AIDS-related female death was recorded in 1990 (Epidemiological Fact Sheets, 2004). From then the epidemic shifted from a "low" to the "concentrated" level.

Based on the reported data, the HIV epidemic in the Islamic Republic of Iran appears to be accelerating. The first increase occurred in 1995, when the number of HIV cases reached 815 new infections (Epidemiological Fact Sheets, 2004). According to reports by the National AIDS program , the number of 1159 people newly diagnosed with HIV or AIDS in 2001 showed a three-fold increase in comparison to both 2000 and 1999 (Epidemiological Fact Sheets, 2004).

Table IV shows estimated number of People Living with HIV (PLHIV) according to the UN in 2003(Epidemiological Fact Sheets, 2004). In this report, adults are defined as women and men aged 15 to 49. This age range covers people in their most sexually active years. While the risk of HIV infection obviously continues beyond the age of 50, the vast majority of those who engage in substantial risk behaviors are likely to be infected by this age. The 15 to 49 range was used as the denominator in calculating adult HIV prevalence.

Table IV Estimated number of people living with HIV (PLHIV) in Iran.

Estimated number of adults and children living with HIV/AIDS, end of 2003

These estimates include all people with HIV infection, whether or not they have developed symptoms of AIDS, alive at the end of 2003:

Adults and children	31,000		
Low estimate	10,000		
High estimate	61,000		
Adults (15-49)	31,000	Adult rate (%)	0.1
Low estimate	10,000	Low estimate	0.0
High estimate	60,000	High estimate	0.2
Children (0-15)			
Low estimate			
High estimate			
Women (15-49)	3,800		
Low estimate	1,200		
High estimate	7,400		

Estimated number of deaths due to AIDS

Estimated number of adults and children who died of AIDS during 2003:

Adults and Children	800
Low estimate	300
High estimate	1,600

Based on census data, from the first reported HIV positive person till 2005, 10265 asymptomatic HIV infected has been reported from all provinces to CDC in Tehran. Out of them 390 had AIDS and 1077 died (Pourmalek et al., 2005).

By late September 2005, the estimate of people living with HIV (adults and children) in Iran was 66 000 with the range of 36 000 – 160 000. Estimates for 15 years and above adults were the same. Prevalence rate for 15 -49 years adults was estimated as 0,2% (0,1% – 0,4%). Estimates of 15 years or older women living with HIV was 11 000 (5 200 – 28 000) (UNAIDS, 2006). .

Over the 2000-2004 period the proportion of women among PLHIV rose from 5,0% to 5,8% (Iran Ministry of Health , 2006)

Based on the latest official statistics published by September 2006, the total number of people living with HIV or AIDS was reported as 13 702, of whom 96% were male. The 25-34 year-old age range comprised 41 percent of cases, followed by 31% among the 35-44 year-olds (Iran Ministry of Health, 2006).

AIDS deaths in adults and children were estimated as 1 600 (920 – 2700) in 2005 (UNAIDS, 2006).By September 2006, 1709 of those infected with the virus had died (Iran Ministry of Health 2006).

Regarding route of HIV transmission, injecting drug use currently predominantly drives the epidemic in Iran. In 2001, 64% of all AIDS cases were injecting drug users (Epidemiological Fact Sheets, 2004). In 2004, injecting drug use was still the main source of transmission of HIV in Iran (63%), while sexual contact was said to be the second most important route of transmission at 7,3 %; 26,1% of the cases, however, were grouped as unspecified route of transmission (Gheiratmand et al., 2005).

According to CDC report, mode of transmission in 65 % of the reported cases involved sharing needles and syringes in 2006. The figures for sexual contact, infusion of contaminated blood products and mother-to-child transmission were 7%, 2%, and 1%, respectively. In 26% of the cases, mode of transmission was unknown (Iran Ministry of Health, 2006)

The statistics regarding HIV prevalence in IUDs in Iran are disputed. Among IDUs who had been referred to the counseling centers, 6% in 1996, 2% in 1997. 9% in 2002 and 29% in 2002 were HIV positive (Epidemiological Fact Sheets, 2004).

In 2004, there were an estimated 2,0 to 2,5 million drug addicts in Iran .If one adds occasional drug users this figure increases . 10-15% of them are IDUs, that is 200 000 to 300 000 IDUs. Of these, 20-25% are HIV positive, which gives at least 40 000 to 60 000 HIV positive IDUs (Iran Drug Control Headquarters' news, June 2005). According to the Iran Ministry of Health, 70 000 people in Iran were living with HIV and 137 000 were injection drug users in 2005. The Director of CDC in Iran Ministry of Health stated that about 64% of HIV cases occurred through injection drug use, and the rate of drug use is increasing by about 8% per annum (Gheiratmand et al., 2005; Daily HIV report, kaisernetwork, 2006).

CHAPTER 2

Objectives

&

Study Methods

2.1. Objectives

2.1.1. General objective

To determine HIV expenditures on prevention, treatment, care, and support services in Iran in 2004.

2.1.2. Specific objectives

1. To describe demographic, transmission characteristics and first CD4 counts by disease stage and death in the HIV positive inpatients hospitalized at Imam Khomeini hospital infectious disease ward.
2. To determine inpatient rate per year, mean inpatient days per patient, mean hospitalization time per patient at Imam Khomeini hospital infectious disease ward.
3. To estimate the inpatient cost per individual per day in Imam Khomeini hospital infectious disease ward.
4. To describe demographic, and transmission characteristics, first CD4 counts, and ART of the outpatient clients seen in the Imam Khomeini VCT center by disease stage and death.
5. To determine the number of outpatient visits for HIV positive clients, number of people (HIV positive or HIV negative) referred to Imam

Khomeini and other selected VCT centers.

6. To estimate the outpatient cost per individual per year and outpatient cost per visit in Imam Khomeini VCT center.
7. To estimate the average outpatient cost per visit in selective VCTs in the country.
8. To determine the HIV expenditures of the other areas including: ART, blood testing and screening, and public education.
9. To estimate overall HIV expenditures on prevention, treatment, care, and support services in Iran, 2004.

2.2. Methods

This study aimed to estimate total expenditure on HIV-related health services at the national level in Iran during 2004. Given the country programs for disease control as implemented by the CDC in Iran, the total country expenditure areas on HIV comprises seven main programs. The programs are (Iran Ministry of Health, CDC, 2003):

1) Program for inpatient care (hospitalization);
2) Program for outpatient care, consultation, and education of the HIV positives and their families;
3) Program for provision of antiretroviral drugs (ART);
4) Program for blood testing and screening;

5) Program for public information and school students' education;
6) Program for harm reduction activities;
7) Program for HIV control at armed forces' health care centers.

Expenditures had to be estimated based on bottom-up estimates for outpatient and inpatient services. Because of paucity of information, especially at health facility level, expenditures could not be tracked right down to these levels. It was for this reason that a second, less preferable, method had to be employed at health facility level. This method infers HIV expenditure in health facilities by estimating the use of services, which combined with unit costs, produce an estimate of costs at health facility level. Similar situations have been found to exist in a variety of countries and the UNAIDS-led National AIDS Spending Assessments (NASAs) have had to employ similar methods as had to be resort to in this study (UNAIDS. National AIDS Spending Assessment (NASA), 2007).

Other expenditure items could be estimated by using a top-down approach but no documentation of expenditures at the peripheral level could be identified , due to the centralized mode of service delivery.

This was observed in the following areas of expenditure:

1) Antiretroviral Therapy medicines distributed by Center for Disease Control of Ministry of Health in Tehran;
2) Blood testing and screening for HIV by Blood Transfusion Organization;

3) HIV prevention health education programs by Ministry of Education, and public health education for HIV prevention by Islamic Republic of Iran Broadcasting agency.
4) Harm reduction activities including syringe and needle distribution, methadone maintenance treatment (MMT), basic health care, counseling and education services. These are mostly intervened by healthcare staff, outreach teams, peers and other volunteers in Drop-in Centers (DICs), VCTs, prisons, Welfare Organization's health care centers, Iranian Red Crescent Society's health care centers, and pharmacies.
5) HIV control and prevention in the armed forces' health care centers.

The inpatient and outpatient cost estimations were used as a proxy for expenditure estimation at the national level. On this basis, an overall estimate of HIV related preventive, treatment, care and support expenditures in Iran during 2004 was obtained.

2.2.1. Data collection

A 'record abstraction form' was developed for abstracting our intended variables from outpatient records in Imam Khomeini hospital. A 'case note abstraction form' was also developed for abstracting inpatient case notes in Imam Khomeini hospital's infectious disease ward (appendix 2, page 135). The two data abstraction

forms used for inpatients and outpatients had a common part for socio demographic information, and each had a specific part for outpatient or inpatient data. We validated the "record abstraction form" in terms of within and between observer reliability. The details about validation are described in appendix 1 page 129.

2.2.2. Sources of data

2.2.2.1. Sources of data for inpatient analysis

Inpatient and financial data were gathered from Imam Khomeini hospital infectious disease ward. The oldest data regarding HIV positive inpatients available in this ward was related to a few patients hospitalized in 2000. The data we gathered included all available inpatient data related to those who were HIV positive or had AIDS and had been referred from private or public clinics and admitted in this ward in 2004.

In Iran, HIV patients are mostly referred to university hospitals when hospitalization is needed because of their specialist services. Since all the university's hospitals use the same tariffs, and the same HIV treatment protocols, the data from Imam Khomeini hospital was assumed to be representative of that of other universities' hospitals.

As the National Strategic Plan on Confronting HIV of Iran's CDC had not been implemented completely in 2004, the data regarding disease stage were extremely incomplete and almost all inpatients were recorded as asymptomatic HIV and records to prove clinical stage were not available. According to Iran CDC records the HIV positive people in the mentioned year were mostly IDUs. Unfortunately, many of their family members often do not take responsibility of these people living with HIV, which include that they do not accept any financial responsibilities(Professor Minoo Mohraz, Tehran University of Medical Sciences, personal communication, May 2004). Thus, we expected large amount of lost -to - follow up for inpatients in this year. Another reason might be that they would be referred back to the private clinics to be cared for. In 2004, there was only one HIV referral private clinic located in Tehran and all clinicians working there were academic members of Tehran University, who referred their patients to Imam Khomeini hospital infectious disease ward to be hospitalized. Thus, we went to that private clinic and compared the name and characteristics of the recorded inpatients with the inpatient records and found out the number of inpatients who had AIDS in the study data gathering time (2004).

Mean inpatient days per patient and mean hospitalization times were calculated from data gathered from Imam Khomeini infectious disease ward. But there were no data regarding inpatient rate available at this ward. It means, there were no data regarding the number of HIV positive seen in the hospital for IP+OP services to be able to calculate the inpatient rate at Imam Khomeini hospital infectious disease

ward. In order to deal with this problem and use it in the inpatient cost estimation, we relied on the data from Imam Khomeini VCT center. In this center the staff send the clients to the hospital to be hospitalized if needed. As the Imam Khomeini VCT is located beside Imam Khomeini hospital infectious disease ward, clients were likely to be referred to the same ward. Thus, in the denominator of the "inpatient rate" fraction, we put the number of outpatients who had history of hospitalization in one year in their records.

Demographic and transmission characteristics, first CD4 count, information on anti retroviral treatment (ART), and death data by disease stage were also collected from case reports in Imam Khomeini infectious disease ward.

Demographic data collected included sex, age (in year), and marital status. Transmission characteristics included history of IDU, history of unsafe sex, defined as penetrating sex without using a condom, history of blood and blood transfusion during their life, history of mother to child transmission (MTCT) or being born from an HIV infected mother, and history of imprisonment in their life. Although being in prison in itself is not a risk factor for HIV infection, it increases vulnerability to and risk of infection in prisoners through injecting drugs with non-sterile needles or having unprotected sexual intercourse. The current research includes both children and adults seen. There were no data available regarding ART prescribed on Imam Khomeini infectious disease ward at the time we gathered data.

Disease stage was defined as: Non AIDS, and AIDS.

- *Non AIDS stage* was defined as: When patient was infected with HIV but remained asymptomatic (asymptomatic HIV stage) and also if the patient had developed symptomatic disease, which was not an AIDS-defining condition (symptomatic non AIDS stage) (CDC classification stages A&B) (Revised Classification System, CDC, 1993). Infection with HIV was confirmed by an ELISA positive test followed by a positive Western Blot test.

- *AIDS stage* was defined using the 1993 CDC AIDS defining criteria, CD4 count less than 200 or clinical signs and symptoms of HIV related opportunistic infections (e.g. brain toxoplasmosis, brain lymphoma, etc.; CDC classification stage C) (Revised Classification System, CDC, 1993).

Regarding death, it was hoped that cause of death were recorded in the medical records. Lost-to-follow-up data was also very important but because of poor case-records, we were unable to gather complete data on the date, cause, and place of study subject's death, nor did we find data on loss to follow up rate. The only available data on death was whether he or she had died or not.

2.2.2.2. Sources of data for outpatient analysis

Outpatient services are provided by outpatient HIV healthcare centers. They include the Triangular Clinics, that provide voluntary counseling and testing along

with other services, and are called "VCTs". Thus VCTs, in addition to counseling and testing services, provide outpatient care and treatment. The HIV healthcare centers are established and supervised by Medical Universities, which are executive branches of the Ministry of Health at provincial level, and each Medical University supervises a number of VCTs in close collaboration with the HIV/AIDS Office in MOH.

To estimate outpatient costs at clinic level, we focused on Imam Khomeini Triangular Clinic and Voluntary Counseling and Testing (VCT) center. This center is located in the Imam Khomeini Hospital beside the Imam Khomeini hospital infectious disease ward and is supervised by Tehran University of Medical Sciences. It was established in 2004. All data from May 2004 till July 2005 in this VCT were transferred onto the record abstraction forms.

We also gathered outpatient and financial data from 5 selected VCTs in the country other than Imam Khomeini VCT .This provided us with a greater range of outpatient activities and cost data based on activity data, including number of outpatient visits for HIV positive and HIV negative clients at these VCTs. Financial data were related to year 2004. Then we considered outpatient cost per visit as cost unit to estimate total outpatient expenditure for both preventive and therapeutic HIV services in the country in 2004.

Clinics affiliated with the institutions such as Welfare Organization (WO), Prisons Organization (PO) and Iranian Red Crescent Society (IRSC) also provide HIV

prevention, care and support services and are in close collaboration with CDC. We also considered the above mentioned organizations' expenditures at country level expenditure estimation (Country Report on UNGASS Declaration, 2006).

Demographic and transmission characteristics, first CD4 count, information on anti retroviral treatment (ART), and death data by disease stage were collected from client records. Definition of demographic and transmission characteristics and also disease stage were the same as described for inpatients.

2.2.3. Data analysis

Analyses were performed separately for inpatients and outpatients.

Demographic and HIV transmission characteristics, first CD4 count (cells/mm3), and whether they were on antiretroviral therapy were recorded for HIV positive patients by disease stage, and among those who had died of the disease.

Regarding demographic characteristics, sex, age, and marital status were described. Age was categorized as 0-24, 25-44, and 45+ years. Marital status was categorized as: married, unmarried, divorced, separated, and widowed (only in outpatients). The three last ones are collapsed into one group (group 3).

History of IDU, unsafe sex, blood and blood born transfusion, mother to child transmission (MTCT), and imprisonment are described as transmission

characteristics of the HIV positive people by their disease stage and death. Data on ART was only available at Imam Khomeini VCT.

We used SPSS (Statistical Package for Social Sciences) version 11.5 and Excel software for data analysis. Estimated expenditure and costs are expressed in Rials of 2004 prices. In 2004, the conversion factor between US$ and Iranian Rial was 8459,16 while the conversion factor between International $ and Iranian Rial was 2742,133 (World Development Indicators, 2006).

Finally, figures were rounded off to their nearest number if necessary.

2.2.4. Inpatients

2.2.4.1. Inpatient services cost

We collected data from HIV positive patients' case notes and financial records in the hospital retrospectively, for those hospitalized at Imam Khomeini hospital infectious disease ward in 2004. This was prone to information bias. Representativeness of data might also be affected.

We used 2004 patient records for inpatient cost estimations. The data included hospital's overhead costs but excluded start up (capital) costs of new equipment or additional services. We calculated the inpatient (IP) cost per individual per day of hospitalization and also IP cost per patient in 2004 at Imam Khomeini Hospital

infectious disease ward.

Mean inpatient days per patient, inpatient rate per year and mean hospitalization times were calculated using the following formula:

Mean inpatient days for each HIV positive inpatient = (total inpatient days of the HIV positive inpatients in Imam Khomeini hospital in one year[†]) / (number of the HIV positive inpatients hospitalized at the Imam Khomeini hospital in the same year).

(Formula 1)

[†] Total inpatient days of the ***HIV positive*** inpatients in Imam Khomeini hospital in one year includes all days for one or more hospitalization of the inpatients in that year.

Inpatient rate = (number of HIV positive inpatients admissions in one year in Imam Khomeini hospital) / (number of HIV positive people seen in the hospital for IP+OP services in the same year) ×100

(Formula 2)

Mean hospitalization time = (Total episodes of hospitalization for a group of HIV positive inpatients in a time period in Imam Khomeini hospital) / (number of hospitalized inpatients in the same group at the same time period in Imam Khomeini hospital)

(Formula 3)

In the next step, we used these data to infer inpatient costs in the country and used it as a proxy for total HIV IP expenditure estimation in Iran.

2.2.4.2. Inpatient services expenditures

We used inpatient cost data described above and gathered from the HIV positive inpatients hospitalized at Imam Khomeini Hospital, as the national university referral hospital for infectious disease, including HIV and AIDS as a proxy for inpatient expenditure estimation in the whole country. The following formula was used:

Inpatient costs at country level = (inpatient cost per day × average inpatient days for each HIV positive inpatient) × (number of HIV positive patients hospitalized in one year in the country).

(Formula 4)

Number of HIV positive patients hospitalized in one year at the national level = (inpatient rate[†] × HIV positive population, alive in the whole year) + (HIV positive population deceased in the same year[‡])

(Formula 5)

[†] Inpatient rate is calculated from formula 2. [‡]The HIV positive deceased in a year, receive hospitalization services at least at the last months/days of their lives as put in the assumptions.

In hospitalization cost items we excluded non-recurrent costs such as costs for starting up new sections/services or preparing new equipments, luxury costs for private hospitalization, logistics and research costs financed by CDC or universities' head offices. Such costs are defined as parts of non-individually or collective services, which are not directly consumed by individuals. This does not cause underestimation because according to the System of National Account (SNA) manual the corresponding costs for individual services excludes the cost items for fixed capital (building and equipment) and collective costs such as logistics and research (Organization for Economic Co-operation and Development, 1993).

Also, in this study the distinctions between individual and collective services and between consumption expenditure and capital formation expenditure correspond to the relevant definitions in the SNA 1993 explained above. Hence, logistics and research expenditures, which are financed by CDC or universities head offices, are not considered in the expenses and cost items, since they are parts of collective costs. Also, capital or equipment and other start up costs for new hospital sections are not included in inpatient cost estimations, since they are not parts of yearly current costs.

2.2.4.3. Assumptions for inpatient expenditure estimation at national level

The following assumptions were made to estimate the inpatient costs for people living with HIV in Iran:

1. Inpatient services in Imam Khomeini hospital infectious ward are assumed to be typical of the services for public HIV positive hospitalization. Averages per inpatient cost in public tertiary hospitals in Iran were assumed to be equal to the estimates obtained from Imam Khomeini hospital.
2. Similarly, the Imam Khomeini hospital infectious ward was assumed to be representative in terms of admissions of HIV positive patients and associated inpatient rates for HIV positives in Iran.
3. Overhead costs for inpatient services which are directly provided for inpatients (e.g. costs of laundry, electrical costs, cleaning services, etc), are included in the inpatient cost estimations as parts of expenses.
4. The HIV positive deceased in a year, receive hospitalization services at least in the last days or months of their lives.

2.2.5. Outpatients

2.2.5.1. Outpatient services costs

Using data for total number of visits at Imam Khomeini VCT center in 2004, we estimated the outpatient cost per visit. The cost items in this VCT are as shown in box 4.

Box 4 Cost items at Imam Khomeini Triangular clinic and VCT center

1- Personnel salaries.
2- Maintenance, rent, transport, and utilities.
3- Medical supplies (e.g. condom, syringe, etc.), consumables.
4- Non medical/administrative supplies and durable goods (e.g. computer, printer, etc.)
5- Non-specific laboratory tests e.g.CBC, and vaccination, etc.
6- Medicines other than HIV specific Antiretroviral Therapy (including antibiotics, methadone, etc.). ART expenditure is included in top-down expenditure by Center for Disease Control explained in chapter 3.
7- Education materials and activities.

As all above cost items are paid for by the government, we collected data from financial department of Imam Khomeini VCT and considered it as the total costs for activities done there in visiting the clients. In this study, "visit" includes all preventive and therapeutic services delivered to the people at VCTs or Triangular Clinics, including laboratory tests, counseling, condom delivery and family planning activities, outpatient care, provision of Antiretroviral Therapy medicines, methadone therapy, and harm reduction activities ,etc.

The next step was to estimate the average number of annual visits for each HIV positive and HIV negative client based on the Imam Khomeini VCT data .Based on

this the cost for each outpatient visit in Imam Khomeini VCT center in 2004 was estimated as was the outpatient cost per individual per year.

2.2.5.2. Outpatient services expenditures

We also gathered outpatient cost data from 5 selected VCTs in the country other than Imam Khomeini VCT in order to have more representative estimates on costing and activity data for HIV outpatient service provision in Iran.

The number of HIV positive outpatient visits during 2004, number of outpatient visits from both HIV positive or HIV negative people referred to the 5 other VCT centers during 2004 were also collected. Expenditure on both HIV positive and HIV negative use of outpatient services were costed. However, HIV positive people will use services more frequently than HIV negative people and in order to estimate the mean number of OP visits for HIV positive people, this had to be estimated separately from the HIV negative people, before an overall estimate of use and cost of OP services by HIV positive and HIV negative people could be estimated .

The five centers mentioned were located in Kurdistan, supervised by Kurdestan Medical University; Fars, supervised by Shiraz Medical University; Lorestan, supervised by Lorestan Medical University; West of Tehran , supervised by Iran Medical University in Tehran; and Kermanshah, supervised by Kermanshah Medical University. Relevant financial data were also obtained from these centers.

According to CDC, the VCTs identified, which are affiliated with the 6 selected Medical Universities, cover most outpatient HIV services in the country. These financial data were also used as proxy for expenditure estimation at country level.

The cost items in each VCT were the same (box 4, page 68) .Average outpatient cost per visit in each VCT was obtained by dividing total cost of the 6 chosen VCTs by the number of visits done in these 6 VCTs. Then, the average for the VCTs related to the 6 universities, or the outpatient cost per visit across all VCTs, was estimated. We also estimated the range and average visits per client using staffs' experience and opinion and some available data in the 6 VCTs.

We performed some sensitivity analyses, considering different scenarios regarding probable annual number of visits and financial sources that is described in follow.

Using CDC statistics for the number of reported HIV positive cases in 2004, we estimated the total number of outpatient visits in the country. Multiplying the latter figure by the outpatient cost per visit, and then adding them to the expenditures in the 3 other HIV outpatient service delivery clinics affiliated with Welfare Organization, Prisons Organization, and Iran Red Crescent Society total outpatient expenditures in Iran in 2004 was estimated.

2.2.6. Other areas of services expenditures

HIV-related expenditure of the following other organizations in 2004 were obtained, whose expenditure items were available at the national level:

1. Antiretroviral Therapy medicines distributed by CDC to provinces and Universities of Medical Sciences. In this regard, we included total ART expenditures in the country in our expenditure estimation. We assumed that 100% drugs are distributed and consumed by eligible HIV or AIDS patients. Thus, using a top down approach for ART expenditures is reasonable. As CDC pays for ART and ensures distribution of the drugs at facility level, it is assumed that double counting is avoided in this regard.
2. Blood screening and HIV tests performed by Iranian Blood Transfusion Organization.
3. HIV prevention health education for students by Ministry of Education and public health education for HIV prevention by Islamic Republic of Iran Broadcasting agency.
4. Harm reduction activities included those performed by outreach teams, peers and other volunteers in Drop-in Centers (DICs), and pharmacies. The harm reduction interventions at VCTs, prisons, Welfare Organization health care centers, and Iranian Red Crescent Society

health care centers are included in the outpatient expenditures described above.

5. HIV control and prevention in the clinics affiliated with the armed forces.

2.2.7. Total national HIV expenditure

The overall national HIV expenditure was obtained by adding the 7 areas of expenditure, as well as provides a breakdown by primary prevention or secondary prevention programs. Primary prevention programs included blood testing and screening programs provided by Blood Transmission Organization, public education programs provided by Ministry of Education. Secondary prevention programs included inpatient services and provision of anti retroviral treatment. We categorized outpatient services, harm reduction activities and services provided in the armed forces' clinics as a separate category as these included both primary prevention programs such as consultation and harm reduction but also secondary prevention programs such as ART, methadone or antibiotic therapy.

2.2.8. Sensitivity analysis

Using the assumptions for outpatient costs, there may be some differences in total HIV expenditure based on variations in local referral patterns the implementation of the national HIV program. To provide more rigorous estimates, we performed sensitivity analyses with two upper and lower limits around the point estimates of expenditures. The variation (uncertainty) factors were as follows:

1. Yearly average of outpatient visits for HIV positive people at VCTs: point estimate: 7 visits; lower limit: 4 visits (one visit per season); upper limit: 12 visits (one visit per month). The range is obtained from 6 above mentioned VCTs. This provides 3 scenarios for outpatient costs.

2. Maximum annual costs in each VCT equals to 1500 million Rials. This amount is the average of the two busiest VCTs (Lorestan and Kermanshah) (table VIII page 89). This gives rise to two other scenarios for each of the scenarios mentioned above.

Therefore, there would be 6 following scenarios for the total outpatient costs:

Scenario 1: Total costs at each VCT are the same as is reported by the university financial department; yearly average of outpatient visits for HIV positive people at each VCT is 4.

Scenario 2: Total costs at each VCT are the same as is reported by the

university financial department; yearly average of outpatient visits for HIV positive people at each VCT is 7.

Scenario 3: Total costs for VCT are the same as is reported by the university financial department; yearly average of outpatient visits for HIV positive people at each VCT is 12.

Scenario 4: Total costs at the VCT affiliated with one university are equal to 1500 million Rials (the highest amount it could be); yearly average of outpatient visits for HIV positive people at each VCT is 4 (1 visit/season).

Scenario 5: Total costs at the VCT affiliated with one university are equal to 1500 million Rials (the highest amount it could be); yearly average of outpatient visits for HIV positive people at each VCT is 7.

Scenario 6: Total costs at the VCT affiliated with one university are equal to 1500 million Rials (the highest amount it could be); yearly average of outpatient visits for HIV positive people at each VCT is 12 (1 visit/month).

Of all these scenarios, scenarios 1 and 6 provide lower and upper limits around the point estimate (scenario 2).

CHAPTER 3

Results

3.1. Inpatients

3.1.1. Demographic characteristics

16 inpatient episodes were recorded in the case notes of 13 people who could be identified as being HIV positive in 2004. 9 (69%) had AIDS and 4 (31%) non AIDS. Of the 13, 6 (46 %) had died: 3 non–AIDS and 3 AIDS inpatients died. All of the inpatients were men.

The most frequent age group among inpatients was greater than 45 years. 53.8 % of inpatients were in this age group. Of them 66.7 %(4/6) had died which was the highest number of death among agegroups. In the non-AIDS group who were greater than 45 years, 3 out of 4 died and in the inpatients who had AIDS and were greater than 45 years 1 out of 4 died. In the 25-44 year age group, 2 out of 6 AIDS patients died.

For 46 % (6 /13) of inpatients there was no data on their marital status. Among dead inpatients 2 out of 4 died among those who were not married and 2 out of 4 married individuals died. Data regarding demographic characteristics of inpatients are summarized in table I.

Table I Demographic characteristics of inpatients by disease stage; Imam Khomeini Hospital infectious disease ward, 2004.

Disease Stage	Non AIDS	AIDS	Total
	N (%)	N (%)	N (%)
Male	4(100)	9(100)	13(100)
Female	0(0.0)	0(0.0)	0(0.0)
Missing	0(0.0)	0(0.0)	0(0.0)
Total	4	9	13
Age group (year)			
0-24	0(0.0)	0(0.0)	0(0.0)
25-44	0(0.0)	6(66.7)	6(46.2)
45+	4(100)	3(33.3)	7(53.8)
Missing	0(0.0)	0(0.0)	0(0.0)
Total	4	9	13
Marital Status			
Married	3(75.0)	0(0.0)	3(23.1)
Not married	1(25.0)	3(33.3)	4(30.8)
Missing	0(0.0)	6(66.7)	6(46.1)
Total	44	9	13

3.1.2. Transmission characteristics

5 out of 13 inpatients (39%) had a history of IDU. Out of these 60% had AIDS and the rest, 40 %, non AIDS. 3 out of 6 inpatients who died had a history of IDU and 3 out of the 5 IDUs died. For those with AIDS, one IDU died. Regarding history of unsafe sex, none of inpatients have had such a history. None of the 13 inpatients had the history of blood and blood products transfusion. 3 out of 13 (23%) had a

history of imprisonment before being hospitalized: needle sharing is common in IDU prisoners. 2 had AIDS and one non AIDS.

Table II Transmission characteristics of inpatients by disease stage; Imam Khomeini Hospital infectious disease ward, 004.

Disease Stage	Non AIDS	AIDS	Total
	N (%)	N (%)	N (%)
History of Injecting Drug Use (IDU)			
Yes	2(50.0)	3(33.3)	5(38.5)
No	2(50.0)	6(66.7)	8(61.5)
Missing	0(0.0)	0(0.0)	0(0.0)
Total	4	9	13
History of Unsafe sex			
Yes	0(0.0)	0(0.0)	0(0.0)
No	4(100)	9(100)	13(100)
Missing	0(0.0)	0(0.0)	0(0.0)
Total	4	9	13
History of Blood and Blood Products Transfusion			
Yes	0(0.0)	0(0.0)	0(0.0)
No	4(100)	9(100)	13(100)
Missing	0(0.0)	0(0.0)	0(0.0)
Total	4	9	13
History of Imprisonment			
Yes	1(33.3)	2(22.2)	3(23.1)
No	3(66.7)	7(77.8)	10(76.9)
Missing	0(0.0)	0(0.0)	0(0.0)
Total	4	9	13

3.1.3. First CD4 count

Only 3 out of 13 inpatients had their first CD4 count after admission recorded. All had AIDS. There were no data regarding first CD4 count in those who died. Mean of the first CD4 count was 26.67 cells/mm^3 with median of 30 cells/mm^3. 25% of the inpatients in the AIDS stage had a first CD4 count of less than 20 cells/mm^3 and 75% less than 30 cells/mm^3.

Table III Description of first CD4 counts /mm3 of inpatients in AIDS stage; Imam Khomeini Hospital infectious disease ward, 2004.

Mean	26.67
Median	30.00
1st quartile	20.00
3rd quartile	30.00
Standard Deviation	5.77
Min	20
Max	30
Number recorded	3
Missing	10

3.1.4. Inpatient use of services

In 2004, there were 13 HIV positive inpatients who generated 16 hospitalizations. The mean number of hospitalization per patient per year was 1,23. Total inpatient days were 323 for 13 inpatients. Thus, mean inpatient days per patient per year was 24,8 days and per admission 20,2 days.

Between May 2004 and July 2005, of the 339 HIV positive people seen at Imam Khomeini VCT center, 10 people were hospitalized in Imam Khomeini hospital infectious disease ward. Thus, for 15 months the inpatient rate was 2,95% (10/339), and hence, after adjusting to 12 months the rate reduced to 2,35%.

3.1.5. Inpatient expenditures

3.1.5.1. Inpatient services costs at hospital level

The 13 inpatients generated a cost of 54 154 492 Rials in 2004.The inpatient cost for each admission amounted to 3 384 656 Rials and hospitalization cost per person was 4 165 730 Rials .Total inpatient days for the above study subject was 323 days and cost per inpatient day amounted to 167 661 Rials or 19, 8 US$ and 61,1 Int $.

3.2. Outpatients

3.2.1. Demographic characteristics

698 people were referred to Imam Hospital VCT center from May 2004 until July 2005, of whom 339 (49%) were HIV positive patients who came for outpatient treatment and care: 119 out of 339 outpatients (35%) had AIDS. Of all outpatients, 18 (5 %) died during the study period from May 2004 until July 2005: 8 were non AIDS patients and 10 had AIDS. 89% of outpatients were men and all outpatients who had died were also men. 246 out of 339 outpatients were in the 25-44 year age group. Of these 4% had died. 10% of non AIDS outpatients had died compared with 1% of AIDS patients. The demographic characteristics of outpatients are shown in table IV.

Table IV Demographic characteristics of outpatients by disease stage and death status; Imam Khomeini VCT center, 2004.

	Total outpatients			Dead outpatients		
Disease Stage	Non AIDS	AIDS	Total	Non AIDS	AIDS	Total
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Sex						
Male	195(88,6)	105(88,.2)	300(88,5)	3(36,3)	10(100)	18®(100)
Female	23(10,5)	14(10,8)	37(10,9)	0(0.0)	0(0,0)	0(0,0)
Missing	2(0,9)	0(0,0)	2(0,6)	0(0,0)	0(0,0)	0(0,0)
Total	220	119	339	3	10	18®
Age group(year)						
0-24	22(9,9)	8(6,8)	30(8,9)	1(33,3)	0(0,0)	1(0,6)
25-44	156(69,9)	90(77,5)	246(72,6)	1(33,3)	5(55,6)	9@(50,0)
45+	31(13,8)	18(15,6)	49(14,5)	1(33,4)	3(33,3)	4(22,2)
Missing	14(6,3)	0(0,0)	14(4,1)	0(0,0)	1(11,1)	4@(22,2)
Total	223	116	339	3	9	18@
Marital Status						
Married	63(27,6)	48(43,2)	111(32,7)	1(12,5)	5(50,0)	6(33,3)
Not married	92(40,3)	44(39,6)	136(40,1)	2(25,0)	1(10,0)	3(16,7)
Di/Se/Wi*	41(18,0)	19(17,1)	60(17,7)	0(0,0)	3(30,0)	3(16,7)
Missing	32(14,0)	0(0,0)	32(9,4)	5(62,5)	1(10,0)	6(33,3)
Total	228	111	339	8	10	18

* Divorced/ Separated/ Widowed

@: Disease stage of the 6 cases of death ,3 in the age group of 25-44 and 3 in the missing age group, were not recorded

® Disease stage of the 5 cases of death (in males) were not recorded.

3.2.2. Transmission characteristics

212 out of 339 outpatients (63%) had a history of IDU (table V) , 28% of whom had AIDS. Only 8 out of 18 outpatients who died had a history of IDU. For IDUs with AIDS, death had occurred in 6 out of 59. In non AIDS IDU outpatients, death had occurred in 2 out of 153.

26% of outpatients had a history of unsafe sex, of whom 32 (37%) had AIDS.

3 out of 87 of the outpatients with the history of unsafe sex had died, all of whom had AIDS. 31 out of 339 outpatients (9%) had a history of blood and blood products transfusion, of whom 23 had AIDS. One of 31 HIV patients with the history of blood and blood products transfusion had died.

198 out of 339 (58%) had a history of imprisonment, of whom 30% had AIDS. 8 out of 198 had died.

Table V Transmission characteristics of outpatients by disease stage and death status; Imam Khomeini VCT center, 2004

	Total outpatients			Dead outpatients		
Disease State	Non AIDS	AIDS	Total	Non AIDS	AIDS	Total
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
History of Injecting Drug Use (IDU)						
Yes	153(69,5)	59(49,6)	212(62,5)	2(25,0)	6(60,0)	8(44,4)
No	67(30,5)	60(50,4)	127(37,.5)	1(12,.5)	4(40,0)	5(27,.8)
Missing	0(0,0)	0(0,0)	0(0,0)	5(62,.5)	0(0,0)	5(27,8)
Total	220	119	339	8	10	18
History of Unsafe Sex						
Yes	55(25,0)	32(26,9)	87(25,7)	0(0,0)	3(30,.0)	3(16,.7)
No	165(75,0)	87(73,1)	252(74,3)	3(36,3)	7(70,0)	10(55,6)
Missing	0(0,0)	0(0,0)	0(0,.0)	5(63,7)	0(0,0)	5(27,8)
Total	220	119	339	8	10	18
History of Blood and Blood Products Transfusion						
Yes	8(3,6)	23(19,3)	31(9,1)	0(0,0)	1(10,0)	1(5,6)
No	212(96,4)	96(80,7)	308(90,9)	3(36,3)	9(90,0)	12(66,.6)
Missing	0(0,0)	0(0,0)	0(0,0)	5(63,7)	0(0,0)	5(27,8)
Total	220	119	339	8	10	18

Table V Transmission characteristics of outpatients by disease stage and death status; Imam Khomeini VCT center ,2004, cont'd.

History of Mother to Child Transmission (MTCT)						
Yes	7(3,2)	6(5,0)	13(3,8)	0(0,0)	0(0,0)	0(0,0)
No	213(96,8)	113(95,0)	326(96.2)	3(36.3)	10(100)	18(100)
Missing	0(0,0)	0(0,0)	0(0,0)	5(63,7)	0(0,0)	0(0,0)
Total	220	119	339	8	10	18
History of Imprisonment						
Yes	138(62,7)	60(50,4)	198(58,4)	2(25,0)	4(40,0)	8(44,4)
No	82(37,3)	59(49,6)	141(41,6)	1(12,5)	6(60,0)	10(55,6)
Missing	0(0,0)	0(0,0)	0(0,0)	5(62,5)	0(0,0)	0(0,0)
Total	220	119	339	8	10	18

3.2.3. First CD4 count

Median first CD4 count was 329 cells/mm^3 for HIV positive outpatients(table VI) with a range of 3 to 1725 cells/mm^3.For people with AIDS, 75% of first CD4 levels were less than 257. Median CD4 count for those who died was 103 when first seen. The range of first CD4 for those who died was from 5 to 1108 cells/ mm^3.

Table VI First CD4 count cells/mm^3 of outpatients by disease stage and death status. Imam Khomeini VCT center, 2004

	All outpatients			**Dead outpatients**		
Disease stage	Non AIDS N=114	AIDS N=111	Total N=237	Non AIDS N=3	AIDS N=8	Total N=13
Mean	534,90	209,80	378,44	726,33	131,88	284,23
Standard Deviation	270,00	212,70	291,75	336,78	158,64	320,71
1st quartile	344,00	66,00	147,50	471,00	31,75	52,00
Median	490,00	149,00	329,00	600,00	100,00	103,00
3rd quartile	640,00	257,00	553,00	1108,00	160,75	485,00
Min	38	3	3	471	5	5
Max	1725	1113	1725	1108	500	1108
Missing	8	7	101€	0	1	4□

@ Disease stage of 2 dead and 12 total outpatients who had CD4 count was not recorded

□ Disease stage of 3 missed outpatients who had CD4 count was not recorded

€ Disease stage of 86 outpatients is not recorded

3.2.4. Antiretroviral therapy

125 out of 173 outpatients (72%) in Imam Khomeini VCT center were managed with ART, of whom 90 outpatients (72 %) had AIDS (table VII). Disease stage of the remaining 28% was not recorded. 7 patients who had been on ART had died, 4 of whom had AIDS.

Table VII Antiretroviral therapy among AIDS outpatients by death; Imam Khomeini VCT center, 2004

	All outpatients		Dead outpatients	
Disease Stage	AIDS	Total*	AIDS	Total*
	N (%)	N (%)	N (%)	N (%)
Yes	90 (76,3)	125 (37,0)	4 (44,4)	7 (41,2)
No	9 (7,6)	48 (14,2)	0 (0,0)	0 (0,0)
Missing	19 (16,1)	165 (48,8)	5 (55,6)	10 (58,8)
Total	118	338	9	17

* Disease stage of other outpatients was unknown

3.2.5. Outpatient use of services

3.2.5.1. Imam Khomeini VCT

523 HIV negative outpatients used services at the Imam Khomeini VCT center in 2004 for testing and counseling. If we assume 2 visits, one for first time consultation and a second for getting test result, then there were 1046 visits for this group of clients. On the other hand, 339 clients had active records as HIV positive patient who received treatment, care and other services in Imam Khomeini VCT center. The mean number of outpatient visits for these HIV positive outpatients was 4.1 in the year 2004 which was apparently less than the other VCTs studied. The reason could be outpatient services provision by specialists in this VCT. A total of 2436 visits had been generated by HIV positive and HIV negative clients during 2004 in this center.

3.2.5.2. Other VCTs

The annual average visits per HIV positive client in the 5 other VCTs was 7 with the range of 4 to 12.

In the VCTs affiliated with Kurdistan University, there were 72 new HIV positive cases recorded and totally 3834 annual visits. In the VCTs affiliated with Shiraz University, there were 132 new cases recorded and totally 1691 annual visits in 2004. There were 343 new cases recorded and totally 8796 annual visits in the VCTs affiliated with Lorestan University in 2004. In the same year, In West of

Tehran VCT affiliated with Iran University of Medical Sciences, there were 82 new cases recorded in 2004 and totally 4730 annual visits .In the VCTs affiliated with the Kermanshah University, there were 249 new HIV positive cases recorded in 2004 and totally 6626 annual visits (table VIII).

3.2.6. Expenditure on outpatient services at clinics

The financial department of Imam Khomeini VCT had spent 297 155 000 Rials for outpatient care in 2004. Considering 2436 visits, the cost per visit was estimated at 114 595 Rials in 2004 in this VCT. If we consider an average of 4,1 visits per HIV positive individual, the outpatient cost per individual per year was 468 840 Rials in Imam Khomeini VCT in 2004 or 36,5 US$ and 171 Int$.

In the VCTs affiliated with Kurdistan University, total costs for outpatient care amounted to 770 000 million Rials in 2004. At the same year, in the VCTs affiliated with Shiraz University, total outpatient costs amounted to 712 400 million Rials.In the VCTs affiliated with Lorestan University total outpatient costs in 2004 was 2 159 500 million Rials. In the West of Tehran VCT, affiliated with Iran University of Medical Sciences, outpatient costs amounted to 467 720 million Rials in 2004.In the VCTs affiliated with the Kermanshah University, total outpatient costs were equal to 1 100 000 million Rials in 2004(table VIII).

Table VIII Outpatient VCT costs in selected Universities of Medical Sciences in 2004

	University	No of Outpatient records (new and old) (1)	No. of new outpatients (at first time visit) (2)	Estimated total visits (3)	Total outpatient cost (1000 Rials) (4)	Cost per Visit (Rials) (5)
1	Kurdistan	110	1532	3834	770 000	200 835
2	Shiraz	101	492	1691	712 400	421 289
3	Lorestan	502	2641	8796	2 159 500	245 509
4	Iran (West of Tehran VCT)	270	1576	5024	467 720	93 097
5	Tehran(Imam Khomeini VCT)	339*	523	2436	279 155	114 595
6	Kermanshah	714	814	6626	1 100 000	166 013
Average cost per visit						206 889

* with average 4.1 visits per outpatient annually

3.3. HIV expenditures at the national level

3.3.1. Inpatient expenditure

According to the Iran's Ministry of Health's Center for Disease Control, in Iran, until the end of 2004, 9188 HIV positive persons were known to be alive and 300 HIV positive people died during this year(Iran Ministry of Health, 2005) .

Given 2896 HIV positive newly diagnosed in 2004, to determine the number of the HIV positive infected people alive in the middle of that year (the average year number), half of the 2896 newly diagnosed in this year have been excluded from the total 9188, assuming that half of the newly diagnosed cases were detected in first half of the year and the second half of the cases in the second half of the year. Thus, in the middle of year 2004 there were an average 7740 HIV positives alive who were assumed to receive inpatient services at the rate of 2,35%. This means that the number of people hospitalized in that year was estimated at 183 people. Also, since the records show that almost all the HIV positive people who died received hospital care in the last months or days of their lives, we are required to add the number of 300 HIV positive people deceased in this year to the 183 patients who were estimated to have been hospitalized by mid-2004. Therefore, it is estimated that 483 HIV positive people were hospitalized in the country in 2004.

As the estimated inpatient cost per day was 167 661 Rials in 2004, the estimated inpatient cost was 4 165 730 Rials per patient per year. Therefore, for our estimated

483 admissions, total inpatient costs in 2004 are estimated to be 2012 million Rials for HIV positive patients .This amount equals 236 946 US$ or 733 753 Int$ (table X, page 98).

3.3.2. Outpatient expenditure

On average, the outpatient cost per visit provided at the 6 VCT centers studied amounted to 206 889 or 24,5 US$ and 75,4 Int $ in 2004 (table VIII, page 89).

The number of HIV positive people estimated to be eligible to receive the required services at the middle of the year 2004 was 7890 people generating a total 94 030 visits in all VCTs in the country. As the average cost per visit was 206 889 Rials, the estimated cost for outpatient services at VCTs at national level in 2004 was 19 454 million Rials (table IX, page 93).

In 2004 Welfare Organization and Prisons Organization spent 10 750 million Rials and Iran Red Crescent Society 5000 million Rials for outpatient HIV related care and treatment (Country Report on UNGASS Declaration, 2006) .In total outpatient services use expenditures at the outpatient clinics except for the Ministry of Health's VCTs accounted to 15 750 million Rials or 1 861 887 US$ and 5 743 704 Int $ in 2004.

Total expenditures as outpatient services on HIV include the outpatient costs in the VCTs affiliated with MoH (Imam Khomeini and 5 other VCTs) extrapolated to the national expenditure estimations and the expenditures at clinics affiliated with other Ministries. They were estimated to amount to 35 204 million Rials in 2004.

3.3.3. ART expenditure

Antiretroviral Drugs in Iran are provided by CDC. The drugs are distributed free of charge at point of delivery and used in the VCTs, other outpatient clinics, and infectious disease wards in tertiary referral hospitals that treat HIV positive patients, most of which are governmental university hospitals at the centers of big provinces. Considering the estimated 60 000-70 000 HIV positive people in Iran, 5% or 3000 people had been estimated to have been eligible to receive ART. In 2004, 380 HIV positive people have received ART (Iran Ministry of Health and Medical Education. Islamic Republic of Iran HIV/AIDS Situation and Response Analysis, Dec 2006). The CDC reported a total expenditure of 7100 million Rials on ART in 2004(Country Report on UNGASS Declaration, 2006). Since the expenditure for drugs other than ART such as antibiotics and methadone are included in cost items for outpatient costs, they are not considered separately in our expenditures estimations.

Table IX Calculation of total outpatient expenditures in Iran in year 2004

Label	Description of variable	Quantity	Data Status
(A)	Total HIV positive people registered in the VCTs up to the end of 2004	10265	(input)
(B)	Total death from HIV positive people registered in the VCTs up to the end of 2004	1077	(input)
(C)	Total alive HIV positive people registered in the VCTs up to the end of 2004	9188	(A) $-^{\alpha}$ (B)
(D)	Death in HIV positive people in 2004	300	(input)
(E)	Newly registered HIV positive in 2004	2896	(input)
(F)	Number of HIV positive people eligible to receive services at mid-2004	7890	(C)$+^{ß}$(D/$^{£}$2) + (E/2)
(G)	Average annual outpatient VCT visits Per HIV positive person	7	(input)
(H)	Total outpatient VCT visits in Iran in 2004	55 230	(F) *$^{\infty}$(G)
(I)	VCT clients seeking consultation and test in 2004	19 400	(input)
(J)	Minimum number of visits for (I)	2	(input)
(K)	Number of VCT visits for (I)	38 800	(I) * (J)
(L)	Number of VCT visits for HIV positive and negative in 2004	94 030	(H) + (K)
(M)	Average VCT visit cost in 2004 (Rials)	206 889	(input)
(N)	Total outpatient expenditures in Iran in 2004 (Rials)	19 454 million	(L) * (M)

α (-): Minus ; ß(+): Plus; £(/): Divided by; ∞(*): Multipled by

3.3.4. Blood testing and screening

This service is totally conducted by Blood Transfusion Organization(BTO). These services included:

a) Personnel training;

b) Consulting services;

c) Screening and HIV tests for blood donors;

d) Research in HIV related blood services.

Total expenditure in 2004 was reported as 45 000 million Rials. There are also some other costs for blood testing for the HIV positive people when they use outpatient and hospitalization services ,but these are included in cost items for these services.

3.3.5. Public education for HIV

The two organizations responsible for these services are the Ministry of Education (MOE) and the Islamic Republic of Iran Broadcasting (IRIB).In 2004, the MOE had a number of programs for public and students' education in public schools at secondary and tertiary levels. Total expenditure for these programs in that year accounted for 3687 million Rials which were financed totally by the head office in the

MOE. The IRIB also conducts education programs on HIV in the following programs:

a) Ordinary radio health programs;
b) Ordinary T.V. health programs;
c) Special T.V. programs and series on HIV/AIDS;
d) IRIB internet health programs (specifically related to HIV prevention);
e) Training workshops for public media personnel (specifically related to HIV prevention).

In 2004 the total expenditure in the above programs accounted to 2162 million Rials.

3.3.6. Harm reduction activities

These expenditures relate to harm reduction interventions including the distribution of sterile syringes and needles, counseling and education services, Methadone Maintenance Treatment (MMT), distribution of condoms and information brochures delivered by peers and other volunteers or out reach team at DICs or pharmacies based on the nature of the intervention. Expenditures related to DIC-type interventions that were provided in VCTs (triangular clinics), Prisons' Organization (PO), Welfare Organization (WO), and Iran Red Crescent Society (IRCS) are considered in this study under the topic of outpatient expenditures.

In 2004, the expenditure on these harm reduction interventions' expenditures

accounted for 12 550 million Rials or 1 483 600 US$ or 4 577 000 Int $ (Country Report on UNGASS Declaration, 2006).

3.3.7. Armed forces expenditure

The armed forces spent 3 084 million Rials or 364 580 US$ and 1 125 000 Int $ for condom procurement, and HIV control and prevention programs in their health care centers in 2004 (Country Report on UNGASS Declaration, 2006).

3.4. Estimated total national HIV expenditure in 2004

Public expenditures on HIV prevention, care, treatment, and support services were estimated at 108 637 million Rials or 12 841 974 US$ and 39 618 695 Int $ in Iran in 2004. This amount is consisted of seven main expenditure areas described above and is shown in detail in table X, page 98.

The following analysis provides information on some classifications of the HIV expenditures:

a) Total expenditure in all the HIV services was estimated to be 108 637 million Rials. Regarding the identified 7890 HIV positive people, in 2004 the per capita expenditure for HIV positive people was 13 768 948 Rials, equal to 1628 US$ and 5021 Int$.

b) The direct expenditures on inpatient, outpatient and ART services, was estimated at 5 616 730 Rials *per capita*, equal to 664 US$ or 2048 Int$.

c) For blood testing and screening services, public education, harm reduction activities, and HIV control programs for armed forces *per capita* expenditure on 2896 HIV positive people, as was done in 2004, was 22 210 290 Rials. This is equal to 2600 US$ and 8100 Int$.

Table XI, page 99 also shows expenditures in terms of preventive programs for:

a. The primary prevention care, regarding HIV blood screening, and education, are estimated 48 687 million Rials. This constitutes 44,8 % of total HIV expenditures in Iran in 2004.

b. The secondary care for the HIV positive at specialists level, following inpatient care or hospitalization and provision of antiretroviral therapy (ART) for specialists'(higher level) services is estimated at 9112 million Rials. This constitutes 8,4 % of total HIV expenditures in Iran in 2004.

The expenditures in terms of foreign exchange in 2004, for prevention care type (a) was 5 756 000 US$ or 17 755 536 Int $, and for prevention care type (b) was 1 076 273 US$ or 3 322 978 Int $ respectively. Regarding HIV outpatient expenditures which compromises both primary and secondary prevention, this amounted to 6 010 000 US$ or 18 540 000Int $.

Table X HIV expenditure sources in Iran in 2004

Expenditure items	Million Rials	US dollars	International dollars (PPP)	% from total	Source and type of data
1- Inpatient services	**2012**	**236 946**	733 753	**1,85**	Patients' Records
2- Outpatient services:	**35 204:**	**4 161 643:**	**12 838 181:**	**32,41:**	
2.1- VCTs	19 454	2 299 756	7 094 477	17,91	Records in VCTs
2.2 - Other outpatient clinics	15 750	1 861 887	5 743 704	14,50	MOH Reports
3- ART	**7100**	**839 327**	**2 589 225**	**6,53**	MOH Reports
4- Blood Testing & Screening at BTO	**45 000**	**5 320 000**	**16 411 000**	**41,43**	MOH Reports
5- Public Education:	**3687:**	**435 878:**	**1 344 536:**	**3,39:**	
5.1- MOE	1525	180 278	556 136	1,40	MOE Reports
5.2- IRIB	2162	255 600	788 400	1,99	MOH Reports
6- Harm Reduction Activities	**12 550**	**1 483 600**	**4 577 000**	**11,55**	MOH Reports
7- Armed Forces' Programs	**3084**	**364 580**	**1 125 000**	**2,84**	MOH Reports
	108 637	**12 841 974**	**39 618 695**	**100,00**	-

Table XI Breakdown of total HIV expenditure in Iran in 2004 by type of prevention programs

Stage of prevention	Programmes	Expenditure (million Rials)	Int $ (PPP)	% of total
Primary & Secondary Prevention	Outpatient Services	35 204	12 838 181	32, 4
	Harm Reduction Activities	12 550	4 577 000	11,6
	Armed Forces' HIV Control	3084	1 125 000	2,8
	Sum	**50 838**	**18 540 181**	**46,8**
Only Primary Prevention(a)	Blood Testing & Screening	45 000	16 411 000	41,4
	Public Education	3687	1 344 536	3,4
	Sum	**48 687**	**17 755 536**	**44,8**
Only Secondary prevention(b)	Inpatient services	2012	733 753	1,9
	ART	7100	2 589 225	6,5
	Sum	**9112**	**3 322 978**	**8,4**
Total	*All programmes*	**108 637**	**39 618 695**	**100**

3.5. Sensitivity analysis

The point estimate for direct medical expenditures of HIV in 2004 amounted to 108 637 million Rials. If we consider the lower visit schedule scenario yearly average of 4 outpatient visits for HIV people at each VCT, this gives an estimation of 93 550 million Rials or 11 058 967 US$ and 34 116 000 Int$, respectively.

If we consider the upper visit schedule scenario with a yearly average of 12 outpatient visits for HIV infected people at each VCT, the direct medical expenditures of HIV in 2004 was 172 407 million Rials. In terms of foreign exchange in 2004 this is 20 381 000 US$ and 62 837 000 Int$, respectively.

Considering 7890 HIV positive people, the public has spent at least 1402 US$ or 4324 Int$ and at most 2583 US$ or 7968 Int $ with the point estimate of 1628 US$ or 5020 Int $ per capita in 2004.

CHAPTER 4

Discussion

4.1. The Iranian HIV epidemic and response

The HIV epidemic is changing in Iran, from a low level epidemic, with no population group having a prevalence greater than 5%, to a concentrated epidemic. The epidemic is currently being driven by IDUs with more than 60% of reported HIV infected people and their contacts. There has been an increase in the number of estimated people living with HIV in Iran, from 20 000 in 2002 to 31 000 in 2003, and 70 000-100 000 in 2005.

HIV health service provision in Iran, has changed over time .As the epidemic is changing, increasing number of people living with HIV will require the use of services, which will require the expansion of services.This in turn will require increased monitoring and evaluation of new and old services.

The present study is part of a comprehensive study titled "Burden of HIV in Iran", of which this study on estimated expenditure on HIV in Iran in 2004 is the first phase. As has been pointed out, "information on the structure, process, outcome and impact of healthcare provision should be collected at many levels of service provision. This is now possible due to the enormous developments in information technology. Such information includes activity data on the use of services, drugs prescribed and procedures performed, as well as the outcomes of these interventions. Outcomes are changes in health status of individuals attributable to treatments or other interventions, and include biomedical measures—clinical or

other markers—as well as more subjective measures of patient wellbeing, while impact in this context is the outcome at the population level." (Beck et al., 2006).

A retrospective study was designed to collect the data. We wanted to perform a study to estimate the expenditure on HIV in Iran in 2004. However, relevant data were not readily available, neither from medical case notes nor from other sources. The HIV services, which we identified for this study included the following areas:

1) Inpatient care (hospitalization);

2) Outpatient care, treatment, testing and counseling, and education;

3) ART provision;

4) Blood testing and screening for prevention from HIV transmission;

5) Education programs for the general Public and school students;

6) Harm reduction activities;

7) HIV control programs at armed forces' health care centers.

We used a bottom-up approach to estimate inpatient and outpatient costs. This information on the cost of inpatient and outpatient care for people living with HIV was used as a proxy for national expenditure on these services.

We estimated expenditures spent in the above seven areas in order to estimate total expenditures on HIV treatment, care, prevention, and supportive services in Iran in

2004. This is the first study, which tried to estimate expenditures on HIV infection in Iran.

4.2. Study limitations

In this study we faced with several serious limitations to obtain the relevant data.

We gathered data regarding the use and cost of HIV health care provision from one inpatient center, which raises serious concern about the representative nature of the information especially given the small sample size.

In Iran, HIV patients are mostly referred to university hospitals when hospitalization is needed. We estimated the basic expenditures in the governmental sector, and excluded items like extra-costs for 'private beds in governmental hospitals'. We also excluded the private sector hospitals, however to date these do not seem to provide much inpatient HIV care. This might result in under-estimating inpatient expenditure.To improve our estimations, additional costing studies should be performed in other hospitals.

We included all deaths that had happened in 2004 who were reported to CDC in the inpatient expenditure estimation. As mentioned before, given the number of estimated person living with HIV in Iran, it is highly likely that a large number of these undiagnosed people may well die at home or in hospital without their HIV-related cause of death being diagnosed or recorded. If someone had died due to

HIV and not reported as such, these could not be identified and included in the estimation and are likely to have resulted in underestimating expenditures.

Another point is that, as the anti retroviral drugs are distributed free of charge in the whole country, we assumed that all drugs are distributed and consumed by eligible HIV or AIDS patients .Thus, we included ART expenditures as a separate expenditure area using a top down approach.

As this was a retrospective study and the medical records were poorly maintained, we were confronted with a large amount of missing data relating to date of death, cause of death, laboratory examinations, disease stage, and information on opportunistic infections. Data were poorly recorded in patient case notes at all the centers studied. This caused a lack of data regarding stage of HIV infection as well as poor data regarding the use and outcome of service delivery.

In the VCTs, we also faced incomplete data recording especially for different ART related issues such as treatment duration, drug side effects, and others. We were not able to distinguish between expenditures on preventive services compared with treatment and care services.

Another limitation to the study was that there were no robust data regarding the total number of HIV positive using inpatient and outpatient hospital services during the data gathering time. Also, patients' inpatient and outpatient data could not be linked. Hence, the exact inpatient rate could not be calculated.

There were no data regarding percentage of HIV positive people seeking medical care. Also, the correction factor for the real number of HIV positive people in the country could not be determined. We did our calculation based on a selected number of HIV positive people in the country reported to CDC. Thus, our estimations regarding the HIV expenditures might be inaccurate and may overestimate expenditure per infected person.

Finally, although important, we did not estimate indirect, capital, and start up costs in the inpatient and outpatient cost estimation because of the paucity of existing financial information at health facility and other levels.Thus may underestimate national IP and OP expenditures. To estimate these, an in-depth costing exercise is required, which was well beyond the scope and resources of this study.

4.3. HIV expenditures in Iran

Despite these limitations national expenditures on HIV in Iran on inpatient care, outpatient care, treatment, testing and counseling, ART provision, prevention and education in 2004 was estimated at 108 637 million Rials or 12 841 974 US$ and 39,6 million Int $. This was similar to that reported as part of Iran's UNGASS report in 2006 (Country Report on UNGASS Declaration, 2006).

Izazola and colleagues (2002) reported on expenditures on HIV in 5 Latin America countries as shown in the following tables:

Table I HIV expenditure in 5 Latin America countries, 1998

Country	Total estimated national HIV expenditures (million Int$)	Total HIV expenditures per capita (US$)	Distribution of the total HIV expenditures in prevention	Distribution of the total HIV expenditures in care
Guatemala	29,5	0,08	15%	70%
Uruguay	32,5	6,63	36%	51%
Mexico	257	1,25	29%	66%
Brazil	587,4	2, 69	10%	80%
Honduras (1999)	33,9	3,6	28%	65%

Source: Izazola et al.,2002

The share of total expenditures on antiretroviral drugs ranged from 52% in Guatemala to 75% in Brazil, even when the estimated coverage of antiretroviral therapy was close to 10% in Guatemala and universal in Brazil (Izazola et al., 2002).

A study done in 2000 on HIV expenditure in 12 Latin America and Caribbean countries, reported that 753 million US$, or 73% of overall HIV expenditures, in the 12 countries were spent on treatment and care, with only 283 million US$

(27%) spent on prevention. Almost 72% of the expenditure on HIV care in the 12 countries was spent on drugs, with 90% spent on ART. The authors concluded that this estimate appeared to be high and may be biased, as drug expenditures are easier to monitor than other components, especially when procurement of ART is centralized through national HIV programs such as is the case in Brazil (Opuni et al., 2002)

The current study, estimated that expenditures in 2004 on HIV primary prevention, including HIV blood screening, education for general population, outpatient care, harm reduction activities, and also armed forces HIV control were 11 767 670 US$ or 36 295 717 Int$, which constituted 91,6% of total expenditures. If we exclude the last three expenditures, primary prevention expenditures including blood screening and public education drop to 5 755 660 US$ or17 755 536 int$.

Expenditure for HIV inpatient care or hospitalization and provision of antiretroviral therapy (ART) was 1 077 180 US $ or 3 322 978 int$ in 2004 or 8,4% of total HIV expenditures . ART expenditure accounted for 6,5% of all HIV expenditures. Given the very limited data available, these figures need to be viewed with a large amount of suspicion.

According to our estimation, the Iranian government sector has spent 13 772 000 Rials (95% CI: 11 860 000 to 21 850 000 Rials) or 1628 US$ (95% CI: 1402 US$ to 2583 US$) per HIV positive person in the year 2004 in Iran.

We did not include the costs of private hospitals, capital, indirect costs, and expenses for research and higher level education .If above costing data were to be included, the estimation would likely to have been higher than the present one. These are some of the additional information gaps, which would need to be completed, as well as better data on inpatient and outpatient services, in order to arrive at a more comprehensive costing study.

4.4. Inpatient and outpatient use of services

Only 13 HIV infected people could be identified as having been hospitalized at Imam Khomeini hospital in 2004. One possible reason for this could be the stigma regarding HIV or AIDS patients in Iran, in addition to poor medical record keeping.

Of those few who could be identified as being seropositive, the mean hospitalization episode per patient was 1,23 per year, and mean inpatient days were 24,8 per patient-year and 20,2 days per admission.Most of these inpatients had AIDS. An average 4,1 outpatient visits per year was made to the Imam Khomeini VCT, compared with 7 visits in the other VCT sites.

In a study set in Cape Town by Badri and colleagues (2005) for patients without AIDS, the mean number of inpatient days per patient year was 1,08 (95% confidence interval: 0,97–1,19) for the HAART group versus 3,73 (95% CI: 3,55–

3,97) for the No-ART group. The mean number of outpatient visits per patient year was 8,71 (95% CI: 8,40–9,03) versus 4,35 (95% CI: 4,12–5,61) respectively between 1995 to 2000.For AIDS patients, mean inpatient days per patient year was 2,04 (95% CI: 1,63–2,52) for the HAART versus 15,36 (95% CI: 13,97–16,85) for the No-ART group. Mean outpatient visits per patient year was 7,62 (95% CI: 6,81–8,49) compared with 6,60 (95% CI: 5,69–7,62) respectively.

Beck and colleagues (2004) reported that the mean number of inpatient episodes was 0,66 (0,19 to 1,13) for those who had AIDS from July to Dec 2000 in the UK. Also the mean outpatient visits for asymptomatic patients was 8,30 (95% CI: 7,18 to 9,42) during July to Dec 2002. For AIDS patients mean outpatient visits was mostly 10,98 (95% CI: 9,67 to 12,29) in Jan- June 2002 period (Beck et al., 2004).

4.5. Demographic and transmission characteristics of inpatients and outpatients

Regarding HIV positive outpatients in Imam Khomeini VCT center, 35,1% had AIDS. In the report from CDC, Iran, 3,8% (390 out of 10 265) of reported HIV positive people from 1987 till 2005 had AIDS (Pourmalek et al., 2005). This greater number of AIDS patients might be due to the greater diagnostic and therapeutic expertise, which is available at the Imam Khomeini Triangular Clinic

and VCT center.Another reason might be the inadequate data collection system in Triangular Clinics and VCTs.

Regarding demographic characteristics of the HIV outpatients, 88,5% were men. Higher frequency of risk factors such as IDU, needle sharing in prisons, and high-risk sexual behavior were recorded in men compared with women in Iran and could explain the large number of HIV infected men. Although HIV is more frequent in men, more women present late in their clinical course with AIDS compared with men: 27,8% in women compared to 18,1% in men. Women may seek HIV testing less frequently and later than men, possibly due to lower knowledge or different attitudes and the existence of greater cultural or social barriers for women to access HIV health care services. This underscores the greater unmet need for knowledge improvement and appropriate access to HIV health services for women.

For those of known marital status 58% of HIV positives were unmarried or divorced: many HIV positive people are young men with unstable marital status. This might result in a future change in the transmission pattern of HIV from predominantly through injecting drug use to a predominantly sexual route.

The number of IDUs among HIV positive persons was very high in our study (62,5%), which confirms other reports. HIV in Iran is thought to be circulating widely among drug injectors, of whom there were an estimated 200 000 in 2003 (UNAIDS, 2006). Studies conducted in 2005 underscored the urgent need to broaden preventive programmes, especially for incarcerated drug injectors. Most of

the drug injectors who participated in the Tehran study were sexually active, with many either buying or selling sex , while only 53% of sexually active injecting drug users had ever used a condom (UNAIDS, 2005)

An earlier study had found that about half of injecting-drug users were married, and one third had reported extra-marital sex which suggests a clear possibility of sexual transmission of HIV from infected drug injectors to their sexual partners (UNAIDS 2005).

Transmission of HIV through sexual routes is more frequent in Imam Khomeini VCT (25,7%) compared with 6,7% in other parts of Iran (Pourmalek et al., 2005).This might be due to changes in the transmission pattern of the virus from IDU to the sexual route .As Iranian culture does not allow the people to be open concerning extramarital sex, the actual frequency of sexual transmission route might be much higher.

The frequency of transmission via blood or blood products is higher in the study population than reported in other areas of the country (9,1% versus 2,1%) (Pourmalek et al., 2005) . From the time the first HIV positive person was infected through contaminated blood transfusion in 1987, it seems that preventive programs such as HIV screening in blood donors had been effective.But more studies are required to prove this.

History of imprisonment is relatively high in the clients to Imam Khomeini VCT (58,4%) .In general, imprisonment and injecting drug use appeared to be the

biggest risk factor for HIV infection in Iran. The reason is that many people in prisons inject drugs (UNAIDS 2005).According to reports by the National AIDS program, HIV rates among prisoners rose six times in 1999 compared to 1996 (UNAIDS 2005).

4.6. Recommendations

These recommendations are made based on the experience of the writer obtained during the study, a process which included reviewing the literature, data gathering and analysis. While some of the recommendations go beyond the direct scope of the thesis, they are certainly pertinent for future researchers, who want to work in this area, and those healthcare professionals and other stakeholders who want to improve the effectiveness, efficiency, equity and acceptability of monitoring and evaluating the Iranian response to their HIV epidemic.

1. It is needed to plan, implement, manage and evaluate, the HIV epidemic in Iran according to the Iranian culture, socioeconomic status, health services infrastructure, budget, and all other elements that constitute Iran's context.
2. Health services play a critical role in HIV prevention, treatment, care, and support services provision. Fortunately, in Iran, the Primary Health Care network was started in 1985 and much experience exist

regarding health service delivery to all levels of the Iranian population. Although service delivery to HIV positive and HIV negative population needs its own services because of the nature of infection, its transmission routes, the characteristics of the infected people, stigmatism, drug prices, and other pertinent issues, the policy makers could draw valuable lessons from the experiences obtained from the development of the Primary Health Care network.

3. Iran should develop and adopt a minimum clinical data set, which should be collected longitudinally on patients to ensure good patient management, which should also include socio-economic data. Clinical and socio-economic minimal data sets have been defined by country and international experts and could form the basis of developing Iran-based data sets (HIV Patient ART Monitoring Meeting, Geneva , 2004 and , WHO/TDR Generic Tools Workshop Report, 2006). Also transmission pattern of HIV should be tracked and any changes in the pattern detected to be analyzed.
4. Hospitals and clinics need to develop and adopt good medical record systems if not already in place. These can be paper-based or electronic in nature. The data need to be collected longitudinally on the use and outcome of services by individual patients, to ensure good clinical management.
5. When these are established, multi-centre prospective monitoring and

evaluation systems can be set up across different units, extending across primary, secondary and tertiary centers. This should be part of tracking the response to the epidemic.

6. In terms of HIV service delivery, the lack of a well defined monitoring and evaluation system is evident. Staffs, especially in the peripheral sites are not aware of the importance of data collection and active follow up. Capacity building in this regard seems essential. Staff education, putting in appropriate incentives, and regular monitoring could be among possible solutions.
7. As demonstrated, there are different areas of HIV expenditure in Iran, including on public education, through the Islamic Republic of Iran Broadcasting agency and Ministry of Education. HIV educational programs in prisons, NGOs, or other agencies might also be supported by national funds. The proportion of expenditure in each agency on the preventive, supportive, care, and treatment should be clarified annually. This would allow better decisions to be made on resource allocation and planning in respective areas.
8. As recently pointed out, "Many have welcomed the recent momentum to provide HIV-infected people in middle- and lower-income countries with appropriate treatment and care, including ART. However, if HIV incidence levels are not reduced, the increasing number of new people infected with HIV, combined with

fewer people dying from HIV due to ART, will result in more HIV-infected people alive and requiring medical and social services. Apart from humanitarian considerations, increased requirement for HIV services can lead to significant cost increases, as has recently been seen in the US and the UK" (Beck et al., 2006) .We estimated that 6,5% of total HIV expenditures at the national level are allocated to ART in 2004. The effectiveness, efficiency, equity, and acceptability of this intervention in Iran need to be fully investigated.

9. To comply with the research projects needed in HIV area in Iran, the design and implementation of a research strategy could be very beneficial and help in priority setting of the research topics.This may prevent resource wastage and duplication. A strategy or map helps to find the way to where you want to go. A research map will also help to find the way to where you want to go with your research (Research Helper, n.d).
10. In this regard, doing a full and formal costing study at a national level, guided by the results of the present costing exercise, with a micro-costing approach and longitudinal design seems to be a priority.
11. Information on the use, outcome, and impact of interventions or programs needs to be complemented by doing costing studies in different types of hospitals on a regular basis to collect robust and

contemporary cost information.

12. Some individual level information can also be used for program or service monitoring & evaluation at primary, secondary & tertiary facilities. These data can then be reported to a central site, like CDC, when the relevant analyses can be performed to obtain the following data:

    - The mean inpatient episodes per patient year by disease stage.
    - The mean outpatient visits per patient year by disease stage.
    - The average cost of hospital services per patient year.
    - Mean new HIV related opportunistic infections per 1000 patient year.
    - Death rate by disease stage.
    - Deaths causes and places.

    Regular feedback of these analyses needs to be provided to those which provide the data for analyses.

13. Ideally, estimates of resource needs should go a step further and be limited to the benefits provided by the resources spent. We need to regularly compare 'how much is needed' with 'what is spent' and 'what is the outcome and impact'.

14. More community involvement is needed. Educational programs

should be adapted with the community needs in different age groups and socioeconomic level.

15. Systems should also be developed to track expenditures from central level to clinics and ideally also include other HIV-related expenditures. As stated: "Every country will need to address how HIV preventive and therapeutic services are funded, and what will be appropriate expenditures for these services. Countries will have to look closely at the best financial arrangements for them to ensure that HIV service provision free-at-the-point-of-delivery is sustainable in the longer term. This will require making good use of available resources" (Beck et al., 2006).

4.7. Conclusion

In spite of all efforts by the Iran government in response to HIV epidemic, the incidence and prevalence of people living with HIV is increasing. A general mobilization is needed to combat this epidemic. More effective, efficient, equitable, and acceptable prevention, treatment, care, and support services should be implemented. More intersectoral collaborations, community involvements and research in the pertinent areas are needed. More resources should be allocated to this including those required to develop and improve a national multisectoral monitoring and evaluation system to track the response.

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APPENDIX 1

Validation of Data Abstraction Forms

1.1. Objective

To determine the validity and reliability of data abstraction forms.

1.2. Methods

Using expert opinion, we determined the face and content validity of data abstraction forms as compared to the patient records through a group interview and consultation session. The expert group consisted of one infectious disease specialist, two epidemiologists, one health economist, and one physician.

After completion of the validity sub-study, a subsample of patient records including 20 records was abstracted into study's record abstraction form by two research assistants separately for assessment of concurrent reliability. These records were randomly chosen from all records in the West of Tehran VCT. It was planned for the same two persons to abstract patient records in the other centers in the study, and there were no factors violating the assumption that the reliability of their abstraction performance will be different in other centers in the study. For assessment of test-retest reliability, two weeks later, the same two persons abstracted the same subsample of patient records again. Inter-rater (concurrent) and intra-rater (test-retest) reliability were assessed by calculating the Kappa and Intra-Cluster Correlation (ICC) coefficients for a selected number of qualitative and quantitative key variables respectively.

1.3. Results

1.3.1. Reliability of data gathering tools

Tables I to V show the result of reliability sub-study.

Table I Intraclass Correlation Coefficients for "age"Two-Way Mixed Efects Model (Consistency Definition)

Measure	ICC	95%CLs		F	p
	Value	LCL	UCL		
Single Rater	.9615	.9247	.9832	100.8267	.0000
Average of Raters*	.9901	.9801	.9958	100.8267	.0000
Degrees of freedom for F-tests are 18 and 54. Test Value = 0					
* Assumes absence of People-Rater interaction					
Alpha = .9901 Standardized item alpha = .9901					

Table II Intraclass Correlation Coefficients for "CD4 count"

Two-Way Mixed Effects Model (Consistency Definition)

Measure	ICC Value	95%CLs		F	p
		LCL	UCL		
Single Rater	.9034	.7947	.9653	38.3904	.0000
Average of Raters*	.9740	.9393	.9911	38.3904	.0000
Degrees of freedom for F-tests are 12 and 36. Test Value = 0.					
* Assumes absence of People-Rater interaction					
Alpha = .9740 Standardized item alpha = .9746					

Table III Intraclass Correlation Coefficients for "time since diagnosis"

Two-Way Mixed Effects Model (Consistency Definition)

Measure	ICC Value	95%CLs		F	p
		LCL	UCL		
Single Rater	1.0000	1.0000	1.0000	.	.
Average of Raters*	1.0000	1.0000	1.0000	.	.
Degrees of freedom for F-tests are 17 and . Test Value = 0.					
* Assumes absence of People-Rater interaction					
Alpha = 1.0000 Standardized item alpha = 1.0000					

Cohen's Kappa coefficient was one for Intrarater measurements of the variable sex

(within rater 1 in both tries, and within rater 2 in both tries), and for its Interrater measurements (between rater 1 and rater 2, in both tries), with a p-value of 0.001.

Table IV Cohen's Kappa coefficient for four measurements of the "sex"

	Rater	
Try No.	Rater1	Rater2
Test	1	1
Retest	1	1

For the variable "entry into AIDS stage", there was only one patient with a positive value, recorded in all four measurements as the same.

Intraclass Correlation Coefficients for variable "history of risk factors" was not calculable due to invariance of all four set of responses. This is interpretable as an ICC equal to one.

1.3.2. Completeness of data for selected key variables

As a sample of records and variables, the four sets of patient record abstractions plus data entries, as compared with the original patient records, revealed a

consistent pattern of data incompleteness in the original patient records, except for one of the patients CD4 level which was documented in the original patient records, but not transcripted into the data abstraction form (study questionnaire) by one of the raters in try 2 (post-test), and hence not present in the resultant file.

Table V Number of missing data (records) for selected key variables in 20 randomly chosen original patient records

Variable name	Number of missing data In original patient records
Age	1
CD4 count	7
time since diagnosis	2
Sex	0
entry into AIDS stage	0

APPENDIX 2

Questionnaire

Tehran University of Medical Sciences

Questionnaire for study:" Public Expenditures on HIV Prevention, Treatment, Care, and Support Services in Iran, 2004"

(A)Data Abstraction Form for Inpatient and Outpatients

(1) Identification Code: (2) Date (dd / mm/ yyyy):

(3) Status in data gathering time: ○1 Alive ○ 2 Dead ○ 9 not recorded

(4) Date of report (dd / mm/ yyyy):

Please fill out sections 1&2 for both outpatints and inpatients

1. Socio Demographic Information:

(1) Name and surname:

(2) Date of birth (dd / mm/ yyyy):

(3) Sex: ○ 1 Male ○ 2 Female ○ 9 not recorded

(4) Marital status: ○ 1 Married ○ 2 Single ○ 3 Separated

○ 4 Divorced/Widowed ○ 9 not recorded

(5) Address:

(6) Contact phone No: ○ 9 not recorded

2. Past history Information:

--- History of exposure to the following risk factors (9 = not recorded):

(1) Imprisonment history: ○ 1 Yes ○ 2 No

(2) Blood /blood products transfusion: O 1 Yes O 2 No

(3) Injection drug use: O 1 Yes O 2 No

(4) Unsafe sexual contact: O 1 Yes O 2 No

(5) Delivery from infected mother: O 1 Yes O 2 No

(6) HIV stage: O 1 A O 2 B O 3 C

(7) History of antiretroviral therapy: O 1 Yes O 2 No

(8) If yes, date of initiation (dd/mm/yyyy):

(9) If yes, totals duration: [ ] months

(10) First CD4 level: [ ] cell/mm^3

Please fill out this section for Imam Khomeini Triangular clinic/VCT only

(1) Refered to hospitl: O 1 Yes O 2 No O 9 not recorded

(2) If yes, date of referal (dd/mm/yyyy):

(3) Hospital name:

Please fill out again if the client is hospitalized more than once in 2004 (including date and place):

Please fill out this section for Imam Khomeini Infectious Disease Ward inpatients

(1) Time of hospitalization in 2004:

(2) Total number of inpatient episodes in 2004:

(3) Hospitalization expenditure on discharge (Rials):

Please fill out this section in the Triangualr clinic/VCT center (all data are related to year 2004)

(1) Reporting centre:

(2) Affiliated university:

(3) No of outpatient records (new and old):

(4) Number of new registered outpatients:

(5) Mean No of outpatient visits:

(6) Total cost (in Rials):

(B)Form for collection of financial data available from organizations

(1) Name of organization:

(2) Date of information retrieval:

(3) Name of person authorizing the information:

(4) Position of person authorizing the information:

(5) Time period for financial information reported:

(6) Total expenditure in Rials:

(7) Breakdown of expenditure by type and year(if available):

Year	Type	Type	Type	Type	Total
	( )	( )	( )	( )	