



Royal Government of Bhutan

Ministry of Health

Thimphu : Bhutan

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The production of 2006 Annual Health Bulletin was coordinated by Kado Zangpo (Information Officer) under the overall guidance of the Annual Health Bulletin Advisory Board.

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Royal Government of Bhutan
Ministry of Health

2006 Annual Health Bulletin

ISBN 99936-661-2-2

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2006 Annual Health Bulletin can be obtained from Health Information Unit, Planning & Policy Division, Ministry of Health, Thimphu:Bhutan (Tel +975-2-328091/328092/32092-97; Fax 975-2-322491; email kadozangpo@health.gov.bt). Request for permission to reproduce or translate for sale or for non-commercial purpose should be addressed to the above address.

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Designed by : **Lhazeen Printing & Publishing House**
Printed by : **Norbu Rabten Press**



Annual Health Bulletin 2006

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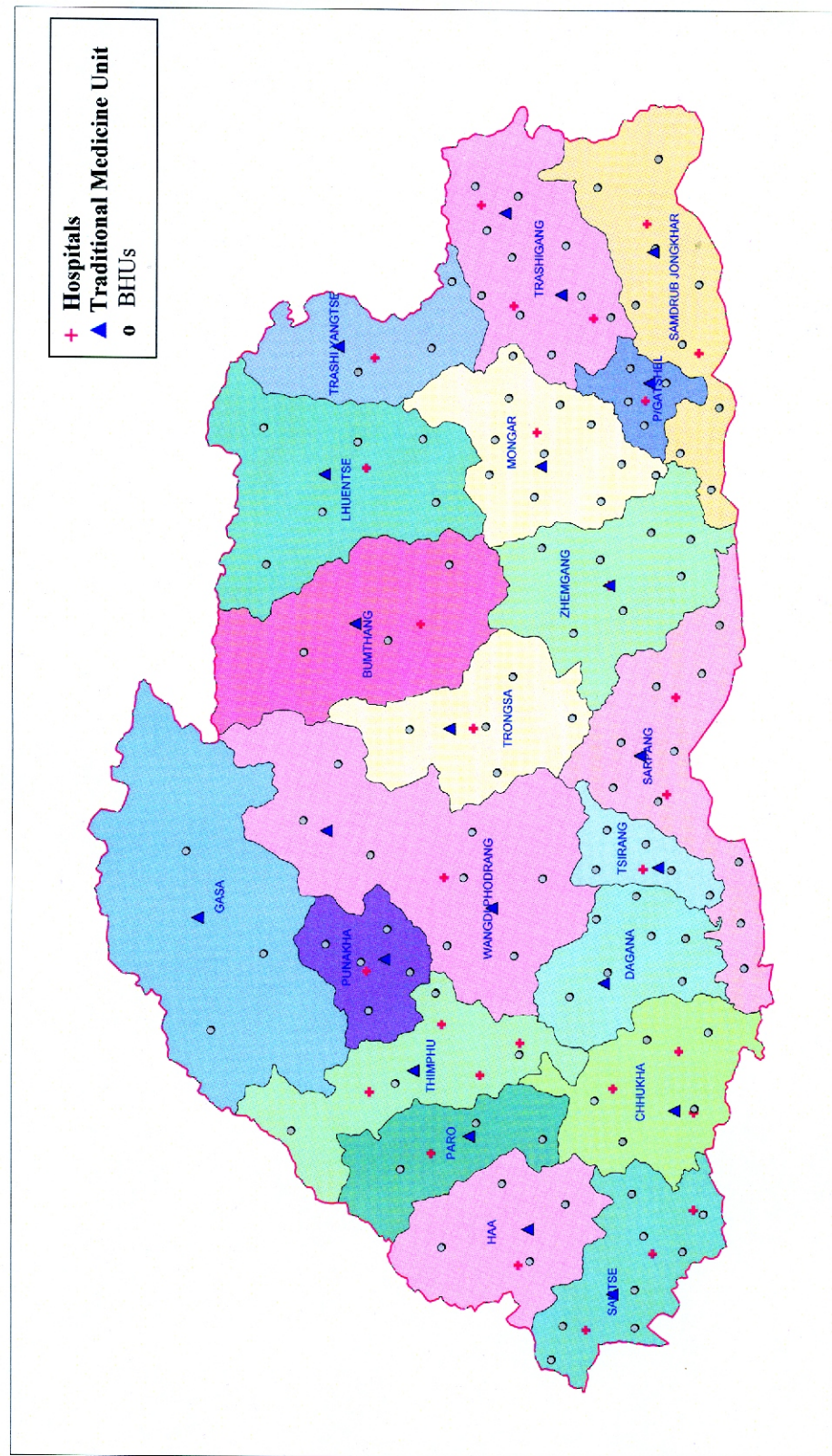
The 2006 Annual Health Bulletin is the 19th publication. It is an annual publication from the Ministry of Health disseminating information with regard to the state of health in Bhutan.

All preceding Annual Health Bulletins were named for the year in which data were collected. For instance, Annual Health Bulletin published in 2005 was named 2004 Annual Health Bulletin as it contained the data of 2004. From this year, Annual Health Bulletin will be named after the publication year. Therefore 2006 Annual Health Bulletin will contain the data of 2005. This is mainly to avoid confusion that the bulletin is out-of-date from the day it is published.

The 2006 Annual Health Bulletin has made some changes for easy use and reference. Also attempts have been made to do descriptive analysis using the data and therefore opinions and conclusions derived may not necessarily reflect the policies and views of the Ministry of Health. Reports of small health researches conducted in the last one year are also included.

Apart from the regular readers, this year the publication will also reach students, teachers, lecturers, tutors so that they may find some during the academic session. The publication can be accessed from the website www.health.gov.bt . Feedbacks and comments for the improvement of the bulletin are most welcome.

Hospitals, Traditional Medicine Units and BHUs in Bhutan



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Designed by WHO Country Office, Thimphu

Comparative Demographic Indicators

Indicator of National Health Survey	Number rate			
	1984	1994	2000	2005*
Life Expectancy at birth (years)	NA	66.1	66.1	NA
Sex ratio (males per 100 females)	103	105.1	106.6	111
Dependency ratio	80	91.7	74.4	60.6
General Fertility Rate	170	172.7	142.7	NA
Total Fertility Rate	NA	5.6	4.7	NA
Crude Birth Rate (per 1000 population)	39	39.9	34.1	20
Crude Birth Rate (per 1000 population)	13	9.0	8.9	7
Population Growth Rate	3	3.1	2.5	1.3
Infant Mortality Rate (per 100 live births)	103	70.7	60.5	40.1
Under 5 Mortality Rate (per 1000 live births)	162	96.9	84.0	61.5
Maternal Morality ratio (per 100000 live births)	770	380	255	NA
Trained Birth attendance (%)	NA	10.9	23.6	49.1

*Population & Housing Census 2005

Health facilities and manpower, 2005

A. Human Resource

Category of manpower	Number/Indicator
Doctors (including expatriates)	145
Assistant Clinical Officer	32
Doctors per 10,000 population	2.3
Ratio of doctors to hospital bed	1:7
Drungtshos (Indigenous physicians)	30
sMenpas (Indigenous compounders)	36
District Health Officer	3
District Health Supervisory Officers (DHSO)	22
B. Sc. Nurses	14
General Nurse Midwife/Staff Nurses (GNM)	202
Auxiliary Nurse Midwife (ANM)	134
Assistant Nurses	174
Health Assistants (HA)	210
Basic Wealth Workers (BHW)	171
Ratio of Nurses to hospital bed	1:2
Nurses per 10,000 population	8.3
Pharmacist	10
Pharmacy Technicians	73
Lab. Technologist	8
Lab. Technicians	106

The State of Bhutan's Health - 2005

Health ingredients in Bhutan:

The establishment of the first hospital in Langjophakha, Thimphu in 1961 marked the beginning of the present day modern health care services in Bhutan. Today, there are 29 hospitals providing sophisticated modern medical care, 176 Basic Health Units (BHUs) and 485 ORCs spread over 205 gewogs providing primary health care services. Staffing these facilities, there are about 145 medical doctors, 463 health workers, 529 nurses, 438 technicians, 66 drungtshos and menpas (Indigenous Physicians). Apart from these regular service providers, there are 1200 active village health volunteer workers (VHWs) continuously assisting the health workers in delivering the health care services. Currently, doctor per 10,000 populations is 2.3 and hospital bed per 10,000 population is 17.

In the current 9 five year plan, a total outlay of Nu. 6536 million (10% of the total 9 FYP budget) was allocated to the health sector out of which an approximate amount of Nu. 1000 million was budgeted for purchase of essential drugs, vaccines and equipments. In 2005, a total of Nu. 82 million has been spent only on procurement of essential drugs and another Nu.80 million on referral costs to treat about 500 patients in India.

Since the inception of the health system in Bhutan, the primary objective was to prevent and reduce morbidity and mortality in the population. To this end, the health system has striven to cater quality care and treatment

through different stages of life cycles of the people from pregnancy to delivery, childhood to adolescence, and youth to old age. At the same time, specialized interventions has been put in place to deal with the threats from malaria, leprosy and HIV/AIDS, etc.

Health of the pregnant mothers.

In 2005, 70% of the pregnant women had visited antenatal clinics four or more times during pregnancy and this is indicative of high service utilization by pregnant women. It is through antenatal clinic or health care during pregnancy that pregnancy related complications are detected early thereby preventing, both maternal and neonatal adverse events.

However, even with very high ANC attendance rate (70% of pregnant women attending ANC more than 4 times) and with an impressive network of 29 hospitals and 176 BHUs spread across the country, 48% of the pregnant women still delivered in the corners of their homes without trained health professionals. 29 women died due to pregnancy related complications in 2005.

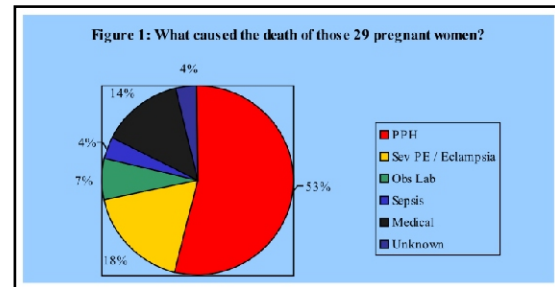
On an average, 22 women had been dying every year since 2000 either during pregnancy or within 42 days of termination of pregnancy (maternal death). Maternal deaths are tragic because these deaths are preventable and also the young children are left alone without their mothers. Between March 2004 and April 2005, a total of 29 maternal deaths were reported out of which 53% of them died due to excessive

Dental Technicians/Hygienist	49
X-Ray Technicians	37
O.T. Technicians	27
Eye Technicians	30
Physiotherapist	3
Physiotherapy Technicians	31
Other Technicians	30
Compounder/ PMW	25
Malaria Technicians	48

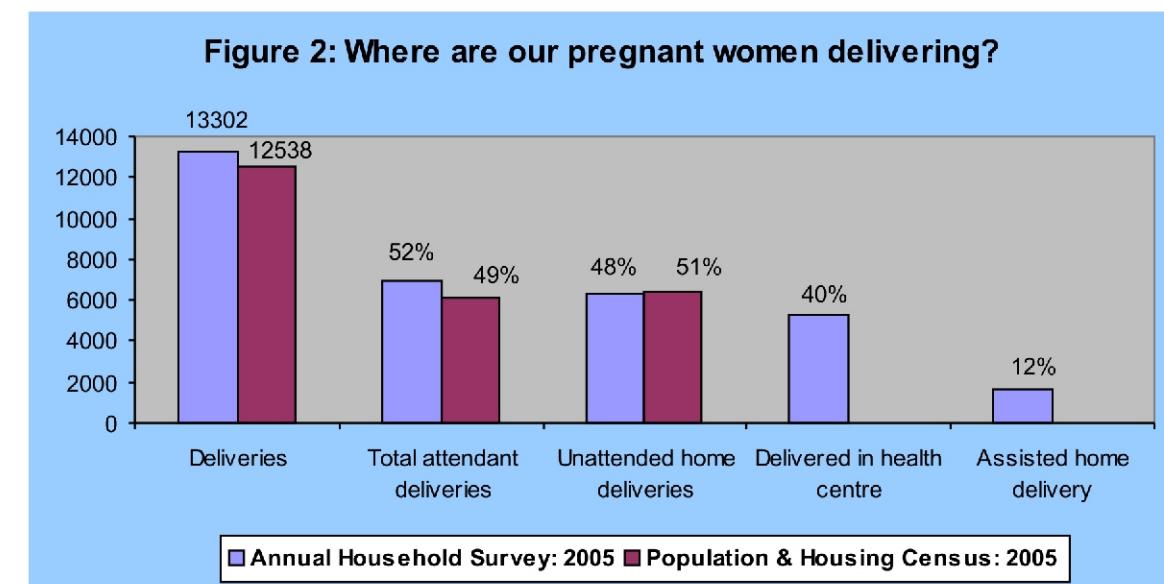
B. Health Facilities

Type of facility	Number /Indicator
Hospitals*	29
Basic Health Units (BHUs)	176
Indigenous hospital	1
Indigenous units	21
Training Institutes (including NIFH, Gelephu)	3
Out Reach Clinics (ORC)*	485
Total Hospital Beds	1078
Hospital Bed per 10,000 population	17

bleeding after delivery also known as (Postpartum Haemorrhage) and 18% died due to severe Pre-eclampsia/ Eclampsia (figure 1).



Of the total 29 maternal deaths, 59% died in the hospitals and 41% died at home. Many died at the hospitals because of late reporting. By the time a woman reports to the health centre, she has already entered into severe and irreversible complications. Unfortunately, 63% of the deaths are among women aged between 20-29 years and 87% deaths occurred in postpartum i.e. after delivery, 10% deaths in antepartum (during pregnancy) and 3% in intrapartum (during labour/during the process of delivery).

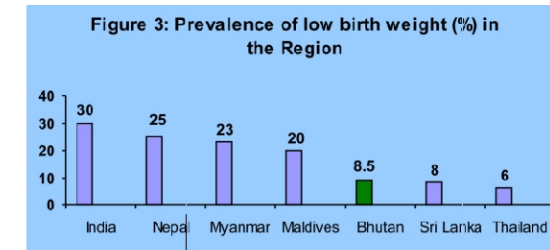


Progress towards institutional deliveries:

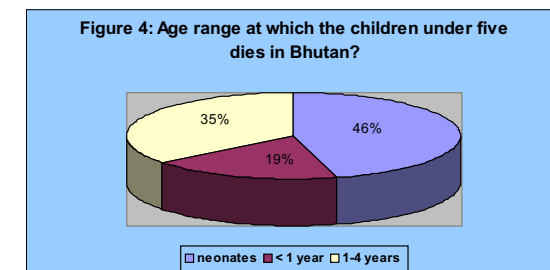
Bhutan wants all deliveries to take place either in hospitals or in the Basic Health Units (BHU) and thus called for 100% "Institutional Delivery" as a mean to prevent maternal deaths. Current estimates show that of the total 13302 deliveries, 40% are delivered in health centres (institutional deliveries), 12% had assisted home deliveries and 48% untrained deliveries. It is also noteworthy that of the 40% institutional deliveries, 11% of them took place at the Jigme Dorji Wangchuck National Referral Hospital, Thimphu.

Health of the newborns and children:

In 2005, out of 4466 deliveries from 17 district hospitals there was found to be a low birth weight (LBW) prevalence of 8.5% out of which only 0.7% were born with birth weight less than 1500g (VLBW). WHO recommends 15% as the prevalence rate at which LBW would be viewed as public health concern.

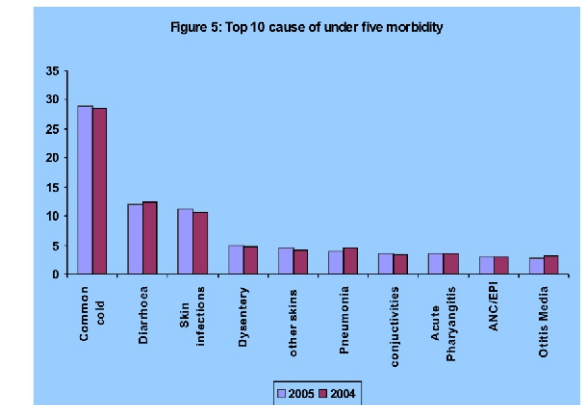


Also, of the total children born in 2005, 46% (107) of them died within the first 28 days of delivery (Neonatal Death) according to AHS. And according to hospital morbidity and mortality report, 65 babies died within the first 28 days of deliveries thereby indicating that many deaths occur at homes and go unreported



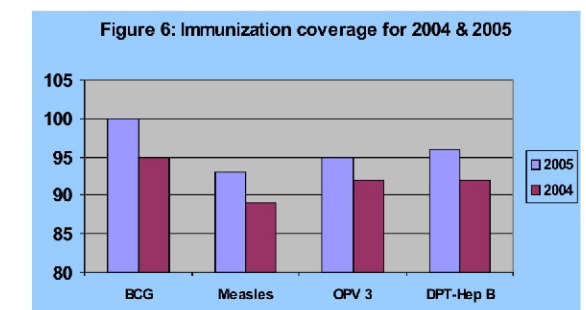
In children under five, the top three causes of morbidity are common cold, diarrhoea and skin infections (Figure 5). These three diseases alone contributed to more than 50% of overall morbidity in children in 2004 and 2005. Therefore, it is evident that effective measures to prevent and control these three diseases can help reduce the overall morbidity cases in under-five children significantly. Diarrhoea and skin infections are more attributed to hygiene and sanitation issues in the region and therefore the Public Health Engineering Division and Information, Communication Bureau have a major role to play in support of the Diarrhoeal Disease Control Programme. If resources are properly channelled to control the

top three diseases mentioned above, morbidity in children would drop significantly.



Preventing diseases through immunization

The Immunization programme was launched in 1979 with six antigens (BCG, diptheria, pertussis, tetanus, polio, & measles). Tetanus toxoid vaccine for pregnant women was introduced in 1994 followed by Hepatitis B vaccination for all children under one year of age in 1996. Since the declaration of UCI in 1991, Bhutan has been successful in sustaining >80% coverage of children <1 year of age for all EPI diseases. In case of poliomyelitis, Bhutan has seen the last clinically proven case in 1986 in Tsirang Dzongkhag. In 2005, 6 AFP cases were reported though none of them were proven to be Polio.



In October 2005, an international team from World Health Organization (WHO) and United Nations Children's Fund (UNICEF) evaluated the AFP surveillance system in Bhutan as a part of the process to assess whether the current strategies and structures in place for Polio eradication had the potential to maintain Zero polio status. The review found that:-

1. There is no evidence of circulation of wild poliovirus in the districts visited.
2. The AFP Surveillance System is sensitive enough to detect circulation or importation of a wild polio case or circulating vaccine derived polio virus (VDPV) in a timely manner.
3. The EPI system had the capacity to respond quickly and effectively if an importation or VDPV should occur.

The Ministry of Health conducted a nation wide Measles and Rubella (MR) vaccination campaign from 16th to 21st of March 2006. During this period, all children (both sex) below 15 years of age and women aged 15-44 years were given a single dose of MR. The nation wide coverage of MR vaccines for the target population was 98%. From 21st April 2006, MR vaccines were given regularly at 9 and 24 months for all children in Bhutan. The introduction of Measles and Rubella vaccines marks another milestone in the vaccines preventable disease control programme.

Building health through nutrition

Nutritional status of the children under five years is one of the underlying outcome indicators for all health interventions. Hence,

assessing the nutrition status of under-five children has always been an international practice. The 2005 AHS showed that 9% of the children under five were malnourished (underweight) and 18.1 % were overweight. However these measurements were from children who reported to health centers and were assessed as per the “road-to-health” card which is based on the national child health service (NCHS) standard. Hence they give only an approximate range of the weight and do not give specific reading. While a prevalence of less than 10% underweight is a positive sign, prevalence of overweight children has to be considered a requirement for appropriate intervention. Overweight leading to obesity in both children and adults is known as epidemiological transition and is generally associated with changing diet, life-style and economic development.

School going children and the adolescents: Comprehensive School Health Programme (CSHP) is one of those specific programs conceived and implemented by the Ministry of Health and Education since 1998. This program administers six monthly de-worming, weekly iron folic and vitamin-A supplementation in all primary schools apart from health education and awareness programs on hygiene and sanitation. For the higher secondary and middle secondary schools the health awareness is more focused on adolescent reproductive health issues. Today more than 80% of the school children are de-wormed and supplemented with Vitamin A and iron folic acids. All schools have trained school health coordinator and the majority of

the schools are supplied with a first aid box. Schools even draw up their own school health calendar outlining their one-year schedule for health related activities.

Similar activities are also conducted in monastic institutes through the Religion and Health program which is coordinated both by the Ministry of Health and the Office of the Special Commission, Ministry of Home and Cultural affairs. Soil Transmitted Helminthes (STH) study conducted in three monastic institutes of Parizampa, Dechenphu and Simtokha, all in the capital city Thimphu shows worm infestation (tape worm, hook worm) prevalence of 17% and anaemia prevalence of 35%. The study expressed concern over hygiene and sanitation issues in all these institutes. The study recommended six monthly de-worming and vitamin A supplementation and improvement in the condition of the latrines and water supply in order to prevent the reoccurrence of STH infestation.

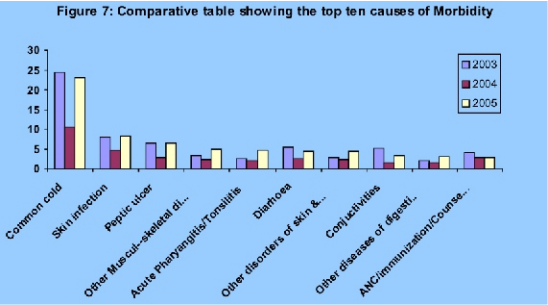
Health status and trends in general population

The Office of the Census Commissioner, Royal government of Bhutan conducted Bhutan's first national population and housing census from 30th to 31st May 2005. The census adopted De facto method; meaning, it includes all persons, irrespective of nationality within the geographical boundary of Bhutan at the reference time of census enumeration. Bhutan's population is 672,425 with 69.1% of the population still residing in rural areas. The Total Fertility Rate (TFR) is 2.6 which means that on an average a Bhutanese woman will

deliver 2.6 children during her life time. TFR is an average because some women will have more, some fewer and some no children. The rate of growth (Natural Increase) or the difference between the number of births and deaths in a population is 1.3 per 100 population and the number of live births is 20 per 1000 population (crude birth rate).

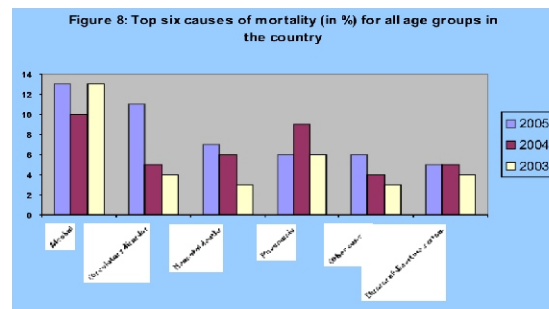
The Crude Death Rate or Crude Mortality Rate (CRM) is 7 per 1000 population. This means that for every 1000 people in the population, there were 7 deaths. However, since the CMR reflects the overall risk of deaths in the population among all ages and both sexes, it is least specific indicator of mortality. Infant mortality rate is 40 per 1000 population which means 40 children out of every 1000 babies born die before reaching age one.

Causes of illness (morbidity) in the community



In 2004 there was a slight encouragement as top ten diseases contributed to only 31% of the total morbidity cases. However in 2005, the top ten diseases again accounted for 65% of all morbidity cases. For the last three years, the top three diseases have been common cold, skin infection and peptic ulcer and they represent 37.7% of the total morbidity cases in 2005.

Causes of death (mortality) in the community



An annual household survey (AHS) of 2005 reports a total of 2,426 deaths. AHS is a regular year-end retrospective information collected by the health workers by visiting each and every household in the country. Surprisingly, the national population and housing census, 2005 reports a total of 4498 deaths for the same recall period. The gap of 2072 deaths between the AHS and the national population and housing census gives rise to a serious doubt in regard to the reliability of AHS data.

The quarterly morbidity and mortality reports from health centres report a total of 704 deaths in 2005 with alcohol as the number one cause of death, contributing to 10-13% of the total deaths. Information from death certification system from 10 districts also revealed a total of 576 deaths with cardiovascular disorder (18.7%) and cirrhosis of liver (7.8%) as the top two causes, contributing to 26.5% of the total deaths. Alcohol liver disease has been the number one cause of death in the country since the past three years signalling a call for attention.

Safe drinking water and morbidity

Access to safe drinking water in the community is a high priority because there is a high association between safe drinking water,

hygiene, sanitation and morbidity incidences. All top ten morbidity causes are related to water and sanitation (diarrhoea, skin diseases, acute respiratory infection, etc). In order for the Health Sector to play a key role in safe drinking water supply and sanitation and to achieve universal access to safe drinking water, the Public Health Engineering (PHE) Unit with the Department of Work and Housing was transferred to the Ministry of Health in 1997. Currently, 84% of the households drink from piped water either within the house (22.7%) or piped water outside the house (61.5%). In terms of sanitation, only 10% of the houses do not have toilet facilities and the rest 90% have either independent flush toilets or pit latrines⁶.

Old Age and Disability

The dependency ratio is a measurement of the age of the population and it helps to evaluate the ability of a nation to adapt to an aging population. Bhutan's child dependency ratio is 53% and old age dependency is 8%, giving a total dependency ratio of 61%⁶ above.

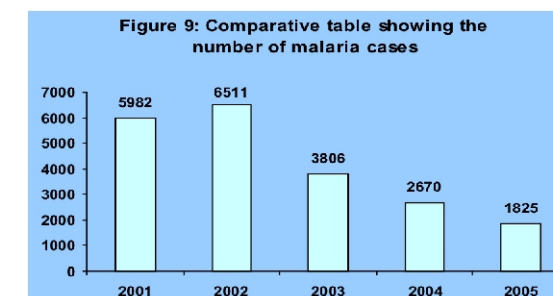
- Child dependency ratio is the number of person 0-14 years per one hundred persons 15 to 64 years.
- Old age dependency ratio is the number of persons 65 years and over per one hundred persons 15 to 64 years.
- Dependency ratio is the sum of youth dependency ratio and old age dependency ratio.

The disability prevalence is 3.4% and it constitutes disabilities like seeing, speaking, hearing, moving and mental disability.

Table 1: Types of disabilities and how many are affected⁶?

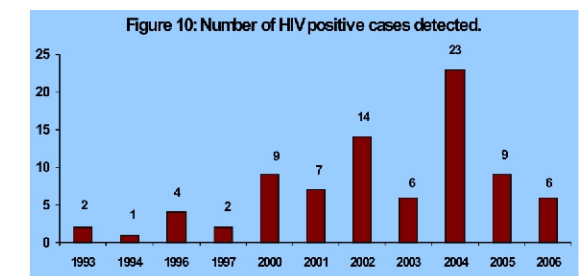
Disability	Cases	Percent
Seeing	5906	23.5
Speaking	4479	17.8
Hearing	8985	35.7
Moving	4370	17.4
Mental	1394	5.5

Prevention of death due to malaria: Vector-borne diseases such as malaria, dengue fever and Japanese encephalitis are endemic to five southern districts of Sarpang, Zhemgang, Samste, Samdrup Jongkhar and Chukha. Plasmodium falciparum and Plasmodium vivax are both prevalent in all these districts. In 2005 there were 1,825 malaria cases out of which 5 died



Prevention of HIV/AIDS

The first HIV/AIDS case was reported in 1993 and since then a total of 83 cases were detected as of April 2006 (Figure 10). A total of 19 people died and 17 of them due to AIDS related illnesses. Of the HIV positive cases, 36% of them are young people in the age range of 15-24 years and 10% are minor who acquired it through their mothers (Mother to child transmission). Since 2005, Royal Governments has introduced Antiretroviral Treatment (ART) and to date 6 people are on the ARV treatment in the country.



In this battle against HIV/AIDS, the most unfortunate victims are those 8 innocent children who are infected with this incurable virus either during pregnancy, delivery or breastfeeding (mother to child transmission). Today, mother to child transmission constitutes 10% of the total HIV/AIDS transmission mode in Bhutan. In this context, HIV surveillance needs to be reviewed to enhance timely detection of HIV positive mothers. The IEC messages should adequately address the mother to child transmission because, with effective combination of interventions, mother to child transmission rate can be reduced up to 40% in breastfeeding population.

Elimination of Leprosy

Leprosy control activities were initiated in 1950's and in 1966 the National Leprosy Control Programme was established with the objective to eliminate leprosy as a public health problem. The elimination goal is defined as achieving a leprosy prevalence of registered patients of below 1 per 10,000 population. That means, Bhutan should have fewer than 33 new cases per year or fewer than 67 patients on active MDT treatment. In this regard, Bhutan has achieved the leprosy elimination goal since 1997 by maintaining less than 33 new cases a year. In 2005, 15 new cases were detected giving a cumulative case under MDT at 36.

Bhutan Essential Drugs Programme:

Overcoming the mountainous terrain to reach essential drugs to all.

The Essential Drugs Programme

Since the declaration of the Alma-Ata, which identified “provision of essential drugs” as one of the eight elements of the primary health care, there was huge improvement in the access to the essential medicines worldwide. The right to health facilities, goods and services in Article 12.2 (d) of the International Covenant on Economic, Social and Cultural Rights (ICESCR) includes appropriate treatment of prevalent diseases, preferably at community level; and the provision of essential drugs.

Until 1986 many problems existed in Bhutan in the public drug supply system leading to poor drug availability, questionable quality, irrational prescribing and high drug costs. In 1986, the Government felt the need to rationalize the drug supply system in both public and private sectors and with the assistance of WHO, embarked upon an Essential Drugs Programme (EDP). One of its

first tasks was to develop a comprehensive National Drug Policy and Legislation that was approved by the Cabinet in 1987. The Essential Drugs Programme was established with a mandate to:

- Ensure regular supply of safe, effective and need based drug of acceptable quality
- Promote and monitor rational prescribing, good storage and good dispensing practices.

The public drug supply system is by far the most important source of drugs for the Bhutanese population. In line with the Vision 2020 document, which aims at achieving Gross National Happiness, the biggest challenge for the Programme has been “to ensure that primary health care services are extended to those living in the most remote part of the nation” i.e. to “reach the un-reached”. The Programme took gradual, systematic steps to achieve its goal of making essential drugs

available to all in the national context and continues to do so. The drugs budget has increased from USD 0.86 million in 1995 to USD 2.20 million in 2005. Considering the increasing expenditure on drugs, it has become crucial to ensure access to essential drugs through efficient and effective procurement, supplies management, quantification and rational prescribing.

In December 2005, the Essential Drugs Programme was reviewed to assess and evaluate its impact.

Published studies and unpublished WHO reports, WHO newsletters/bulletin, country

reports were reviewed and a qualitative research and analysis has been carried out during this assessment.

Use of medicine in hospitals

Many small scale surveys have been carried out over the years to study the pattern of drug use and drug availability in the country. In 2004, a nation-wide survey was conducted in various hospitals around the country. The study on the use of medicine, using the WHO guideline “How to investigate drug use in health facilities” is the first of its kind and presents a baseline data on various prescribing and dispensing practices in Bhutan.

Indicators	Other countries in the region				
	Bhutan (2004)	India-West Bengal	Nepal (1992)	Banglades (1991)	Pakistan (1999)
Average no of drugs per prescription	2.4	3.0	-	1.5	3.5
% of prescription with at least one antibiotic	36.5	72	-	31	78
% of prescription with at least one injection	1.7	4.0	5.0	1.0	75
% drugs written in generics	85.8	45	44	-	35
% drugs prescribed from the Essential Drugs List	98.5	44	84	-	70

Source: Bhutan figures from the study conducted in 2004 by EDPSource for other countries: The World Medicines Situation, WHO (2004)

Medical Services - A Vision

The Year 2000 saw major reorganization in the Government development machinery in order to improve programme focus, management, and streamline activities of various ministries and departments. One of the results of this exercise was the bifurcation of the Ministry of Health and Education into two separate Ministries: Ministry of Health and Ministry of Education. The Department of Medical Services also came into existence in June 2003 under the Ministry of Health.

Headed by a Director General, this Department has two Divisions namely, Drugs,

Vaccines & Equipments Division (DVED) and Health Care & Diagnostic Services Division (HC& DSD). The Department is responsible for the health institutions like the Jigmi Dorji Wangchuck National Referral Hospital and two Regional Referral Hospitals, the Institute of Traditional Medicine and Services (ITMS), the Health Equipment Repair & Maintenance (HERM) Unit. Its programmes include those on primary eye care, oral health, infection control and hospital waste management, diabetes, emergency medical services, the Magee Project in support of child nutrition, and Damchu

Project in support for disability and rehabilitation. The Department also manages fielding of foreign volunteer personnel in the health sector.

The overall mandate of the Department is to provide quality health care services to all Bhutanese. This is done through provision of curative health care services at the primary, secondary and tertiary levels. Traditional system of medicine is given as much importance as modern allopathic medicine.

It is also mandated in streamlining uniform services and facilities at various levels of health care in order to standardize them. Other crucial

functions include the introduction and streamlining of diagnostic and laboratory services; coordination with districts and hospitals; and continued medical education for the doctors, nurses and other cadres across the country. As health care is a technology-intensive field, this Department is responsible for keeping the medical services in Bhutan abreast of new methods and current technology for health. One such development is the health telematic service to improve case consultation between the Regional Referral Hospitals and the National Referral Hospital in Thimphu and patient referral. The Department

(ii) Prescription trend in Bhutan over the years

Indicators	1990	1995	1998	2004
Average no of drugs per prescription	1.77	1.70	1.89	2.4
% of prescription with at least one antibiotic	47.0	45.0	43.0	36.5
% of prescription with at least one injection	9.25	18.0	4.0	1.7
% drugs written in generics	-	80.0	-	85.8
% drugs prescribed from the Essential Drugs List	-	100	-	98.5
Availability of essential drugs (from a basket of drugs)*	87%	84%	87.5%	90%

**This finding is on a particular day of the survey/visit. The basket of drugs included 20 vital drugs from the EDL. Source: WHO, Department of Essential Drugs and Medicines Policy, Bhutan Essential Drugs Programme: A case history. Geneva, WHO; 2000.*

Twenty years of Essential Drugs Programme has left significant mark in Bhutan. Bhutan has certainly made better progress in this field over the years in comparison to other countries. Some of the broad parameters used for measuring the impact of the Programme are selection of essential drugs list; drug regulation and quality assurance; rational drug use; and monitoring and evaluation.

The concept of essential drugs is to have a list comprising of more effective drugs that can be used by majority of the population. The list is not meant to cover all diseases but to ensure

the availability of drugs to treat majority of the diseases that occurs in a country. Bhutan has a very comprehensive Essential Drugs List (EDL) with 371 products as of 2005. The list is compiled and reviewed by the Bhutan National Drug Committee (NDC) every two years and procurement of drugs for the health sector is restricted to this list.

Effective drug regulation is required to ensure the quality, safety and efficacy of drugs, as well as the accuracy and appropriateness of the drug information available to the public. The Medicines Act of the Kingdom of Bhutan was

is responsible to improve this technology further and expand it down to the district hospital level. Development of standard health infrastructures and routine procurement health supplies are also important responsibilities of the Department.

Rational deployment of human resources based on workload analysis is one of the strategies that the Department will be pursuing to fulfill its vision. The other strategies are the introduction and optimal use of relevant services and appropriate health technology. Introduction of uniform care and laboratory and diagnostics services at various levels will be a

focus of attention for the Department in the future. Timely supply of drugs and non-drugs to the health centers will be implemented. Continuing Medical Education (CME) for doctors, nurses, technicians and other relevant staff will be streamlined and enhanced. Technical updates, refresher courses will be scaled up imbibing the concept of Professionalism and Service with **'Humane Face'** all along for nursing and other relevant staff. Integration and further strengthening of the Emergency Medical Services (EMS) in the general health care system is also one of its important strategies. Infection control and hospital waste management guidelines will be

passed during the 81st session of the National Assembly in August 2003. Following this, the Drug Regulatory Authority (DRA) was established as a separate body under the Ministry of Health, in early 2004 to implement the provisions of the Act. The Essential Drugs Programme continues to maintain an active programme of Quality Assurance through careful selection of suppliers and targeted sampling of products for external laboratory examination for quality.

The main activities in the area of Rational Drug Use centre on the availability of the drugs as per the EDL, their use as per the the Standard Treatment Guideline (STG) and Bhutan National Formulary (BNF), and their storage as per the Store Management Manual. These guidelines also form important reference and teaching materials at the Royal Institute of Health Sciences. More recently, the establishment of Hospital Therapeutic Committees (HTC) in various hospitals around the country has made it possible to implement

developed and training to relevant health staff provided. Oral Heal and Primary Eye care programs will be further strengthened to reach the un-reached population. Diabetes clinics and services will also be initiated and established in referral hospitals and training imparted at all levels of health care in future to reduce the risk and burden of non-communicable diseases.

Future strategies of the Department

Keeping one of the principles of primary health care in view, emphasis will be given to equitable distribution of services as well as facilities to all health centers across the country.

comprehensive and coordinated rational drug use activities in hospitals. Improving the basic training of health professionals is an important strategy for achieving rational drug use. The essential drugs concept is included in the curriculum of all health workers and the Programme conducts annual workshops and refresher courses on rational use of drugs, good prescribing practices, and good store management for various categories of health workers.

Ensuring drug safety though Pharmacovigilance

In September 2005, the Programme in collaboration with the Drug Regulatory Authority and the Institute for Traditional Medicines and Services (ITMS) initiated “pharmacovigilance” following which, Bhutan formally applied to become a member of the WHO Programme for International Drug Monitoring based in Uppsala Monitoring Centre (UMC) in Sweden. A national centre has been identified for collection of reports of adverse

In the bid to reach the unreached, focus will be given to remote health centers and difficult-to-access geographical areas. Fielding best of the health workers for this mission for a short-duration on rotation may be one way of reaching them to render quality care and improve health.

Improving communication system and facilities for back-stopping with effective and rapid management consultations, faster referrals as well as improved patient care through tele-consultations will be one area of attention. In this, the health telematic services will be up scaled and given due priority. The

effects due to drugs and other related problems and to collaborate with the UMC. A separate pharmacovigilance centre has been established for traditional medicines, which will work closely with the national centre and collect reports of adverse reactions due to traditional medicines. In the coming years, the Programme will focus on strengthening pharmacovigilance, to ensure patient safety from drugs in Bhutan.

The impact of the Programme on the Health sector

The programme on essential drugs has made a significant impact in Bhutan. Today over 90% of the Bhutanese population have access to essential medicines as their right. The Ministry of Health gives top priority to the health care needs of the population and therefore has put in considerable effort in achieving these

goals. “The uninterrupted supply of vaccines, drugs...” as one of the objectives of the 9th Five Year Plan has been realised with 90% of the 20 vital drugs available to any Bhutanese individual on any particular day. Side by side with ensuring the availability of essential drugs, the Programme has also been successful in reducing the expenditure on wastage of drugs due to expiry from 0.81% in 1994 to 0.67% in 2004. Good coordination among health workers, health administrators and peripheral health centres; good integration of the elements of the Essential Drugs Programme into the health infrastructure; a comprehensive National Drug Policy; excellent technical support from the WHO; and high precedence from the Ministry of Health are among some of the factors contributing to the success of this Programme in Bhutan.

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focus will be to reach the unreached by accessing difficult and remote areas through use of information technology in collaboration with different stake holders like Bhutan Telecom and Department of Information Technology and other outside agencies.

Formalizing Dzongkhag health structure with a District Health Officer, a District Health Supervisory Officer, an Assistant District Health Officer, two Doctors, one or two Assistant Clinical Officers for each Dzongkhag and fulfilling the sanctioned posts in nursing and technician cadres in all hospitals is one of the Department's dreams that must come true as

this is seen as one of the prerequisites for quality health care services in the Dzongkhags. Thus by decentralizing health care services further to Dzongkhags and Geogs it will enable local authorities to prioritize their needs based on local set up and situation.

Keeping in view that most of the resources essential for health care services are imported, rational indenting, tracking stock position and expiry dates and efficient mechanism for their mobilization and re-mobilization will be pursued to minimize wastage.

Improvement of secondary and tertiary health care services will also be the focus of the

Department that will be achieved through the introduction of appropriate health technology and building up human capital required for the betterment of the health of the Bhutanese population.

The Department of Medical Services will further endeavor and strive to fulfill its vision by catering to all forms of emergencies promptly, efficiently and effectively by improving faster communication of health events between districts and center and expediting consultations with specialists across the country for better patient care services. The health care service must be delivered by

reflecting upon and practicing the concepts of “Bhutanese doctoring”, “professionalism”, “service with humane face” and by pursuing “patient-centered efficient provider concept” of health care services.

PROMOTING HEALTH THROUGH SAFE DRINKING WATER AND HEALTHY ENVIRONMENT

With Eyes set on the Millennium Development Goal of sustainable access to safe drinking water

Neatly Dressed Thinlay walked to his school, his 'home works' all complete. It imbued him with a lot of confidence. Over years, he learned that preparedness always gave him confidence and a feeling of well-being at school. It was all different two years ago.

As the stream was about one kilometer away from his home, he had to spend considerable amount of his time to fetch water for his household and he almost never completed the 'home works' his teachers gave him. His clothes were untidy and the Headmistress, who was all for neatness, always picked on him. He was made to stand at the head of the assembly gathering in the mornings as an undesirable example of untidiness for the whole school to avoid. Going to school was total misery for him those years and he nearly gave it up for the village life.

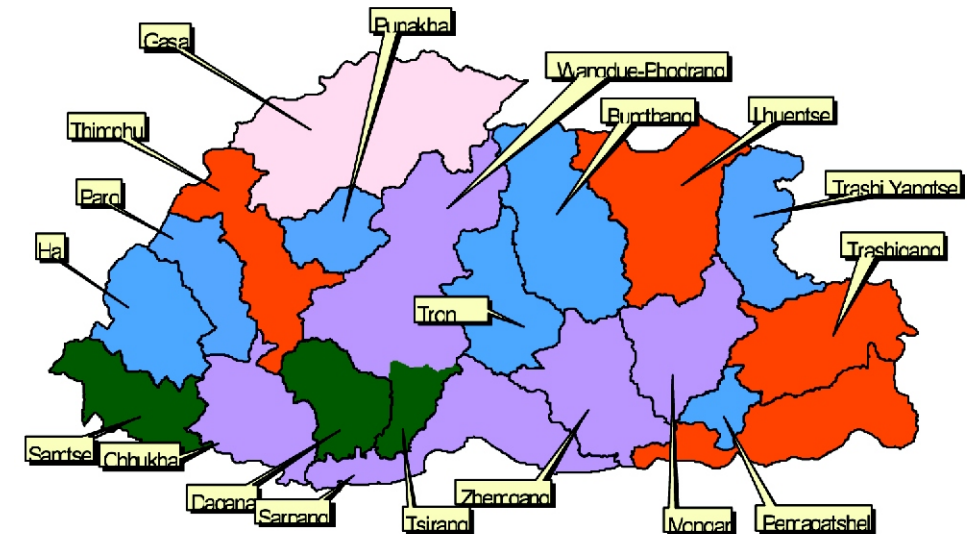
But a blessing came in the shape of a water tap-stand near his house. With drinking water at his doorstep, he could fetch all the water his family needed in just 10 minutes and devote the rest of the time to completing his assignments from the school or to read and prepare himself for the school. In the evenings, he could wash his soiled sleeves and socks at the tap-stand and dry it in the night to make them a neat wear for the school during the next day. Even the bout of diarrhea he used to suffer

from during summers was forgotten now. The water from that stream those days always gave Thinlay diarrhia during summer just as he was getting ready for his half-yearly examinations.

Such was the impact of the Health Ministry's Programme on Rural Water Supply and Sanitation entrusted to the Public Health Engineering Division (PHED) even on an individual student. Nationwide, the situation of access to safe drinking water has improved considerably since 1990. Eighty-four per cent of the country's population now has access to safe drinking water. The proportion of population without access to safe drinking water declined from 55% in 1990 to 16% in 2005. The target of reducing by half those without access to safe drinking water has thus already been achieved.

Access to basic sanitation, the latter being defined and understood to mean access to a minimum facility of a pit latrine, has likewise improved substantially in the country. In 1990, 33% of the country's population did not have access to basic sanitation, which improved considerably by 2000 during which only 12% did not have basic sanitation facilities. The target has accordingly been achieved well in time.

RWSS Coverage as of June 2005 is as below:



Diseases like diarrhea are attributable to lack of safe-drinking water and unhealthy environment such as ill-disposed garbage and human excreta. Therefore, PHED is made responsible for planning, designing, allocating funds and managing the implementation of rural water supply schemes, promoting the use of latrines in rural areas and implementation of water supply and latrines in community and primary schools in the country.

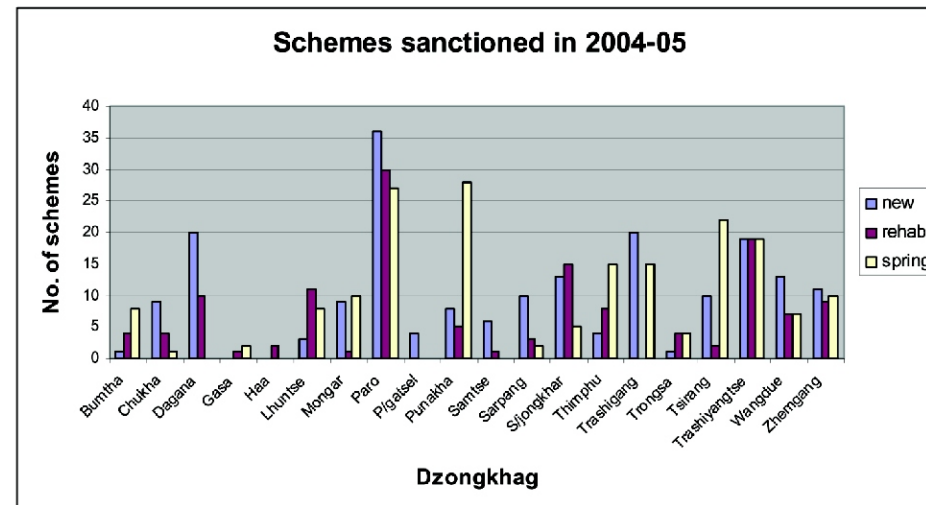
How much is done during the 9th Five-Year Plan?

The Royal Government has accorded high priority to providing water supply to rural areas and thus the target to achieve universal coverage of safe drinking water to rural areas has been set for the 9th Five-Year Plan with the following specific objectives:

1. To provide universal access to safe drinking water supply to the rural population.
2. To promote and ensure use of basic sanitary latrines by all the rural population.

3. To ensure that 90% of the rural water schemes are functioning and have water quality monitoring system in place.
4. To increase provision of drinking water supply and sanitary facilities in schools.
5. To enhance the operation and maintenance of water supply and sanitary facilities in all schools.
6. To have 90% of schemes with trained and functioning water caretakers and maintenance committees.
7. To provide water supply to national workforce camps

In line with the objectives of the 9th Five-Year Plan, PHED had facilitated implementation of various RWSS activities in all Dzongkhags during 2004-05. Initially 150 new, 80 rehabilitation and 100 spring protection schemes were planned for the year. However with additional funds being mobilised, 197 new, 136 rehabilitation and 183 spring protection schemes were sanctioned. Dzongkhag wise distribution is shown in the table below.



In order to improve functionality of schemes, training of water caretakers were organized by Dzongkhags with funds which were released from PHED, Community Planning and Management workshops, Community Development for Health workshops had been also carried out.

Rural Water Supply and Sanitation Management Information System (RWSS MIS) has been developed and introduced in eight Dzongkhags during 2005.

The importance of RWSS caretakers

Safe drinking water being the fundamental component of the primary health care, the Royal Government of Bhutan accorded the Rural Water Supply (RWS) programme a national priority in the early nineties including a Royal Decree on water and sanitation. However, while there is significant progress in physical construction of RWS scheme covering 80% of the rural population within the last four decades, operation and maintenance (O&M) which is one of the most vital factors contributing to the sustainability of water supply schemes

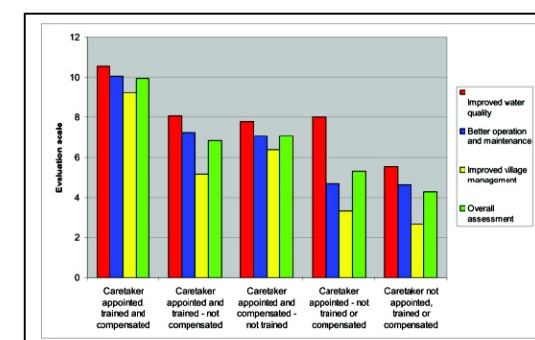
was lacking. The actual functionality of the existing schemes is questionable. Therefore, a strong need was felt to equip the communities with the capacity to operate and maintain their water schemes after the completing the construction of schemes.

In 1991, a maintenance system was established that called for trained RWS caretakers for every scheme built. Since then, the PHE has been putting lots of effort in assisting the Dzongkhags in institutionalizing water caretaker training. It is mandatory to have at least one trained caretaker for every scheme. As of now, only 50% of the water schemes have trained caretakers.

While the District Engineering sector regularly conducts a 5 day new water caretaker training and a 2 day refresher training course every year, further intensification on the training is imperative.



Every scheme with trained water caretaker is supplied with basic operation and maintenance tool box. The training course essentially covers basic technical skills to carry out minor repair and regular maintenance and introduction to three main roles and responsibilities: i) cleaning of water intake and tanks; ii) regular inspection of water supply infrastructure and iii) carrying out repairing water works.



However, the caretaker training alone can not guarantee the functionality of the water schemes. An equally important aspect to uphold the functionality of scheme is the provision of compensation in kind or cash to the caretakers by the water users themselves. For instance, the correlation between the functionality of the schemes and trained and compensated caretakers has been proven by the study on RWS functionality survey carried out in Paro Dzongkhag in February 2004. The analysis of the survey revealed that the schemes that have trained and compensated caretakers have far improved water quality, better O&M and better community self-management. This in essence illustrates the functionality and sustainability of the RWS schemes largely depends on whether the schemes have properly trained and

compensated caretakers. Therefore, it is the responsibility of community to compensate water caretakers and districts to offer regular caretaker training. Otherwise the RWS schemes' functionality and sustainability remains at stake and never will we achieve the national goal of "Access to safe drinking water by every citizen".

Proper assessment of programme dependent on RWSS Management Information System

The rural water supply and sanitation coverage is today approaching 85%, which for a development country like Bhutan is highly satisfactory. Nevertheless concerns have been raised regarding the actual functionality of rural water supply and sanitation schemes. Although we might praise ourselves for the high coverage, we do not have a clear picture of the number of defunct or partly defunct RWSS schemes, which is actually included as being covered. In addition there is little data on "why RWSS schemes gets defunct". For these various reasons, PHED initiated the development of the RWSS monitoring tool to address these problems in early 2003. PHED conducted a pilot survey of the RWSS MIS in Paro Dzongkhag in February/March 2004. Several experiences and interesting results were gained from this survey.

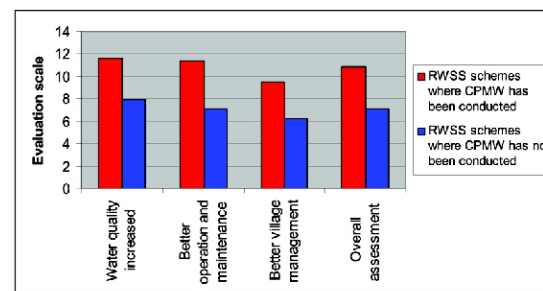
The main objectives of RWSS MIS is as indicated above to obtain information on RWSS coverage, RWSS functionality, reasons why RWSS schemes get disrupted or defunct and finally the impact of participatory user oriented programs.



How effective is the Community Planning and Management Workshop (CPMW)?
Has this caretaker been trained?



Management Workshop (CPMW)?



Data from the Paro RWSS MIS survey clearly indicate the positive impact of CPMW

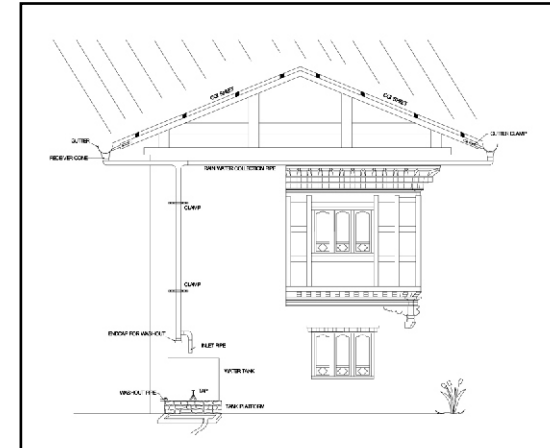
The RWSS MIS tool is focused on assessing the risk of water contamination, risk of disturbance in water supply and risk of quickly deteriorating water supplies. In addition relevant information is collected at village level household for example scheme age, number of HH, status of the caretaker and if any community based workshops has been conducted. All this information is needed to make proper correlations between present village scenarios and interventions made. The RWSS MIS expected to hugely increase the effectiveness of the RWSS sector in Bhutan and to make appropriate actions where needed.

New technologies introduced

Rainwater has been used as a source of drinking water and for irrigation purposes in

places where there are no reliable surface water-sources and is practiced in most of the developing countries. In Bhutan, rainwater harvesting had been traditionally practiced in some areas located on mountain ridges especially where there is lack of water sources. For irrigation purposes rain water is stored on the ground as water quality is not an issue, however, rain water for drinking purposes have to be collected on the individual roof tops and stored in individual reservoirs with proper covers to avoid any risk to the health of the people.

Therefore, the household rainwater harvesting technology is not new to the communities, infact it has been there for many years. The technology is an improvement to the traditional concept by using more reliable and better quality materials so that water quality is maintained properly. It is one of the simplest technologies that is cost effective and involves minimum operation costs. The technology is demonstrated in the following diagram.



Some areas in Bhutan are today very troublesome in respect to identifying suitable sources to use for regular piped water supply schemes. Until now, the traditional solution in such areas has been to utilize rainwater, which is collected in ponds or to carry water from far away sources. In some cases, RWSS schemes have been implemented using distant sources, which clearly increase the cost for the schemes, but even more important, it increases the amount of work and cost for operation and maintenance expected to be borne by the villagers.

Hence, PHED initiated the development of other suitable solutions. In Lhuentse Dzongkhag a roof rainwater harvesting was installed in 2002 at Rinchen Bumpa Monastery

in Kurtoe Geog, which today is functioning very well.

There has long been a persisting water problem in Kengkhar and Jurmey area in southern Mongar district. Still today several villages are without safe drinking water supply and use unsafe ponds for drinking or have to fetch their water from sources far below. These are all villages located on higher elevated terrain and suitable sources are not easily available.

Therefore PHED decided to investigate the possibilities for providing safe drinking water to several villages in Kengkhar and Jurmey geogs with the use of roof rainwater harvesting in 2003. During field visits it was found that there was a genuine interest from villagers to receive support for roof rainwater harvesting structures and it was found to be technically feasible as well. A project proposal was developed, which was later endorsed by MoH and eventually financed by Sustainable Development Secretariat.

In 2004, a demand driven approach was adopted and villagers interested in receiving support was encouraged to make effort to register at geog level. Today, 109 households



Pond presently used in Pingphu village for drinking purposes



20 litre container used for carrying water from distant sources



Rainwater harvesting being discussed at village level

have registered and implementation is in progress. One RWS system for Gonpa Singma Lhakhang in Pemagatsel has been completed and is functioning very well.

The project will greatly enhance the living conditions of the people in Kengkhar and Jurmey geog, lessen the daily hardship of carrying water and improve the socio economic status. The project is also expected to increase the capacity of PHED as a learning organisation and similar projects can be expected to be implemented elsewhere if the rainwater harvesting structures in Kengkhar and Jurmey are proven to be technically and socially successful.

Water quality

Rural water schemes are simple gravity

fed systems without any treatment facilities. Providing treatment plants will be quite expensive and also difficult to operate and maintain. Therefore, government policy is to select water sources which are safe, reliable and without any risk of contamination.

In 2002, PHED conducted a water quality study and found out that the main parameter of contamination is microbiological and there was no risk with chemical contamination for rural water sources. Therefore, in order to monitor microbiological contamination of water, water testing kits were distributed to all Dzongkhags and one Engineer and one lab technician from each Dzongkhag was trained on the use of the test kit. Water quality monitoring system was developed and distributed to all Dzongkhags for implementation.

Collaborators in the Programme


The first rural water supply schemes were constructed in 1970, however the RWSS program was initiated in 1974 mainly with UNICEF funding. It was not before the late seventies that construction of RWS really took off. PHED records show that rehabilitation of schemes had started in 1992. The spring protection project had started in 1994 to cater to scattered households which cannot be included in a normal standard RWS scheme.

From inception till 1999, RWSS program was funded by Unicef, however from 2000, UNICEF focus shifted from RWSS to

institutional water and sanitation. The Royal Government was able to mobilize funds from Danida from June 2000 to July 2005 for the program. From June 2005 onwards, donors were not forthcoming and therefore RWS program is funded by RGOB.

Till date more than 3000 new schemes and 1000 spring protection have been implemented in the rural areas. More than 30% of existing schemes have been rehabilitated.

WHO has been supporting the Programme by providing the required technical expertise both in terms of consultancies and developing guidelines and human resource.



Solar disinfection of Water

PHED had also explored the possibility of introducing household water treatment. Solar Disinfection of Water (SODIS), a widely practiced technology for household water treatment was found to be an option.

The Solar Disinfection (SODIS) of water is a simple, environmentally sustainable, low-cost technology used to improve the microbiological quality of drinking water. SODIS uses solar radiation (germicidal effect) and heat to destroy pathogenic micro organisms, which cause water borne diseases. SODIS is ideal to treat small quantities of water to be used for drinking purposes.


PHED tried out several experiments during January and February 2005 in Thimphu with very promising results. The containers used for these SODIS experimentations were plastic bottles. These are easily available, cheap and SODIS efficient. The containers should not exceed a thickness of 10 cm as Ultra Violet radiation reduces quickly with increasing water depth. Different types of plastic bottles were used - some fully transparent and others painted black on one side (to increase heat absorption).

Water with possible pathogenic micro organisms is filled into transparent plastic bottles and exposed to full sunlight for six hours. For cloudy weather, the plastic bottles were exposed for 2 consecutive days.

The degree of pollution in the water before the SODIS treatment can be described as heavily polluted with a content of thermotolerant (faecal) coliforms between 1000 and 2000 per 100 ml. Still the removal rates were very high, above 99% and in several cases 100%. When using raw water from springs or streams, the water is expected to be much less contaminated and this water, if treated by SODIS, will become fully potable and in compliance with WHO guidelines.

The experiments in Thimphu show that using transparent plastic bottles of 1 litre on an unpainted CGI roof gives the best results with a nearly certain 100 % removal of harmful pathogen micro organisms.

The advantages of the technology is it being low cost, easy to use and learn, efficiency proven and can be utilized at household level.



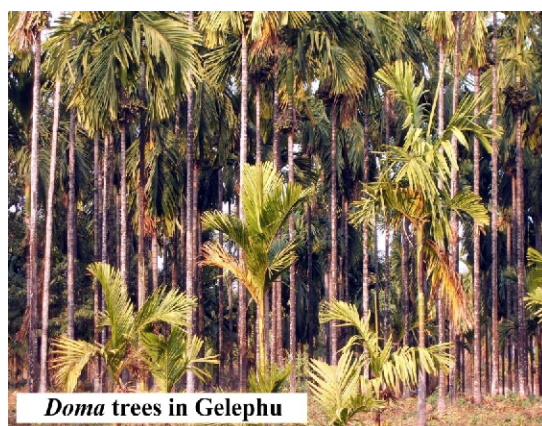
Different type of bottles placed on CGI roof

SHALL WE SAY 'NO' TO *DOMA*?

Doma and the Bhutanese

Recently there is a regular message on an Indian TV channel explaining how the beggars and street vendors bother the tourists in India and discourage them from visiting the country. Perhaps *areca catechu*, known as *doma* in our country, does a similar thing to the visitors to our country. For them, Bhutan is a beautiful country till one sees every street, building corners, public utilities smeared with the red spit of *doma* and white dashes of lime. Bhutanese are good-looking people till they smile and exhibit their *doma*-stained teeth. Bhutan has clean air unless it is drenched with the odor from the *doma* chewers around them.

Doma was introduced in Bhutan as early as 1774 and its use increased with the improvement of automobile transport system that connects Bhutan to India. *Doma* has been so widely used that it has even become part of Bhutanese tradition and social interaction (Pommaret, 2000).



Doma trees in Gelephu

Doma is the fruit of a species of palm native to Asia, Pacific, and parts of Africa (William *et al*, 2002). It is the fourth most addictive substance in the world (Boucher & Mannan, 2002) and is used by 10 (Boucher *et al*, 2002, Taylor *et al*, 1992) to 15% (Nelson & Heischouer, 1999) of the global population. It is also known to contain the alkaloids *arecadine*, *arecolidine*, *guracine* (guacine), *guvacoline* and a number of others and it stimulates and mildly intoxicates like nicotine and inhibits appetite (TheFreeDictionary.com).

Its use is known to cause cancer (IARC) and Vitamin B deficiency (Vimokesant *et al*, 1975) and aggravate asthma (Kiyingi, 1991). It is also associated with Type 2 diabetes and obesity after prolonged use (Mannan, Boucher & Evans, 2000). The skin of the nut and the red saliva spat by users causes "public nuisance" in terms of sanitation as in the case of our country (discussions in *Kuenselonline* in September 2004). Further, tobacco industries also use betel nut products to supply tobacco in the market in the name of betel nut products (WHO, 2003).

In Bhutan, it is thought that educated youngsters may be using less betel nut than their parents and that people in the western part of the country may be using more than those in the eastern part. Hence, it may now be time to carry out studies to not only confirm these suppositions but also to examine how much burden the use of this substance is causing to the health of the Bhutanese people.

Starting to look at the *doma* use

As a beginning, a small study was carried out in early 2005 among 345 students ranging from Grades 7 to 11 from five government-owned secondary and high schools in the main town of Thimphu. The investigator remains grateful to the Ministry of Education for the permission to carry out this small study.

The students in the study group were asked to answer a self-administered questionnaire with the intention of finding out the prevalence of *doma* use among adolescent students and the factors affecting this habit in them.

As the model used for this study was a modified version of the bio-psychosocial model adopted by the Tobacco Research and Implementation Group (TRIG) for tobacco studies (Morgan *et al*, 2003), the study looked at the relationship between some of the bio-psychosocial aspects like negative affect, depression, and stressing factors and the cultural background of the students with *doma*-chewing. Instruments for the psychological aspects were adapted from the measure guide of National Cancer Institute. The study also used CDC/WHO's concept of prevalence for tobacco use (CDC, 2002).

Further, the study used the stratified cluster sampling method by randomly selecting the grade clusters from among the schools and particular classrooms from among the grades. As all the government secondary schools are day schools within the same settlement, no attempt was made to compare the results among the schools.

What do we find?

In this randomly selected student population, the age range of the respondents was between eleven and twenty years with the majority of them within the age range of 15 and 17. The group also consisted of almost equal males (46.7 %) and females (53.3 %) confirming that there was almost equal number of boys and girls in the schools in Thimphu. The maximum number of students were found in Grades 9 (35.9 %) and 10 (26.4 %). Fifty-six per cent of the students live with parents or guardians who can write and speak fluently in English language and 46.1 % of the students belong to parents or guardians who are self-employed. Further, Thimphu being located in the western part of the country, (38.8 %) students belonged to families from western part of the country. The next is the eastern Bhutanese which amounted to 35.4 %, 18.3 % were from southerners and the students from central region consisted of 7.5%.

The study revealed that 32.8 % of the students have never used *doma* so far in life. 67.2 % have used it at least once in their life time so far. This group is further divided into current and ex-users. Twenty-eight students (8.1 %) have used *doma* but quitted the habit for more than a year which left 59.1 % as current *doma* chewers. If all those who were not chewing *doma* at the time of data collection were excluded, the percentage of students who chewed *doma* at that point is 35.4. The figure below provides the picture of the situation:

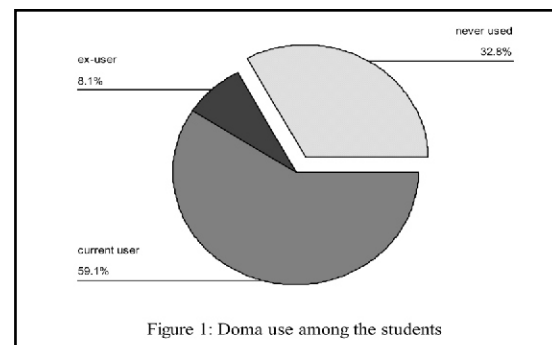


Figure 1: Doma use among the students

Among the 232 students who use or have used doma, 9.1 % have been introduced to the habit at the age of 7 years or less. From the study it is also known that 14.2 % got introduced to doma chewing between the ages of 10 or 11 years and most of them (28 % each) were introduced to the habit between the age range of 12-13 and 14-15. Very few of them started the habit at 18 years or after that age.

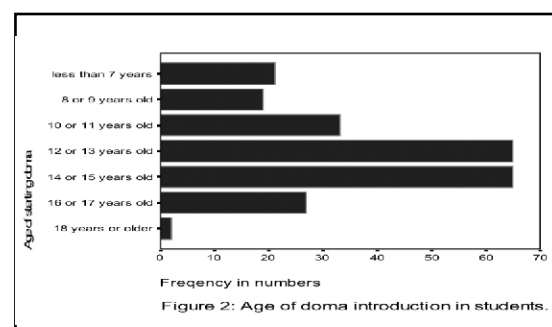


Figure 2: Age of doma introduction in students

Among the doma users, 40.1 % used it only on rare occasions; 14.2 % on special occasions like religious ceremonies, New Year celebrations, etc.; 44.4 % chewed doma regularly although not daily and 1.3 % used it daily.

The maximum number of students used doma when at home. Next most popular place of using it is at their friends' houses. It may be because of the restrictions at school; only 3.4 %

use it at school as well. Public places like the market, other places like while going to school, and social events rank 10.3 %, 6.5 %, and 6.0 % respectively.

The most favored doma preparation is the dried, raw betel nut (supari) as 33.6 % of the students preferred it. This even beats the use of traditional doma khamto (consisting of doma-areca nut, paney- betel leaf, and tsuney-lime) which was favored by 32.3 % of the users. Other listed preferences were doma with or without lime (no leaf added) which was liked by 5.2 %, sweetened Indian quid with many ingredients called mithra paan liked by 9.5 %, and factory-prepared supari sachets favored by 12.9 %. Fifteen students (6.4 %) did not have any particular preference. Except for the traditional doma khamto and the mithra paan which make saliva and the mouth red, the chewers of the other preparations are not so obvious to mere observation.

Among the doma-using 232 students, 26.7 % never made an effort to stop the habit, 20.7% made efforts to stop but relapsed, and 52.6% (122) have made efforts and actually stopped the habit. However, those who have stopped for only less than a year were not treated as 'ex-users' because authorities on substance use believe that one cannot be sure of relapses unless the habit has been stopped for at least one year. Besides the instrument also takes into consideration the period of one year, with questions like, "During the past one year, how often did you chew doma?" Hence if somebody has chewed doma during the year, he is considered a user even if he has stopped for the last 1-3 months or 4-11 months. Only those who

have stopped the habit for more than a year are considered "ex-users".

Of the 122 students who have made an effort to stop the habit, 59 % have just passed 1-3 months without chewing, 18 % have made it past that period to 11 months, 13.1 % of them have not used it for more than one year. Six students (4.9 %) have stopped the habit for more than two years and the same number has made it past the third year.

On the whole, the use of doma rises around grade 8 and peaks at grade 9. Then it stabilizes at grade 10 and then falls off in grade 11.

Girls (59.6%) prefer to use doma at home more than boys (40.4%). Girls also tend to use it at friends' house and school more than boys do. On the other hand, boys tend to prefer to use doma more than girls at social events, public places and other places such as on the way to school.

The use of doma by the students is significantly related to the role models around them. The more an individual student is surrounded by chewers in the form of parents, older brother or sister, male friends, female friends, and teachers, the more is the chance of the individual student of chewing the substance.

Although the actual number of tobacco users (chewing and/or smoking) is only 33 in the given student population, the analysis revealed a clear association between doma chewing and tobacco use, especially chewing tobacco.

More number of male students preferred

traditional doma khamto, doma alone with or without lime, and the sweetened Indian Mithra Paan prepared by small shops while more females tend to like dry supari and also the ready-made supari sachets prepared large scale by factories outside the country.

Finally, in terms of motives for chewing doma, 72.8% of the students used it to relive themselves from boredom. 62.1% of them used doma to fit themselves with other people, be sociable, and enjoy parties and social get-togethers. The third in the rank were those students who used doma to regulate mood swings, known as affect, with 58.2 %. Self-enhancement motives rank the last with 54.3 % students scoring positively.

How does this picture look?

Unlike the betel nut chewing practices in adolescent students in Taiwan, girls tend to use more doma than boys in Thimphu. For example, Lu et al (1993) who carried out a similar prevalence study in the Changhua area in Taiwan among Junior High School students found that prevalence of betel nut use in male and female students were 9.2 % and 0.9 % respectively. Ho et al (2000) who conducted a study in southern Taiwan has found the betel nut chewing prevalence among males to be within the range of 0.9 % and 16.1 % with only (0.0 % to 5.6 %) among females. Wang et al (2003) also found significant difference in prevalence between males and females with males ranking higher. However, in Thimphu, among the current doma users within one year, prevalence among girls amounted to 106 (52 %) and among boys, 98 (48 %). Similarly



Doma fruits on the tree

among ex-users, only 7 (25 %) were males and 21 (75 %) were females and the difference was significant. Several reasons may account for this difference between the Bhutan and the Taiwan studies. But to the investigator, the most probable one may be that while Taiwan males think that betel nut chewing projects a “macho” image and enhances their social relationship (Wang et al, 2004), this had never been heard from the males in Bhutan. Doma use in Bhutan, instead, signifies openness, friendship, homeliness and a moment of “relaxation and conviviality” (Pommaret, 2000). However, suitably designed studies may explore the reasons for this difference in the future.

There were no significant differences in the prevalence of doma chewing among students due to age, social status, whether or not the parents are English-educated, cultural background, status of negative affect in the students, the existence of personal or family stress-causing factors, or depression.

We can hazard a little digression here to see why the study looked at negative affect in these students. Human beings face both negative and positive mood swings called affects and more so in the adolescent phase. According to Professor David Watson, Department of Psychology, University of Iowa it

was Silvan Tomkins who identified 9 affects out of which 2 are positive, 1 is neutral, and 6 are negative in his Affect Imagery of Consciousness (Watson, 2000). Studies in other addictive substances like tobacco proved that negative affect or mood exerts potent effects on the motivation to use addictive substances like tobacco (Wills et al, 2002). Negative affective states in this study, like in the study on tobacco use, included lack of perceived control, negative self-concept, and pessimism.

Negative affective state was found higher among girls though not statistically significant. However, the level of negative affect differs significantly among grades and as grades roughly represented age, negative affect rises and peaks at the age range of 17-18 years and then falls in the next age range of 19-20 years. This too did not have significant association with doma use.

Similarly, study of other addictive substances like alcohol and tobacco (Choi et al, 1997) found a co-occurrence of depression and substance use. Hence, in this study too depressive symptoms (sleep disturbance, feeling of tiredness, unhappiness or sadness, hopelessness, nervousness or tense, or worried) of the individuals were explored. Notable depression but not up to clinical level, was found in 5.5 % of students as against 15 % in the United States (Choi et al, 1997). Given Bhutan's slower pace of life when compared to that of the United States, this finding may ring true.

Students do face some stress from personal and family matters. However, stress

levels in the students were less than half the possible level. Significant association was also found between the stress level in students and the English education status of their parents. Children of parents who could “read and write fluently in English” had far less amount of stress than the children of parents who are not English-educated. Does that mean that English-educated families have more harmonious family life that gives less stress to their children? Or, is it because the education system in Bhutan uses English medium and the children of English-educated parents perform better at school and have less personal stress? It may also be that the English-educated parents earn better so that their children are not bothered by financial stress in the family. However, the stress level has no significant association with doma use by the students.

Although it was expected that there would be a significant difference in the preference of the type of betel nut preparation among different cultural groups, this hypothesis had to be rejected as such difference was not seen.

It may be recalled that there were significant differences in the preferences of the type of doma products and place of chewing between boys and girls. This may show that girls did wish to be too open about their use of doma. When at home, friends' houses or at school, they were among known friends and supari did not reveal too much of itself in the mouth.

One of the most important factors that influence doma chewing habit in students was the presence of role models around them

creating an environment conducive to doma use.

At home students see their parents and older siblings using doma, at school they see close male and female friends and the teachers taking doma. The higher the number of role models around them, the more likely was an individual student's tendency to use the stuff. This positive association was highly significant and was quite similar to the observation by Wang et al (2003) in their betel nut studies in Taiwan. Although they have used only parents as role models, they have observed “a significant difference between the behavior of their parent and the prevalence in adolescence of betel nut chewing”.

Tobacco use among these student group had a peculiarity in the sense that smoking was positively associated with education, which was also found by wider studies conducted by the Ministry of Health in 2001. The present study also observed that mixed forms of tobacco use (smoking and chewing tobacco by the same person) is more popular among males.

Like the findings in Taiwan studies, the association between tobacco use especially the chewing habit - and doma use by students was also significant. All tobacco chewers (100%) and all those who chewed tobacco and smoked (100%) were also doma chewers and 76% of smokers were again doma users. In case of Taiwan, Wang et al (2003) found that “there was a high percentage of betel nut chewing adolescent students with the related habits of smoking and drinking”.

In short ...

This study revealed that 59% of students in Thimphu were doma chewing with habit slightly more among girls than boys. The presence of doma chewers as role models around children formed an environment conducive to doma chewing in the students. The use of tobacco comes next although whether it is the tobacco use that affects the betel nut use or whether it is vice versa remains to be further explored.

It was seen that students get introduced to doma even before they attain 7 years of age and that 31.5 % of the students chewed doma before they reached the age of 12 years. As per the findings, the majority of students get introduced to doma in the ages ranging from 12 to 15. In view of these findings, prevention programs could target students in the primary schools so that many of them can be prevented from starting the habit. The intervention programs should basically try to minimize the influences of the social environment and control the doma use at home. It may be recalled here that more than 60 % of students chew doma while at home.



As the study indicated that a high percentage of students actually tried to stop chewing doma, future studies could go further and explore the reasons for this effort as occurrence of health problems due to doma chewing may not be so obvious to this group. This will be useful in formulating intervention programs for the future.

And finally, broader surveys could be conducted to look at the doma chewing situation in all adult population in the country no matter whether they are students, dropouts, or non-educated villagers with special attention to the difference in doma chewing practice between genders. Outside of the health jurisdiction, it may also be interesting to explore why children of parents who are not English-educated score more in the negative life events (stress) score.

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HIV/AIDS and Bhutan

The Royal Government of Bhutan anticipating the inevitable entry of HIV in the country established the STD/AIDS Control Program as early as 1988 to coordinate prevention efforts. It was only five years later, in 1993, that the first two cases of HIV in the country were detected. Today, HIV/AIDS prevention, treatment and control efforts are closely guided by the National HIV/AIDS Commission, which was reconstituted from the former National AIDS Committee of 1993.

Bhutan is fortunate that the prevention and control of HIV/AIDS enjoys a strong political commitment. A glaring testimony of the high level of support that HIV/AIDS receives is the His Majesty the King's Royal edict issued in May 2004 commanding for the concerted response of citizens in prevention efforts for HIV/AIDS and the rightful provision of support and care to people living with HIV/AIDS.

By January 2006, the cumulative total detected HIV positive cases had reached 79. Among these 19 people have died, 17 of them due to AIDS related illnesses. Although the numbers in themselves are not disquieting, a retrospective analysis of people who had died

due to AIDS showed that over 76% (13) of them had died within two years after the detection of infection. Since it is known that without any treatment, the average life span after HIV infection is about 8 years in our region, we can assume that these people had remained undetected for an average of 6.6 years which also means that there are probably many more people who are infected but remains undetected yet.

Profile of HIV/AIDS infected people

Unlike in many other countries HIV infection where HIV was initially predominantly found among high risk groups such as sex workers, Injecting Drug Users or other marginalized groups such as prisoners, in Bhutan the infection is sporadically prevalent among almost all occupational groups and not restricted to any particular one. Judging from the profiles of those who have already been identified as HIV positive, it is impossible to say which geographical regions of the country or which occupational or demographic groups of people are most affected since they have been identified from almost all over the country and more or less represents all groups.

Table 1: Number of HIV cases detected through different modalities

	Approach	Cases detected
1	Medical check up/Medical screening	18
2.	Blood Donor Screening	09
3	Surveillance	21
4	Voluntary Testing	05
5	Contact tracing	19
6	Vertical Transmission	07
	TOTAL	79

The first HIV case in Bhutan was detected from medical screening on clinical suspicion. Contact tracing, blood donor screening, surveillance and voluntary testing are other methods through which HIV cases have been detected in the country.

In the case of 71 of the infected adults the virus was found to have been acquired through unprotected heterosexual intercourse. No formal studies or assessments have been carried out in Bhutan to study the prevalence of homosexual activity or Men having Sex with Men (MSM). The second common mode of HIV transmission in Bhutan is through the mother to the child. Currently there are seven children who have acquired the infection through this route.

Of the total people found to have been infected by HIV, 38 are females (including seven children who have been infected through mother to child transmission) and 41 males. Gender dynamics plays an important role in the spread of HIV infection. Biologically, it is much easier for a woman to contract HIV from sexual contact with a man than it is for a man with a woman. Lack of power for condom negotiation in females and early initiation of sexual activity in girls may also put females at a higher risk.

Youth and HIV/AIDS

88% of the infected cases fall in the age range of 20 to 49 years, the economically productive group. Most of our infected cases are also from the lower income group of people. 36% of HIV cases in Bhutan are young people in the age range of 15-24 years. This shows that

the youth of Bhutan are vulnerable. Increasing youth unemployment and youth becoming sexually active at an early age may increase their vulnerability. An Exploratory Study on Knowledge Attitude and Behavior towards HIV/AIDS among Out of School Youth in 2004-05 revealed that both genders were exposed to multiple sexual partners ranging from single partner to 8 partners within the previous three months. Condom use during last sexual encounter was found to be about 60% for both genders. Early sexual debut in young people would mean likelihood of more sexual partners in their life time. Low condom use would put them at higher risk of exposure to STI and HIV infections.

A study in high school reported high awareness among Bhutanese young people but detailed knowledge of the disease was often lacking. In one study among High school students found that 48% of students believed that HIV could be transmitted by mosquito bites, and 69 % believed HIV was curable if treated early. And 76 % felt that HIV/AIDS could be isolated to avoid spreading of infection. There were also high levels of possible stigmatization with 76% believing that People living with HIV/AIDS should be isolated to avoid the spread of HIV/AIDS. This means that although awareness is high, there is a lack of access to correct information of HIV/AIDS.

Considering that over 35% of the Bhutanese population are under 15-24 years of age, an intensification of youth targeted HIV/AIDS programs are required.

Stigma, Discrimination and HIV/AIDS

Stigma and discrimination surrounding HIV/AIDS is a common problem. A study conducted in Thimphu with 638 university graduates in 2005 found that 8.6% of them strongly felt that PLWHA should be incarcerated, 22.6% felt PLWHA should be made known to every one and isolated, 30.4% felt discomfort in attending puja at a home of HIV infected people and 4.5 % said they would refuse an invitation from HIV infected person and not attend a puja at all at a home of HIV infected person. Considering that this cohort was the educated lot, stigmatization of PLWHA could be very high amongst the general population of Bhutan.

There are also instances of healthy PLWHA leaving their profession and work place to avoid being disclosed as being HIV/AIDS positive. There are reports of fear and discomfort expressed even among health care workers in dealing with PLWHA.

Care for the care givers is a necessity, but should not be used as an excuse for indirectly discriminating PLWHA. Studies in many countries have documented prevalence of heavy discrimination of PLWHA among health institutions and health care professionals. Our health care professionals must be educated better on stigma and discrimination in HIV/AIDS as it is more often born of ignorance.

A study carried out in 2003 with Bhutanese “People Living with HIV/AIDS” (PLWHA) to understand difficulties and challenges faced by them and their families, found that they lived in

constant fear of being identified and discriminated against. They anticipate that their family, particularly their spouses and children, would be looked down upon if their HIV status becomes known. Today, many of PLWHA have disclosed their HIV/AIDS positive status to their spouses only. Very few have been able to talk about it even to close family members.

STIs and HIV/AIDS

Presence of Sexually Transmitted Infections (STIs) in a community is indicative of prevailing unprotected sexual behavior in the community and is an early marker for possible HIV transmission. STIs increase the risk of HIV transmission by at least two to five times. If untreated, they not only increase the infectivity of HIV positive individuals but also make those uninfected people more susceptible to infection. STIs appear to be widespread in the Bhutan with pockets of high prevalence in some areas and this is seen as a cause for concern in terms of risk of HIV/AIDS in Bhutan. There is a drop of STI cases from 5035 in 2002 to 2253 in 2005 according to the morbidity reports of the health care facilities. This figure is still considered as substantial and STI cases must be brought down.

Sex Work in Bhutan

The scale of commercial sex work in Bhutan is not very well understood or documented and the absence of the established brothels or an organized sex industry in the country makes it difficult to assess the extent of commercial sex workers in the country.

However, there is some evidence of “increasing” sex work in towns like Phuntsholing. A focus group discussion of key informants with six sex workers found that there were about 50 sex workers including one Bhutanese, operating in Phuntsholing at that time. Most of the sex workers came from across the border. The focus group discussion also revealed that there was inadequate knowledge on HIV/AIDS and STIs among the sex workers. Many of them thought that HIV was not transmitted through anal or oral sex and that family planning pills protected them from STIs and HIV/AIDS. Risk perception and vulnerability among the sex workers were also poor. All respondents reported having had unprotected sex with regular clients. All of them also reported having had sex without condoms in the past one month.

Regarding the number of clients in a day, the sex workers reported having as many as 7 clients a day and that almost half their clients were Bhutanese coming from various societal and occupational backgrounds. They also said that while many clients used condoms there were also a sizable number of clients who did not want to or refused to use condoms. Instances of condom breakage were also reported which may indicate that there is inadequate knowledge on proper condom use.

The discussions revealed that the sex workers lived in constant fear of harassment from the police on both sides of the border and that it was one reason they found it difficult to visit hospitals to seek treatment, collect condoms and avail testing services.

The clients of the sex workers continue to be at a great risk of acquiring HIV infection. A study among the infected Bhutanese showed that 28 of them believed that they had been infected after having had sex with sex workers outside Bhutan. From 2000 to 2004, seven sex workers were detected with HIV infection through an out reach program in Phuntsholing. Among them 2 were Bhutanese sex workers. The presence of HIV infection among the sex workers is a serious concern.

An assessment of sex work in other urban settings is required especially in larger towns such as Thimphu and Paro.

Universal Access to Comprehensive Treatment and Care

An important milestone in the Royal Government's response to the HIV/AIDS epidemic has been the introduction of Antiretroviral Treatment (ART) which has been made available to infected people free of cost. ART can dramatically reduce morbidity and mortality of infected people. The treatment and care is being decentralized and integrated within the normal health care delivery system.

The introduction of ART, however, poses a number of challenges. ART requires long term care through which individual patients receive continuous follow up treatment for the remainder of their lives. Additionally, although the cost of ARV has reduced considerably, there still is a huge cost implication considering long treatment duration and the added cost of treatment for opportunistic infections and laboratory services. As of now six people are on the ARV treatment in the country since the

treatment services were initiated in 2005.

Transmission of HIV from a mother to child can occur during pregnancy, delivery and after delivery through breast milk of the infected mother. The most effective ways to prevent infection in infants and young children are to prevent HIV infection in women and to prevent unintended pregnancies in HIV infected women. Other additional interventions are ARV prophylaxis in combination of safe delivery practices. The Royal Government has adopted the prevention of mother-to-child transmission (PMTCT) as an integral part of the HIV/AIDS prevention and control efforts.

Emerging HIV/TB co-infection

One emerging challenge is the problem of HIV/TB co-infection. The HIV epidemic can fuel the spread of TB infection as HIV drastically reduces the immune system of people and threatens to reverse the success of TB control activities in the country. Tuberculosis is one of the leading opportunistic infections and the leading cause of deaths among the HIV infected people in Bhutan. Five deaths among the HIV infected people were due to TB and four PLWHA are being treated for tuberculosis.

In order to control both diseases, TB/HIV collaborative activities have been planned and implemented. Future strategic programming and integration of these two programs will be strengthened.

Promoting HIV testing seeking behavior through VCT

Generally, HIV testing among the community is very low. In order to encourage

people to voluntarily seek counseling and HIV testing a “voluntary counseling and testing” (VCT) strategy was adopted in 2005. VCT offers pre test and post test counseling while providing confidentiality to the clients. Studies elsewhere have shown that people who test for HIV/AIDS with counseling tend to reduce risk behaviors. VCT is foreseen to become a routine part of health care and will assist in delivering behaviorally sensitive intervention for clients of STIs, pregnant women, TB patients, voluntary testers.

Conclusion

Effectively tackling HIV/AIDS is the world's most urgent public health challenge. Bhutan fortunately can learn lessons on which works best for HIV prevention. Implementation of treatment programs to make it universally accessible and comprehensive have been initiated. However, the onus is upon each and every individual of the country to make these programs a success.

Addressing the challenges of preventing, controlling and treatment of HIV/AIDS remains a high priority in the country and also enjoys strong political commitment. The main strategy will be on focusing on prevention through services such as condom promotion, increasing IEC strengthening of counseling, comprehensive support; provision of treatment to those already infected; institutional strengthening, especially in terms of human resources; and on carrying out targeted interventions for population at risk.

MALARIA SITUATION IN BHUTAN

From 1965 to 1989, Bhutan has witnessed dramatic changes in malaria morbidity and mortality (see table 1). The Annual Blood Smear Examination Rate (ABER) during the last two decades was more than the minimum prescribed level of 10%, (ranging from 6.4% to 53.9%). During the same period the Annual Parasite Incidence rate (API) was between 1.5 to 140.0. The Slide Positivity Rate (SPR) ranged from 2% to 30% and *Plasmodium*

falciparum (Pf) over the 15 year period ranged from 11% to 60%.

After the initiation of the Malaria Control program, the situation initially got worse and the BSC increased 7 folds indicating increased number of fever cases screened. The SPR increased 5 to 6 folds and API increased to as high as 140 indicating high transmission. Pf % increased by 2-3 folds.

Table 1: Malaria Incidence in Bhutan from 1965 to 1989

YEAR	BSC	T+VE	T.PF	ABER	API	SPR	PF%
1965	10189	518	85	11.0	5.5	5.1	20.1
1966	7148	114	20	7.1	1.5	2.0	15.5
1967	15329	405	41	7.6	2.0	2.6	11.2
1968	12913	247	26	6.4	1.2	1.9	12.3
1969	25531	672	181	12.4	3.1	2.6	28.8
1970	30886	630	147	14.0	2.9	2.0	24.5
1971	31369	720	155	14.2	3.3	2.3	22.3
1972	38703	1376	337	16.2	5.7	3.6	25.3
1973	47909	3402	1221	21.5	15.2	7.1	37.3
1974	47874	4623	2193	21.3	20.5	9.6	48.4
1975	48170	7929	4459	20.7	33.0	16.5	56.9
1976	47699	8035	4271	31.3	50.6	16.9	53.0
1977	33619	3328	1597	29.0	27.5	9.9	48.0
1978	39518	3483	1474	30.3	28.7	8.8	42.0
1979	41079	5375	3172	43.2	44.3	13.1	59.0
1980	45487	3933	2145	41.5	45.9	8.7	55.7
1981	48361	4522	2722	35.0	32.7	9.4	60.4
1982	51939	6328	3043	34.8	42.4	12.2	48.2
1983	42633	5213	3072	32.6	39.3	12.2	59.0
1984	62667	18368	10147	48.0	140.0	29.3	55.9
1985	31763	7043	3951	24.3	53.9	22.2	56.3
1986	82639	19916	10361	52.5	126.4	24.1	52.0
1987	69029	13134	6174	53.9	120.7	19.0	47.3
1988	51164	11134	5169	44.6	97.2	21.7	46.8
1989	71653	19162	8429	20.4	54.7	27.0	43.9

Note: BSC=Blood slide Collection, T+VE= Total Positive for Malaria, TPf= Total Positivem for Plasmodium falciparum; ABER= Annual Blood Examination Rate, API=Annual Parasite Incidence, SPR= Slide Positivity Rate, Pf=*Plasmodium falciparum*

Over the next 14 year period from 1990 to 2005, the ABER was maintained way above the 10% minimum prescribed level, between 16.6 and 27.8, indicating consistency in case detection. A reason for concern to the program, however, is the increase in Pf rate observation over the same period from 31.5% to 59.3% with the lowest of 31.5% recorded in 1995 (see table 2). ABER in 2003 was 17.

The malaria situation started to get worse again from 1990 onwards to 1994 with API increasing from 53.6 and reaching its peak at 111.1 and SPR increased from 28 to 40% in 1994. The PF % was between 42% to 60% in 1990 to 1994. In 1991 the first line treatment for malaria was changed to SP Compound and, as a result of this change to an effective drug regimen, the Pf showed some decline.

However, API and SPR further increased indicating that intense transmission was taking place.

The Pf reduced from 60% in 1991 to 32% in 1995 before starting to increase and reaching 50% in 1999. Following this spurt in API and SPR in 1995 the vector control strategy was changed and two rounds of Indoor Residual spraying with Deltamethrine at six months interval was introduced to cover all endemic districts. This was continued for another three years as a result of this strategy the API showed marked improvement between 1995 and 1998 declining from 111.1 in 1994 to 20 in 1998. SPR also declined from 40 in 1994 to 12 in 1998 (see table 2).

From 1998 onwards the Indoor Residual Spray was phased out and replaced by

“Insecticide Treated Bed Net” (ITBN) program. However, in 1999 the situation once again started to get worse; API and SPR increased and Pf reached 51% indicating that vector control strategy was not adequate enough to cover the populations at risk. In 1999 the first line treatment for Pf malaria was also changed to Artesunate combination therapy (ACT).

From 1999 onwards there has been steady increase in the population using ITBN as a result of which API and SPR reduced by 50% in 2002 as compared to 1999. The only concern was that in spite of using the ACT, Pf remained about 54% even in 2002. Therefore in 2003 focal Indoor Residual Spray (IRS) was carried out in high Pf areas in the endemic areas and this led to further decline in API and SPR. The blood slide collection in the health centers

declined which indicated that the strategy of reducing transmission through the integrated use of IRS, up scaled ITBN and vector control strategies through weekly larviciding and environmental management methods was indeed effective. In 2004 there was improved API, SPR and even some decline in Pf. However ABER was below 10%.

Malaria case load trend

Malaria caseload increased drastically from 9497 positive cases in 1990 to 38901 cases in 1994. However, in 1999 the positive caseload again decreased to 12591. Since then, there was a steady decline to 2670 positive cases in 2004. Taking 1994 as the base year, the overall case reduction rate over the years has seen decline of 40% in 1995 to decline by 93% in 2004.

Malaria in the Global Context.

Background

Malaria has been known since time immemorial as a life-threatening disease. It was then thought that bad air or gas from the swamps caused this dreaded disease. To counter the disease, effective treatment such as Artemesia annua has been in use in China for the last 2000 years. The bitter bark of Cinchona ledgeriana was known to be used in Peru even before the 15th century. Similarly protective measures against mosquitoes have been used although people were unaware of the origin of malaria and its transmission mode. The people in the swampy region in Egypt were

known to be sleeping in tower-like structures to keep out the mosquitoes. And sleeping under nets is recorded as early as 450 B.C.

The cause of malaria was discovered by Laveran in 1889 for which he received the Nobel Prize for medicine in 1907. The control of malaria started after this discovery and demonstration by Ross in 1897 that the parasite is transmitted from person to person through the bite of mosquito.

Malaria was a significant cause of illness and death across the globe until about 50 years ago. Today the disease is generally accepted to be eradicated from temperate environment but

the recent outbreak in DPR Korea is an exception. In the tropical regions like Africa, Central and South America, tropical Asia, and parts of the Middle East, the disease is still reported in alarming proportions. Malaria is currently endemic in these 91 countries and sporadic malaria transmissions are reported from another eight countries.

Malaria no doubt is a dreaded disease but it is at the same time curable and preventable.

Malaria is caused by parasite known as Plasmodium. There are as many as four species of Plasmodium and Plasmodium falciparum is the most dangerous one as it can cause death within twenty-four hours of infection if untreated.

Today one fifth of the world's population is at risk of malaria. Approximately 300-500 million clinical cases are reported every year. This is around five times more than the clinical cases reported from TB, AIDS, measles and leprosy combined. Between 1 and 1.5 million people die from it every year. This is despite being able to confine malaria only in the regions of Africa, Asia and Latin America. The problems of controlling malaria in these regions are aggravated by inadequate health structures and poor socioeconomic conditions. The situation has become even more complex over the last few years with the increase in resistance to the drugs, which normally used to cure the disease.

Table 2: Malaria Incidence in Bhutan from 1990 to 2004

YEAR	BSC	T.+VE	T.PF	ABER	API	SPR	Pf%
1990	33973	9497	4126	19.2	53.6	27.9	43.5
1991	67699	22126	12966	19.3	63.2	32.7	59.3
1992	73986	28900	13910	21.1	82.6	39.0	48.7
1993	80980	28392	12779	23.1	81.1	35.0	45.9
1994	97425	38901	15998	27.8	111.1	39.9	42.3
1995	83899	23195	7326	23.9	66.2	27.6	31.5
1996	76019	15696	6026	21.7	44.8	20.0	38.3
1997	68153	9029	3614	19.4	25.8	13.2	40.0
1998	58086	6995	3403	16.6	19.9	12.0	49.0
1999	79589	12591	6380	22.7	35.9	15.8	51.0
2000	76445	5935	2507	21.8	16.9	8	46
2001	56974	5982	3177	18	17	9	53
2002	74696	6511	3496	20	18	9	54
2003	61246	3806	1518	17	7.2	6	44
2004	54892	2670	1094	7	4	5	41

Of the 1-1.5 million deaths, 80-90% of malarial deaths occur in tropical Africa and most of them among young children. In fact, malaria is the single biggest infectious cause of death in African children. Malaria accounts for 10% to 30% of all hospital admissions and is responsible for 15% to 25% of all deaths of children under the age of five. This accounts to around 800,000 children deaths.

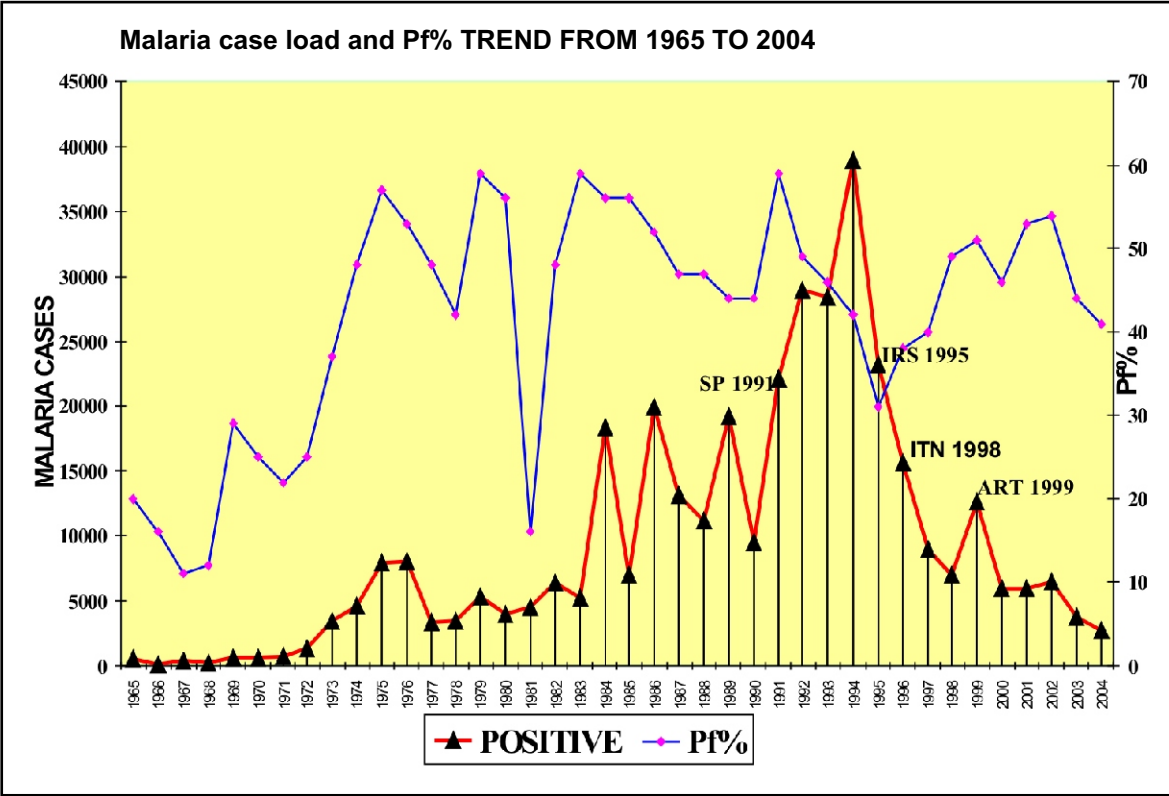
Cerebral malaria caused by *Plasmodium falciparum* accounts for over 500,000 African children developing cerebral malaria annually. 10 to 20% of these die and approximately 7% are left with permanent neurological damage.

Malaria is also the major cause of anemia in many parts of the world. Chronic anemia may adversely affect a child's growth and

intellectual development. Repeated episodes of malaria may lead to severe, life threatening anemia.

Malaria is also a huge burden to the economy of the country. It is estimated that a single bout of malaria cost a sum equivalent to over 10 working days in Africa. The cost of treatment is between US\$ 0.08 and US\$ 5.30. In 1987, the total cost of treating malaria and work loss contributed to around US\$ 800 million for tropical Africa and this figure is currently estimated to be more than US\$ 1.8 million.

In addition to the human toll, malaria is considered by health economists to be one of the four most common causes of poverty. People exposed to the infection may spend as much as 25% of their household income on malaria-related expenses.



The distribution of malaria varies greatly from country to country and within the countries themselves. In 1990, 75% of all recorded cases outside of Africa were concentrated in nine countries: India, Brazil, Afghanistan, Sri Lanka, Thailand, Indonesia, Vietnam, Cambodia, and China.

Malaria Situation in the SEARO Region

Malaria is a major public health problem in the South-East Asia Region. The disease remains endemic in ten countries of the South East Asia Region. The 11th Maldives was declared malaria free in 1984.

Over 22 million illnesses are reported every year, which results in nearly 40,000 deaths. Although these figures are small when compared with Africa estimates, the disease is

an important cause of continuing poverty because of decreased productivity and high treatment costs.

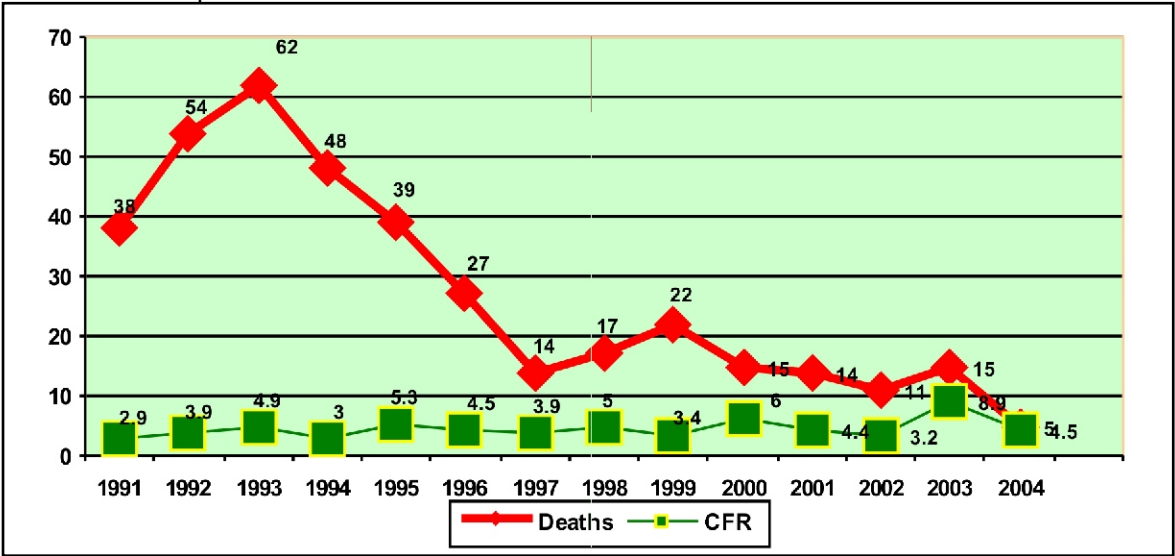
The geographic range and overall incidence of *Plasmodium falciparum* is steadily increasing and the problem of multi-drug resistance in this parasite is more severe than in any other part of the world.

The resources available for malaria control are insufficient in nearly all countries; political commitment to malaria control is inconsistent, and the numbers of staff knowledgeable and experience in control activities are diminishing in all countries of the region.

Malaria in the region accounts for approximately 30% of the globally reported morbidity and around 5% of the global mortality.

Malaria Deaths

Although there has been a significant reduction in the malaria caseload, case fatality seems to be on the rise since 1994. In 1994 there were 48 reported deaths due to malaria and the mortality related to malaria was 22 in 1999 and further reduced to 5 in 2004. Though the mortality numbers seem to be constant over the last five years the falciparum specific case fatality rate per 1000 in 1994 was 3 and in 2004 it was 4.6 which indicates that there are still more room for improvement.



Trends of malaria infection

Plasmodium falciparum and Plasmodium vivax are prevalent in Bhutan. Pf has remained above 30% since 1973 and has been between 30% and 60%. Whenever the first line treatment was changed the Pf had shown slight reduction as in 1991 when SP compound was introduced and after 1999 when ACT was started. Pf was 41% in 2004.

The total figure of caseload detection is well marked in the five endemic Dzongkhags,

viz. Sarpang, Samdrup Jongkhagr, Samtse, Chukha and Zhemgang. Amongst the five Dzongkhags where malaria is endemic, Sarpang Dzongkhag has the highest number of cases followed by Samdrup Jongkhar, Samtse, Chukha and Zhemgang.

Over the last five years it has been observed that the age group of “15 years to

49 years” are most affected (about 56%-60%), followed by age group between “5 years to 14 years” (about 24%-27%). The “above 50 years” age group contributes 9%-12% and about 6% of malaria morbidity is contributed by the “1 year to 5 years” age group and only about 1% is contributed by “under 1 year” age group.

Table 3: malaria caseloads in five endemic Dzongkhags from 2000 to 2004

Dzongkhag	2000	2001	2002	2003	2004
Sarpang	43	51	49	36	34
S/Jongkhar	34	26	23	18	14
Samtse 8	14	17	28	38	
Chukha 4	3	5	12	7	
Zhemgang	5	2	1	1	1
Other dzongkhags	6	4	5	5	6

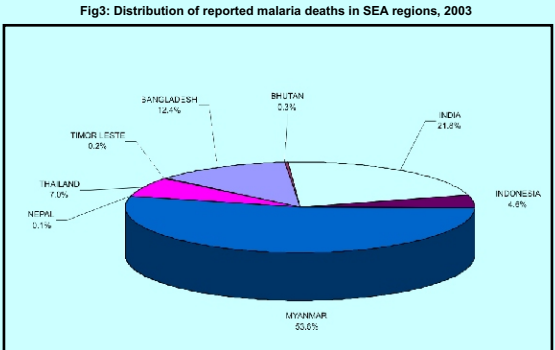
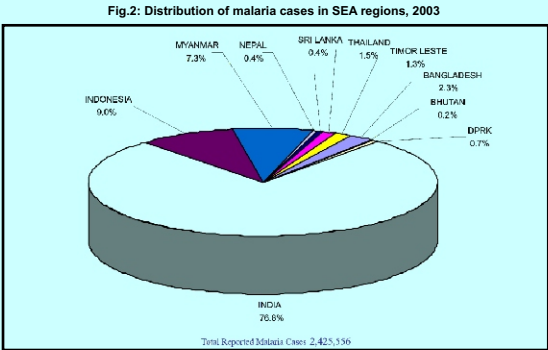
Malaria in different age and sex groups.

Age wise & Sex wise malaria cases 2000-2004

Year	2000			2001			2002			2003			2004		
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
< 1	41	32	73	19	24	43	17	16	33	15	10	25	12	0	12
1-4	273	213	486	214	146	360	227	239	466	120	94	214	85	66	151
5-14	860	648	1508	874	692	1566	1060	715	1775	580	367	947	357	292	649
15-49	2121	1205	3326	2136	1266	3402	2255	1379	3634	1315	949	2264	1000	552	1552
>50	367	175	542	411	200	611	395	208	603	280	76	356	192	114	306
Sub. Total	3662	2273	5935	3654	2328	5982	3954	2557	6511	2310	1496	3806	1646	1024	2670

Around 83.5% of the total population of SEA regions is at risk of malaria. Frequent epidemics are being observed by member

countries. However Bangladesh, Bhutan, Nepal and Sri Lanka have not reported any major epidemic.



Border malaria in 2003 and 2004

Malaria cases from across the border from four bordering Districts

Dzongkhag	2003			2004		
	National cases	Non-national cases	Non-national %	National cases	Non-national cases	Non-national %
Sarpang	1362	515	27%	912	155	15%
Sijongkhar	386	5	1.0%	374	1	0.2%
Samtse	1078	18	2%	1018	9	0.8%
Chukha	476	71	13%	191	12	6%
Total -	3566	609	17%	2493	177	7%

The endemic Dzongkhags share borders with India. In 2003 Sarpang Dzongkhag has the highest percentage of non-national patients (27%) from across the border followed by Chukha Dzongkhag with 13% of malaria patients from India. Samtse Dzongkhag had only 2% and Samdrup Jongkhar had 1% from across the border. In 2004 the national cases and the non-national cases had proportionately gone down indicating that as cases go up on the other side of the border it reduces proportionately on this side of the border.

Issues and challenges ahead

- Community participants and inter-sector collaboration is weak and needs to be further strengthened for vector control activities without their active participation vector control would be nearly impossible.
- Environmental management (manipulation and modification) also needs further strengthening. It is expensive and donor support is needed to support dzongkhags.
- Technical capacity in the program is poor, especially in research, entomology and drug research capacity. Reliance on the outside consultancy is very high.
- Developmental process in the various other ministries like agriculture (fishery, Irrigation), Hydroelectric power resources, Trade and Industries, Works and Housing are creating an environment conducive for disease vectors proliferation. Vector control strategy for man-made breeding places needs to be in place.

REVIEW OF MORTALITY REPORT 2005

Vital statistics is critical for any system. In Bhutan mortality reporting started as early as 1985 through village and community leaders. However the system did not pick up as expected because there was periodic changes of leaders at the community level. Currently there are three system of mortality reporting;

- Inpatient death is reported through the routing reporting system.
- Maternal Death is reported separately and reviewed by a committee to give immediate feedbacks.
- Certification of death was started in 2000 whereby all death needs to be reported. This certification of death is a form of verbal autopsy. In Bhutan this was tied with the life insurance scheme. Certificates are issued by all the health centers.

I. Mortality through Routine Reporting

The health facilities have the system of submitting monthly morbidity report to the District Health Supervisory Officer which has the provision of disease wise death reporting. The information received from this source is the deaths that have taken place in the hospitals or BHUs. Therefore the causes of death if not accurate would be the most realistic one. This reporting definitely will not cover the deaths in the entire country.

The leading cause of death is Alcohol Liver Diseases followed by Other Circulatory Disease, Neonatal death, pneumonia and cancers. The total deaths reported for the year 2005 is 771 out of which 92 deaths (13% of total death) are Alcohol liver Diseases. Since 2003 Alcoholic Liver Diseases has been the top killer. This may be probably because alcohol drinking is very much ingrained in the Bhutanese society.

Table : Major Causes for Inpatient Deaths

Disease Code	Disease_name	No. of cases	%
K70*	Alcohol Liver Diseases	92	13.07
I26*	Other Circulatory Diseases	77	10.94
P96*	Neonatal Death	52	7.39
J12*	Pneumonia	44	6.25
C69*	Other Cancers	40	5.68
K10*	Other Diseases of the Digestive System	34	4.83
J01*	Other Respiratory & Nose Diseases	31	4.40
A15*	Tuberculosis	29	4.12

G00*	Meningitis/Encephalitis	24	3.41
P00*	Conditions Originating in the Perinatal Period	24	3.41
N00*	Other Kidney, UT/ Genital Disorders	22	3.13
I10*	Hypertension	20	2.84
I60*	Cerebro-vascular Diseases	20	2.84
A05*	Other Infections (excluding ear, brain, STI)	15	2.13
I00*	Rheumatic Heart Disease	15	2.13
S00*	Injuries & Poisoning	14	1.99
V01*	Transport Accidents	14	1.99
P95*	Foetal Death & Stillbirth	10	1.42
W00*	Other External Causes of Injury	10	1.42
E10*	Diabetes	8	1.14
I20*	Ischaemic Heart Diseases	7	0.99

II Deaths Reported through Death Certificate

Death Certificate Reporting has been irregular since its inception. Therefore death reporting is incomplete. In 2005 only 10 Districts have reported which also seems to be underreported. The total death reported was 576. The remaining 10 districts have not submitted any death reports from the year 2005.

The Death Certificate was introduced in the beginning of the year 2000 at two levels i.e. Hospital level and BHU level. It was made mandatory to certify all deaths that occur in the health facilities or at home by the respective health staff in their operational area and submit a copy of the death certificate to the Health Ministry. Though the death reporting system has attained more than five years since the inception, the system has not shown significant momentum for timely reporting, completeness of information & accuracy in

specifying cause of death.

The information on cause of death gathered through the death certificates may not be very precise and accurate, since most of the deaths take place at home and the relatives come to health facilities lately to obtain death certificate to produce evidence of death for claiming life insurance. Nevertheless the health workers who issue death certificate tries his/her best to capture the history, sign and symptoms of illness to find out the possible cause death.

Situation

Among the reported cases, major causes of death beside Unknown, Old Age and Others are Cardiovascular disease which tops the rank with 18.75% followed by, Cirrhosis of liver 7.81%, COPD/Br. Asthma 6.94%, Malignancies 6.77%, Injuries 4.51%, Diarrhoea & Dysentery 4%, Tuberculosis 2.60%, Road traffic accident 2.43% (Note: Unknown and Old Age are

excluded from the denominator).

It is observed that significant number of reports particularly in BHU level reporting, the cause of death is mentioned as old age, which

comprises of 5.90% of the 576 reported cases. Other common cause of death reported in BHU Level Form is Unknown, which comprises of 22 % of the 576 reported cases.

Dzongkhag wise reported cause of Death for 2005

Cause of Death	Lhuntse	Mongar	Paro	Punakha	S. Jongkhar	Samtse	Sarpang	Thimphu	Trashigang	Tsirang	Total deaths	Percentage
Cardiovascular disorder	5	6	25		3		10	1	54	4	108	18.75
Cirrhosis of liver	10	7	6		2	1	2		16	1	45	7.81
COPD/Br. Asthma	5	3	9		3	1	7		12		40	6.94
Malignancies	4	5	10		2	1	5		9	3	39	6.77
Injuries	3	7	1			2	3		9	1	26	4.51
Tuberculosis	2		5				1		6	1	15	2.60
RTA	1	1			3		3		6		14	2.43
Encephalopathy/Epilepsy		2			2	1	3		5		13	2.26
Diarrhoea and Dysentery	1		5			1			3		10	1.74
Renal failure	1	1	5				1		1		9	1.56
L. Resp. Tract Infection	1		1			2	3		1		8	1.39
Septicemia		1					5				6	1.04
Maternal Death		1					1		2		4	0.69
Malaria							3				3	0.52
Sucide		1	1			1					3	0.52
Diabetes							1			1	2	0.35
Animal bites			1								1	0.17
Nutritional Deficiency									1		1	0.17
Perinatal Condition			1								1	0.17
Prematurity							1				1	0.17
Unknown	34	28	6		10	1	11	1	63	1	155	26.91
Others	1	4	5		1		16	1	9	1	38	6.60
Old Age	5	4	12	1		1	2		9		34	5.90
Total	73	71	93	1	26	12	78	3	206	13	576	100

Further enhancement

In order to ensure timely flow of mortality data from the periphery, the Health Department should monitor and remind the DMO/DHSO regularly about it. It may be included in the existing HMIS, which can be compiled at Dzongkhag level and submitted to the Health Department in a standard format at routine interval. If need be, software can be developed and given to the Dzongkhags so the health authority at Dzongkhag level can analyze and also use the data for Dzongkhag level health planning. The department should also identify the priority disease and short list, so that important cause of death can get special focus so that the causes of death as old age & unknown will not take the leading cause death and as well during the process of compilation it will not be omitted or merged with others.

While going through the entire exercise of compilation of the records, it is observed that very often, many of the important information like age, sex etc. asked in the format are not filled. The mortality report from the ten dzongkhags, namely Bumthang, Haa, Gasa, Zhemgang, Pemagatshel, Dagana and Wangdue, Chukha, Trashigang and Yangtse and

Trongsa are not available for compilation. This clearly indicates that there is lack of coordination and understanding among the stakeholders.

Recommendations:

1. Old age is not a cause of death. Patient dies of some medical conditions even in old age. Hence all BHU and hospital level should give the underlying cause of death.
2. The health workers should derive maximum information from the relative of the deceased and reflect in the death form when a diagnosis cannot be made. This information can be utilized by the analyst in deriving a diagnosis at the time of analysis.
3. Cause of deaths, as unknown should not be reported. This may be done only under rare circumstances when no information is available at all.
4. Cause of death, as Cardio-pulmonary arrest should not be reported as all deaths ultimately occur following cardiac or pulmonary arrest.
5. All hospital and BHU should report death without fail. This is an important indicator in planning health activities both at local as well as national level.

Review of Maternal Death

Introduction

Death during pregnancy or due to complications related to pregnancy is a very tragic event, more so because young children will be left behind without mothers leading to individual, family and social tragedies.

There has been a decline in mortality since the 1980s. However the trend in decline has remained low over the last decade and the maternal mortality ratio still remains high at 2.55 per thousand live births. Many of these deaths are preventable.

Maternal Investigation was revitalized in the country during the Annual Health conference 2001. Following the Annual Health Conference of 2001, Maternal Mortality Committee was formed to do the thorough investigation on the reported deaths from the Dzongkhags and provide feedback and recommendation to the districts. The main objective of this investigation is to know causes and factors leading to maternal deaths and to prevent avoidable deaths by instituting appropriate remedial measures. So far the committee has received and investigated a total of 85 deaths, 14 in 2001; 21 in 2002; 16 in 2003 and 29 deaths were reported within the period 2004 to April 2005. It is believed that many deaths are not recorded, especially those occurring in the remote regions.

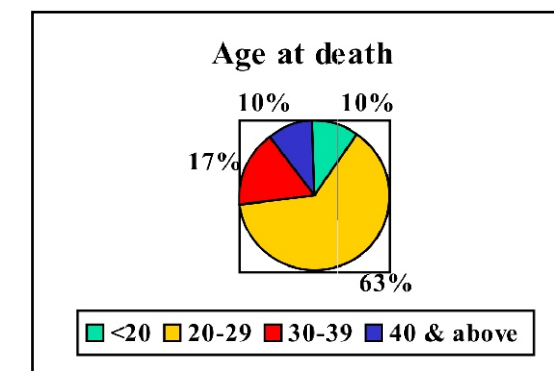
The most recent maternal deaths review was conducted in May 2005 during which the above 29 cases were reviewed. Each case was presented and discussed in detail about the

causes of deaths, events before deaths and management. Each maternal death has a story to tell and can provide indications on practical ways of addressing the problem. The lessons derived will enable health care practitioners and health planners to learn from the errors of the past and help to prevent such tragic incidences of maternal deaths in the country.

Maternal Deaths Review (2004-April 2005.)

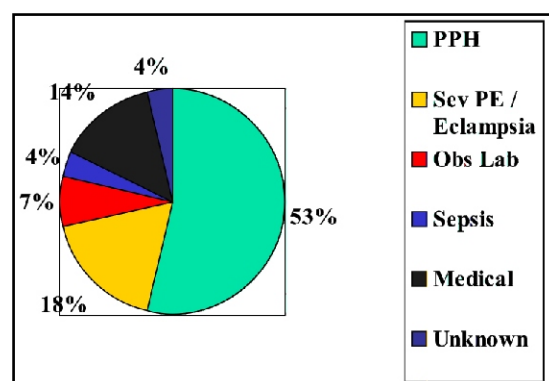
Of the 29 deaths 17 were reported in 2004. The table below gives the Dzongkhag wise distribution of the deaths. Only 12 Dzongkhags have one or more deaths reported, but this doesn't mean deaths haven't occurred in rest of the dzongkhags. A significant portion of maternal deaths in the country go unrecorded.

In 15 cases the delivery had occurred at home, majority of them conducted by untrained personnel; 50% of the deliveries were not attended by health worker. 21 of them were below the age of 30. The investigations also found that 11 of the deceased did not have adequate ANC attendance.



Dzongkhag wise distribution of maternal deaths

Thimphu	8
Samtse	4
Sarpang	3
Trongsa	3
Lheuntse	2
Tsirang	2
Chukha	2
Dagana	1
Punakha	1
Monggar	1
Paro	1
Trashigang	1



Some of the avoidable factors that contributed to the unfortunate demise of the mothers are listed down.

Avoidable factors: Mother and her immediate environment

- Lack of family planning (pregnancy out of wedlock, grand multiparas)
- No ANC or inadequate ANC (late booking, inadequate no. of visits)
- Lack of knowledge on danger signs/problems
- No birth plan

- No emergency preparedness/ complication readiness
- Long distance from health facility
- Home delivery without trained attendance
- Wrong attitude / beliefs
- Delayed decision-making

Avoidable factors: Care provider/facility

- Incomplete/Inadequate ANC
- Referring patients without stabilizing them
- Referring serious patients without a medical escort
- Delayed referral
- Insufficient follow-up of referred patients
- Lack of skills (MRP)
- Incomplete information (relevant section of the investigation form not filled up)
- ANC card not attached

Recommendations

Recommendations: Family Planning and ANC

- Strengthen Family Planning services

- Recommend TL for those with chronic med probs
- Advocacy / IEC on early and adequate ANC
- Active booking of all preg women & follow-up of defaulters
- If LMP is not known, refer for USS to date pregnancy
- Create awareness on danger signs
- Birth planning and complication readiness - integral component of ANC.

Recommendations: Delivery

- Strengthen IEC on institutional delivery
- Preg women living far away should move closer to BHU/Hosp by 37 to 38 weeks
- Admit all preg women for induction of labour at 41 weeks
- For multiple pregnancies delivery should be in hospital
- Maintain partograph/ delivery record for home deliveries attended by health personnel and keep the records at the BHU/hospital
- Monitor home deliveries at least for two hours and maintain records
- While attending obstetric emergencies, always carry essential equipments and instruments, sufficient quantities of IV fluids and Oxytocin/ Methergin Injection in the home delivery kit

Recommendations: General

- DMO or Medical Officer should investigate home maternal deaths.
- Explore mechanism for reporting and investigating maternal deaths in urban areas. In the meantime, community team in hospitals should investigate home maternal deaths.
- Conduct local Maternal Mortality Committee meeting involving community

leaders/VHWs and local health workers.

- Community level mechanism to be explored to render help during emergencies especially with regard to transport, finances & human resources.
- Attach all relevant documents with the investigation report (e.g. ANC card, partograph, and copy of all hospital records) including records of referring center i.e. BHU. Investigating person/s should ask the referring centre for records.
- Establish a living donor network to reduce delays in blood transfusions

A complete review report consisting of the findings and recommendations against each individual case was sent to all Dzongkhags/ health facilities. The sole purpose of these observations and recommendations is to learn from past tragedies and save lives in the future-not to apportion blame. It also brings up the hard effort put up by the maternal mortality committee, reviewing the maternal deaths and passing recommendations for improvements. And because action is the ultimate goal of these reviews, it is important that those with the ability to implement the recommendations actively participate in the endeavor to reduce maternal deaths.

*"Whose faces are behind the numbers? What were their stories? What were their dreams? They left behind children and families. They also left behind clues as to why their lives ended early".**

* Berg C et al.(Eds). Strategies to reduce pregnancy related deaths. Atlanta, GA, Centers for Disease Control and Prevention, 2001.

HEALTH INFORMATION SYSTEM

The Key to Health Sector Strengthening

“ Health information system is one of the
weakest link in the health system ”

Lyonpo Sangay Ngedup
Former Minister for Health

Health Information for evidence based decision

1. Introduction

On 26 April 1986, the Chernobyl nuclear power plant in Ukraine (then Soviet Union) exploded. This resulted in 56 direct deaths and estimates as many as 4000 would die from long term illnesses according to a report published by International Atomic Energy Agency (IAEA) in 2005. Greenpeace, amongst many others, disputes the findings stating that many more could die from long term illness. Although the concrete cause of the accident is unknown, independent experts believe that an important factor contributing to the accident was that information regarding the reactor's problem was not conveyed to the operators. This was indeed a costly mistake committed as a result of information denial.

Similarly the work of John Snow during the cholera epidemics in mid 1800s in London was possible only because there were information on births and deaths. Without this information, Snow's mapping of mortality in relation to the water pumps would not have been possible. This was the beginning of modern era for public health. Since then, information collection, processing and dissemination became an integral part of health system.

In Bhutan, the system of collecting morbidity data evolved almost in parallel to the establishment of modern health care system in the country. However only in 1985(MIS Working Group 1991) a health information support

section was created within the Health Planning & Development Division at the central ministry.

The health information system than used to collect information on service statistics and morbidity, disease surveillance and vital statistics (MIS Working Group 1991). The information collection even today is almost same.

The purpose of such information collection was to enhance the management of health services and thereby improve the health of the population. The decision makers and the management team could use the collected information for undertaking situational analysis, setting priorities, or implementing a programmed activity.

Social and political changes are also changing the need for information. There is generally an agreed perception that the gap between have and have nots are increasingly widening. And today economy/wealth is intrinsically linked with the health(Commission on Macroeconomics and Health 2001). Politically a policy of decentralization started as early as 1981 but strong roots are now taking place with the Kingdom opting for constitutional democracy. To reach the un-reached population and the poor and to provide timely and accurate information to the public in a democratic system, information will continue to play a very important role.

Information will also be necessary to evaluate, re-assess and prioritize so that more

is achieved with less. Information will also be required to consolidate and sustain on the achievements made thus far. And also seek to understand the problems and provide appropriate and cost effective solutions.

information support to the decision-making process at each level in the system. The ultimate objective of HIS is not to gain information but to improve action.

In summary health information systems

The Vicious HIS circle

- There is plenty of data recorded at the service level.
- Most of it goes unused, in the service and at the policy level.
- It is not used at the service level, because there is so much of it that was designed for the policy level.
- It is not used at the policy level because it is felt to be invalid and incomplete.
- One reason it is invalid and incomplete is because it is not used at the service level.

Courtesy : Steve Sapirie, MSH

1. What is Health Information System (HIS)?

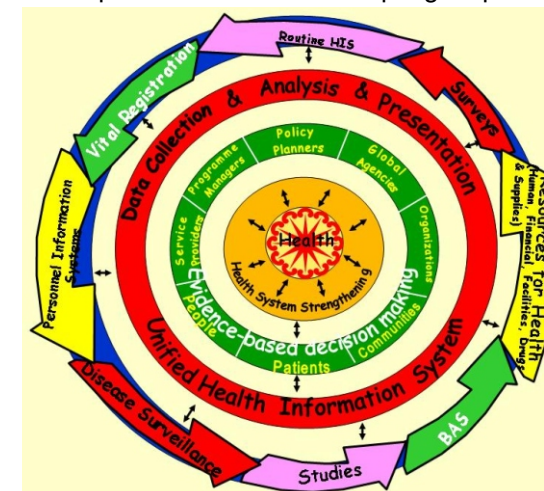
A system is defined as any collection of components that work together to achieve a common objective. The objective of HIS then is to improve health service management through optimal information support. Therefore information is collection of facts or data.

Health Information System initially was collecting information on diseases and on health service output. While these functions are still important HIS is now adapting to provide

integrate data collection, processing, reporting and use of information necessary for improving health services effectiveness and efficiency through better management at all levels of health services(Sauerborn & Lippeveld 2000a).

2. Why we need Health Information System?

The need to do more with less has been recognised in the society since the start of civilization. However this is becoming more realistic especially in the health sector with people demanding more quality services. Good management therefore is a prerequisite for increasing the efficiency and effectiveness in the delivery of health care services with the available resources(Sauerborn & Lippeveld 2000a). As an example, the effectiveness of the polio vaccine may be diminished by the breakdown of the cold chain, incorrect assessment of the child, failure to follow up on children who do not come for booster dose and many other such flaws.



Courtesy: Antru Fric, EHI/SEARO

WHO has long identified health information system as critical in achieving high standards of health service delivery. Further WHO has linked improved management to improved health information system (WHO 1987).

Information is crucial at all management levels of health services from periphery to the centre. It is crucial for patient/client management, for health unit management, as well as for health system planning and management. This means not only policy makers and managers need to make use of the information in decision making but also care providers including doctors, health technicians and community health workers.

To improve the health of the population, health system needs strengthening. To strengthen the health system; policy makers and planners, programme managers and service providers, global agencies and organizations, patients, communities and the general population need timely, accurate and reliable information to make evidence based decision.

Currently in Bhutan, health information needs to fulfil three types of management functions:

- i) patient/client management
- ii) Health Unit Management
- iii) Health system management.

The patient/client and health unit management function includes all the

Important Uses of Health Information

- Management of cases and community health
- Disease surveillance and outbreak control
- Reporting births, deaths and cause of death
- Monitoring coverage of essential services
- Monitoring quality of care
- Informing the population of health risks
- Monitoring cost-effectiveness of services
- Monitoring the efficiency of health services
- Providing summaries of the above for policy purposes

Courtesy : Steve Sapirie, MSH

Evidence Based Decision to strengthen the Health System

Every day 1300 health personnel working towards the improvement of health of the Bhutanese population are making a decision. Of the hundreds and thousands of decisions that are made everyday, how many are based on evidence? The answer is very difficult to ascertain. However decisions made without evidence/data are likely to fail than succeed.

interactions with the community. The health system management involves the coordination and provision of management support to the service delivery levels.

The patient/client and health unit management are usually operational and health systems management decisions usually are strategic planning including policy formulation.

The users of the patient/client level

are the care provider- the doctors and the health workers. A health information system can be a major tool for providing quality care by the care providers as in the following illustration;

A child of two years is brought by his mother because of skin rash and diarrhoea. Does the care provider have necessary information to know whether the child has already had measles vaccination?

The objective of the health unit management is to provide health care within its catchment area with a given amount of resources. The following scenario illustrates how information can be used for health unit management;

A health centre is supposed to provide treatment to TB patients. The health in charge would like to know how many patients out of those who started treatment in the health centre abandoned prematurely. This information can prompt the health worker to improve the follow-up of TB patients.

One of the functions of BHUs is to provide ANC to all the pregnant women in the catchment area and to refer those at risk to the district hospital. In the last few years several women died of pregnancy related complications. The HA and the ANM would like to know how many of the total expected pregnancies in the catchment area received ANC care. This information will guide the health workers reorganize ANC care activities in more effective way.

A district hospital with 20 beds provides inpatient care to a population of 5000. For about a year beds have been constantly full. The Superintendent of the hospital would like to know the average length of the patient stay in

the hospital to decide whether more beds are needed or alternative discharge procedure could solve the problem.

Finally the objective of the health systems management is to coordinate and provide planning and management support to service delivery levels. Some of the health systems management functions are;

- Establishment of health policies and legislation
- Inter-sectoral coordination
- Strategic planning and programming
- Budgeting and financial resource allocation
- Organization of the system, including referral mechanisms
- Personnel development including continuing education
- Resource management including finance, personnel and information
- Distribution and management of equipments, supplies and drugs
- Disease surveillance
- Protection of the environment

4. What can be done to further improve the Health Information system?

It is recognized that health information systems in many countries are not able to provide the much needed management support (Sauerborn & Lippeveld 2000b) and Bhutan is no exception. The review done in 1991 by MIS working group highlights this issue that "the use of that information is limited, and there is no link between the information received and the planning of supervision visits (MIS Working Group 1991, p. 14)". However the current thinking in healthcare personnel equating health information system with filling endless registers and forms are gradually changing for the better.

Principles & Approaches for Enhancing the use of Health Data & Information

- **Clarify national essential health services, targets and standards.**
- **Devise a national minimum set of health indicators to monitor essential health services.**
- **Insure the indicators draw on data known to be needed for case, facility and community health management.**
- **Use action learning-by-doing in the district health services to enhance data use.**
- **Place the design of health records and registers in the hands of national clinical and PH experts, not HIS experts and statisticians.**
- **Use central HIS units for sharing health information, not designing records and registers.**
- **Reduce the involvement of foreign experts in the design of the HIS, but learn their techniques.**
- **Build HIS development into health service and other support system development; avoid HIS development projects.**

Courtesy : Steve Sapirie, MSH

The following are the major constraints:

Duplication & Waste among parallel health information systems:

In many countries parallel information system evolved for varied reasons mostly within the Ministry of Health started by national programmes (Sauerborn & Lippeveld 2000b). Within the Ministry of Health in Bhutan there are three vertical reporting systems namely TB, Malaria and RWSS reporting system. Further drug inventory system and laboratory information system are also expected to come up within the next few years. Such system usually puts additional pressure on the existing resources. This system needs separate categories of personnel, facilitate separate training programmes and fails to address the management function in a comprehensive way. Although vertical reporting system tended to provide better and quality information, it made the routine health information system chaotic

(Sauerborn & Lippeveld 2000a). In Bhutan there is no documentation as to know whether it provides quality information. Further efforts are made to ensure that whatever is collected by the vertical reporting system is not duplicated in the routine information system. However peripheral health workers do feel drowned in a multitude of reports to be completed every month.

Lack of timely reporting & feedback

Similar to adage “justice delayed is justice denied”, information delayed is information denied. The process of compiling and transmitting is as tedious as analysing and the data often becomes outdated when it reaches the planners and decision makers. And thus decisions are often made without information input as planners and managers face deadline and constraints in their daily work. Coupled with a lack of timely reporting there is also no institutionalised feedback mechanism at any

level of health care and reporting system.

Conclusion:

The 1930 physicist Niels Bohr stated “Nothing exists until it is measured”. Although he was referring to quantum mechanics, it is very relevant in health sector where there is multitude of stakeholders. Information is the key to promoting Govt. policy of transparency, efficiency and accountability. Health sector uses over 4% of the total government budget. Information therefore is critical to gauge the

return on investment. The demand for information is also increasing with the need to track the progress of five year plans and the Millennium Development Goals.

Realizing the importance of information, the users of information should adapt to the changing needs. The use of health data currently is very poor at all levels in the system. Therefore the capacity strengthening of data generators and users should go hand in hand.

Examples of Learning-by-doing

- **Assessment of clinic performance and data use**
- **Assessment of district service coverage and quality**
- **Service performance improvement and problem-solving at district and facility level**
- **Design and implement performance monitoring (“Health Watch”) function at district level.**
- **Support “Health Watch” with geographic displays of data**
- **Assess and develop district and municipality disease surveillance and outbreak control procedures**

Courtesy : Steve Sapirie, MSH



Courtesy : Mendoza, WIPRO

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Information Reliability Using Computers for Data Entry

Introduction

Technologies in its varied forms are making a niche in Bhutan. The health sector in 2003 computerized the recording and reporting of the medical reporting systems. The idea was basic and simple, to transfer the data from paper records to a database. However, it is known to introduce errors in transferring the data from paper records to database(Joshi et al. 1992; Klein 2000; Kreher & Sesney 1995; Norton et al. 1981; Salenius et al. 1992; Samuels et al. 2002).

In Bhutan such errors are more likely as the country has only recently come in contact with the existing and emerging information technology. Computers first arrived in early nineties and the internet in 1998(Ministry of Information and Communication 2002). The population at large are therefore not familiar with the technology. Thus it is common sense to assume that people with little computer experience are likely to make more data entry errors.

What is acceptable error rate internationally?

The industry standard of acceptable error rate is 1% or less (Fleege, Diest & Baak 1992). In a hypertension prevention trial, error rate was 0.52% (Prud'homme, Canner & Cutler 1989), 0.68% in coronary artery risk development study (CARDIA) (Hilner, McDonald & Horn 1992), 0.22% in the Cardiac

Arrhythmia Suppression Trial (Reynolds & McBride 1992), 0.15% in the Continuous Hyper fractionated Accelerated Radiotherapy Trials (Gibson et al. 1994), and 0.31% in Nepal(Pradhan et al. 1994).

Types of Methodologies used for detecting errors

Several methodologies are used in detecting errors. The traditional of all the methodologies is the 100% manual verification. This method is tedious, time consuming and therefore very costly. The most acknowledged method for detecting error is double data entry. Double Data Entry is a technique in which raw data are entered twice to create two separate electronic data sets. The two data sets are then compared electronically and any differences in data set will be reported. When differences exist, it is corrected by referring to the original data sheet. In theory the only chance of not detecting the error is when the two data entry operator makes the same mistake. This technique is found to save time compared to the time required to manually identify the dataentry errors(Cummings & Masten 1994). It is also found to reduce the entry errors by 99%(Cummings & Masten 1994).

Causes of Data Entry Errors

The causes of data entry errors are many. Not filling in the information from the record form to the computer and leaving the database empty is the most common data entry error.

This contributed to 49% of the error in on-site data entry(Kreher & Sesney 1995), and 38% in a computerized immunization registry (Hermansen, Kahler & Kahler 1986). Others also observe this type of errors(Joshi et al. 1992; Norton et al. 1981). This is followed by typing errors or filling in incorrect information (Fleege, Diest & Baak 1992; Hermansen, Kahler & Kahler 1986; Kreher & Sesney 1995; Norton et al. 1981). Other types of errors are illegibility of raw data, difficulty in recognizing data points, inadvertent key stroke errors, disparity between raw data collection form and the entry screen (Cummings & Masten 1994; Dambro & Weiss 1988; Hermansen, Kahler & Kahler 1986; Kreher & Sesney 1995; Pradhan et al. 1994).

The design of database also influences the data entry errors by including detection mechanism like range check, logic checks, pull-down menus, pop-up lists, and scrolling fields enhanced user acceptance(Salenius et al. 1992). It is known to increase the accuracy of the data entry(Kreher & Sesney 1995).

A database that has the same screen interface with that of the raw data collection form provides the best combination of low error rate and high speed, besides being very popular among all users (Crombie & Irving 1986; Norton et al. 1981). Errors are also less likely to occur when data entry clerk is able to see all the variables at the same time as they may not lose their place while moving through

the variables. However when more than two rows are displayed on the screen, data entry was slower and resulted in high error rate(Crombie & Irving 1986). Building data entry around nine key number pad increases the efficiency and accuracy of data entry as it keeps the data entry person stay oriented (Schneider & Deenan 2004).

Data Entry Errors in Wangdiphodrang District

The database used in the district is Microsoft Access 2002. The raw data collection form and the entry screen are exactly the same except for the two variables. A variable present on the hard copy is missing in the electronic screen while there is a variation for the other variable.

The entire database uses the entry of numerical except for the sixteen variables in the activity reporting form, which needs to be ticked using mouse. The database also accepts the entry of characters and any other signs available on the keyboard including negative values. The database does not have any kind of range checks nor logic checks or cross checks. Tab and arrow keys can be used to move from field to field forward as well as backward. The same keys can also be used for skipping the field. Onsite screen correction can be made.

Table 1. Total Field Entries and the Error Rate

Activity Report Morbidity Report								
Sl.#	Health Center	July	August	September	July	August	September	Total
1	Phobjikha	29	30	26	55	61	59	260
2	Sephu	28	28	28	72	61	62	279
3	Gaselo	29	31	36	91	101	117	405
4	Samtegang	29	28	30	88	82	89	346
5	Bajo	36	37	38	72	67	61	311
6	Uma	12	11	16	35	33	42	149
7	Teki-Agona	21	26	25	37	64	0	173
8	Jala Ula	30	29	27	47	33	29	195
9	Kamichi	31	32	0	49	55	63	230
10	RBA Hospital	0	46	47	0	128	135	356
11	Dangchu	26	28	30	76	41	46	247
	Total	271	326	303	622	726	703	2951
	Total Errors of the 2951 entered field							80
	Error rate							2.7%

The data entry error in Wangdiphodrang district is 0.78%. In other words 7.8 entry errors are made for every 1000 data field. However most of the data field did not required any entry. Leaving out the field that did not require any entry from the denominator gives an error rate of 2.7% (refer Table 1).

screen attributed to ten percent of the error. In the same reporting form sixteen fields meant for ticking attributed to thirteen percent of the error. There were 13764 entry fields of which 21% of field were entered. The total error committed was 107.

Table 4. Types of Errors

Sl.#	Types of Error	Total	Percent
1	Not Entered/empty field	29	27.1%
2	Entering in wrong row/column	27	25.2%
3	Typing Error	15	14.0%
4	Ticking Entry/Use of Mouse	14	13.1%
5	Disparity in data collection form and entry screen	11	10.3%
6	Others	11	10.3%
	Total	107	100.0%

Twenty seven percent of the errors made were mistakes in which the information was filled out on the reporting forms but was not entered into the database. Twenty five percent of the errors were of entering into incorrect rows and columns. Fourteen percent of the errors were of incorrect entries. Disparity of a single variable in the activity report form with the entry

Conclusion

The overall error rate of 0.78% looks acceptable in comparison to industry standard of 1% or less which is regarded as tolerable(Fleege, Diest & Baak 1992). The industry standard was determined based on the performance of data entry clerk who do the data entry full time. The District Health Supervisory

Officers (DHSOs) who does the data entry in Bhutan is assigned with other tasks as well. In other words data entry is not their full time job.

A quality control method to reduce the error in the regular reporting system would be worth the investment in the long run. Probably a full time data entry clerk at the centre could re-enter the data which can then be electronically compared with the data set sent from the district. Such a method of double entry done by different operator has an error detection rate of 88.3% while double entries done by the same operator has an error detection rate of 69%(Kawado et al. 2003).

Most of the errors look likely to be avoided with minor adjustments. A correction of single variable on the activity reporting form to match with the entry screen could avoid ten percent of the total errors. This disparity was communicated to the DHSOs and correction will be done on the raw form very soon(Dukpa 2005). Similarly over thirteen percent of the error could be averted if there is a way to avoid ticking entry. Here the data entry person shifts from using keyboard to mouse. A shift from keyboard entry to mouse entry is known to disturb the rhythm of the data entry resulting in errors(Kreher & Sesney 1995).

Almost one third of the problems were mistakes in which the information on the reporting form was not entered. Such errors are generally known to be avoidable with reminders about attention to accuracy and its importance(Kreher & Sesney 1995). Probably information collected should be ensured to be used at every level in the system. Once the

users of the information uses the information, errors are known to be detected at the user level and thereby reduction in the error(Klein 2000).

The database is quite simple and lacks sophistication. There is no range check, logic check, cross checking etc. There is minimal use of mouse interface features such as pop-up lists, pull-down menus, buttons, etc. Database with some sophistications are known to be easily accepted by the users as it is easy to be used with minimal training(Salenius et al. 1992). However, in this study, though the database does not have any kind of sophistication, two DHSOs have never experienced any kind of problem with the database. They found the database easy to use and user friendly(Tshering & Zangmo 2004). The assumption that sophisticated database design would minimize the error was also not realized in practice(Crombie & Irving 1986). Only two errors were detected due to lack of range check in this study.

The major problem with the database was that there are lots of rows and columns. This could probably create a mesmerizing effect on the data enterer resulting in data entry error. The error because of entering in wrong rows/columns constitutes 25.2% of the total errors. A screen with lots of rows is known to introduce lots of error (Crombie & Irving 1986). A data entry screen with more than two rows resulted in more entry time as well as produced very high error rate(Kreher & Sesney 1995).

A significant number of mistakes were made probably because of not understanding the terminology used in the form or there is no uniform definition for the terminology used. The

manual on Bhutan Health Management Information System guides on how to fill the form but lacks specific definition(Ministry of Health 2003a). Common mistakes were made in rows and columns where phrases such as 'condoms distributed' and 'no. fully immunised' were used. For instance in the condom distributed some have entered as grosses

while others have just the numerical number. This lack of understanding has probably resulted in either not entering the data or entering it wrongly. High error rates were observed in which conventions were poorly defined (Norton et al. 1981). Data entry person having protocols to follow is known to make less mistakes (Schneider & Deenan 2004).

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Review of BHU Bulletin Board Display

1. Background

Bulletin Board is one of the main instruments for dissemination of information at the BHU level. At the same time it is also meant to be used by health personnel in management of patients and the health facilities. However during Hon'ble Lyonpo's tour of the Kingdom, serious lapses were noted and instructed especially to come up with a standardized form of displaying information. In this regard a review was done simultaneously with the routine monitoring and supervision visit of Health Information System.

Bulletin Boards are displayed usually in the form of chart paper pasted on the walls of the health facilities or on wooden boards. The information displayed in most health facilities are on demography, service statistics and on morbidity. These statistics varies from facilities to facilities. Therefore the content of this information was evaluated to develop a standardized form of displaying health information in BHUs. This evaluation has taken into account the following stakeholders.

1.1 Secondary Stakeholders

1. Bilateral & Multilateral Partners
2. Schools & RNR centres at the Geog
3. Community Leaders of the Geog
4. Dzongdags

1.2 Primary Stakeholders

1. DHSOs, DMOs & DHO
2. BHU staffs
3. All the programs in the Health Ministry

2. Methodology

2.1 Consumer Oriented Framework

A consumer-oriented framework was used. This framework focuses on gathering product or program information from the user perspective. It allows the evaluators to better understand how people use and interact with the product. In this evaluation the Bulletin Board is the product and the above listed secondary stakeholders are treated as consumers.

The author of the consumer oriented framework, Michael Scriven promotes the value of several strategies in consumer-focused evaluations. Two of them are particularly useful for this evaluation. The first is to assess the performance of true consumers. This means the evaluator should test run the product with consumers.

The second is to find out the evidence of the need. Why do the consumers need that particular product, in this case the Bulletin Board? What is the significance or what use does it have?

2.2 Participant Model:

This model particularly will be used to address the issues and concerns of the primary stakeholders. It provides the actual users of the

product/services and responds to audience's requirements for information.

This model also gives first hand experience on site as well as involves the intended users and trains the intended users.

2.3 Expertise Oriented Model

This model can be used in the process of evaluation or at the end. In this case, the model was used at the end after doing a preliminary analysis. The expertise of demographer, statistician, paediatrician, gynaecologist, malaria etc was used.

2.4 Evaluation Instruments

A questionnaire and face to face interviews were conducted for the BHU staff to get feedbacks on the Board. A guide questionnaire was also used by the moderator during the interview so as not to get diverted from the main issue

For the rest of the primary stakeholders,

Table 1. Type of information desired to be displayed by secondary stakeholders.

Sl.#	Type of information desired	Number of Respondent
1	Activities Achievement	6
2	Static & Mobile population	5
3	Disease pattern	5

questionnaire was used to get feedback on the Bulletin Board.

3. Results

Eight district medical officers (DMOs), 13 district health supervisory officers (DHSOs) and one district health officer (DHO)

responded to the questionnaire. 32 health personnel from the district hospital comprising of HAs, ANM and BHWs working in the community health unit also responded.

33 BHUs were covered in this study and at least one or more BHUs were visited in every district. 30 HAs, 27 BHWs, 14 ANM, 13 AN and 1 malaria technician responded to the questionnaire at the BHU Level.

3.1 Secondary Stakeholders

Secondary stakeholders include personnel from donor community, schools & RNR centre at the geog level, community leaders and district administrators. 30 of them have responded to the questionnaire. 28 of them visited one or more BHUs in the last one year. 27 of the 28 who visited BHU have seen a BHU Bulletin Board and 15 of them remember seeing health data being displayed followed by 6 of them seeing health education materials.

All of them who visited BHU during the last one year feel BHU Bulletin Board is useful and 21 of them thinks it should be uniform one across the country.

26 of them desired to see an annual comparative display of information mostly in the form of tables (11) and graphs (15). Concurrently 11 of them desired to see figures only in counts and 5 respondents each wouldn't mind having rates, ratios and proportions being displayed.

Chart 1: Demography & Vital Statistics

Demography		2005	2004	2003
1	Total Household			
2	Total Population			
3	Total Active VHW			
4	Total Male			
5	Total Female			
6	Total Female (15-49 years)			
7	Total children less than 1 year			
8	Total Children less than 5 years			
9	Total population within 3 hrs reach of health facilities			

Vital Statistics				
1	Total Births			
2	Total Live Births			
3	Total Deaths			
4	Total death less than 28 days			
5	Total Death less than 1 year			
6	Total Death less than 5 year			
7	Total Maternal Deaths			

Table 2. Purpose & usefulness of information viewed by secondary stakeholders

Sl.#	Purpose & Usefulness	No. of respondent
1	To create awareness	13
2	To plan & monitor activities	7
3	For Visitors & as BHU reference	2

If affordable, most of them suggested displaying information using wooden boards and chart papers. 23 of them feel that the same information should be also displayed in our national language Dzongkha.

3.2 Primary Stakeholders

3.2.1 BHU Staff

A total of 113 BHU staff from 32 different BHUs and community health unit of the hospitals were administered structured

questionnaire. 108 said that they have a BHU Bulletin Board displayed at the centre. 87% (94/108) said that they follow some structured guideline in displaying the information. 88 of them said that they display the information on an annual basis while 45 of them said that they change the information monthly.

The respondent recollects displaying the information as given in Table 3.

Chart 2 : Reproductive Health & Family Planning & Immunization

Reproductive Health & Family Planning		2005	2004	2003
1	Total Pregnant Women			
2	ANC Attendance>=4 visits			
3	Trained Deliveries (Home etc)			
4	Institutional Deliveries			
5	Tubectomy			
6	Vasectomy			
7	IUD User			
8	DMPA User			
9	Oral Pills User			
10	Condoms Distributed			

Immunization(less than 1 year)				
1	OPV 1			
2	OPV 3			
3	DPT-Hep B 1			
4	DPT-Hep B 3			
5	BCG			
6	Measles-Rubella			

104 respondents said that they use the displayed information to plan health centre activities followed by 15 of them who said that they displayed the information on instruction of DMO/DHSO and 6 of them said that they displayed the information to please the visitors.

Table, Graphs and pie charts were the most common form used for displaying the information. 90 and 84 respondents cited using graphs and tables for displaying information. Similarly 65 of them said that they felt easy to use graph & table in displaying the information. Few of them also cited using

pie chart.

On ranking the type of information that needs to be displayed, 45 of them ranked immunization as the most important one and 36 has ranked malaria as the lowest. The following table gives you the details of the ranking.

Table 3. BHU Staff recollection of type of information displayed

Sl.#	Type of Information Displayed	No. of Respondent	Percent respondent
1	EPI	70	61.9
2	Water & Sanitation	70	61.9
3	Reproductive Health	70	61.9
4	Demography	38	33.6
5	Morbidity Trend	39	34.5
6	Work-plan	13	11.5
7	Map of BHU area	12	10.6
8	Educational Material	11	9.7
9	Others	7	6.1

Table 4: Ranking the type of information desired to be displayed by the BHU Staff (1 is the highest priority & 7 the lowest)

Rank/ Type of Information	Immunization	Nutrition	Family Planning	MCH	TB	Malaria	STD/AIDS
1	45	0	6	24	2	3	10
2	21	3	39	16	0	1	5
3	11	5	29	24	1	2	13
4	5	31	10	12	8	3	13
5	3	32	2	9	11	10	16
6	1	7	0	1	31	19	11
7	0	2	1	0	23	36	11

As many as 92 respondents said that they are using the displayed information but only 40 them of them were able to recollect as to what purposes it were used.

66 said it was important to display the same information in Dzongkha while 19 of them felt it was not necessary. Rest of the respondent did not have a stand.

3.2.2 DHO, DMO & DHSO

22 respondents in this category responded to the questionnaire. 20 of them had visited more than three BHUs in the last one year. 19 of them cited seeing a BHU Bulletin Board. 16 of them said that there was no uniformity in the displayed information.

As many as 20 of them said that they gave specific instruction during their visit on what to be displayed and how to be displayed. 8 of them instructed to display only relevant information while 4 of them stressed on uniformity and on updating the information.

15 of them felt that the displayed information was used by the BHU staff; 9 of them said it was used for local planning purpose followed by 5 of them who said that it was for visitors' purpose.

18 of the respondent cited finding some use to them during their visits. 10 of them said that it gave information at a glance during their visit, 8 of them found useful in gauging how good the

Chart 3 : Nutritional & RWSS

Nutritional Status (Children less than 5 years)

1	% of Normal Weight	2005	2004	2003
2	% of Over Weight			
3	% of Under Weight			

Water & Sanitation

1	Total Household with Pit/VIDP/Flush Latrine			
2	Total Household with piped water supply			
3	Total household with piped water not functioning			
4	Total Household having livestock but without Separate animal shed			
5	Total Diarrhoea cases (A01+A02+A03)			

Others

1	Total Laboratory Examinations			
2	Total Disability (Physical Impairment)			
3	Total TB Cases			
4	Total TB Pulmonary Positive Cases			
5	Plasmodium falciparum (B50)			
6	Other Malaria (B51)			

Table 5: Type of displayed information remembered by the respondents.

Sl.#	Type of Information	No. of respondent
1	Demography/population	13
2	Activity coverage	13
3	Disease Trend	10
4	Household Survey Data	9
5	Map of catchment area	4
6	Work-plan	2
7	Staff list	1

activities are planned and implemented and 3 of them found useful in knowing the population.

59 percent (13/22) of the respondent felt that the information should be mainly displayed in the form of graphs & tables followed by pie chart that had 45 percent (10/22) respondents

airing their support.

On asking what needs to be done further to improve over the existing display, 10 of them said that it should be standard and uniform and one respondent said that the displayed information needs to be reduced.

15 respondents felt it was necessary to display the same information in our national language.

3.2.3 HEADQUARTER STAFF

19 questionnaires were administered to headquarter staffs that were mainly looking after the programs. 17 of them had made a visit to BHU in the last one year and all of them remember seeing a BHU Bulletin Board.

15 respondents felt that it was of some use; 8 of them said that it gave an understanding on the disease incidence, 6 felt, it gave the community health status, and 1 said that it helps in planning, and monitoring activities. All the respondent felt that it did not met their program requirement fully.

Respondent felt that graphs, pie charts and tables should be used for displaying the information while they also felt conformable in reading rates and counts.

Most of the respondent had the following suggestions for further improvement:

- Information board should be updated regularly
- Standard/uniform display
- Train to interpret data or analyze data
- Make use of data in planning & monitoring activities
- 7 respondents said that the same information should be displayed in our national language.

4.0 Discussion

A total 184 people participated by answering the structured questionnaire interview. 61% of the respondents were staffs from Basic Health Unit and community health unit of the hospitals. 16% comprised of donor communities, schools & RNR centres at the geog level, gups and district administrators, 11.9% by DMO/DHSO/DHO and 10.3% from the Health Ministry, Thimphu.

There was an hundred percent affirmative answer on the need for a BHU Bulletin Board. 72.7% of the DHO/DMO/DHSO found that the display at BHU were not uniform during their

Table 6: Matching HQ respondents displayed information recollection VS desire for the type of information to be displayed

Sl.#	Type of information seen displayed	Type of information needs to be displayed
1	Reproductive Health Data	Water & sanitation
2	Morbidity Pattern	Demography/population
3	Household Survey Data	RH Information
4	EPI information	BHU Map
5	Demography	Activity & target
6	BHU Map	Morbidity Pattern
7	Office order, organogram	Work Plan
8		TB Information
9		Monthly drug consumption

last visit. This is also indicative from the BHU staff answering that they display information in whatever way they like.

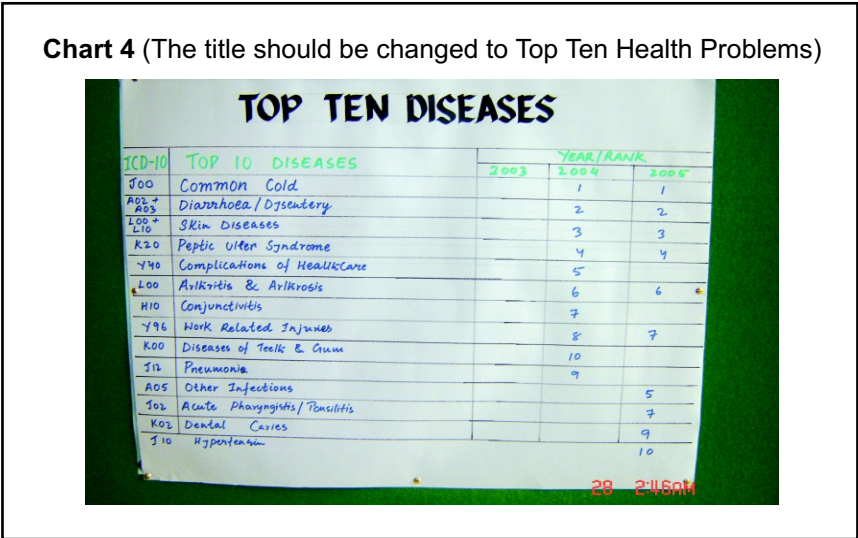
Respondent across the board have recommended having a uniform information display board at the BHU. 70% of the secondary stakeholder supported for the same, over 90% of DMO/DHSO/DHO also aired the same view, and most of the respondent from the headquarters also agreed to have a basic minimum uniform information display with room to include specific information endemic to a particular BHU.

The respondent are grouped into four categories viz BHU/CHU staff, DHO/DMO/ DHSO, Headquarter Staff and secondary stakeholders. What the respondent remember seeing and what they feel important to be displayed matches almost one to one for all the above four categories. The following are the list that provides what all the four categories remember seeing:

1. Population & demography information
2. Immunization

3. Reproductive Health Information
 4. Disease pattern or morbidity pattern
 5. Map of BHU catchment area
 6. Health Education Material
 7. Information from Annual Household Survey
 8. Work Plan
 9. staff list
- The following list provides what all the four categories feel important to be displayed:
1. Immunization
 2. MCH
 3. Family Planning
 4. Nutrition
 5. Water & sanitation
 6. Demography
 7. Map of BHU catchment area
 8. Activity & target
 9. Morbidity Pattern
 10. Work Plan
 11. Monthly drug consumption
 12. TB & Malaria

The following are the purpose of displayed information cited by all the four categories of respondent:



1. To plan the health centre activities
2. To monitor the activities
3. To please the visitors
4. To create awareness
5. Instructed by DMO/DHSO
6. To know the community health status

From 23 BHUs the type of information displayed was collected by the review team. Comparing this existing displayed information with what the respondent feel important to be displayed, it is found that there are far more information that is displayed than what the respondent felt important. Thus it makes sense when few DHSO/DMO/DHO have said that the displayed information needs to be reduced.

Most respondent have said that they use the displayed information for planning, and monitoring. However this statement needs further scrutiny. On informal enquiry many respondent were unsure of using the information for planning & monitoring. Many of them didn't know why they were collecting the data and for what purpose it will be used. Therefore data usage at BHU level could be very minimal. Also most of them were handling data because the system required them to do.

Most of the DMO/DHSO/DHO did give instruction to update the information but none of them seems to have given as how often it should be updated. Similarly staff from the headquarters also suggests updating the information without citing the frequency to update. On the other hand, BHU staff seems to be updating information. 81% said that they update the information annually and the rest

said that they update the information monthly.

Almost all the respondent has suggested using chart paper and wooden board to display the information. 83 percent of the BHU staff cited using chart paper currently.

There were mixed reaction when asked whether it was necessary to display the same information in our national language. Although 60% of the respondent said that it was necessary to the same in Dzongkha, rest of them were unsure of it.

5.0 Recommendations

1. Based on the respondents' recollection of what they remember seeing and what they feel important to be displayed and their perception on use & purposes, the following are recommended for the BHU Bulletin Board Display.

- Demography: Demography encompasses human population dynamics. It looks at size, structure, and how population change over time with births, deaths, ageing and migration. All the categories of respondent have ranked demography in the in the top three.
- Vital Statistics: It is a sub-component of demography specifically recording the information on birth and death within a defined jurisdiction. All the BHUs visited had information on vital statistics displayed.
- Reproductive Health & Family Planning: It encompasses the health of humans in the reproductive age and currently is more concern with women of the child bearing age. 24 BHU staff has ranked MCH as

their top priority, 39 has ranked family planning as their second priority and almost all the respondent remembers seeing a Reproductive Health information on the Board.

- Immunization & Nutrition: Immunization was ranked top in the preferences listed by the BHU staff. 45 of them felt immunization to be the most important one. Immunization & Nutrition are also the ones that have been collecting information for many years. Therefore information on it is not only important but is also the most reliable ones.
- Water & Sanitation: Water & Sanitation is recognized to be important one by all categories of respondent. However only few of them recollect seeing information on it displayed. During the visit to BHU also only scanty or no information at all were found on water & sanitation.
- Top Ten Health Problems: Most respondents felt necessary to have a disease pattern of it displayed. Ten Top Disease would probably give a glimpse of it. Also all the BHUs visited already has ten top diseases displayed.
- BHU Catchments Area Map: The requirement for the map was mentioned only by few respondents. However many respondents have said that they display the information for visitors. A map of this nature would give information at a glance for the visitors as well as many BHU staffs after extensive discussion felt it would be useful for them for their daily activity monitoring purpose.

- EPI Monitoring Chart: No respondent have seen or expressed interest for EPI Monitoring chart. But all the respondents have felt that BHU Bulletin Board could be used for planning and monitoring health activities. In this light, EPI Monitoring chart could be a very useful tool for monitoring EPI activity at BHU. All the DHSOs have undergone training on EPI monitoring and most of them expressed that it could be a very important tool.

- For the malaria endemic region, display of cases of Plamodium falciparium and other malaria are kept.

2. All the BHUs and Community Health Unit in Hospital should continue having Bulletin Board.
3. In principle all the information displayed at BHU & Community Health Unit in the hospital should be uniform. However room should be kept for displaying information endemic to that community.
4. The materials to be used for displaying information would be primarily chart paper pinned on a wooden board.
5. The displayed information should be changed once in a year. Probably Bhutanese calendar year should be followed.
6. The displayed information should cater for the following purposes:
 - To monitor activities
 - To plan the activities
 - To provide information at a glance thereby serving the purpose of pleasing the visitors
 - To create awareness in the community

Chart 5

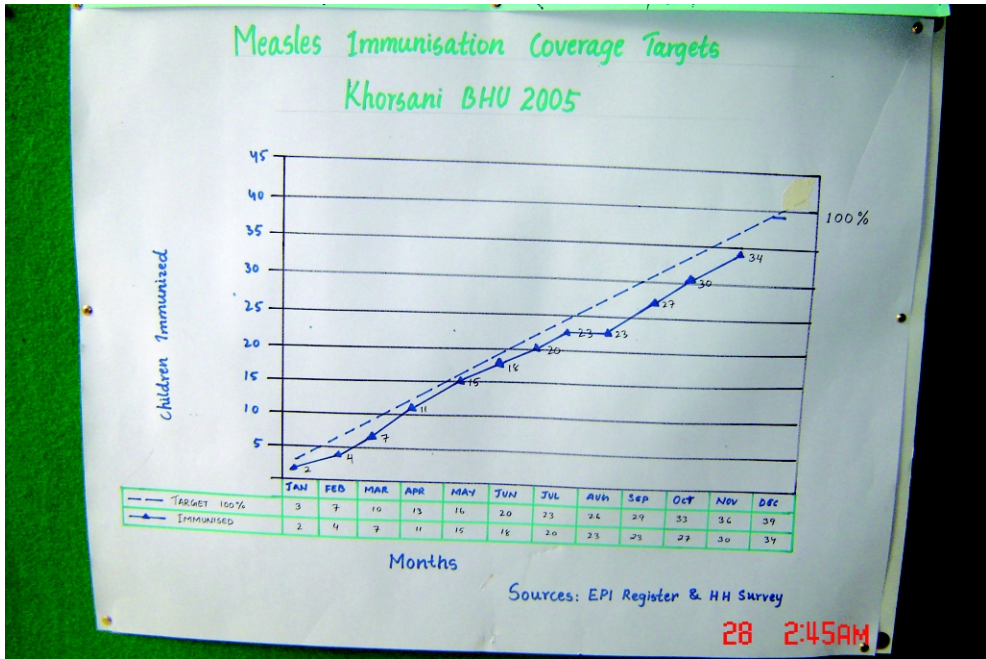
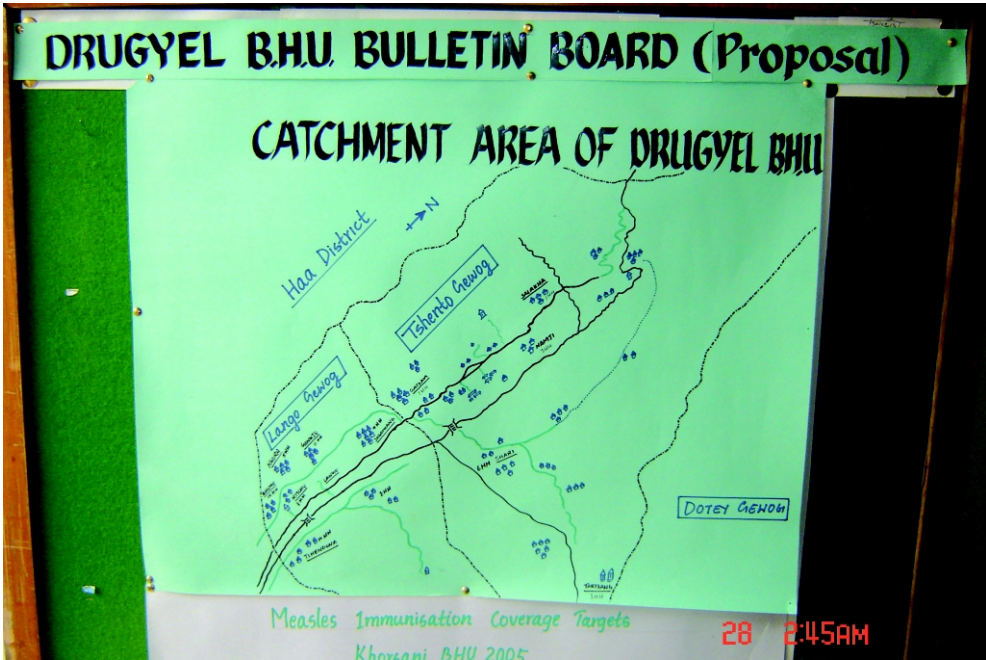


Chart 5



List of Health Facilities under different Districts - 2005

S#	Dzongkhag	S#	Health Centre		S#	ORC	
			Hospital	Basic Health Unit		With Shed	Without Shed
1	Bumthang	1	Bumthang		1	Dhur	
					2	Zhabjethang	
					3	Kurje	
					4	Thangbi	
		1	Tang		5	Besur	1
					6	Gamling	Takhung
					7	Phomrong	
		2	Ura		8	Tangsibi	
					9	Shingneer	
					10	Shingkhar	
		3	Chhumey		11	Gaytsa	
					12	Nangar	
					13	Chungphel	
2	Chhukha	1	Tsimalakha				
				1	Chukha BHUI	1	Chungkha
				2	Trashigatshel RBP	2	Toktogom
						3	Toktowom
			Chongekha		2	Wanakha	4
					3	Kamji	Omchu
					4	Chanachin	Dhap
			Chapcha		5	Rincheling	6
					6	Semagangkha	Bunakha
					7	Lobnekha	
		2	Gedu THPA	5	Bongo	8	Zamsa
						9	Gedephu
			Baikunza				
			Tala		11	Chargharey	9
							Kezari
							Agoan
							Rupang
			Getana		12	Daga	12
							Arikha
							Sinchula
			Dungna		13	Mondokha	14
					14	Jashina	Pangsila
					15	Metakha	Cheyul
					16	Bamphu	Phutsha
			Lokchina		17	Chimuna	
					18	Khatykh	17
					19	Damchekha	Jedokha
					20	Rodingkha	Dolechen
3	Dagana		Phuentsholing		21	Lingden	
					22	Pachutar	
					23	Chelauney	
					24	Panitar	19
			Dagapela		25	Kungkha	Rangyetung
					26	Chomchey	Ramitey
			Dagana BHU I		1	Samey	
					2	Tanabji	
			Jurugang		3	Namshigang	
			Khagochin				
			Dagapela		4	Nimtola	
					5	Gesailing	
			Akochin		6	Gangzur	
					7	Trashiding	
					8	Namchala	
			Chuga		9	Gangkhar	1
						Gepsa	2

S#	Dzongkhag	S#	Health Centre		S#	ORC	
			Hospital	Basic Health Unit		With Shed	Without Shed
				6 Drujegang	10	Pangserpo	
				7 Tsangkha			3 Zinchela
				8 Lajab	11	Thrisa	4 Bana
							5 Kompa
4	Gasa			1 Laya	1	Lungo	1 Tsharijathang
							2 Wachey
				2 Lunana			3 Tshozong
							4 Thanza (Dotta)
				3 Gasa			5 Yadho
				4 Damji	2	Trashithang	6 Remi
5	Haa	1	IMTRAT	1 Bali BHU I	1	Girina (Bali)	
					2	Tsilungkha	1 Dorikha
					3	Shari	2 Nobgang
					4	Balamna	
				2 Yangthang	5	Talung	3 Damthang
				3 Sambaykha	6	Nakha	4 Shebji
				4 Dorithasa			5 Mochhu
							6 Yangtse
6	Lhuntse	1	Lhuntse			1 Shamling	
						2 Shawa	
						3 Thimiyul	
				1 Ney		4 Tsholing	
				2 Lhadrong		5 Jarrey	
						6 Pam	
						7 Yumchey	
				3 Khoma		8 Baplong	
						9 Nyalamdung	
						10 Pangkhar	
						11 Serphu	
						12 Tshawang	
				4 Dungkhar		13 Chakzam	
						14 Jasabee	
						15 Thunpay	
				5 Tangmachu		16 Dangling	
						17 Manjabe	
						18 Murmur	
						19 Shungkhar	
				6 Menji		20 Bragoan	
						21 Budur	
						22 Chenling	
						23 Lekshogang	
						24 Zham	
						25 Ungar	
				7 Gortshum		26 Shongmay	
						27 Bamdir	
				8 Zangkhar		28 Domkhar	
				9 Patpachu		29 Dongthung	
						30 Phawantoe	
				10 Tshenkhar		31 Tongphugang	
						32 Umling	
						33 Yangla	
				11 Autsho			
7	Mongar	1	Mongar			1 Tongshing	1 Wangling
						2 Themnangbi	
						3 Konbar	
				1 Balam		4 Sangshung	
						5 Soikhar	
				2 Chaskhar		6 Gonpa	2 Dungsingma
						7 Pam	
						8 Yangra Phugshing	
						9 Chali	
				3 Drametse		10 Khalong	
						11 Narang	
						12 Baging	

S#	Dzongkhag	S#	Health Centre		S#	ORC	
			Hospital	Basic Health Unit		With Shed	Without Shed
					13	Gomchu	
					14	Waichor	
				4 Bumpazor	15	Drepong	
					16	Zunglen	
					17	Tsangkhara	
				5 Gongdu	18	Pam	
					19	Bangbangla	
				6 Pangthang			
				7 Yangbari	20	Bagla	
				8 Jurmey	21	Tulukpi	
					22	Sangkama	
					23	Yarakla	
				9 Kengkhar	24	Murung	3 Uderic
				10 Tongla			
				11 Ngatshang			
				12 Yadi	25	Sherichu	
				13 Lingmithang	26	Mangling	
					27	Senggor	
					28	Thridangbi	
					29	Broksar	
					30	Tsenzabi	
					31	Choling	
				14 Gyelposhing BHU I			4 Kalapang
				15 Resa			
				16 Shershong	32	Muhung	
					33	Sonakhar	
					34	Jabgang	
				17 Nagor	35	Jaigang	
					36	Wama	
					37	Dak	
				18 Silambi			
				19 Thangrong	38	Lingkhar	
					39	Atola	
					40	Changshinggonpa	
					41	Ngarpongtag	
				20 Tsakaling	42	Takhambi	5 Chubar
					43	Petshongbi	
					44	Palangphu	
					45	Tormashong	
				21 Tsamang			6 Drangmaling
				22 Banjar	46	Ganglapong	
8	Paro	1	Paro hospital		1	Shabdeyangkha	1 RBA MI Room
					2	Jabji zam	2 Airport
					3	Pongbisa	3 Chelela
					4	Nabisa	
					5	Jeshigang/Bochasa	
				1 Bitekha	6	Rashigang	4 Bempfu
					7	Lingshi	5 Wangkha
					8	Tshaluna (Gedakom)	6 Chasi
							7 Tshendu Gonpa
							8 Jashina
				2 Drugyal	9	Misi zam	9 Gedazam
					10	Satsham Chhorten	10 Leyna/Nubri
							11 Gunitsawa RBA MI Room
							12 Soi Yaksa
				3 Dawakha	11	Isuna	13 Chhuzom
					12	Lhagay	14 Phuchikha
9	Pemagatshel	1	Pemagatshel		1	Khar	
					2	Resinang	
					3	Gonpasingma	
					4	Tshelingkhor	
					5	Ngangmalam	

S#	Dzongkhag	S#	Health Centre		S#	ORC	
			Hospital	Basic Health Unit		With Shed	Without Shed
				1 Bartsham	4 Kumung		
					5 Muktangkhar		
				2 Bidung	6 Zongthung		
					7 Dogorom		
					8 Jalung		
					9 Wongcheloo(Lemphang)		
				3 Kanglung BHU I	10 Rongthung	1 Resadung	
						2 Younphupam	
				4 College Dispanary			
		2	Youngphula				
				5 Kangpara	11 Zordung	3 Bedingphu	
					12 Merda	4 Threlphu	
					13 Lamyong		
				6 Pasaphu			
				7 Khaling	14 Barshong		
					15 Befu		
					16 Brekha		
					17 Jeeri		
					18 Khoidung		
					19 Lemi		
					20 Monangkholo		
				3 Riserboo	21 Bemree		
					22 Dupkhang		
					23 Kurichilo		
					24 Lumang		
					25 Tshogonpa		
				8 Merak	26 Damachung		
				9 Nanong	27 Lepre	5 Nangshing	
					28 Tokari		
					29 Tshatshi		
					30 Wongchiloo		
				10 Phongmey	31 Shokang		
					32 Tokshingmang		
				11 Thangrong			
				12 Yabrang	33 Phemsong		
				13 Radhi	34 Bongman		
					35 Pakaling		
					36 Tongling		
				14 Sakten	37 Jonkhar		
					38 Thrakthick		
				15 Bikhar	39 Kadam		
					40 Yanangbrangsa		
				16 Changmey	41 Galing		
					42 Yobinang		
				17 Chaling			
				18 Rangjung BHU I			
				19 Tsangpo	43 Phekpari		
					44 Thrimshing		
				20 Thungkhar	45 Berdungma	6 Thungkharzam	
					46 Yemkhar		
				21 Uzorong	47 Bepam		
					48 Benshingmo		
					49 Cheya		
					50 Gangkhar		
					51 Jomtshang		
					52 Mankhar		
				22 Yangneer	53 Dalingphangma		
					54 Durung		
					55 Gongthung		
					56 Khardung		
16	Trashiyangtse	1	Yangtse		1 Shadi		
					2 Gangkhar		
				1 Dungzam	3 Tarphe		
					4 Womonang		
				2 Jamkhar	5 Larjab		
					6 Tachema		
				3 Kheni	7 Chemkhar		
					8 Jangphutse		

S#	Dzongkhag	S#	Health Centre		S#	ORC	
			Hospital	Basic Health Unit		With Shed	Without Shed
					9 Manam		
					10 Omba		
					11 Seeb		
				4 Khamdang	12 Doksum		
					13 Lengkhar		
					14 Kencholing		
					15 Khamdang		
				5 Ramjar	16 Bhawoong		
					17 Romang		
				6 Tomizhangsa	18 Bainangkhar		
					19 Changmadung		
					20 Lhowshing		
					21 Tokaphu		
				7 Thragom	22 Chema		
					23 Dukthi		
					24 Melongkhar		
					25 Namthe		
					26 Yallang		
17	Trongsa	1	Trongsa		1 Simphu		
				1 Langthil (Tongtophel)	2 Wamling		
					3 Nada		
					4 Baling		
					5 Belling		
					6 Langthil		
				2 Zhangbi	7 Phungzor		
				3 Kungarabten	8 Majaling		
					9 Khamay		
					10 Kella		
					11 Tashidungkha		
18	Tsirang			4 Trashiling	12 Chendibji		
					13 Drangla		
					14 Ngaldrangla		
				5 Bemji	15 Tangsibi		
				6 Nabji			
		1	Dampu		1 Tsholingkhor		
					2 Gosiling		
					3 Sunkosh		
				1 Mendegang	4 Barshong		
					5 Beteni		
				2 Khorsaney	6 Lalikharka		
					7 Shemjong		
19	Wangdiphodrang			3 Tsirangtoe	8 Burichu		
					9 Thulo Malay	1 Kapashing	
				4 Patalay	10 Patala Tar		
					11 Mithun Tar		
		1	Tencholing	1 Bajo BHU I	1 Phangyul		
						1 Rubesa	
				2 Gaselo	2 Nahi		
					3 Tabchakha		
					4 Hebesa		
				3 Jalaula	5 Ula		
				4 Kamichhu	6 Lopokha		
					7 Rukha		
				5 Uma	8 Daga uma	2 Tasha	
				6 Samtegang	9 Kazhi	3 Pinsa	
						4 Tanggangkha	
						5 Damchuthangkha	

S#	Dzongkhag	S#	Health Centre			S#	ORC				
			Hospital	S#	Basic Health Unit		With Shed	S#	Without Shed		
				7	Teki Agona			6	Neol		
								7	Khelekha		
								8	Sha Ngawang		
								9	Khotokha		
				8	Dangchhu	10	Nobding				
				9	Phobjikha			10	Gangphey		
								11	Gogona		
								12	Taphu		
				10	Sephu	13	Longtey				
						14	Nakha	11	Thangay		
20	Zhemgang	1	Yebilapcha			1	Tama				
						2	Tshanglajong				
						3	Berti				
						4	Zurphey				
						5	Goiling (Nangkor geog)				
						1	Gonphu	6	Subrang		
						2	Lelegang	7	Dunmang		
						3	Zhemgang BHU I	8	Kikhar		
								9	Dakpai		
						4	Buli			1	Buligoanpa
						5	Khomshar	10	Bardho	2	Fulabhi
						6	Langdorbi	11	Digala		
						7	Shingkhari	12	Thrisa	3	Radhi
								13	Nimshong		
								14	Thajong		
						8	Bjoka	15	Dali		
								16	Kamati		
								17	Namergang		
						9	Pangbang BHU I	18	Ngangla		
								19	Rebati		
				20	Yumdang						
		10	Kaktong			4	Ngala Trong				
		11	Gomphu	21	Dungdungbi						
				22	Yukhor						
		12	Kadidzong								
		13	Goshing	23	Budashi						
				24	Lichibi						
				25	Mewangang						
		14	Edi*								
Bhutan		29		176	380		105				

NB/-
 *Centres having structure not functioning as a BHU included in the Bulletin 2004
 Dalim, Edi

Annex-2 Antenatal Care attendance of Pregnant Women - 2005

S#	District	ANC attendance			
		1st visit	2nd visit	3rd visit	4+ visit
1	Bumthang	289	291	241	468
2	Chhukha	1686	1424	1172	2369
3	Dagana	335	283	196	157
4	Gasa	54	33	30	17
5	Haa	164	120	100	118
6	Lhuntse	356	293	231	274
7	Mongar	760	632	448	555
8	Paro	682	633	581	1288
9	Pemagatshel	288	207	139	133
10	Punakha	475	406	300	506
11	Samdrubjongkhar	967	828	653	1081
12	Samtse	1273	1134	1008	1663
13	Sarpang	1125	924	754	990
14	Thimphu	2456	2294	2057	5882
15	Trashigang	958	822	654	841
16	Trashiyangtse	344	294	177	134
17	Trongsa	241	200	183	200
18	Tsirang	374	316	290	461
19	Wangdiphodrang	609	617	424	909
20	Zhemgang	382	334	286	269
	Total	13818	12085	9924	18315

Annex-3 Attended deliveries by trained health personnel in 2005

S #	District	Attended Deliveries			Total Deliver	% Trained	Un-Trained	% Un-Trained	Forceps Vaccum
		Home	Facility	Total					
1	Bumthang	76	93	169	281	60.1	112	39.9	0
2	Chhukha	82	395	477	1701	28.0	1224	72.0	14
3	Dagana	37	45	82	411	20.0	329	80.0	0
4	Gasa	21	0	21	50	42.0	29	58.0	0
5	Haa	4	48	52	178	29.2	126	70.8	0
6	Lhuntse	68	70	138	347	39.8	209	60.2	0
7	Mongar	136	316	452	935	48.3	483	51.7	3
8	Paro	45	373	418	592	70.6	174	29.4	5
9	Pemagatshel	38	5	43	274	15.7	231	84.3	0
10	Punakha	54	128	182	356	51.1	174	48.9	0
11	Samdrubjongkhar	162	291	453	909	49.8	456	50.2	0
12	Samtse	117	646	763	898	85.0	135	15.0	25
13	Sarpang	151	596	747	915	81.6	168	18.4	18
14	Thimphu	11	1573	1584	1989	79.6	405	20.4	26
15	Trashigang	217	273	490	1181	41.5	691	58.5	14
16	Trashiyangtse	55	52	107	399	26.8	292	73.2	0
17	Trongsa	83	57	140	299	46.8	159	53.2	2
18	Tsirang	106	189	295	449	65.7	154	34.3	0
19	Wangdiphodrang	54	107	161	737	21.8	576	78.2	0
20	Zhemgang	112	71	183	401	45.6	218	54.4	3
	Total	1629	5328	6957	13302	52.3	6345	47.7	110

Annex-4 Nutritional status of children attending clinics - 2005

S #	District	Cases of child clinic attendances				Total Cases	Total cases With over-	Total cases with normal	Total cases under weight	% of normal weight	% of Over weight	% of Under weight
		Infants<1year		1-4years								
		New*	Old	New*	Old							
1	Bumthang	278	2584	6	2521	5389	854	4291	240	79.6	15.8	4.5
2	Chhukha	1442	7899	128	4365	13834	2479	10301	1054	74.5	17.9	7.6
3	Dagana	359	2782	72	1670	4883	1079	3163	617	64.8	22.1	12.6
4	Gasa	37	334	51	189	611	20	550	39	90.0	3.3	6.4
5	Haa	216	1577	5	1594	3392	623	2130	410	62.8	18.4	12.1
6	Lhuntse	370	2515	25	1768	4678	926	3187	490	68.1	19.8	10.5
7	Mongar	915	7338	0	7605	15858	3324	11149	1515	70.3	21.0	9.6
8	Paro	486	4415	0	2189	7090	912	5509	379	77.7	12.9	5.3
9	Pemagatshel	294	1806	3	1590	3693	1023	2851	468	77.2	27.7	12.7
10	Punakha	404	2395	0	1272	4071	248	3537	320	86.9	6.1	7.9
11	Samdrubjongkhar	938	5506	62	4968	11474	1681	8147	1029	71.0	14.7	9.0
12	Samtse	1290	6706	33	2683	10712	2174	7365	965	68.8	20.3	9.0
13	Sarpang	1204	6188	43	4288	11723	1697	8833	1193	75.3	14.5	10.2
14	Thimphu	2965	11698	3	4404	19070	4443	13365	1232	70.1	23.3	6.5
15	Trashigang	1056	7670	242	7298	16266	1030	13286	1947	81.7	6.3	12.0
16	Trashiyangtse	412	2494	6	2305	5217	785	4076	653	78.1	15.0	12.5
17	Trongsa	243	1950	0	1484	3677	1088	2746	210	74.7	29.6	5.7
18	Tsirang	373	3117	101	2520	6111	1636	4148	960	67.9	26.8	15.7
19	Wangdiphodrang	542	3637	93	2109	6381	1675	4114	365	64.5	26.2	5.7
20	Zhemgang	385	3124	8	3357	6874	1384	4319	1009	62.8	20.1	14.7
	Total	14209	85735	881	60179	161004	29081	117067	15095	72.7	18.1	9.4

*New: First Visit or first attendance

Annex-5 Number of Vaccines administered in 2005

S#	District	BCG No.	Measles No.	OPV3 No.	DPT-Hep B No.	OPV 0 No.
1	Bumthang	279	309	290	290	247
2	Chhukha	1440	1549	1585	1585	1277
3	Dagana	348	420	460	457	215
4	Gasa	22	50	29	31	14
5	Haa	198	213	205	205	173
6	Lhuntse	362	363	392	392	274
7	Mongar	915	910	874	868	673
8	Paro	486	638	622	623	438
9	Pemagatshel	290	280	288	288	229
10	Punakha	409	431	418	417	263
11	Samtse	1284	1220	1309	1287	883
12	Sadrubjongkhar	984	921	972	966	952
13	Sarpang	1101	927	975	973	800
14	Thimphu	2960	1869	1977	1981	2783
15	Trashigang	1060	1144	1104	1104	758
16	Trashiyangtse	411	379	411	409	314
17	Trongsa	227	277	280	284	229
18	Tsirang	370	427	409	402	350
19	Wangdiphodrang	557	699	702	728	468
20	Zhemgang	381	409	444	438	356
	Total	14084	13435	13746	13728	11696

Annex-6 Different types of Family planning method administered in 2005

S#	District	IUD Incerted	Oral Pills prescribed	DMPA Injected	Male sterilisation	Female sterilisation	Condoms distributed
1	Bumthang	27	252	637	72	6	30216
2	Chhukha	102	2866	4156	399	24	165106
3	Dagana	8	1195	1682	408	19	28928
4	Gasa	2	85	223	15	8	5828
5	Haa	7	206	542	4	9	8133
6	Lhuntse	5	563	1559	196	17	29471
7	Mongar	130	1172	4443	355	120	174355
8	Paro	104	368	897	424	215	23162
9	Pemagatshel	2	348	1117	6	1	8336
10	Punakha	19	1232	2685	34	11	25206
11	Samdrubjongkhar	107	917	2275	563	111	39195
12	Samtse	24	3025	2682	353	58	44593
13	Sarpang	72	1660	2688	1049	362	88439
14	Thimphu	492	2891	5124	433	210	161751
15	Trashigang	69	1136	4833	172	15	102531
16	Trashiyangtse	14	219	1045	0	1	16794
17	Trongsa	5	120	366	169	31	32421
18	Tsirang	41	583	1230	6	37	51521
19	Wangdiphodrang	28	471	976	46	7	76894
20	Zhemgang	47	901	1845	215	102	50354
	Total	1305	20210	41005	4919	1364	1163234

Annex-7 Hospital Admissions & Average duration of stay per inpatient - 2005

S #	District	Hospital Admissions			BHU Admission
		Total	Patient days	Average days	
1	Bumthang	220	647	2.9	12
2	Chhukha	4372	16708	3.8	168
3	Dagana	127	553	4.4	147
4	Gasa	0	0	0.0	4
5	Haa	267	535	2.0	0
6	Lhuntse	665	2957	4.4	183
7	Mongar	2957	20186	6.8	435
8	Paro	1896	6425	3.4	79
9	Pemagatshel	474	1898	4.0	26
10	Punakha	1436	6870	4.8	51
11	Samdrubjongkhar	2264	13217	5.8	217
12	Samtse	3115	16224	5.2	347
13	Sarpang	3787	13760	3.6	252
14	Thimphu	11185	81372	7.3	64
15	Trashigang	2239	11474	5.1	402
16	Trashiyangtse	628	4462	7.1	155
17	Trongsa	589	2772	4.7	65
18	Tsirang	642	2695	4.2	48
19	Wangdiphodrang	1237	5295	4.3	184
20	Zhemgang	1039	4355	4.2	76
	Total	39139	212405	5.4	2915

Annex-8 Laboratory services provided in different health facilities - 2005

S#	District	Haemoglobin levels	Blood grouping	Malaria slides	TB Sputum	Urine	Stool	HIV	Total
1	Bumthang	1110	373	23	51	1091	67	58	2773
2	Chhukha	11496	4023	5848	1115	11520	668	801	37611
3	Dagana	1312	529	97	66	2009	17	309	5609
4	Gasa	65	35	0	0	67	0	0	167
5	Haa	846	346	46	86	969	47	115	2970
6	Lhuntse	2033	869	99	183	3301	130	200	7084
7	Mongar	9886	2681	1204	1872	4971	423	666	27807
8	Paro	4435	1979	268	396	4576	326	380	21293
9	Pemagatshel	520	577	84	215	395	32	108	2664
10	Punakha	3336	1239	731	197	2926	83	301	8813
11	Samdrubjongkhar	5222	2145	11512	614	7677	395	618	28183
12	Samtse	7160	2504	8524	495	6255	283	523	25744
13	Sarpang	7395	2849	25398	579	24838	355	758	90563
14	Thimphu	48040	18694	2330	2941	33072	4666	6039	499256
15	Trashigang	4303	5222	315	368	6985	145	427	28809
16	Trashiyangtse	1095	419	32	139	971	74	45	2775
17	Trongsa	963	518	117	64	703	37	91	3003
18	Tsirang	1265	753	487	187	1340	19	34	4085
19	Wangdiphodrang	4490	1319	416	311	2697	144	242	9619
20	Zhemgang	1528	521	1050	88	3032	185	78	9381
	Total	116500	47595	58581	9967	119395	8096	11793	818209
	Percentage	14.2	5.8	7.2	1.2	14.6	1.0	1.4	100.0

Annex-9 Different Types of surgical procedures held in various hospitals - 2005

S#	District	Caesarian section	General abdominal	General othersextremities	Orthopaedic Others	Gaeno- cology	ENT	Eye	Total
1	Bumthang	0	0	0	0	0	0	10	10
2	Chhukha	39	592	5288	158	181	6	110	6402
3	Dagana	0	0	0	0	0	0	0	0
4	Gasa	0	0	0	0	0	0	0	0
5	Haa	0	0	0	0	0	0	0	0
6	Lhuntse	0	0	0	0	0	0	0	0
7	Mongar	48	129	146	185	27	134	111	883
8	Paro	57	57	98	3	12	89	16	341
9	Pemagatshel	0	0	6	0	0	0	0	6
10	Punakha	0	1	31	23	10	4	23	101
11	Samdrubjongkhar	36	108	193	126	158	27	48	753
12	Samtse	183	269	643	77	82	106	5	1366
13	Sarpang	131	128	2230	147	90	202	30	3011
14	Thimphu	609	924	187	576	59	851	469	4157
15	Trashigang	30	0	9	2	0	8	0	52
16	Trashiyangtse	0	0	53	0	0	0	12	65
17	Trongsa	0	0	119	12	15	2	0	148
18	Tsirang	0	0	0	26	0	3	1	30
19	Wangdiphodrang	0	0	110	26	137	0	46	349
20	Zhemgang	0	21	35	7	7	0	8	104
	Total	1133	2229	9148	1368	778	1432	867	17778

Annex-10

Diagnostic and dental services provided by hospitals - 2005

S#	District	X-ray			Ultrasound			Dental Services				
		Chest	Extremities	Others	Gyn/Obs	Abdomen	Others	Prophylaxis	Scaling	Fillings	Extractions	Others
1	Bumthang	76	84	10	0	0	0	17	30	260	418	291
2	Chhukha	3148	1391	1267	121	160	30	277	80	2873	2338	4539
3	Dagana	0	0	0	0	0	0	22	1	63	176	221
4	Gasa	0	0	0	0	0	0	0	0	0	0	0
5	Haa	18	42	12	0	0	0	40	0	199	397	326
6	Lhuntse	313	112	93	50	14	1	27	3	208	264	278
7	Mongar	1603	725	969	704	1025	245	35	33	518	1190	1925
8	Paro	477	535	324	372	38	8	74	52	1029	1514	1847
9	Pemagatshel	66	37	22	0	0	0	24	0	260	372	235
10	Punakha	621	460	283	450	372	188	34	11	556	484	1035
11	Samdrubjongkhar	1266	757	521	21	57	4	71	3	344	1193	608
12	Samtse	1930	1617	1277	579	50	138	100	24	597	984	1042
13	Sarpang	3528	831	444	1185	1260	178	50	24	1069	1959	2097
14	Thimphu	11305	6507	5337	7977	4605	5599	524	129	6025	9394	10525
15	Trashigang	829	396	311	1379	422	0	73	92	1105	1636	956
16	Trashiyangtse	208	72	83	0	0	0	37	8	60	108	137
17	Trongsa	108	119	61	0	0	0	28	31	294	324	419
18	Tsirang	209	218	59	0	0	0	44	33	325	477	620
19	Wangdiphodrang	878	282	166	22	0	0	15	2	402	744	1769
20	Zhemgang	339	65	296	383	557	14	4	0	254	188	234
	Total	26922	14250	11535	13243	8560	6405	1496	556	16441	24160	29104

Annex-11

District wise coverage of water and sanitation 2005

S#	District	% of Latrine Coverage	% of Safe water supply	% of HH with Functional	% of drainage Footpath Piped water	& % of HH with vegetable garden	% of HH with garbage	% of HH with Animal shed
1	Bumthang	98.1	95.1	93.1	86.7	92.0	94.3	96.7
2	Chhukha	90.6	82.6	79.2	72.2	34.1	76.9	87.9
3	Dagana	83.9	56.9	46.3	28.1	81.9	79.0	54.4
4	Gasa	88.2	38.5	37.3	39.6	39.6	77.7	95.4
5	Haa	82.4	91.7	87.9	29.3	65.0	34.6	66.1
6	Lhuntse	88.8	89.0	86.1	49.9	90.2	62.5	77.0
7	Mongar	87.9	76.3	57.1	37.0	70.5	57.4	83.6
8	Paro	94.4	89.7	87.5	75.2	81.8	82.4	81.5
9	Pemagatshel	83.2	84.6	67.7	22.5	57.5	49.8	86.4
10	Punakha	90.1	74.6	64.1	22.7	93.1	82.7	93.4
11	Samdrubjongkhar	93.7	80.8	76.9	29.5	69.0	70.3	83.3
12	Samtse	85.2	68.1	59.3	28.0	77.0	53.4	90.2
13	Sarpang	87.7	83.6	80.7	46.8	57.0	60.3	64.3
14	Thimphu	82.3	79.5	75.7	34.8	72.6	37.4	89.3
15	Trashigang	91.9	85.7	74.2	29.7	81.4	46.2	83.0
16	Trashiyangtse	89.6	81.4	74.9	52.3	80.5	71.1	77.2
17	Trongsa	89.8	93.5	90.6	55.1	86.2	64.3	98.4
18	Tsirang	82.7	70.5	67.5	42.9	78.9	71.4	61.5
19	Wangdiphodrang	92.3	75.7	63.5	61.0	79.1	80.2	69.9
20	Zhemgang	91.4	84.9	81.8	72.1	84.9	60.9	74.0
	Total	89.2	80.5	73.5	46.6	69.6	64.7	80.8

Functional Piped Water: At the time of Household Visit, if there wasn't any running tap water for whatever reason,it is treated as pipe water not functioning. However this may not necessarily mean the non-functionality of water scheme.

Annex-12

Morbidity and Report - 2005

ICD Code	Priority Health Problem/Disease	Under 5 Years		5 Years and above		Total	Referred		Deaths
		Male	Female	Male	Female		In	Out	
Infections									
A00	Cholera	2	2	18	7	29	2	0	0
A01	Typhoid	173	168	1311	1296	2948	41	37	1
A02*	Diarrhoea	12570	12204	22918	19609	67301	55	19	4
A03*	Dysentery	5044	5251	11768	9341	31404	27	11	0
A15*	Tuberculosis	38	22	600	416	1076	185	74	29
A33*	Tetanus	1	0	3	1	5	0	0	0
A36	Diphtheria	0	0	0	0	0	0	0	0
A37	Pertussis	0	0	0	0	0	0	0	0
A51	Early Syphilis	6	5	52	29	92	0	0	0
A54*	Sexually Transmitted Disease, excluding HIV/AIDS	5	12	1180	600	1797	3	16	0
A80	Polio	0	0	0	0	0	0	0	0
A82	Rabies	0	0	5	5	10	0	0	0
Viral, Protozoal & Helminthic disease									
B05*	Measles	8	14	20	27	69	1	1	0
B15*	Viral Hepatitis	102	84	352	273	811	17	30	0
B50	Plasmodium falciparum malaria	46	47	754	476	1323	23	26	4
B51*	Other Malaria	44	65	600	362	1071	9	5	1
B65*	Intestinal Worms	2785	2948	6949	6970	19652	9	2	2
B86	Scabies	1310	1368	6911	4663	14252	11	49	0
ABZ*	Other Infections (excluding ear, brain, STI)	1089	1095	4966	4588	11738	52	50	15
Neoplasm									
C53	Cervical Cancer	0	0	0	27	27	7	2	2
CZZ*	Other Cancers	0	5	312	211	528	83	13	40
D00*	Neoplasm (benign + CIS)	4	2	20	12	38	2	0	1
Blood diseases									
D50*	Nutritional Anaemia	224	252	2566	7076	10118	39	48	6
D55*	Blood & Immune Disorders	69	78	393	471	1011	8	12	6
Endocrine, Metabolic & Nutritional									
E10*	Diabetes	1	4	495	444	944	34	20	8
E40*	Malnutrition (exclude child clinic attendance)	145	194	225	318	882	14	14	16
EZZ*	Other Nutritional & Metabolic Disorders	168	178	761	800	1907	10	9	3
Mental disorders									
F20*	Psychosis	0	1	72	49	122	10	1	0
F31*	Depression	0	3	190	251	444	16	4	0
F40*	Anxiety	1	2	150	228	381	9	3	0
FZZ*	Other Mental Disorders	8	7	259	291	565	23	16	1
Disease of Nervous system									
G00*	Meningitis/Encephalitis	27	23	64	79	193	25	24	24
G41*	Epilepsy	23	29	525	431	1008	21	10	4
GZZ*	Other Nervous including Peripheral Disorders	217	246	6171	8625	15259	67	51	6
Eye & Ear Diseases									
H10	Conjunctivitis	3738	3862	14827	17980	40407	55	59	0
H25*	Cataract	16	11	454	371	852	28	2	0
HZ1*	Other Eye Disorders	1143	1324	12368	14064	28899	78	159	2
H65*	Otitis Media	2928	3052	6622	6302	18904	20	80	0
HZ2*	Other Ear Disorders	984	1027	3853	3932	9796	25	100	0
Diseases of Circulatory System									
I00*	Rheumatic Heart Disease	23	27	485	500	1035	90	38	15
I10*	Hypertension	0	0	7359	9211	16570	85	154	20
I20*	Ischaemic Heart Diseases	0	0	91	107	198	11	7	7
I60*	Cerebro-vascular Diseases	2	15	108	77	202	17	20	20
IZZ*	Other Circulatory Diseases	121	139	1941	2174	4375	117	111	77

Respiratory diseases									
J00	Common Cold	29633	30212	109298	116447	285590	172	72	5
J02*	Acute Pharyngitis/Tonsillitis	3597	3858	21083	22894	51432	12	84	1
J12*	Pneumonia	4033	4088	2220	2183	12524	96	144	44
JZZ*	Other Respiratory & Nose Diseases	2851	2900	12973	13933	32657	192	167	31
Diseases of the Digestive system									
K02	Dental Caries	1068	1039	12469	13773	28349	21	154	0
K00*	Diseases of Teeth & Gums	720	806	7034	7195	15755	14	102	0
K20*	Peptic Ulcer Syndrome	112	256	27185	34663	62216	88	229	6
K35	Acute Appendicitis	5	1	319	267	592	54	48	2
K70	Alcohol Liver Diseases	0	0	656	561	1217	99	85	92
K80*	Gall Bladder Diseases	19	18	299	651	987	32	30	1
KZZ*	Other Diseases of the Digestive System	2598	2514	15766	16128	37006	256	220	34
Skin Diseases									
L00*	Skin Infections	11597	11862	44406	36474	104339	93	110	4
LZZ*	Other Disorders of Skin & Subcutaneous-tissues	4794	4761	22997	19354	51906	120	144	2
Diseases of Musculo-skeletal system & Cogenital Deformities									
M00*	Arthritis & Arthrosis	184	217	5847	5622	11870	17	63	1
MZZ*	Other Musculo-skeletal disorders	395	653	24800	22290	48138	172	160	5
Genito-Urinary diseases									
N30	Cystitis	11	16	203	593	823	11	4	0
N61*	Infection of Breasts, including Puerperium	0	2	20	617	639	5	7	0
N62*	Other Disease of the Breast	1	8	24	1315	1348	6	19	1
N70*	Pelvic Inflammatory Disease	0	0	0	1759	1759	47	12	0
N91*	Menstrual Disturbances	0	0	0	3618	3618	24	38	2
NZZ*	Other Kidney, UT/ Genital Disorders	495	444	6282	12446	19667	229	208	22
Pregnancy, Childbirth and Puerperium									
O00*	Abortions	0	0	0	657	657	62	44	4
O13*	Pregnancy Induced Hypertension	0	0	0	514	514	66	66	1
O20*	Ante-Partum Haemorrhage & Placenta Previa	0	0	0	125	125	26	32	0
O32	Malpresentation	0	0	0	148	148	25	46	1
O63	Prolonged Labour	0	0	0	235	235	30	97	0
O64*	Obstructed Labour	0	0	0	155	155	28	25	1
O72	Post Partum Haemorrhage	0	0	0	197	197	22	16	3
O73	Retained Placenta	0	0	0	248	248	24	26	0
O85*	Puerperal Sepsis	0	0	0	92	92	12	9	1
OZZ*	Other complications of pregnancy	0	0	0	3726	3726	301	227	2
Perinatal Conditions									
P05*	Low Birth Weight	64	70	0	0	134	9	13	4
P95	Foetal Death & Stillbirth	29	29	0	0	58	3	1	10
P96	Neonatal Death	37	28	0	0	65	1	0	52
PZZ*	Conditions Originating in the Perinatal Period	398	257	0	0	655	20	12	24
Malformations									
QZZ*	Malformations	69	35	16	28	148	8	7	1
Injuries & Trauma									
T20*	Burns and Corrosions	756	751	1578	1124	4209	29	49	2
STZ*	Injuries & Poisoning	1123	1074	13079	5596	20872	256	297	14
VZZ*	Transport Accidents	60	71	986	293	1410	58	100	14
W50*	Bites & Stings	389	392	3274	2190	6245	24	23	1
WXZ*	Other External Causes of Injury	735	654	7947	3668	13004	113	121	10
Y96	Work Related Injuries	136	181	7830	3282	11429	79	87	4
YZZ*	Complications of Health Care	64	73	687	826	1650	9	20	1
ZZZ*	ANC, Immunisation & Other counselling	3092	3203	8884	18440	33619	45	69	2
Total Old Cases all causes : 447776									
Total		102130	104239	476880	497021	1180270	4339	4766	704

Annex-13 TB report from 2001 - 2005

TB report from 2001 - 2005						
1. Laboratory report	2001	2002	2003	2004	2005	2006
Sputum examined for AFB	5613	6014	6663	5781	6314	
Confirmed positive cases	384	416	443	418	350	
Smear positivity	6.8	6.9	6.6	7.2	5.5	
2. Case finding report of new & re-treatment cases						
New smear positive	359	364	360	356	308	
Relapse	28	35	38	36	40	
Failure	27	19	19	5	7	
Defaulters	34	29	11	9	4	
New smear negative	478	272	284	242	272	
New Extra pulmanary	329	318	344	354	387	
Total	1255	1037	1056	1002	1018	
New smear positive cases by age breakdown						
00 - 14	9	11	23	9	10	
15 - 24	109	108	119	108	94	
25 - 34	95	89	89	87	96	
35 - 44	57	54	37	61	39	
45 - 54	44	46	38	37	34	
55 - 64	21	27	35	26	23	
65 and above	24	29	19	28	14	
Total	359	364	360	356	310	
4. New smear positive cases by gender						
Male	199	209	199	203	179	
Female	160	155	161	153	129	
Total	359	364	360	356	308	
5. Case registered by treatment category						
Cat-1					610	
Cat-2					57	
Cat-3					351	
Total					1018	
6. Smear conversion at 2/3 months (%)						
New smear positive	68.5	71	80	86		
Relapse	72.5	52	72	85		
7. Treatment outcome among new smear positive cases (%)						
Cured	72	76	77	78		
Completed	14	10	11	5		
T/Success	86	86	89	83		
Deaths	2.3	3.3	3.5	4.5		
8. Treatment outcome among relapses cases (%)						
Cured	52	65	60	77		
Completed	19	14	13	10		
T/Success	70	78	73	87		
Deaths	7	5.4	6.6	0		
9. Present situation						
Population of the area:	Baseline (2000)	Target (9FYP)	Achievement (2004)	Gap		
Case detection	69	75	73	2		
Cured	72	85	78	7		
Completed	14	5	5	0		
T/Success	86	90	83	7		
Deaths	2.3	< 5	4.5	0		
10. Problem/contraints						

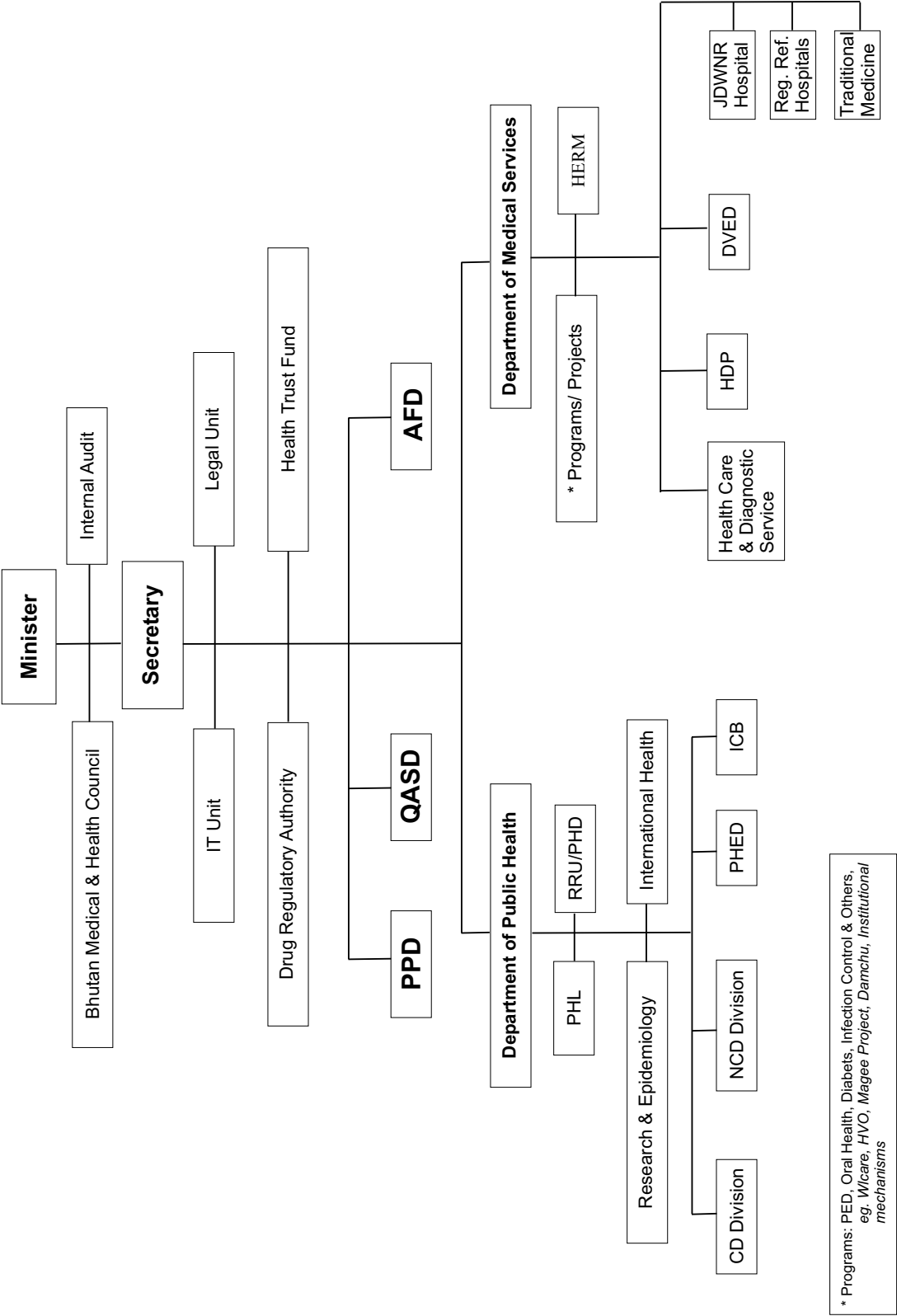
Annex-14

Treatment outcome from 2000 - 2004 in percent

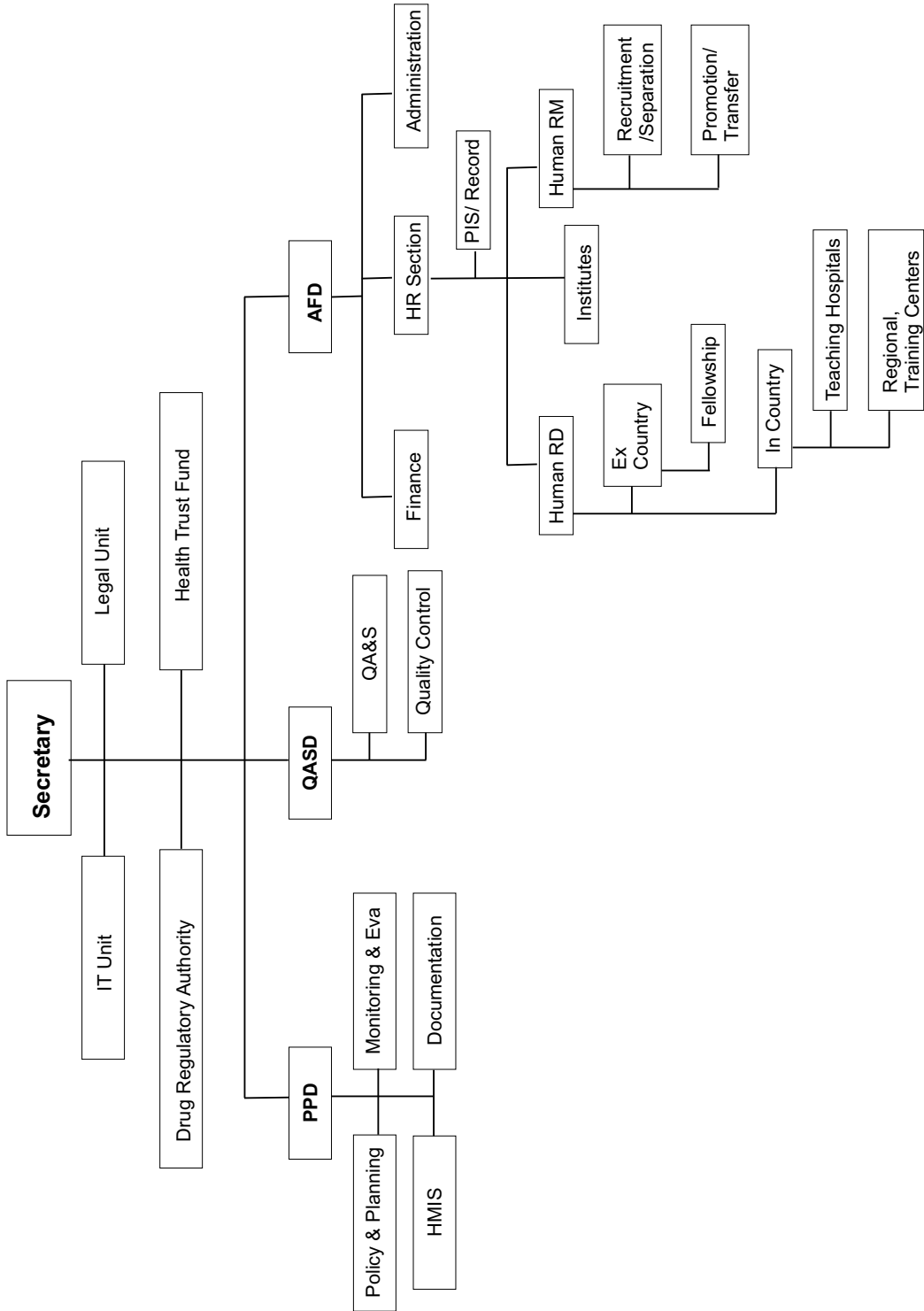
	2000	2001	2002	2003	2004	2005
1. New Pulmonary Positive:						
Cured	66	72	76	77	78	
Completed	20	14	10	11	5	
T/Success	87	86	86	89	83	
Deaths	4.6	2.3	3.3	3.5	4.5	
2. Relapse:						
Cured	57	52	65	60	77	
Completed	3.3	19	14	13	10	
T/Success	60	70	78	73	87	
Deaths	3.3	7	5.4	6.6	0	
3. Failure:						
Cured					66.6	
Completed					0	
T/Success					66.6	
Deaths					16.6	
4. Defaulters:						
Cured	35	35	45	12	50	
Completed	40	55	36	35	25	
T/Success	75	90	81	47	75	
Deaths	10	6.4	0	0	0	
5. Pulmonary Negative:						
Cured	3	15	5	6		
Completed	66	70	68	75		
T/Success	69	85	73	81		
Deaths	3.5	4.5	6.9	2.8		
6. Extra Pulmonary:						
Cured	4	4	1	3		
Completed	79	82	81	72		
T/Success	83	86	82	75		
Deaths	3.7	3.7	3.1	6.2		

Annex-15
Organogram Ministry of Health

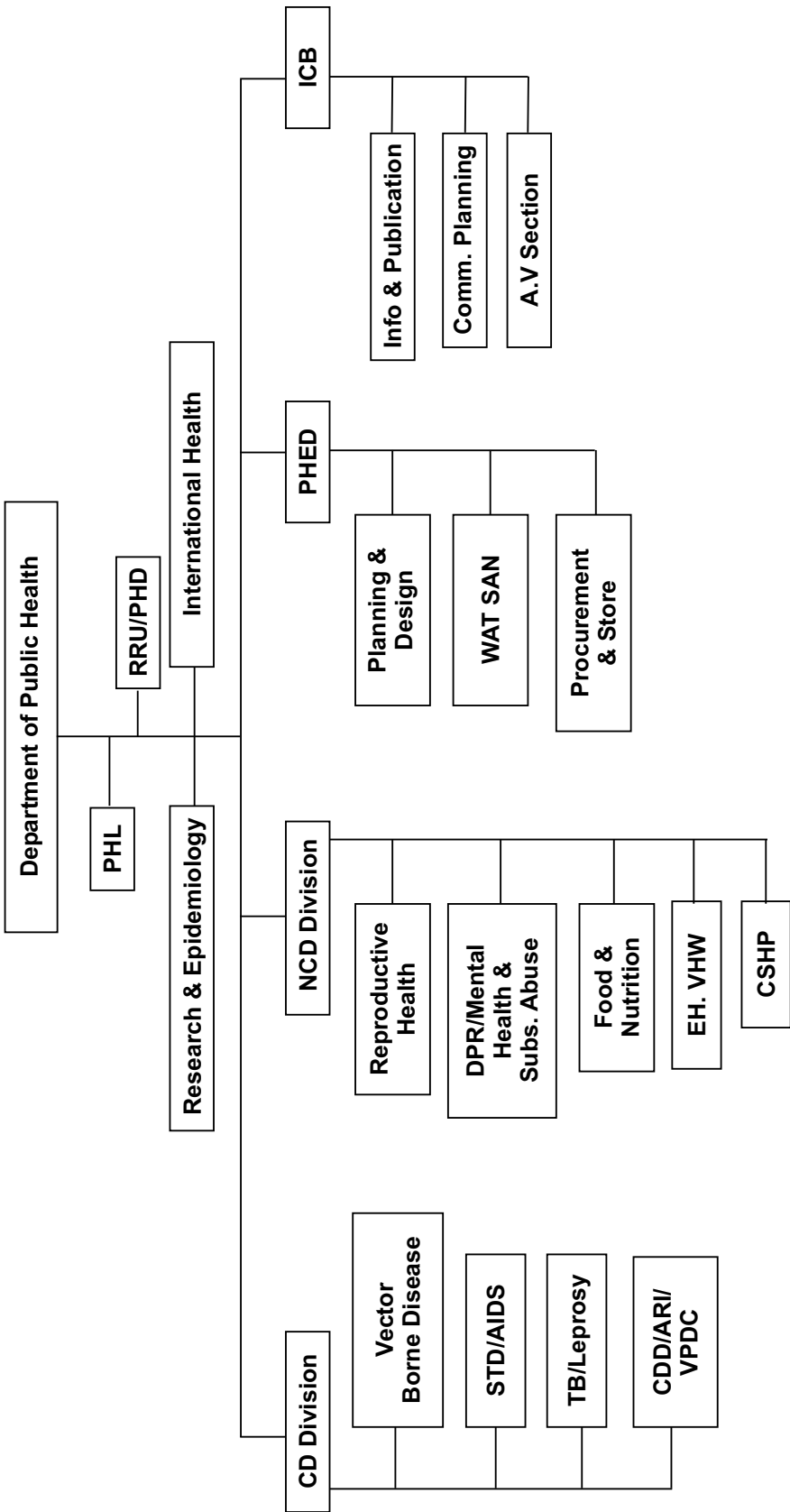
MINISTRY OF HEALTH



MINISTRY OF HEALTH
secretariat

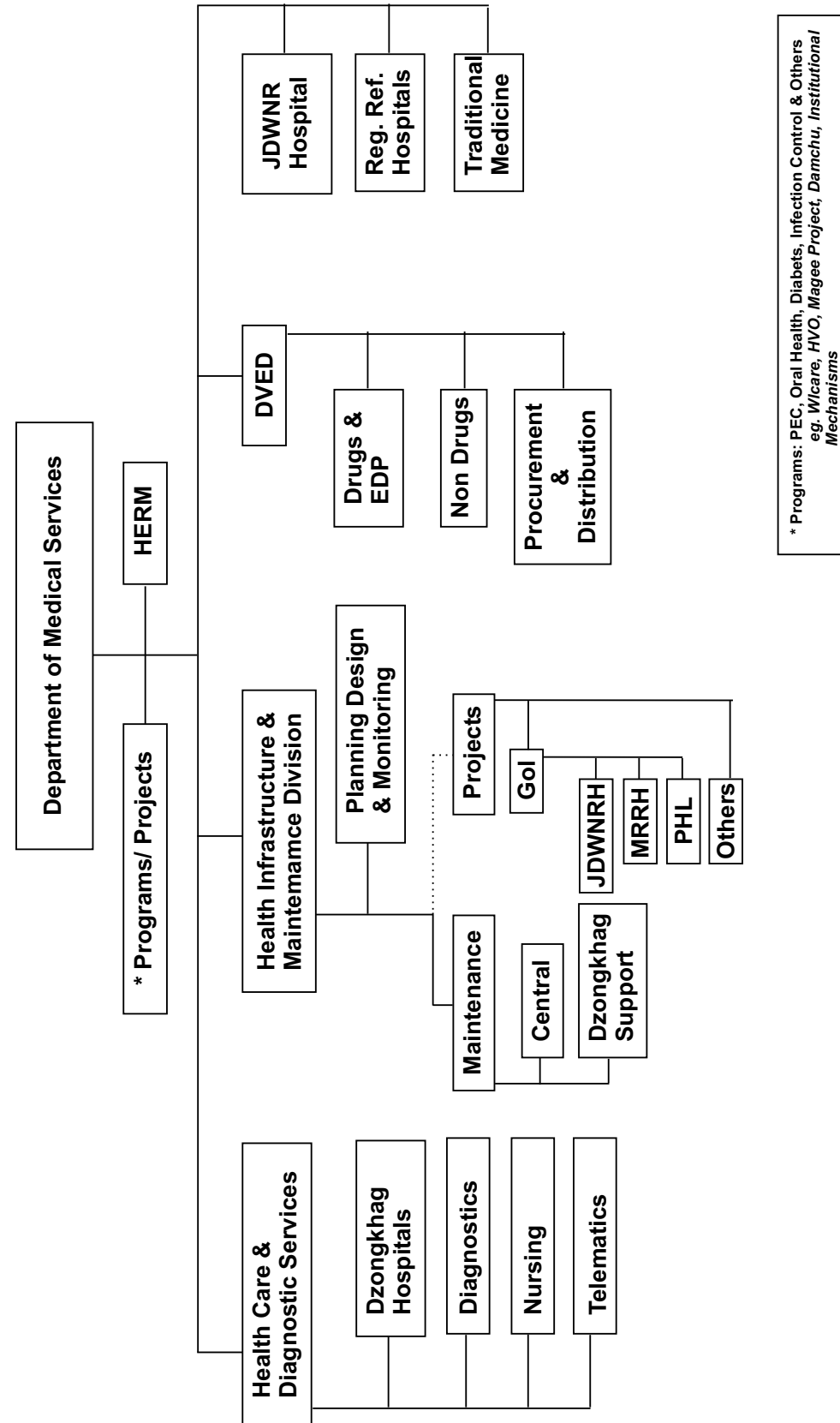


MINISTRY OF HEALTH
Department of Public Health



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Department of Medical Services



Annex XVI- Publications from Health Ministry

SL	NAME OF PUBLICATION	YEAR PUBLISHED	AVAILABLE
1	A Report, National Health Survey	2000	Research Unit, PPD Nutrition
2	Growth Monitoring Manual		
3	The path to eliminate Iodine Deficiency Disorders	1998	Nutrition
4	Kitchen Garden manual	1997	Nutrition
5	Community Based Nutrition Initiative : Guidelines	2003	Nutrition
6	Micronutrient supplementation and monitoring <ul style="list-style-type: none"> ➤ Guidelines for implementing and monitoring. ➤ Instruction pamphlets for teachers ➤ Resource booklet. 	2004	Nutrition
7	National Breast feeding policy (Dzongkhag & English)	2002	Nutrition
8	Public Health Nutrition for RIHS	2004	Nutrition
9	Anemia among men, women and children in Bhutan(How big is the Problem)	2002	Nutrition
10	National strategy for IDA	2002	Nutrition
11	Survey on Breastfeeding situation in Bhutan (Dr Ugyen Tshomo)	1990	Nutrition
12	A study on the knowledge, attitudes and practices of care for young children and pregnant women and mothers in P/gatshel(Dechen Choden)	1997	Nutrition
13	Community based nutrition projects, Pilot programme in Langdurbi, Zhemgang on care and nutrition(Damcho Lhamo)	1999	Nutrition
14	National Nutrition Manual, Program, Policies and Protocols	2004	Nutrition
15	National Food security Programme: Food Consumption Patterns (Chhoden Tshering, Ministry of Social Services)	1993	Nutrition
16	Community Based Nutrition Program, Langdurbi, Zhemgang: Participatory evaluation Report(Lungten and Tashi Tenzing)	2001	Nutrition
17	Report on the survey for Vit.A deficiency in children under five and pregnant women in Bhutan. (Dr Pem Namgyel)	2000	Nutrition
18	Nutritional status of Bhutanese Children	1998	Nutrition
19	Interim report on the Nation Wide IDD study	1991-1992	Nutrition

20	Internal Evaluation of Iodine Deficiency Disorders Control Programme(IDDCP)by cyclic monitoring	1998-2001	Nutrition
21	Guide to taking & reporting of ADR	2005	DVED
23	Store management manual	2005	DVED
24	Drug Utility Study	2004	DVED
25	National Drug Policy	1987	DVED
26	Essential Drug list	2005	DVED
27	EDP Case history book	2000	DVED
28	Standard treatment guideline	1998	DVED
29	Alcohol Booklet Dzongkhag & English	1997	IECH
30	Booklet on the facts about substance use and abuse	1999	IECH
31	Booklet on Common Mental Problem	1999	IECH
32	Booklet on Comprehensive School Health Document	1998	IECH
33	Health Education Manual booklet	1997	IECH
34	Family Planning Buddhism booklet	1996	IECH
35	Question and answer about HIV/AIDS(Dzongkhag & English)	1996	IECH
36	Art work/Illustration booklet and facts about substance use and abuse	1998	IECH
37	Booklet on Alcohol(Dzongkhag & English)	1999	IECH
38	Booklet on Tobacco(Dzongkhag & English)	1999	IECH
39	Booklet on Common mental problem	1999	IECH
40	Flip chart (mode village)	1998	IECH
41	Brochure safe blood (English & Dzongkhag)	2000	IECH
42	Brochure on F.P (Dzongkhag & English)	1995	IECH
43	Brochure on Leprosy Comprehensive(Dzongkhag & English)	1996	IECH
44	Message to Remember about STD/AIDS(Dzongkhag & English)	1996	IECH
45	STD/AIDS brochure English & Dzongkhag	1997	IECH
46	National Medical Standard for Contraceptive		

	Service	1996	Reproductive Health
47	National Medical Standard for Contraceptive Service. (2 nd Edition)	1999	Reproductive Health
48	National Medical Standard for Contraceptive Service. (3 rd Edition)	2003	Reproductive Health
49	Standard of Midwifery Practice for safe Motherhood	1999	Reproductive Health
50	Standard of Midwifery Practice for safe Motherhood. (2 nd Edition)	2004	Reproductive Health
51	Training Manual for Infertility Management	2003	Reproductive Health
52	Implementing the ICPD Programme of action in Bhutan.	1994-2005	Reproductive Health
53	Cervical Cancer Prevention in Bhutan (A Manual for Health Worker)	2005	Reproductive Health
54	Quality Assurances Policy Document	2002	QASD
55	Quality Control & Quality Inspection Guidelines	2005	QASD
56	Quality Assurance Training Manual(Draft)		QASD
57	MSTF	2005	HIV/AIDs
58	Voluntary Conduct Test	2005	HIV/AIDs
59	Sentinel Sero-Surveillance(Protocol)	2006	HIV/AIDs
60	Prevention of mother to child transmission	2006	HIV/AIDs
61	Pediatric (Guidelines)	2006	HIV/AIDs
62	STI	2006	HIV/AIDs
63			

Dear Readers,
Annual Health Bulletin has come a long way maturing with every issue. What Annual Health Bulletin today is all because of all our readers' feedbacks, suggestions and contributions.
To further strengthen and make it more relevant for our valued readers, we invite articles of any sort related to health especially in the context of Bhutanese population from the readers.
Some of the topics for articles which our readers may find interested are as suggested below:

- The HIV epidemic & Bhutan
- What threat does Avian Influenza pose to Bhutan?
- The role of research in health care
- Equal access to health care-are there still marginalized groups?
- IEC- does it work?
- The interface between health & education sector-exploring the potentials
- Rethinking manpower shortage in the Bhutanese health sector
- Who are actually referred to referral hospitals?

A day or week in the working life of a(Health Worker/Doctors/Nurses/Drungtsho/Chowkidar/Night Guard/ etc etc etc)

Real life experiences of patient cases (could be stories of difficult deliveries in remote places, critical operations in hospitals, situations where health staff have shown extraordinary initiative to provide treatment, prevention and many more)

We expect to receive contributions.

Editorial Team

To send contributions, feedbacks or for any queries relating to Annual Health Bulletin, Please contact:
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