2007–2017

National Cancer Control Program 2007–2017 Mongolia

Preparation of the National Cancer Control Program (NCCP)

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Table of Contents

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

ADB	Asian Development Bank
ADRA	Adventist Development and Relief Agency International
AFP	Alpha-FetoProtein
BMI	Body Mass Index
CIN	Cervical Intraepithelial Neoplasia
FDP	Family Doctor Practice
FGP	Family Group Practice
HBV	Hepatitis B Virus
HCC	Hepatocellular Carcinoma
HCS	Health Care System
HDR	High Dose Rate
HPV	Humanpapilloma Virus
HSUM	Health Science University of Mongolia
IARC	International Agency for Research on Cancer
IAEA	International Atomic Energy Agency
IAEC	International Atomic Energy center
ICC	Interagency Coordination Committee
IEC	Information, Education and Communication
IGRT	Image-Guided Radiotherapy
IMRT	Intensity Modulated Radiation Therapy
IRMS	Immediate release Morphine Sulphate tablets
JICA	Japan International Cooperation Agency
JICWELS	Japan International Corporation of Welfare Services
KAP	Knowledge, Attitude and Practice
KNU	Kagawa Nutrition University
LEEP	Loop Electrosurgical Excision Procedure
MCHRC	Maternal and Child Health Research Center
MCA	Millennium Challenge Account

MNE	Ministry of Nature and Environment
MoECS	Ministry of Education, Culture and Science
MoSWL	Ministry of Social Welfare and Labor
MOF	Ministry of Finance
MOH	Ministry of Health
MOJ	Ministry of Justice
MPCA	Mongolia Palliative Care Association
MUST	Mongolian University of Science and Technology
NCC	National Cancer Center
NCCP	National Cancer Control Program
NCD	Noncommunicable Disease(s)
NCHD	National Centre for Health Development
NHA	National Health Account
NPCP	National Palliative Care Program
OHS	Occupational Health and Safety

PHCS	Primary Health Care System
PHI	Public Health Institute
RCT	Randomized controlled clinical trial
RDTC	Regional Diagnostic and Treatment Center
SRMS	Slow Release Morphine Sulphate Tablets
SSIA	State Specialized Inspection Agency
TNM	Tumour, Node, Metastases (Classification of Malignant Tumours)
UNICEF	United Nations Children' s Fund
VIA	Visual inspection with acetic acid
WHO	World Health Organization

Summary

A National Cancer Control Program (NCCP) 2007–2017 with Action Plans is presented in this document. Priorities and strategies for Mongolia were identified based on cost-effective public health principles and WHO guidelines, for establishing NCCP.

The NCCP will be incorporated into all levels of Mongolia' s health care system (HCS), including the primary health care system (PHCS), and other existing relevant national programmes.

Goals:

(1) To prevent more than one third of all cancers.
(2) To cure more than one third of all cancers.
(3) To provide palliative care to two thirds of all cancer victims.

Objectives:

(1) To prevent two common cancers with vaccinations:
    (a) to prevent 40% of primary liver cancer, Mongolia' s most common cancer, with hepatitis B virus (HBV) vaccine at birth; and
    (b) to prevent 70% of cervical cancer, the most common cancer in women and fourth most common overall, by vaccinating young girls against the human papillomavirus (HPV).
(2) To prevent one third of cancers by reducing multiple risk factors for NCD in an integrated NCD approach, especially for tobacco.
(3) To establish earlier detection of cancer of the cervix, breast and larynx/oropharynx through health education; and to cure 80% of all these early cancers.
(4) To introduce a clear referral system so that limited therapeutic resources can be concentrated on curing the curable and improving the quality of life for the incurable.

(5) To increase the availability of palliative care services to improve control of pain and other major symptoms, thereby improving the quality of life for both cancer victims and their families.

(6) To integrate palliative care in all levels of the health care system, including home care, in order to cover all patients in need, regardless of the type of disease.

(7) To set up an effective surveillance system on epidemiology of cancer, and to establish a population-based cancer registry to monitor and evaluate indicators selected to determine the effect of NCCP interventions.

Expected outcomes:

The NCCP will be implemented stepwise with annual evaluations of indicators. Soft results will be available early, while hard results such as cure rates will take at least five years. Results from prevention activities may take from seven to 30 years. Palliative care results will be available days or weeks.

(1) More than one third, to probably more than half of future new cancers will be prevented within 20–30 years.
(2) The cure rate for cervix and breast cancers will shift from less than 15% to 60% within 10 years.
(3) All cancer victims will receive relief from pain and other debilitating symptoms within three to five years nationwide.

1. Introduction

Cancer is a major global problem. Each year, ten million new cases are diagnosed and seven million die of the disease. Over the next ten years, 84 million people will die if action is not taken. It is estimated that the incidence will be 16 million new cases a year by 2020 and 24 million by 2050.[1]

The predicted increases in cancer will be caused by dramatic demographic changes, i.e. a rapidly aging population. Today, more than 600 million people are aged 60 and over. This figure will double to 1.2 billion in 2025, and jump to two billion in 2050.

Many AIDS patients also have cancers. The annual mortality from AIDS is estimated to increase to four million in 2015 and, if preventive measures do not work, to six million in 2030s.[2]

More than 70% of all cancer deaths occur in low- and middle-income countries where resources for early detection, diagnosis, treatment and palliative care are limited or nonexistent. This is tragic as more than one third of cancers can be prevented,[3] one third can be cured if detected early, and most can be relieved of unnecessary pain and suffering through standard therapy.

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[1] Parkin DM, Bray FI, Devesa SS. Cancer Burden in the Year 2000: The Global Picture. *European Journal of Cancer*, 2001, 37:4–66.

[2] *Incidence and mortality data*. Geneva, WHO, 2003 (www.who.int/whr/2003/en/annex2-en.pdf).

[3] Stjernsward J *et al*. National cancer control programs and setting priorities. *Cancer Detection and Prevention*, 1986, 9(1-2):113–124.

Although considerable resources are being allocated globally to cancer research, efforts to implement these findings efficiently are lagging behind. Most cancer activities were developed haphazardly and lack overall coordination. Cancer control efforts can be more effectively planned and implemented if they follow a systematic stepwise approach of assessing the current situation, setting health objectives, evaluating the possible strategies, and setting clear priorities.

The World Health Organization (WHO) has pioneered and developed a public health strategy for cancer control as a rational way for using existing knowledge in cancer control. WHO's strategy is designed to be effective in countries with limited resources, considering the fact that the majority of the world cancers are in low- and middle-income countries.[4] Thus, guidelines for establishing national cancer control programmes based on these principles have been advocated, produced,[5,6,7,8,9] and implemented.[10,11,12,13,14,15,16,17]

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[4] *Ibid*.

[5] *National cancer control programmes: polices and managerial guidelines*. Geneva, WHO, 1992 (limited edition), 1995 (first edition) and 2002 (second edition).

[6] Cancer Control in the Eastern Mediterranean Region. EMRO Technical Publication Series, 20. Cairo, WHO, 1995.

[7] *Strategies to improve and strengthen cancer control programmes in Europe*. Report of a WHO Consultation. Geneva, WHO, 2004.

[8] *Cancer control: knowledge into action, guide for effective programmes (Planning).* Geneva, WHO, 2006.

[9] *National Cancer Control Program for India*. New Delhi, Directorate General of Health Services, Ministry of Health and Family Welfare, 1984.

[10] Nair MK. *Ten-year Action Plan for Cancer Control in Kerala*. Kerala, Trivandrum, 1989.

[11] *General strategies and provision for cancer control in Chile*. Chile, Ministry of Health, 1988; and *Plan AUGE 2000-2010*. Chile, Ministry of Health, 2003.

Special strategies for effective cancer control in resource-poor countries have been established,[18,19,20,21,22,23,24,25,26,2728] with concepts such as: down-

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[12] Generalitat de Catalunya, Departament de Sanitat i Seguretat Social, Direccio General d' Ordenacio i Planifacacio Sanitaria. *Catalan Cancer Control Programme*. Barcelona, Generalitat de Catalunya, 1991.

[13] *Nasjonal strategi for arbeid innenfor kreftomsorgen-kvalitet,kompetanse og kapacitet*. Oslo, Helse Departementet, 2004.

[14] *The National Health Service Cancer Plan: A Progress Report*. London, National Audit Office, Department of Health, 2005.

[15] *Cancerfondsrapporten 2006*. Stockholm, 2006.

[16] Duc NB. *National Cancer Control Plan for Vietnam 2006-2010.* Ho Chi Minh City, National Cancer Institute, Viet Nam, 2006 (www.nci.org.vn).

[17] *Albania National Cancer Control Program*. Tirana, Ministry of Health, and Copenhagen, WHO Regional Office for Europe (in press).

[18] Stjernsward J. National training of radiotherapists in Sri Lanka and Zimbabwe: priorities and strategies for cancer control in developing countries. *International Journal of Radiation Oncology, Biology, Physics*. 1990, 19(5):1275–1278

[19] *Ibid*.

[20] Hanson GP, Stjernsward J, Nofal M, Durosinmi-Etti F. An overview of the situation in radiotherapy with emphasis on the developing countries. *International Journal of Radiation Oncology, Biology, Physics*. 1990, 19(5):1257–1261.

[21] Nofal M, Durosinmi-Etti F, Hanson GP, Stjernsward J. Supporting cancer care in the developing countries: role of IAEA/WHO. *International Journal of Radiation Oncology, Biology Physics*. 1990, 19(5):1249–1256.

[22] Stjernsward J and Hanson G, eds. *Radiotherapy in Cancer Management: A Practical Manual*. London, Chapman & Hall Medical, published on behalf of WHO, 1997.

[23] Essential Drugs for Cancer Chemotherapy. *Bulletin of the World Health Organization*. 1994, 72(5):693–698.

[24] Sikora K et al. Essential Drugs for Cancer Therapy: A World Health Organization consultation. *Annals of Oncology*. 1999, 10:385–390.

[25] *Cancer Pain Relief*. Geneva, WHO, 1986.

[26] *Cancer Pain Relief and Palliative Care*. Geneva, WHO, 1990 (WHO Technical Report Series 804).

[27] Stjernsward J. Palliative Care: The Public Health Strategy. *Journal of Public Health Policy*. 2007, 28:42–55.

staging; mandatory linkage of radiotherapy to search for earlier referral of curable tumours; essential drug policies; pain relief and palliative care as a mandatory integral part of cancer control; and, prevention of tomorrow' s cancers, prioritizing tobacco control and vaccination.

When drawing up an outline for the NCCP, the working group kept in mind the following principles recommended by WHO:

- **People-centred:** The ultimate goal is to improve the well-being of people, communities, families and individuals.
- **Equity:** The strategy should focus on the needs of low- and middle-income countries and of vulnerable and marginalized populations.
- **Ownership:** The strategy should guarantee the strong commitment and active involvement of key stakeholders in each stage of the decision-making process and implementation.

- **Partnership and multisectoral approach:** The strategy should ensure the wide participation and collaboration of public and private sectors.
- **Sustainability:** The strategy should emphasize the need for national governments and partners to collectively strive for financial and technical self-reliance, to ensure the continuation of benefits from established programmes after major assistance has been completed.
- **Integration:** The strategy should be embedded within the overall framework of chronic disease prevention and control and other related areas (such as environmental health, communicable diseases).

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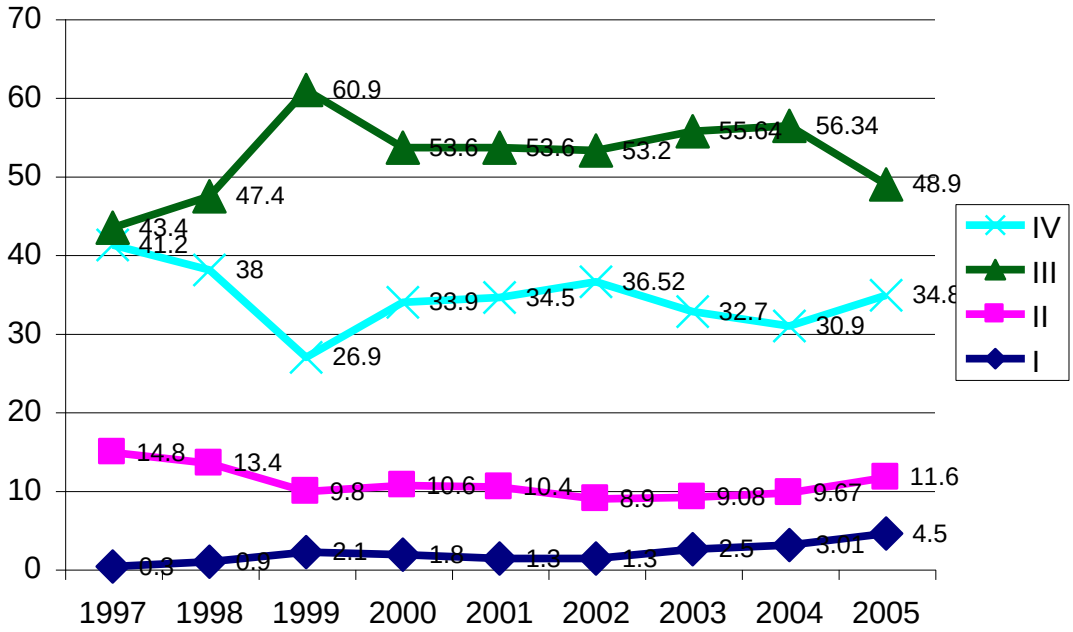
[28] Stjernsward J, Foley K, Ferris F. The Public Health Strategy for Palliative Care. *Journal of Pain and Symptom Management*. 2007 May, 33(5):547–551.

- **Stepwise approach:** The strategy should consider the implementation of interventions, at a national or subnational level, in a sequential manner.
- **Evidence-based:** The strategy should be based on research results, programme evaluation, economic analysis, best practice, and lessons from other countries.

Cancer is the second leading cause of mortality in Mongolia. Until now, cancer control has mainly been institutionalized with an emphasis on therapy-driven approaches and acute responses with no clear future plans. More than 80% of cancers diagnosed have been and still are incurable. Thus, during the previous so-called NCCP from 1997 to 2005 (Figure 1), cancer rates did not change. In 1997, 84.6% of cancers were stage IV or III and 15.1% were stage II or I. In 2005, 83.7% were stage IV/III and 15.1% were stage II/I.

Figure 1. Percentage of new cases of cancer in Mongolia by stage (1997-2005)



No follow-up of the curable 15% has been done, but the cancer registry reports death within five years after diagnosis in the majority of these cases, which reflects a significantly low cure rate in spite of the millions of US dollars invested in the National Cancer Center (NCC). However, there is now a critical mass of highly experienced and competent colleagues who, although underpaid, are dedicated and eager to implement new approaches.

Remarkably, the Mongolian Government at the same time has successfully pioneered mass vaccination of newborns with HBV vaccines, which ultimately will prevent a major part of the most common cancer today, namely primary liver cell cancer, which accounts for 40% of all cancers. The experience, knowledge and skills of mass vaccination and surveillance (including the cold chain), which permits over 98% childhood vaccination rates, will offer a platform for Mongolia to pioneer vaccination against the most common cancer in women, i.e. cervical cancer, which is also the fourth most common cancer in Mongolia. Vaccines against the two most common strains of the human papillomavirus (HPV), 16 and 18, which cause 70% of cervical cancer cases, are now available. In addition, one third of cancers are causally related to common risk factors, especially tobacco use, which is being addressed by the recently launched National Noncommunicable Disease (NCD) Program and the National Tobacco Program.

Mongolia is the only country in Asia and the neighbouring Russian Federation that has a National Palliative Care Program.[29] This programme is critically important for the country' s incurable cancer patients, where

[29] Davaasuren O, Stjernsward J, Callaway M et al. Mongolia: Establishing a National Palliative Care Program. *Journal of Pain and Symptom Management*, 2007, 33(5):568–572,.

palliative care and pain relief are pragmatic, relevant, cost-effective and humane. Ultimately, the National Palliative Care Program, which is being integrated in all levels in the health care system, will benefit all terminally ill patients with chronic diseases such as cardiovascular disease, AIDS, chronic hepatitis, and many diseases of the elderly, 60% of which have symptoms that can be controlled by palliative care.

Two common cancers that are curable with standard therapies if diagnosed early are cancer of the cervix and breast. Therefore, another priority besides primary prevention will be health education for women on early warning signs for these two cancers. These cases must be supported by adequately informed health professionals, diagnostics, referral systems, and curative therapies.

The regional diagnostic and treatment centres (RDTCs) must be strengthened and clear referral policies introduced so as to save the numerous incurable patients from excessive economic suffering as a result of coming in vain to the NCC. Proper diagnostic work-ups will be completed at the regional centres, professional "breaking of bad news" will be introduced, and palliative care will be offered in *aimags*, *soums* and homes.

By strengthening the capacity of RDTCs, the NCC will be able to concentrate on curing the curable and developing new information and approaches in controlled studies on common cancers, such as liver and stomach, identifying the borderlines for therapy. NCC staff will also be able to support and help build excellent regional programmes.

2. Present situation

2.1 Population and demographic data

Mongolia is a vast country with few people. Mongolia is located in north-central Asia, bordered by the Russian Federation to the north and by China to the south, east and west. Located far from any ocean, Mongolia has a unique landscape consisting of steppes, semi-deserts, and deserts, with high mountain ranges and alternately dry, lake-dotted basins. Mongolia occupies a total land area of 1565 million square kilometres (km^2). Mongolia is one of the most sparsely populated countries with 1.6 inhabitants per square kilometre.

In 2005, the resident population of Mongolia was 2 562 400, of which 49.6% were men and 50.4% were women. Sorted by age group, the population distribution was 32.6% for ages 0–14, 63.9% for ages 15–64, and 3.5% for age 65 and above. The average life expectancy at birth was 65.2 years (62.1 years for men, 68.6 years for women).[30] The adult literacy rate was 97.6% in 2000, according to a population and housing census.

Using a low poverty line (approximately US$ 20 per month per person), some 36.1% of the population is classified as poor with much more poverty observed in rural areas as compared to urban areas. In urban areas, the poor account for 30% of the population, while in rural areas they account for 43%. For all of Mongolia, the average consumption per person in 2003 was estimated at less than US$ 30 per month.[31] Per capita annual gross national income (GNI) was US$ 744 in 2005.[32]

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[30] State Statistical Office, 2005.
[31] *Country health information profile: Mongolia*. Manila, World Health Organization, 2006.
[32] *Op cit*. Ref 30.

In rural areas, Mongolia is divided administratively into *aimags* (21 *aimags*), with further local subdivisions into *soums* (343 *soums*) and *bags* (1222), the smallest administrative unit in rural areas. In the urban areas, the administrative units are divided into districts, with further subdivisions into *khoroos*/*khesegs*, the smallest administrative unit in urban areas. As of 2005, about 60.2% of the total population, or 1 543 300 people, lived in urban areas. Ulaanbaatar city area is divided into nine districts (six urban and three rural), with a total population of one million (see Figure 2).

Forty-five per cent of the Mongolian population live in *gers* and 20% live in apartments. Some 43.4% of the population living in *gers* are estimated to live on less than US$ 20 per month, with very limited access to safe water, sanitation and basic infrastructure services.[33]

2.2 Political situation

There are frequent changes of ministers and vice-ministers along with subsequent and continuing changes in senior staff of the Ministry of Health. In spite of this, Mongolia has succeeded in successfully pioneering many public health strategies in vaccination, prevention and end-of-life care.

2.3 Health system

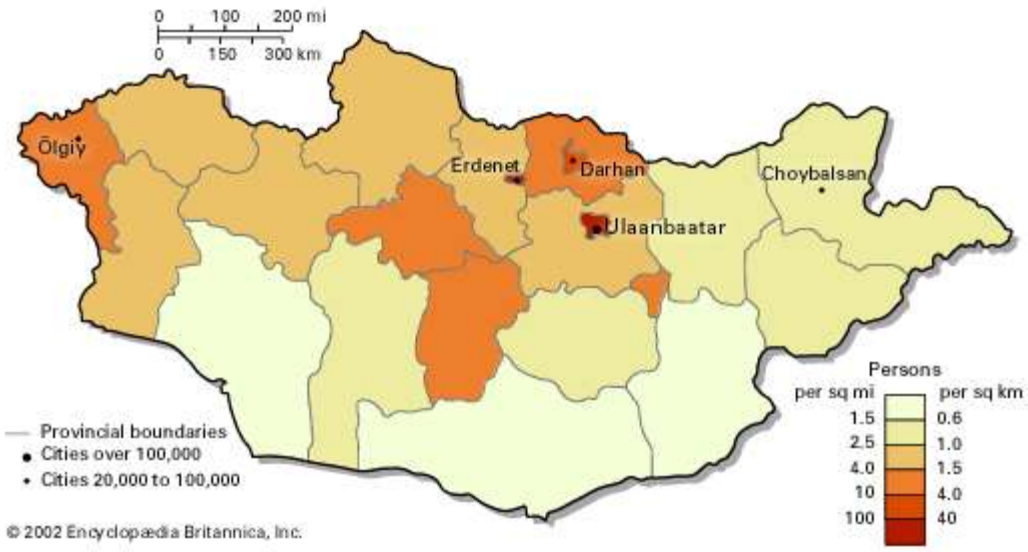
The health system in Mongolia is still in transition. There has been continued development of inefficient hospital-oriented services, which take the major part of funding resources, but have a limited impact. Recently, attention has been given to public health and primary health care

[33] *Op cit.* Ref 31.

services. Hopefully this will be supported by appropriate funding allocations to allow effective programme implementation.

The health care system in Mongolia has three levels. The first level comprises family group practices (FGP) in Ulaanbaatar city and *soum*/*inter-soum* hospitals in *aimags*. At least 230 FGPs are providing public health and primary health care in Mongolia. The secondary level includes the District Health Department (including district hospitals and ambulatory care) in Ulaanbaatar city and *aimag* hospitals in provinces. The tertiary level of health care services includes clinical hospitals and specialized centres in Ulaanbaatar city as well as RDTCs in the regions (consists of three to four neighbouring *aimags*). RDTCs have been established in the east (Dornod), the south-central area (Uvurkhangai), and the west (Khovd), within the framework of the regional development strategy. A fourth RDTC will soon be established in Orkhon to provide health care services to the northern region of the country (see Figure 2). Initially, RDTCs were established to provide specialized and tertiary-level health care services in the regions. However, their responsibilities need to be expanded to include the delivery of public health and primary health care services.

Figure 2. Population density and regional diagnostic and treatment centres



The three established regional diagnostic and treatment centres (RDTCs). A fourth is being planned in Erdenet, Orkhon *aimag*.

In 2004, the total number of health workers was 33 478, including 6590 doctors,
913 pharmacists and 7915 nurses.

The leading causes of morbidity in Mongolia are diseases of the respiratory system, digestive system, genitourinary system and circulatory system, as well as injuries. The crude death rate per 1000 population was 6.5 in 2004. The leading causes of mortality in Mongolia are diseases of the circulatory system, cancer, injuries, diseases of the digestive system and diseases of the respiratory system.[34] Primary liver cancers make up 40% of deaths caused by cancer.

2.4 Health financing

[34] *Op cit.* Ref 31.

The total government expenditure and net lending was 600 300 000 000 tugrigs or US$ 516 609 294 in 2005.[35]

In 2004, the health sector was financed by the state budget (68.9%), health insurance funds (27.4%), private out-of-pocket payments (co-payments) and other sources (3.7%). Health care accounted for 10.1% of the state budget.

Since 1994, the Health Insurance Council has supervised the utilization and spending of the health insurance fund. In addition, a National Health Accounts (NHA) system has been developed with support from the World Bank and WHO to track sources and use of funds in the health system. As shown in Table 1, the majority of funds are allocated for hospital care (76%); only a small amount is earmarked for ambulatory care (7%), public health (1%) and primary care.

Table 1. Spending by type of service

Type of service	Total spending	Percentage of total health expenditure	Spending per capita
Public health	US$ 589 387 (686 637 000 tugrig)	1%	US$ 0.24
Ambulatory care	US$ 3 544 223 (4 129 020 000 tugrig)	7%	US$ 1.46
Hospital	US$ 37 614 363 (43 820 734 000	76%	US$ 15.47

[35] US$ 1 is equal to 1162 tugrigs.

tugrig)

Primary care spending varies according to how it is allocated locally (for example, how much primary care is provided by a particular *soum* hospital). Overall, health care financing for primary health care was 29.4% of the total health expenditure, or 18.7 bln tugrig in 2005[37].

The Ministry of Health is now directly involved in the decision-making process for the allocation of public finances to health care institutions and programmes[36].

[36] *Op cit.* Ref 31.
[37] Health Indictors 2006, Mongolia

2.4.1 Health financing for cancer

A significant portion of NCC' s budget (see Tables 2 and 3) is spent on chemotherapy drugs. Without clear treatment policies and guidelines, these therapies have had little effect, as evidenced by the low rates of cured patients, overall definitively less than 15% five years survival. Essential drug lists and clear treatment policies should now be introduced.

Table 2. Expenditures of the National Cancer Center (2005-2006)

	Expenditures (in billion tugrig)		Difference	
Items	**2005**	**2006**	**(in billion tugrig)**	**%**
Salaries and bonuses	337 745.7	499 131.7	161 386.0	47.80%
Social insurance	92 425.5	142 175.5	49 750.0	53.80%
Electricity	37 029.0	38 166.1	1137.1	3.07%
Heating	100 188.9	95 939.5	-4249.4	-0.04%
Fuel	11 824.4	15 171.6	3319.2	28.00%
Water	31 852.4	41 376.7	9524.3	29.90%
Duty trip	1217.4	3605.0	2387.6	196.10%
Administration	34 934.2	60 383.5	25 449.3	72.90%
Laundry	32 000.0	32 000.0	0	0
Library	976.3	1774.8	798.5	81.70%
Communications	12 684.4	12 325.2	-359.2	-2.83%
Inventory	43 947.8	105 247.4	61 299.6	139.40%
Supply	16 901.5	11 707.7	-5193.8	-30.70%
Food supply	78121.7	77 080.6	-1041.1	-1.33%
Drugs and medicines	397 794.5	419 412.7	21 618.2	5.40%
Regular reconstruction	46 861.6	54 129.1	7267.5	15.50%
Others	89 584.6	67 168.8	-22 415.8	-25.02%
Fund for support	14 598.4	24 493.6	9895.2	67.70%
Total	**1 380 688.3**	**1 701 289.5**	**320 601.2**	**23.20%**

*Data from NCC

Table 3. Planned budget for the National Cancer Center in 2007

Items	State budget (Tugrig)	Funds from projects and/or programmes	Total budget (US$)
Drugs	550 000 000	—	473 322
Chemotherapy and/or injections	180 000 000	—	154 905
Morphine	15 500 000	—	13 339
Inpatient meal	76 000 000	—	65 404
Equipment	9 000 000	—	7745
Equipment maintenance	8 000 000	—	6884
Information, education and communication activities for community/population	—	20 000 000	17 212
Training	—	—	
Totals	**1 900 000 000**	**20 000 000**	**1 635 112**

*Data from NCC

2.5 Legal framework for health sector

The legal framework for the improvement of the population' s health is well established; however, the implementation of programmes and plans has not been successful because of financial shortages. The Ministry of Health of Mongolia has developed a Health Sector Master Plan for 2006–2015 and it's Implementation Framework for 2006–2010, with the support of the Japan International Corporation of Welfare Services (JICWELS). In addition, a National Programme on Prevention and Control of Noncommunicable Diseases was endorsed in 2005. Other supporting policies and programmes are the National Drug Policy; Law on Tobacco Control (2003), which was amended in 2005; National Program of

Population Health Education (1998); National Oral Health Program; National Communicable Disease Control Program (2002–2010); National Fitness Program (2002–2008); and National Palliative Care Program (2005–2015).

Evidence-based health reports have been released, such as the Mongolian STEPs survey on the prevalence of NCD risk factors (2006), report on the assessment of the mental health system in Mongolia using the WHO Assessment Instrument for Mental Health Systems (2006), and the national survey on the prevalence of alcohol dependence (2005–2006). These evidence-based documents will serve as a basis for the development of the updated NCCP, in accordance with WHO NCCP guidelines to reduce major cancers among the population of Mongolia. Also, the establishment of an operational Health Promotion Foundation will support primary prevention activities directed towards reducing major cancers in the community.

2.6 Cancer facilities and staffing

Table 4 shows the availability of diagnostic equipment and facilities at the National Cancer Center, RDTCs and local hospitals. Early detection capabilities are shown in regard to the major cancers.

Table 4. Early detection facilities

Major cancers	Early detection tests	National Cancer Center	Regional diagnostic and treatment centres	*Aimag* and district hospitals	*Inter-soum* and *soum* hospitals
Liver cancer	Alpha-fetoprotein testing	-	-	-	-
	Ultrasound	+	+	+	+
	Computer tomography	+-	-	-	-
	Arteriography	-	-	-	-
	Cytology	+	-	-	-
Stomach cancer	Endoscopy	+	+	+-	-
	Double visual	+-	-	-	-
Oesophagus cancer	Endoscopy	+	+	+-	-
	Double visual	+-	-	-	-
Lung cancer	X-ray	+	+	+	-
Cervical cancer	Acetic acid	+-	+-	+-	+-
	Cytology (Pap smear)	+	+	+	-
Breast cancer	Breast examination	+	+-	+-	+-
	Mammography	-	-	-	-

+ Available

- Not available

+ - Available, but not functioning

Recommendations

(1) Each year, 160 to 180 stomach cancer operations are performed in Mongolia. External funding should be sought to buy two Pentax® endoscopes (US$ 150 000 for
both) to assist with these operations and to facilitate a stomach cancer study.

(2) Standards and guidelines for diagnosis, treatment and palliative care of major cancers should be established in NCC, RDTCs and for all levels of the health care system.

3. Priorities and strategies for cancer control

The ten leading cancer sites among males and females in Mongolia are listed in Tables 5 and 6. An overview of the seven most common cancers is given in Table 7, together with a summary of priorities and strategies to be addressed regarding prevention, early diagnosis, therapy and palliative care for each cancer.

Table 5. Ten leading cancer sites among males in Mongolia (2005)

	ICD-10	Localization	Number of cases	Incidence	Frequency (%)
1	C22	Liver	674	54.6	39.0
2	C16	Stomach	341	27.6	19.7
3	C34	Lung	224	18.1	13.0
4	C15	Oesophagus	152	12.3	8.8
5	C40-C41	Bone and articular cartilage	33	2.7	1.9
6	C25	Pancreas	31	2.5	1.8
7	C00-C14	Lip, oral cavity and pharynx	29	2.3	1.7
8	C91-C95	Leukaemia	28	2.6	1.6
9	C71	Brain	25	2	1.4
10	C32	Larynx	20	1.6	1.1
		Others	168	13.6	9.7
		Total	**1725**	**139.6**	**100**

Source: National Cancer Center, National Cancer Registry

Table 6. Ten leading cancer sites among females in Mongolia (2005)

	ICD-10	Localization	Number of cases	Incidence	Frequency (%)
1	C22	Liver	505	38.9	30.4
2	C53	Cervix	292	22.5	17.6
3	C16	Stomach	189	14.5	11.4

4	C15	Oesophagus	138	10.6	8.3
5	C50	Breast	95	7.3	5.7
6	C34	Lung	59	4.5	3.5
7	C00-C14	Lip, oral cavity and pharynx	38	2.9	2.3
8	C56	Ovary	37	2.8	2.2
9	C18	Colon	35	2.7	2.1
10	C54	Corpus uteri	23	1.7	1.4
		Others	251	19.3	15.1
		Total	**1662**	**128.0**	**100**

Source: National Cancer Center, National Cancer Registry

Table 7 summarizes priorities and strategies for the eight most common cancers in Mongolia. Seven out of the eight cancers are clearly preventable. Five out of eight cancers are eligible for early detection, in which case they are also curable. Three cancers are incurable; however, if detected early, stomach cancer can be cured. Palliative care is needed for all types of cancer. Unfortunately, in Mongolia, more than 80% of breast, cervix and larynx cancers are late-stage, incurable cancers when diagnosed.

Table 7. Priorities and strategies for the eight most common cancers in Mongolia

	Type of cancer	Primary prevention	Early detection	Curative treatment	Palliative care
1	Liver	++	-	-	++
2	Stomach	+	+	-	++
3	Lung	++	-	-	++
4	Cervix	++	++	++	++
5	Breast	-	++	++	++
6	Lip, oral cavity and pharynx	+	+	+	++
7	Colon	+	+	+	++
8	Larynx	++	++	++	++

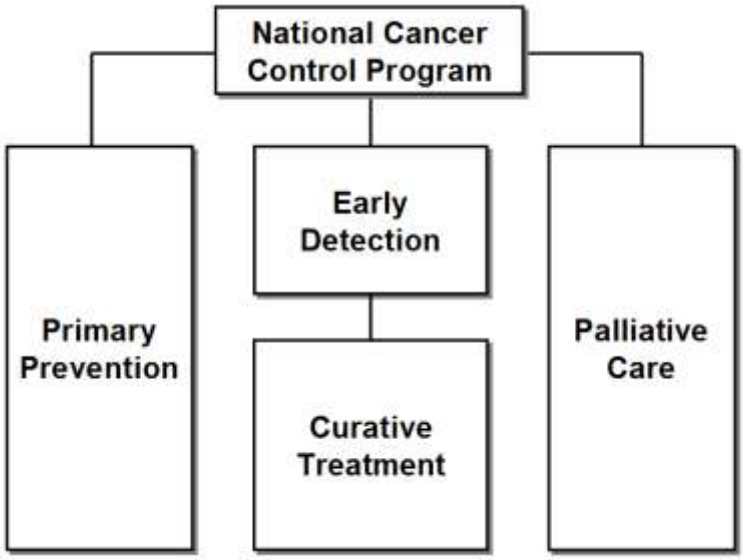
+/++ = effective, possible, should be done

- = not effective

Figure 3 shows the four key components (pillars) of a national cancer control programme. The two pillars of "primary prevention" and "palliative care" should be part of an integrated approach to health care and should be incorporated with other relevant national programmes.

Meanwhile, "early detection" and "curative treatment", which are specific to cancer, should be mandatory linked.

Figure 3: Pi



4. Cancer prevention

At least one third of all cancers can be prevented through the control of known risk factors (see Table 8). Primary prevention of future cancers, therefore, must be one of the priorities of the NCCP. Most of the common cancers in Mongolia can be averted through primary prevention: (1) liver cancer (hepatitis B vaccination, improved food safety, and reduced alcohol consumption; (2) stomach cancer (improved diet, treat *Heliobacter pylori* infections, and reduced salt intake); (3) oesophageal cancer (uncertain); (4) cervical cancer (change sexual behaviour, vaccine); and (5) lung cancer (control tobacco use). Tobacco is the single most important risk factor for not only lung cancer but also many other types of cancer

Table 8. Risk factors associated with common cancers

	Common cancer	**Prevention**	**Risk factors of common cancers**									
			Heliobacter pylori	Tobacco	Alcohol	Some mycotoxins,	Obesity	Post-menopause	Salt intake	Hepatitis B virus	Humanpapilloma	Occupation
1.	Liver	++			+	+				++		+
2.	Stomach	++	++		+				+			
3.	Oesophageal	-			+				+			
4.	Lung	++		+ +								++
5.	Cervix uteri	++		+							++	
6.	Breast	-		+			+	+				

\+ risk effect
++ strong risk effect

- no risk effect

In Mongolia, the legislative environment for primary prevention has been established. In 2005, the Government endorsed an integrated programme for noncommunicable disease (NCD) prevention and control. It also runs several other national programmes that deal with infectious disease control; tobacco use; alcohol consumption; immunization; and food security, safety and nutrition. The NCCP should be integrated with these national programmes.

Table 9 outlines an action plan for primary prevention. The outlined strategies for the general public should be coordinated with those for the health professions.

Table 9. Action plan for primary prevention

Target audiences	Strategy	Approach
General public	Promote health education and public awareness: o Conduct intensive information, education and communication (IEC) campaign to promote changes of behaviour, e.g. healthy diets and healthy lifestyles. Specific to cancer control: o Increase public awareness on vaccinations for hepatitis B virus and humanpapilloma virus. o Increase awareness of sexually transmitted infections. o Increase awareness of cervical and breast cancer among highly susceptible groups. Increase awareness of environmental and occupational safety (danger of chemical toxicity).	Conduct mass media campaign. Prepare education materials. Carry out more than 60 activities in cooperation with the NCD programme.
Health care professionals	Promote education and awareness: o Improve knowledge and skills on risk factors of cancer. Improve knowledge and skills on	Conduct training. Prepare education materials.

	early detection of cancer.	
Stakeholders and policy-makers	Provide information on cancer burden	Prepare policy papers through intersectorial collaboration and multidisciplinary approach. Use one third of the tax revenues on tobacco to finance the NCCP and integrated NCD prevention and control programme.
Evidence and verification	Monitoring and evaluation	Prepare technical reports. Conduct periodic surveys.
Expected outcomes: (1) Improved capacity for establishment of health promotion environment (2) Increased number of "health promotion" settings, production and services (3) Enhanced healthy lifestyles among population and reduced NCD risk factors		

4.1 Viruses

4.1.1 Hepatitis B virus and liver cancer

Primary hepatocellular carcinoma, or liver cancer, is the most common cancer in Mongolia and accounts for 40% of all new cancers diagnosed annually. Fortunately, it is also the first cancer that might be prevented with a vaccine.[37][38] The vertical transmission of the hepatitis B virus from mother to child at birth can be prevented by immunization. WHO recommends HBV vaccination at birth in countries with a chronic carrier rate
over 10%.

Mongolia places a high priority on childhood immunization and has achieved notable success in controlling vaccine-preventable diseases. Despite the challenge of low population density in rural areas, where over half of the population lives and many lead nomadic lifestyles, routine immunization coverage with hepatitis B vaccine at birth has achieved a rate of 98%. There is already increasing evidence of a significant reduction in chronic hepatitis B infection in vaccinated children. An expected decrease in the incidence of liver cancer will take a considerably longer time to document, however. The HBV vaccine is given at birth and repeated as booster doses. The monovalent vaccine is being replaced by the pentavalent DTP-HepB-Hib vaccine in concordance with the new Immunization Safety Policy and an associated Safe Injection Plan. Both the policy and the plan were established by the Expanded Programme on Immunization (EPI), with support from WHO, United Nations Children' s

[37] Prevention of liver cancer. *WHO technical report series*, No 691. Geneva, WHO, 1983.
[38] Prevention of hepatocellular carcinoma by immunization. *Bulletin of WHO*, 1983, 61(5):731–744.

Fund (UNICEF) and Japan International Cooperation Agency (JICA), and coordinated by the Interagency Coordination Committee (ICC).

Again, Mongolia is at the forefront of a public health strategy for disease control, including vaccinating against a virus that causes the country's most common cancer.
In 2006, 46 040 out of 47 950 newborns were vaccinated, and in 2010, it is expected that
50 742 out of 52 311 will be covered.[39]

Recommendation

(1) A member from the NCC liver cancer team should be included in the Ministry of Health's ICC on EPI. Their involvement would ensure the inclusion of liver cancer data on cancer registry forms, which would aid the scientific documentation of the preventative effect of vaccination on the development of primary liver cell cancer.

4.1.2 Human papillomavirus and cervical cancer

Cervical cancer is the most common cancer in women in Mongolia and it is the fourth most common cancer overall in Mongolia. Virtually all cervical cancer cases are linked to genital infection with human papillomavirus (HPV). There are 40 different genotypes of HPV. Two high-risk genotypes, HPV 16 and 18 are responsible for the majority of HPV-related cancers. The peak incidence of infection usually occurs during the first years of sexual activity. HPV infections usually resolve spontaneously but may persist, and precancerous lesions may follow. If untreated, these may progress to cervical cancer over a period of 20 to 30 years. There now

[39] Proposal for support submitted to the Global Alliance for Vaccines and Immunization (GAVI) and the Vaccine Fund. Ulaanbaatar, the Government of Mongolia, 2004.

exists vaccines that target HPV 16 and 18, which are responsible for 70% of cervical cancer cases in Asia and worldwide. Vaccination should occur before the sexual debut, before the risk of HPV infection. Each country must identify the most convenient and effective way of reaching young girls before they begin having sex. Mongolia has convincingly documented its competence in surveillance, reaching desired targets for mass vaccination and establishing necessary infrastructures, e.g. the cold chain, and thus would be highly competitive in acquiring financial support to pioneer vaccination against cervical cancer.

Recommendations

(1) The sexual and reproductive health programmes in Mongolia should begin to include information about cervical cancer (cause, vaccination, detection, early warning signs, and curability) in addition to information on sexually transmitted infections, including HIV/AIDS.

(2) Because Mongolia has extensive experience with mass vaccinations (see 4.1.1) and has established infrastructure for its successful implementation, the NCCP should seriously consider vaccinating young girls before they become sexually active, e.g. at age 12. Thereafter, the NCCP should approach a suitable donor agency, e.g. JICA, Bill & Melinda Gates Foundation, Asian Development Bank (ADB) and especially GAVI, which financially supports the introduction of "new vaccines" and "health system strengthening."

(3) A gynaecologist from NCC should be added to the ICC for mass vaccinations.

4.2 Common NCD risk factors

Within the framework of the NCD prevention and control programme, Mongolia adopted the WHO STEPwise approach to surveillance (STEPS) to collect and analyse data on the NCD-associated risk factors in Mongolia and to establish a NCD surveillance system. An integrated approach that collectively covers cancer, cardiovascular disease and diabetes is the most rational and cost-effective strategy for addressing the risk factors outlined below.

4.2.1 Tobacco

Tobacco is causally related to around one third of cancers. It is the single most preventable cause of ill health. The majority of males smoke and this trend seem to be increasing; the proportion of females who smoke is still relatively small but is increasing. The import of tobacco products has dramatically increased in Mongolia over the past few years. For instance, the number of manufactured cigarettes imported per person has increased by 10–15 times in 2000 as compared to 1997, which also reflects the rise in tobacco use among the population.

A survey from 1999 showed that 14.1% of teenagers smoked, 66.2% were exposed to second-hand smoke, and 44.8% of children and adolescents bought tobacco and/or cigarettes. As part of the Tobacco Free Youth project, another survey was conducted in 2000-2003 with support from the Adventist Development & Relief Agency (ADRA) International. The study revealed that in 2000, 40% of urban youth were smokers (61.4% were male and 18.9% were female). As of 2003, the overall proportion of smokers had increased to 45% (65% were male and 21% were female). A joint survey conducted in 2002 by Public Health Institute (PHI), Mongolia and Kagawa Nutrition University (KNU), Japan revealed that 55.6% of men and 16.6% of women of Ulaanbaatar city were smokers.[40]

Overall, 28% of Mongolians are current smokers, of which 24% are daily smokers and 3% are non-daily smokers. The proportion of daily smokers in males (43%) is ten times higher as compared to females (4%). The average age when tobacco users started smoking was 20 years, resulting in an average duration of smoking of 17.5 years. This long duration of smoking is a high risk for regular smokers. Most of the regular smokers use manufactured cigarettes.[41]

A Health Promotion Foundation is being established in Mongolia. Funds for the Foundation will come mainly from the state budget in accordance with Article 6.1.3 of the Law on Special Foundations of the Government. Article 10.2 of the Law on Tobacco Control states that the Foundation will

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[40] *Japan joint survey 2002*. Mongolia, Public Health Institute and Japan, Kagawa Nutrition University, 2002.

[41] *Mongolian STEPS survey on the prevalence of noncommunicable disease risk factors 2006*. Manila, World Health Organization, 2007.

be funded by the budget, equal to 2% of the tobacco excise tax (about 200 million tugrig in 2004). As such, 212 million tugrig has been allocated to the budget of the Ministry of Health.

4.2.2 Nutrition

The diet of Mongolians is characteristically high in protein and rich in fatty foods of animal origin, predominantly mutton and beef. Around 80% of all dietary fat is derived from saturated animal fat. In addition, the continental climate affects nutritional variety and accessibility of certain foods as well as the eating patterns of Mongolians. Also, eating habits and food consumption are different between urban and rural populations. The lifestyles and more traditional eating patterns of urban residents have changed; it is therefore necessary to investigate diet-related NCD, particularly cardiovascular disease, cancer and metabolic disorders, and associated common risk factors specific to Mongolia.

According to results from the Second National Nutrition Survey (1999), the daily fat intake was 92.1 grams (g) in urban and 112.5g in rural areas, which in turn demonstrates an excessive fat intake as compared to the recommended fat intake of 76.2g.[42]

Seventy per cent of Mongolians drink salted tea. The average daily salt intake (15.1g) is more than two times higher than the salt intake (6g per day) recommended by WHO.

Due to the continental climate of Mongolia, some types of fruit and vegetables cannot be grown and therefore must be imported. The high cost of imports has had a negative impact on the consumption of fruit and vegetables. Mongolians tend to eat vegetables like potato, cabbage,

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[42] *The Nutrition Status of the Mongolian Population 1999: The 2nd National Nutrition Survey*.
Ulaanbaatar, Nutrition Research Center of the Public Health Institute, 2002.

carrot, turnip, onion, garlic, tomato and cucumber. Over the past few years, the consumption of green leafy vegetables has been increasing somewhat in urban areas.

The consumption of fruit and vegetables varies between urban and rural residents. In urban areas, 89.2g of vegetables and 59.1g of fruits are consumed per household member per day, as compared to 79.5g and 32.8g, respectively, in rural areas.

The joint PHI, Mongolia and KNU, Japan survey, which was conducted in Ulaanbaatar city in 2002, concluded that the daily intake of fruit and vegetables did not meet the WHO recommendations (400g per day).[43] The survey also indicated that 23.1% of the respondents did not consume vegetables and 81.3% of the respondents did not consume fruits daily. In addition, the respondents used excess amounts of saturated fat from animal sources; on the contrary, the intake of dietary fibre was low.[44]

[43] *Op cit.* Ref 40.
[44] *Op cit.* Ref 40.

4.2.3 Overweight and obesity

According to survey results from 1993, 17.3% of the population was overweight (body mass index [BMI] from 25 to 30) or obese (BMI from 30 to 40). This reached 26.5% in 1999,[45] and 27% in 2001.[46] The average height, weight and BMI were 167.4 cm, 67.7 kg and 24.1 for Mongolian men and 154.9 cm, 59.4 kg and 24.7, accordingly, for women.

In regard to BMI, 31.3% of adults were overweight and 9.4% were obese; 47.7% of adults residing in downtown of Ulaanbaatar city were overweight and obese. In regard to waist-to-hip ratio, 74.2% of women and 24.4% of men had central obesity, thus the prevalence of central obesity was greater in women by almost 50% than in men.[47]

4.2.4 Alcohol

According to statistics from the Mental Health and Narcology Center, 51.2% of adults use alcohol on a regular basis. Results from a United Nations survey (1998) indicated that 12.7% of adults could be identified as heavy drinkers.[48]

The knowledge, attitude and practice (KAP) survey of 2001 revealed that 43.6% of the respondents consumed one to three standard drinks of

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[45] *Op cit.* Ref 42.

[46] *Op cit.* Ref 40.

[47] *Op cit.* Ref 40.

[48] *International guide for monitoring alcohol consumption and related harm*, pp 193. Geneva, WHO, 2000.

alcohol and alcoholic beverages a week, while 47.5% consumed more than three standard drinks a week.[49]

Regarding alcohol use, 34% of respondents of the STEPS survey (25% of the surveyed male and 43% of the surveyed female population) did not consume alcohol at all over the past 12 months. Among drinkers, about 60.8% consumed alcohol occasionally
(65.1% males and 56.2% females), 5.0% consumed alcohol moderately (8.8% males and 1.0% females) and only 0.7% drank alcohol frequently (1.1% males and 0.2% females).[50]

[49] Knowledge, attitude and practice towards risk factors of noncommunicable diseases. Ulaanbaatar, Public Health Institute, 2002.
[50] *Op cit*. Ref 41.

4.2.5 Physical inactivity

The socioeconomic situation in Mongolia has changed dramatically due to a shift to market economy. As such, new developments and technology have been introduced into public and private sectors, resulting in an advancement of human knowledge and life requirements. In such a situation, it is necessary to develop evidence-based health and physical fitness education programmes, taking into account physical features of Mongolians and today' s social environment.

According to "the test to define physical fitness and body development of the population" performed in 2000, 48.6% of preschool children, 40.1% of adolescents and 42.6% of adults did not meet the desirable standard levels of physical fitness and body development. The assessment of physical fitness and body development in schoolchildren conducted between 2002 and 2004 revealed that 68.3% of all schoolchildren of Ulaanbaatar city did not meet the required levels.[51]

The joint Mongolia and Japan survey (2002) revealed that 23% of the urban respondents engaged for less than 30 minutes per day in physical activity or were physically inactive; additionally, 51.6% of the respondents were watching television for one to three hours, 27.7 % for four to five hours and 8.5 % for more than six hours per day.[52]

About 23% of the STEPS survey respondents engaged in only low levels of physical activity; 34% and 30% of the surveyed population did not engage in vigorous and moderate physical activity, accordingly, at work and in

[51] *Op cit.* Ref 41.
[52] *Op cit.* Ref 40.

recreational settings, which might be related to sedentary work places. Therefore, actions are needed to be taken at the national level to develop community-based physical activity programmes matching modern lifestyle needs.[53]

4.3 Environmental and occupational risk factors for cancer

4.3.1 Environmental health

There is strong evidence that environmental pollution is above acceptable levels in urban areas:

- three power plants use 3.3 million tonnes of coal annually;
- more than 400 chimneys burn 1.3 million tones of coal annually;
- 134 000 households burn 0.7 million tones of coal every year; and
- in Ulaanbaatar, about 80 000 vehicles use 152 800 tonnes of benzene and 108 300 tonnes of diesel fuel.

[53] *Op cit.* Ref 41.

Due to weak capacity, only two parameters (sulphur dioxide and nitrogen dioxide) are routinely monitored by the Central Laboratory of Nature and Environment. There is no baseline information on the level of environmental carcinogens. Consequently, no systematic measures are being taken to reduce the level of environmental carcinogens to an allowable level.

Table 10 provides an action plan for environmental health. It outlines the strategies and approaches, estimated budgets and responsible organizations.

Table 10. Action plan for environmental health

Strategic approach	**Suggested activities**	**Cost (US$)**	**Responsible body**
Improve health education and training on prevention of environmental pollution	Develop comprehensive training programme on sources, harms of environmental carcinogens and methods of prevention. Conduct intensive education, training and IEC activities for health and other sector workers and for general public. Review and update environmental health curricula in universities and schools.	3000 15 000 5000	HSUM MOH, PHI MNE MOH, PHI, NCHD MoECS MNE HSUM MoECS MOH, PHI
Strengthen legislative	Conduct advocacy to decision makers on primary prevention of environmental	10 000	MOH, MoECS, MNE, MOJ

environment and its enforcement	burden of diseases. Review and update existing policy and regulations and build proper mechanism for enforcement.		
Build capacity for monitoring of priority environmental hazards	Take measures to strengthen laboratory capacity for monitoring of environmental carcinogens. Conduct training for laboratory professionals, inspectors and researchers on analysis, allowable levels, etc.	10 000–20 000 (initial) 8 000	MOF, SSIA, MNE, MOH, PHI

HSUM, Health Science University of Mongolia; MNE, Ministry of Nature and Environment; MoECS, Ministry of Education, Culture and Science; SSIA, State Specialized Inspection Agency; MOF, Ministry of Finance; MOH, Ministry of Health; MOJ, Ministry of Justice; NCHD, National Center for Health Development; PHI, Public Health Institute.

4.3.2 Occupational health

Occupational cancer may occur in selected small populations, but the risk is very high. This type of cancer is preventable through education, information and legislative measures to protect the workers.

In Mongolia, about 1 488 000 people were in the labour force in 2003. The occupational diseases surveillance data from 1990 to 2000 indicated that work-related lung disease; chemical poisoning and neurological disease are the top three causes of occupational morbidity in Mongolia.

Industrial growth heightens the number and intensity of hazardous work exposures as well as worker vulnerability to these hazards. Workers in

Mongolia are at risk of occupational exposure to arsenic, chromium, silica, and polycyclic aromatic hydrocarbons. Some examples include the following:

- Asbestos cement was very popular in the construction of buildings in the 1960s, 1970s and 1980s. Many of these buildings are in disrepair, exposing unprotected workers and the population to asbestos.
- Arsenic content in drinking-water is high in eastern and *govi aimags.* Arsenic is also found in some coal mining sites.[54]
- Chromium is widely used in the leather processing industry.
- In Ulaanbaatar, about 80 000 vehicles use 152 800 tonnes of benzene and 108 300 tonnes of diesel fuel.

Currently, there is no system for monitoring occupational carcinogens and no reliable data available on occupationally related cancer (lung cancer, leukaemia and malignant mesothelioma, etc).

Proper legislation and consistent enforcement will be critical to ensure that private sector workers and those in the informal economy are protected from adverse work conditions and potentially dangerous exposures. At the same time, the existing laws and policies fail to address the preventive aspects of occupational health and safety (OHS); thus additional legislation is needed to support the establishment of a preventive health and safety culture at the workplace.

Integrating occupational health and safety into primary health care is especially relevant to Mongolia. This will require the expansion of occupational health and safety training to all health professionals, rather than to a few, select "specialists."

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[54] *National arsenic distribution survey*. Mongolia, Public Health Institute, 2004.

Finally, it will be critical to strengthen the avenues for collaboration between all stakeholders, in the public and private sectors, to ensure that good OHS practices are implemented across all workforces in an effective and equitable manner. Table 11 provides an action plan for occupational health.

Table 11. Action plan for occupational health

Strategic approach	Suggested activities	Cost (US$)	Responsible body
Build national capacity for monitoring of occupational carcinogens	Conduct inventory of industries on occupational carcinogens. Organize trainings for inspectors and other occupational and environmental health professionals. Strengthen the laboratory capacity for monitoring occupational carcinogens. Take interventions to limit exposures and to reduce level of occupational carcinogens down to allowable level based on monitoring data.		MoSWL, MOH, MNE, SSIA, PHI, HSUM, employer' s association
Strengthen primary prevention measures to reduce risk of exposure to occupational carcinogens	Disseminate existing knowledge and international evidences on prevention of occupationally related cancer to professionals, worker and general population. Integrate occupational health and safety into primary health care service activities. Improve knowledge and skills of		MOH, MoSWL, WHO, private employers association, industries

	primary health care workers and occupational health professionals on prevention of occupational exposure to carcinogens. Implement protective measures for reducing risks of exposure to carcinogens at workplace.		
Strengthen legislative environment and its enforcement	Conduct advocacy to decision-makers on primary prevention of occupational carcinogens. Review and update existing policy and regulations and build proper mechanism for enforcement.	10 000	MOH, MoECS, MNE, MOJ

HSUM, Health Science University of Mongolia; MNE, Ministry of Nature and Environment; MoECS, Ministry of Education, Culture and Science; MOJ, Ministry of Justice; MoSWL, Ministry of Social Welfare and Labour; NCHD, National Center for Health Development; PHI, Public Health Institute; SSIA, State Specialized Inspection Agency; WHO, World Health Organization.

5. Early detection and therapy

The current situation in Mongolia could not support massive breast and cervical screening programmes: resources are low, infrastructure is limited and the great majority cancers are detected at advanced stages (III/IV). In this situation, "down-staging" (17) by increased public awareness and training of health professionals could have a major impact on the disease; emphasis should be placed on health education and raised awareness among the public and health professionals.

Recommendations

(1) For breast cancer, women should be taught breast awareness and self-examination, with self-referral to physician if lumps were detected; mammography should be focused on case finding rather than screening so that it is used to confirm the presence of a lump detected by woman (over 50) or physician.

(2) For cervical cancer, women should self-refer to physician if they have warning signs of post-coital bleeding, post-menopausal bleeding or foul discharges.

(3) For laryngeal cancer, patients should self-refer to general practitioner if they experience hoarseness for more than one to two weeks hoarseness. For skin cancer, people should be taught to recognize warning signs.

(4) Greater importance should be placed on early referral, diagnosis and therapy of cancer of the breast, cervix and larynx/oropharynx, rather than any other therapy applied at a late stage of the disease.

(5) Improvement of diagnostic services and treatment protocols is essential for the effective diagnosis, "staging", and proper treatment (including radiotherapy), of cancers, detected possibly at an early stage in their development. It involves both the introduction of proper methods and technology (equipment) and proper training of specialists to make the best use of it.

(6) Patients should be triaged into three groups: curable (using standard therapy protocols), incurable (palliative care) and other (partial treatment may be beneficial depending on resources). After diagnosis, patients need to be seen by a multidisciplinary team that includes palliative care. Doctors need to be taught how to "break bad news", i.e. tell patients the truth about their diagnosis (doctors tend to be uncomfortable with this culturally unacceptable task), and understand the principles of effective pain relief through undergraduate training and bedside teaching.

(7) The building up of new radiotherapy facilities should be linked mandatory to the search for earlier referral/diagnosis of curative cancers. An essential cancer chemotherapy drug list should be established, implemented and enforced.

(8) National therapy efforts should mandatory be linked with the search for earlier detection and referral, down-staging of curable cancers, and palliative care at time of diagnosis for the incurable patients.

5.1 Health education

Increased awareness of the early symptoms of certain cancers and the curability of these cancers if detected early is most important for the curability of these cancers. The earlier referral presenting cancers in stage I and II for therapy has a bigger effect on a curative effect of standard therapies than any therapy however expensive applied to late stage cancers. There is also an educational socioeconomic barrier in most countries, showing that poorer and less educated populations have a poorer prognosis. An effective educational programme that reaches the whole population, leading to earlier detection and referral of certain cancers, is essential for being able to cure them. Table 12 shows the strategies and approaches, estimated budgets and responsible organizations for the action plan for health education.

Table 12. Action plan for health education

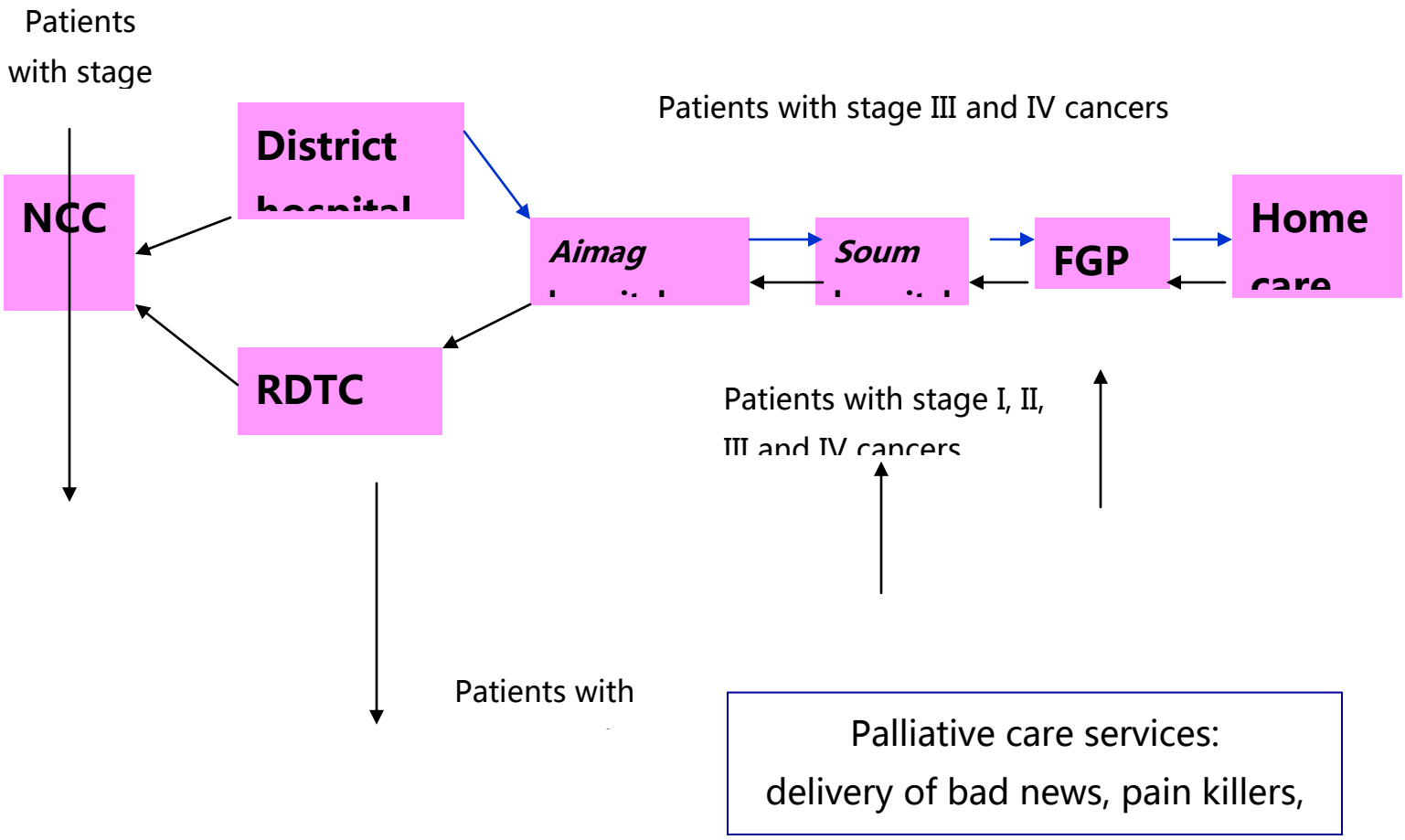
Target	Strategy	Approach	Costing	Timeline

Women: breast and cervical cancer General population: skin cancer and general cancer prevention information	Public awareness on early warning signs and curability cancer: - Training for trainers - Training for selected volunteers - Mass media campaign	Radio for rural community Television for urban community Training for family and rural doctors Person-to-person contact training by woman volunteers and secondary school leavers	Educational material production - US$ 60 000 Running of training - US$ 100 000 Monitoring and evaluation - US$ 2000	2007–2013 (five years)
	Establish indicators for monitoring and evaluation	KAP test before and after health education campaign	National team	Each year
		Statistical health indicator of trend monitoring		End of five-year programme, then continuously

5.2 Referral policies

Less than 20% of the patients coming to the NCC with curable cancers are in early stages. Allocated resources for cancer therapy, economic as well as human, have minimal effect and patients and families suffer economically in vain. A clear referral system and empowerment of all chains in the referral pathway should be established. This will improve the quality of life for the patients and their families and allow limited resources to have a real effect. Figure 4 outlines the proposed referral system that will allow the NCC and RDTCs (and the patient to be treated curatively closer to home) to increase their cure rates, and allows the cancer numerous incurable cancer patients, over 80%, to get cost-effective palliative therapy early, at time of diagnosis and until death at home among loved ones. The minimal technical equipment and diagnostics to be established are also outlined.

Figure 4. Down-staging, referral policies and case finding



Pathological laboratory	Mammography
	Cytology
Cytology	Colposcopy
Mammography	Pap smear
Laboratory	Ultrasound

CT, chemotherapy; HT, hormone therapy; FGP = family group practice; NCC, National Cancer Center; RDTC, regional diagnostic and treatment centre.

5.3 Cervical cancer: early diagnosis and therapy

In Mongolia, 88% of cases of cervical cancer are diagnosed at an advanced (II+) stage.[55] There are many reasons for this, including a lack of knowledge among women of the relevance of symptoms of the disease, the possibility of being cured and a lack of availability of health care in rural areas.

[55] NCC cancer registry, 2005.

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It is well known from Swedish and Indian experiences that the public education of women on the symptoms of cervical cancer can lead to early detection of diseases[56,57,58,59,60,61].

Visual inspection with acetic acid (VIA) is a form of cervical screening that has been evaluated extensively in India. It is economical and easy to implement in primary care situations. It has a high sensitivity (90.1%) and high specificity (92.4%) in populations where the disease has a high prevalence (17/1000). An examination of 2009 women in three *aimags* was used to assess VIA in Mongolia. Based on this study, the sensitivity and specificity of VIA were 82.9% and 88.6%, respectively, while the sensitivity and specificity for Pap smear were 88.6% and 98.5% which shows that VIA has an acceptable test parameter for population-based cervical screening in Mongolia'.[62] Evidence showed that the advantages of VIA are its low cost and immediate results (which promotes immediate colposcopy/biopsy or treatment).

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[60] Jayant K, Rao RS, Nene BM, Dale PS. Improved stage at diagnosis of cervical cancer with increased cancer awareness in rural Indian Population. *International Journal of Cancer*, 1995, 63(2):161–163.

[61] Sankaranarayanan R *et al*. Effect of visual screening on cervical cancer incidence and mortality in Tamil Nadu, India: a cluster-randomised trial. *Lancet*, 2007, 370:398–406.

[62] Baigal G, Elit L, Tan J, Munkhtaivan A. Assessment of two cervical cancer screening methods in Mongolia: cervical cytology and visual inspection with acetic acid. EUROJIN 2004 International Expert Meeting. Ulaanbaatar, National Cancer Center; Hamilton, McMaster University; Melbourne, Royal Women's Hospital.

Screening programmes for cervical cytology are difficult to organize and require sophisticated infrastructure (i.e. highly trained personnel, adequately equipped laboratories, referral systems to communicate results).

The following approaches to down-staging cervical cancer in pilot areas are proposed:

(1) **Primary prevention**. Health education for men and women. Primary-level health care workers should be trained to carry out VIA. The target population, i.e. women aged 30 to 60 years, should be tested every three years. Primary health workers should collect data and choose the target population.

(2) **Secondary prevention**. Earlier case detection through VIA, possibly screening later. Secondary-level health care workers should be trained to do loop electrosurgical excision procedure (LEEP) for treatment of cervical intraepithelial neoplasia (CIN) based on VIA result with following histology confirmation. The reference pathological laboratory, which is located at the NCC, should confirm tissue after LEEP.

(3) **Treatment**. The NCC is responsible for the treatment of early and advanced stages of cervical cancer. A central/national registry on VIA and LEEP should be kept at the NCC and every health care level.

In order to increase public awareness of the early signs of cervical cancer, there is a need to organize training for volunteers, person-to-person training and a mass media campaign. For capacity-strengthening of health care service providers and institutions, there is need to train rural (*bag* and *soum*) midwives and nurses on VIA, train secondary health care level gynaecologists on VIA and LEEP, strengthen the cytological and pathological laboratory work-up capacity at the NCC, improve radiotherapy capacity on cervical cancer at the NCC, and improve colposcopy clinic capacity at the NCC. There is also a need to introduce

and adapt internationally accepted clinical guidelines on Pap test screening, VIA guidelines for primary-level health care providers, and CIN guidelines for gynaecologists. Finally, monitoring and evaluation (KAP survey, randomized control trial, etc.) should be organized.

5.4 Breast cancer: early diagnosis and therapy

Nearly all breast cancer can be treated successfully if detected early. Obtaining an annual mammogram beginning at age 40 is the most effective way to detect breast cancer at an early, curable stage. However, in Mongolia, more than 80% of breast cancers are detected in a late stage and cannot be cured. A down-staging approach is needed as a first step, combined health education and the availability of mammography to detect cases within the greater Ulaanbaatar area (one million inhabitants) and in Uvurkhangai (800 000 inhabitants).

The incidence of breast cancer is low in Mongolia. The rate doubled between 1996 and 2005, reaching 5.6 per 100 000 population. The highest incidence rate is observed in Ulaanbaatar.

The population of Mongolia is concentrated around the capital city. More than a half of the entire population of the country lives in Ulaanbaatar city and the central region. Therefore, the group proposes to pilot a breast cancer case finding programme in Ulaanbaatar and the central region, with further expansion if the programme is effective in the pilot area. The following activities have been proposed for the pilot programme and the detailed Plan of Action for down-staging breast cancer is given in Table 13:

- behaviour change communication targeted at increasing awareness of women above 40 regarding the importance of regular breast self-examination and possibility of mammography.
- training of health volunteers and nurses working at the primary- and secondary-level health facilities;
- strengthening the diagnostic work-up capacity for breast cancer at the NCC and RDTC in Uvurkhangai province;
- developing and annually revising clinical guidelines on breast cancer diagnosis and treatment at NCC;
- improving capacity for radiotherapy of breast cancer at NCC; and
- introducing breast-preserving operations at NCC.

Indicators include the following:

- KAP test changes in women,
- increase in TNM for stage I and II cancers in relation to stage III and IV,
- improved five-year survival rates.

Expected outcomes

(1) The proportion of women above 40 in Ulaanbaatar city and central region who report having had a mammogram in the past year will increase 20% from the baseline at five years of implementation.
(2) More than 50% of breast cancer cases in Ulaanbaatar and central region will be diagnosed at early stages (I and II) at five years of implementation.
(3) The five-year survival rate of breast cancer patients in Ulaanbaatar and central region will increase 30% from the baseline at five years of implementation.
(4) At least 80% of patients undergoing surgery for breast cancer will receive cytology-confirmed diagnosis before the surgery.

Table 13 provides a more detailed action plan on the early diagnosis and treatment of cervical cancer.

Table 13. Action plan on early diagnosis and treatment of cervical cancer

	Objectives and activities	Time-line	Indicators	Stakeholders	Budget (US$)	Donors
1	Increase awareness of women on early signs of cervical cancer					
1.1	Train volunteers Person-to-person information Conduct mass media campaign	2007 - 2013	>80% of women know the early signs for cervical cancer (yearly KAP test)	General population, volunteer health workers, mass media workers	80 000	MCA
		2007 - 2017	Reduction in proportion of cases of invasive cervical cancer with advanced stage (2+)			
2	Capacity strengthening of health care services providers and institution(s)					
2.1	Train rural (bag and sum) midwives and nurses on VIA	2007 - 2008	>80% of primary health care workers instructed in VIA.	Rural health workers		MCA
		2007 - 2017	>80% of women aged 30–60 years tested at least once			
2.2	Train secondary health care level gynaecologists on VIA and LEEP	2007 - 2008	>80% of secondary health level gynaecologists instructed in LEEP	Regional GYNs, MCH		
2.3	Procure LEEP machine and supplies	2007 - 2009	>80% procurement at the secondary health level	Regional GYNs, MCH		
2.4	Strengthen NCC's cytological and pathological	2007 - 2010	NCC has cytological and pathological reference laboratories	NCC	200 000	MCA

	laboratory work-up capacity					
2.5	Strengthen the colposcopy clinic' s capacity at the NCC	2007 - 2008	Video colposcopy machine set up >80% of referred women diagnosed by colposcopy Created colposcopy database	NCC	30 000	MCA
2.6	Strengthen radiotherapy capacity for cervical cancer at the NCC	2007 - 2010		NCC		IAEC
3	Introduce internationally accepted and adopted in to Mongolian situation clinical guidelines					
3.1	Develop clinical guidelines for Pap test screening	2007	Clinical guidelines revised annually, published and distributed to aimag and district hospitals			WHO
3.2	Develop VIA guidelines for primary-level health care providers					
3.2	Develop CIN treatment guidelines for gynaecologists					

CIN, cervical intraepithelial neoplasia; GYN, gynaecologist; IAEC, International Atomic Energy Center; KAP, knowledge, attitude and practice; LEEP, loop electrosurgical excision procedure; MCA, Millennium Challenge Account; NCC, National Cancer Center; VIA, visual inspection with acetic acid; WHO, World Health Organization.

5.5 Liver cancer: therapy development

Primary liver cancer, or hepatocellular carcinoma (HCC), is the most common cancer in Mongolia. It is the leading cause of cancer morbidity and mortality in the country. It accounts for 38% of new cancer cases of all locations. Primary liver cancer incidence rate is 104.6 per 100 000 population for males and 77.2 per 100 000 for females. An average survival rate after diagnosis is six months.

Liver cirrhosis is a predisposing factor for HCC. In Mongolia, more than 60% of patients undergoing surgery for HCC have liver cirrhosis. Liver dysfunction caused by cirrhosis severely limits surgical treatment opportunities for HCC patients.

A decade ago, Mongolia introduced hepatitis B vaccination of children and hepatitis C screening of blood donors. It will take more than 20 years for these efforts to lower HCC incidence. Two other important measures for reducing HCC incidence include preventing sexual transmission of the hepatitis B and C viruses and testing for hepatitis C among high-risk groups with subsequent immunization.

Early diagnosis of HCC is important because smaller lesions may be cured by resection. A recent practice guideline recommends that 'this is the treatment of choice for HCC in non-cirrhotic patients, who account for around 40% in Asia'. Regarding the age preference, Asian men ≥40 years and women ≥50 years with non-cirrhotic type of Hepatitis B should undergo surveillance for HCC. However, patients with Hepatitis B accompanied by cirrhosis should be screened regardless of age[63]. The

[63] Jordi Bruix, Morris Sherman, Management of Hepatocellular Carcinoma. *Hepatology*, Vol. 42, No.5, 2005, pp.1211,1220.

surveillance is done by the combination of liver ultrasonography and alpha-fetoprotein (AFP) testing because AFP-secreting liver cancer is common in Asian countries, and the sensitivity of AFP test is 60%–90%. Furthermore, surveillance using six-monthly ultrasound and AFP has been shown to reduce HCC mortality by 37% in a randomized trial in China.

Therefore, regular surveillance and a referral policy for liver cancer need to be established and implemented at the district and/or province level. The importance of such a policy is further highlighted by official statistics, according to which only 100 out of 1000 liver cancer cases referred to NCC from districts and/or provinces are treatable surgically, which means 90% of cases are needlessly referred to NCC not to mention unnecessary out-of-pocket expenses on transportation and accommodation while in Ulaanbaatar.

HCC can be treated with surgery. However, liver cirrhosis and late diagnosis severely limit surgical treatment opportunities for HCC patients. As a result, only 8%–10% of HCC patients undergo surgical treatment in Mongolia.

Although HCC is widely distributed throughout the country, reaching the size of epidemic in Mongolia, early detection and treatment of HCC might not be cost-effective at this stage. Therefore, it is vital to establish a referral policy for liver cancer in the country. The group proposes the following:

- raising awareness on sexual transmission of hepatitis B and C viruses;
- introducing methodology for the detection of aflotoxin B1 in grain;
- establishing a referral policy for liver cancer, delineating minimal criteria for referral from province to regional diagnostic and treatment centre, and from the RDTC to NCC (see Table 14);
- building laboratory capacity at RDTCs to perform AFP testing;
- improving postgraduate and distance education opportunities in oncology for *aimag* and/or district health providers;
- developing and annually revising clinical guidelines on liver cancer diagnosis and treatment at NCC; and
- assessing the feasibility of establishing a hepatology centre at NCC.

Indicators

- The proportion of patients correctly referred to NCC from districts and/or provinces is increased from 10% (2006) to 20% (2012).
- All regional diagnostic and treatment centres perform AFP testing.
- At least one major clinical trial on HCC treatment is conducted.

Table 14. Action plan for down-staging breast cancer

	Activity	Time-frame	Indicator	Target			Stake-holders	Budget US$	Confirmed donor
				Base-line	2012	2017			
1.1	Conduct mass media campaign to increase awareness of women above 40 regarding importance of regular mammography and breast self-examination	2007–2012	Proportion of women above 40 in Ulaanbaatar city and central region who report having had a mammogram in the past year	NA	20% increase from the baseline	40% increase from the baseline	MOH, NCC, WHO, NCHD, UNFPA, MCA, FGPs	100 000	MCA
1.2	Train the trainers in breast self-examination	2007	Number of trained health professionals	60	300		NCC, HSUM, FGPs, RDHCs	4000	MCA
1.3	Strengthen the diagnostic work-up capacity for breast cancer at NCC and the RDTC in Uvurkhangai province • Procurement of mammography machine and supplies • Training for invasive radiographers • Training for pathologists	2007–2009	Proportion of women diagnosed in early (1, 2) stage in Ulaanbaatar and central region	16%	>50%	>72%	MOH, NCC, WHO, MCA	400 000	MCA
			Five-year survival rate of breast cancer patients in Ulaanbaatar and central region		30% increase from the baseline				
			Cytology-confirmed diagnosis before surgery		80% of patients				
1.4	Develop and annually revise clinical	2007–	Clinical guidelines revised	-	-	-	MOH, NCC,	20 000	MCA

	guidelines on breast cancer diagnosis and treatment at NCC	2012	annually, published and distributed to aimag and district hospitals				WHO		
1.5	Improve capacity for radiotherapy of breast cancer at NCC • Procurement of radiography machine • Training for onco-radiotherapist	2008					MOH, NCC, IAEA		MCA

FGP, family group practice; HSUM, Health Science University of Mongolia; IAEA, International Atomic Energy Agency; MCA, Millennium Century Account; MOH, Ministry of Health; NA, not available; NCC, National Cancer Center; NCHD, National Center for Health Development; RDHC, regional district health centre; UNFPA, United Nations Population Fund; WHO, World Health Organization.

5.6 Stomach cancer

Mongolia has one of the highest stomach cancer incidence rates in the world. The incidence in the western parts of the country is especially alarming.

There is a worldwide tendency for distal oesophageal and proximal stomach cancers to increase, and for distal stomach cancer to decrease. A similar tendency is also observed in Mongolia.

Stomach cancer risk can be reduced by an overall diet plan that includes mostly plant foods (fruits, vegetables, grains and beans) and limits tobacco and alcohol use. Gastric reflux, obesity and *Helicobacter pylori* infection increase gastric cancer risk.

Table 15. Establishment of referral policy for liver cancer

	Activity	Time-frame	Indicator	Target			Stakeholders	Budget US$
				Base-line	2012	2017		
1.1	Develop a referral policy for liver cancer delineating minimal criteria for referral	2007	Referral policy developed and approved by Health Minister's Order				Ministry of Health, NCC, NCHD, RDTC, local health centres	50 000
			Number of medical doctors trained centrally	0	90			
			Number of medical doctors completing on-the-job training	0	120			
			Proportion of patients correctly referred to NCC from districts and/or provinces	10%	20%	30%		
1.2	Strengthen the diagnostic and treatment capacity for liver cancer at NCC • Procurement of ultrasonography and angiography machines • Training for invasive radiographers	2007–2009					Ministry of Health, NCC, WHO, ADRA	
1.3	Build laboratory capacity at RDTCs to perform AFP testing	2007–2009	Number of RDTCs performing AFP testing	0	3		Ministry of Health, NCC,	90 000

							RDTC	
1.4	Develop and annually revise clinical guidelines on liver cancer diagnosis and treatment at NCC	2007–2012	Clinical guidelines revised annually, published and distributed to *aimag* and district hospitals	-	-	-	Ministry of Health, NCC, WHO	20 000
1.5	Randomly conduct clinical trials on HCC treatment	2007–2017	Number of clinical trials conducted and published	0	1		NCC, HSUM, WHO	200 000

ADRA, Adventist Development & Relief Agency; AFP, alpha-fetoprotein; HCC, hepatocellular carcinoma; HSUM, Health Sciences University of Mongolia; MOH, Ministry of Health; NCC, National Cancer Center; NCHD, National Center for Health Development; RDTC, regional diagnostic treatment centres; WHO, World Health Organization.

5.7 Radiotherapy: Upgrading needed 2007–2017

One third of all cancers are curable if the (available) standard treatment can be delivered in proper time. Radiotherapy is a main kind of cancer treatment. Currently, NCC has two teletherapy units with Co60 sources for external beam therapy and one aged unit for brachytherapy, which is capable of treating only about 800 new patients per year. This means only one third of all cancer patients receive radiotherapy, either as part of their primary treatment, or in connection with recurrences or palliation due to the lack of equipment. About half of all cancer patients require radiotherapy. It must be anticipated that radiotherapy will have an increasing curative role due to the previously mentioned improvements in cancer detection or screening and early diagnosis. Furthermore, there is an increasing use of adjuvant radiotherapy treatment, firstly due to the trend away from radical surgery towards organ-conserving surgery combined with radiotherapy (e.g. head and neck cancer, sarcoma) and secondary for the patients with high risk of developing loco-regional recurrences (e.g. breast cancer, rectal cancer). The results of radiotherapy have substantially improved over the years in connection with improvements in human skills. However, it is still estimated that one third of cancer patients will die as a consequence of failure to control the loco-regional disease.

The Radiotherapy Department of the National Cancer Center does not have a linear accelerator machine and does not plan to procure one in at least three to five years because of the government' s lack of funds. A lack of modern equipment (e.g. Linac, dynamic multi-leaf collimator, CT-simulator, high dose rate (HDR) brachytherapy machine mould room) and technology (e.g. 3-D treatment planning system, in vivo-dosimeter system, intensity modulated radiation therapy (IMRT), image-guided radiotherapy (IGRT) are making it difficult to plan and deliver individualized treatment. Modern equipment is required to deliver radiotherapy services and to control the quality of radiotherapy in a qualified oncology environment (see Table 16).

The Radiotherapy Department also does not have a mould room. Therefore, we could not use the individualized shields for patients. Instead we introduced a few

standards on shaped shielding in the irradiation field of different cancer. During radiotherapy delivering procedures the radiotherapist put those standards shielding on the plate of the teletherapy machine by manual method. From this became the condition that will be decreased quality assurance of radiotherapy. The absence of a mould room is increasing the risk of technician error, such as overexposure for a critical organ and insufficient exposure for a tumour located near the spine and brain, e.g. metastases of lymph nodes, cancer of the head and neck. For this reason, some patients do not survive for long; they suffer from recurrence and distant metastases after a few years. Since 1997, the Radiotherapy Department has used the HDR brachytherapy machine. Because it has aged and has few applicators for brachytherapy, the machine is used only for cervical, oesophageal and rectal cancers. The department has also not been able to carry out interluminal brachytherapy for patients with head and neck, breast and lung cancers.

Table 16. Present equipment capacity of the Radiotherapy Department

	Equipment	Factory	Year of installation	Supported by
Teletherapy or external beam treatment	GWGP-80,** /Co60/	Nuclear Power Institute, China	1995	International Atomic Energy Agency (IAEA)
	Teragam /Co60/	UJP, Czech Republic	2005	IAEA, Government of Mongolia
Brachytherapy	GZP-6 HDR ** /Co60/	Nuclear Power Institute, China	1998	Government of Mongolia
	AMRA*, LDR /Cs137/	France	1997	IAEA
Treatment planning system (TPS)	HMD-I * simulator	Nuclear Power Institute, China	1997	IAEA
	Theraplus TPS	Nucleotron, Holland	2005	IAEA
	ROCS**	USA	1997	IAEA
	C-arm X-ray machine	Siemens, Germany	2002	IAEA
Dosimeter measurement system	HDR-chamber	-	1997	IAEA
	UNIDOS	-	1997	IAEA

** Equipment not working in current situation*

*** Equipment very aged and working with many problems*

Recommendations

(1) New treatment methods and quality assurance features should be introduced, e.g. individual patient' s shielding.
(2) New brachytherapy machines with many kind of applicators should be introduced.
(3) New brachytherapy techniques such as interluminal should be introduced.
(4) A linear accelerator should be bought when down-staging has worked and there are a sufficient number of curable cancers.
(5) A fully developed quality control programme in radiotherapy should be implemented. RT services should be improved within the departmental and throughout the country.
(6) At least one more cancer centre with a radiotherapy department should be built elsewhere in Mongolia, perhaps in the RDTC in the west, since the distances from some regions to the capital are very far (sometimes more than 1600 km).

Table 17. Action plan for treatment/quality assurance for Radiotherapy

	Objectives and activities	Timeframe	Indicators	Targets			Stake-holders	Bu
				Base-line	2012	2017		
1. Introduce new and advanced treatment methods								
1.1	Build a mould room	2008	Proportion of patients who use shielding and immobilization devices	0	80%	100%	NCC, MOH, NEC WHO, IAEA	8
1.2	Install 3D treatment planning system	2008	Proportion of patients who use 3D treatment planning	0	100%		NCC, MOH, WHO	1
			Number of radiotherapy late complications	5%	3%	<2%		
1.3	Introduce new approaches of radiotherapy, e.g. IMRT, IGRT	2008-2017	Proportion of treatments that use new technology	0	50%	100%	NCC, MOH, NEC WHO, IAEA	2
1.4	Introduce a new brachytherapy unit with Ir192 source	2008-2009	Proportion of patients who received brachytherapy	30	50	60	NCC, MOH, NEC, IAEA	35
			Five-year survival rate of patients with cervical, rectal, lung, head and neck, and breast cancers	NA	Increased by 20%	Increased by 40%		
1.5	Install a new simulator machine	2007-2008	Number of radiotherapy late complications	5%	3%	<2%	NCC, MOH, NEC, IAEA	40
1.6	Introduce a linear accelerator	2010	Proportion of patients who received radiotherapy by linear accelerator	0	50%-70%	100%	NCC, MOH, WHO	
1.7	Introduce a dosimetry system	2008-2010	Monthly and annual report of dosimeter measurement	-	-	-	NCC, NEC, IAEA, WHO	3
1.8	Train staff to run new treatment machines and	2008-2017	Number of staff who can work in mould room and do patient immobilization	0	10-15	20-30	NCC, MOH, NEC WHO, IAEA	3

	technology							
2. Improve quality assurance and control of radiotherapy								
2.1	Develop and publish clinical guidelines on radiotherapy	2007-2012	Annual publication of clinical guidelines for radiotherapy	-	-	-	NCC, MOH, WHO	10
2.2	Develop a QA programme in radiotherapy	2007-2012	Publication of QA guidelines for radiotherapy	-	-	-	NCC, MOH, NEC, WHO	500
2.3	Improve internal audit system	2007-2010	Annual report of audit team	-	-	-	NCC, NEC	300
			Decreasing radiotherapy error	NA	Decreased	Decreased		
2.4	Cooperate with experts	2008-2017	Expert’ s report	-	-	-	NCC, IAEA, WHO	50
2.5	Train staff	2007-2017	Number of trained staff in Radiotherapy Department	6	10	15	NCC, MOH, NEC, IAEA, WHO	50
2.6	Randomly conduct clinical trials to calculate radiotherapy results	2008-2015	Number of published clinical trials	0	1-2	3-5	NCC, HSUM, MOH, WHO	50

HSUM, Health Science University of Mongolia; IAEA, International Atomic Energy Agency; IGRT, image-guided radiotherapy; IMRT, intensity modulated radiation therapy; MOH, Ministry of Health; NCC, National Cancer Center; QA, quality assurance; WHO, World Health Organization.

5.8 Chemotherapy

The NCC Chemotherapy Department has five doctors, one pharmacist, one senior nurse and eight nurses.

- Approximately 3000 inpatients are treated by the Chemotherapy Department every year.
- The outpatient chemotherapy unit has 12 beds providing service to 15–22 patients per day and 900 patients per year.

Cancers are grouped according to the effectiveness of chemotherapy and hormonal therapy:

- Category 1: Trophoblastic disease, Hodgkin' s and Non-Hodgkin' s lymphoma
- Category 2: Breast cancer, ovarian cancer, colorectal cancer
- Category 3: Stomach cancer, oesophageal cancer, soft tissue sarcoma, head and neck cancer, cervical cancer, bone sarcoma and other cancers
- Category 4: Oropharyngeal, nasopharyngeal cancers
- Category 5: Hepatobillary cancers, kidney cancer, thyroid cancer, melanoma, pancreatic cancer, central nervous system cancers

An essential drug list and standard therapy protocols have not yet been established. However, the drugs listed in Table 18 are considered essential.

Table 18. Essential cancer drugs used in Mongolia, adult tumours

Drug	Cost	US$
Adriamycin	6500	5.9
Methotrexate	3200	2.9
Leukovorine	7300	6.6
Vincristine	7500	6.8
Cisplatin	3200	2.9
Cyclophosphamide	1000	0.9
5-Fluorouracil	750	0.6

Carboplatin	17250	15.6
Tamoxifen	473	0.4
Filgrastim	80000	72.7
Epoetin	75000	68.1

Action Plan and Recommendations Cancer Chemotherapy NCC

(1) The equipment such as cytotoxic drug compounding box, pump, flexure, and lamina flow hood are necessary to ensure safety of health workers working with chemotherapy and maintain quality of drugs

(2) Human resources should be developed through the training of oncologists in *aimags* and districts.

(3) An essential drug list should be established and listed drugs should be reliably available (see need for central pharmacy under 5.9 Children' s cancers).

(4) Standard therapy protocol should be established.

(5) "Palliative chemotherapy" is not cost effective in incurable solid cancers and should not be given routinely.

(6) All incurable patients should be referred to a palliative care doctor.

(7) Adjuvant chemo-hormone therapies for stage 1 and II cancers where high risk for micro-metastasis exists. Adjuvant systemic therapy should be offered for tumours where they have been proven to be curative, e.g. breast cancer.

5.9 Children's cancers

The greatest therapeutic progress in cancer therapy has occurred in children's cancers, where up to 65% have been showed to be possible to cure. Children's cancers are treated primarily at the Maternal and Child Health Research Center (MCHRC) in Ulaanbaatar, where there are two onco-haematologists and one paediatric cancer surgeon. From 2002 to the end of 2006, a total of 114 new patients were treated, of which 66 have had acute lymphatic leukaemia (ALL). Thirty-four are alive today. The MCHRC twinned with the Medical university clinic in Tubingen, Germany during these years and drugs were provided by the Germans. This collaboration has now ended. At present, families cannot afford drugs as the total government support to a child with cancer is 85 000 tugrig (US$ 80) per year.

During 2002-2006, 17 children with solid tumours, mainly located in the mediastenum, retroperitoneally, lungs or kidney underwent surgery and/or postoperative radiotherapy or chemotherapy, for which the children were transferred to the NCC. There has been no follow-up of these cases. Ten are dead within a year.

Published data from the Cancer Registry found 5% of cancer patients were in stage I, 19% in stage II, 51% in stage III, and 25% in stage IV. The data also showed that 32.9% of children were treated in MCHRC, 30.7% in the NCC, 33% in provincial health settings, and 4.5% in other hospitals.[64] About 29.5% of children had surgery, 35.2% chemotherapy, 1.1% radiation therapy, and 34% palliative care. At least 73.3% of children survived up to six months, 18.3% from six to 12 months, and 8.3% from two to five years.

Colleagues in MCHRC and NCC do not hold joint consultations before the child is treated or during the treatment. Accompanying parents are offered lodging with the children in MCHRC.

[64] Tuvshingerel, S. Epidemiological issues of childhood cancer. *Oncology*. 2006, 1(7):25–28.

Recommendations Paediatric Chemotherapy

(1) Cancer drugs for children should be declared "life saving", should be added to the essential drug list and should be provided free of charge to patients.

(2) The Ministry of Health should be responsible for tendering and ordering all essential drugs, most of which are generic and affordable. These drugs should be stored at and sold from a centralized government pharmacy or a designated pharmacy in the NCC. Otherwise, as is the documented practice, some importers will tell patients that generic drugs are unavailable and will attempt to sell brand name drugs that are much more expensive.

(3) Most new patients should be observed in a "tumour conference" between colleagues from MCHRC (haematologists and surgeon) and NCC (palliative care doctor, radiotherapist, chemotherapist) and the child's family doctor, when available.

(4) Rooms and/or beds should be made available in NCC for accompanying parents.

(5) Ondansetron should not be used routinely to treat nausea and vomiting because it is expensive. Haloperidol, which is on the palliative care essential drug list, should be used instead.

(6) The following drugs should be declared life saving and added to the essential drug list:

- Methotrexate
- Vincristine
- Doxorubicin
- Daunorubicin
- Asparaginase
- Mercaptopurin
- Tioguanin
- Cyclophosphamide
- Cytarabine
- Dakarb
- Hydroxycarbamide
- Prednisolon
- Dexamethasone
- Mesna
- Calcium folinate
- Leucovorin
- Vinblastin
- Bleomycin
- Mytomicin
- Oxaliptin
- Carboplatini
- Dactinomycini
- Mitomicin
- Oxaplatini
- Carboplatini
- Dactinomycini
- Etoposide
- Gemcitabine
- Ifosfamidi
- Ininotecan
- Dacarbazine
- Epirubicin
- Vinorelbine
- Vinblastine

5.10 Recommendations for Telemedicine

It is proposed that the NCC should partner with an international cancer centre to provide patients with a "second opinion". This would reassure clinicians, patients and families that better therapies are not available abroad for cases judged incurable. Currently, some patients find it difficult to accept the national centre's diagnoses and spend scarce economic resources going abroad, all in vain. An authoritative second opinion would save patients money and help them to accept their fate. The policy for a decision to treat patient with stage III (and IV) cancers would be that there are two randomized controlled studies that

demonstrates a significant survival benefit of minimal two years. A partial tumour remission will not count. A second opinion would also help the national oncologist to resist pressures from international pharmaceutical companies, either directly or via patients or patient organizations, to use only the latest brand name drugs, which are extraordinary expensive but not curative in late stage solid tumours.
The WHO Collaborating Centres for Cancer in Seoul, Republic of Korea or NCC Tokyo, Japan or the Cancer Centre in Singapore should be considered among suitable centres for Telemedicine.

It is also suggested that Telemedicine between RDTCs and the NCC should be established.

6. Palliative care

A WHO public strategy for pain relief and palliative care was established during the period 2002–2005.[65] Here is given the continued plan for development of the National Palliative Care Program within the NCCP. Annex 1 outlines the comprehensive development of palliative care nationally so as to cover all in need of pain relief and palliative care. Palliative care will be integrated into all levels of the Mongolian health care system, including primary health care and home care, as is also outlined in the new NCD prevention and control programme.[66]

6.1 Present situation in Mongolia

- Palliative care is included in the undergraduate and postgraduate programmes of medical schools.
- Palliative care is recognized as a medical specialization. Palliative care doctors and nurses must have a specialized diploma.

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[65] 12, Davaasuren O, Stjernsward J,Callaway M et al: Mongolia: Establishing a National Palliative Care Program. *Journal of Pain and Symptom Management*. 2007,33,5,568-572,

[66] National Programme on Prevention and Control of Noncommunicable Diseases. Ulaanbaatar, Ministry of Health, Mongolia, 2007.

- The NCC has a Palliative Care Department with 15 beds.
- Affordable drugs for pain management have been available since 2006.
- Morphine consumption in Mongolia increased from 1 kg per year up until 2005, to 5 kg per year in 2006.Palliative care is included in the Master Program of the Ministry of Health 2006–2015 (Government Resolution N 72, 2005).
- Palliative care was included in the National Program on Prevention and Control of Noncommunicable Diseases in 2005 (Government Resolution N 246, 2005).
- Palliative care was included in the new Health Law of Mongolia in 2006. The Government' s responsibility for palliative care is outlined in paragraph 28, part 1.6.
- The palliative care standard was approved in 2005.
- The palliative care registration formula was approved by order of the Ministry of Health (N 20) in 2005.

6.2 Adjustments for future development

- Not enough doctors and nurses are educated on palliative care in the first, second and third levels of medical care.
- There is no education guide for family and voluntary caregivers, as well as no public education programme on palliative care.
- The availability and price of Immediate Release Morphine Sulphate Tablets (IRMS) and Slow Release Morphine Sulphate Tablets (SRMS) are not constant.
- Because IRMS and SRMS are usually not available at the same time, it is not possible to provide pain management according to WHO recommendations.
- Provinces do not have palliative cares services and need to develop home care teams.
- A registration and reporting policy for palliative care is not available.

Recommendations

(1) One oncologist and one nurse from 21 provinces and nine districts should be trained to develop cancer palliative care services in Mongolia.

(2) For caregivers, a palliative care guide should be published and education should be arranged.

(3) Public education on palliative care should be organized.

(4) A drug policy that would improve drug availability should be developed according to WHO recommendations.

(5) A palliative care registration and reporting system should be established.

Table 19 outlines the action plan for palliative care. It covers strategies, approaches, timetables and estimated budget.

Table 19. Action plan for palliative care

Target	Strategy	Approach	Time table	Cost (US$)
Cancer palliative care services established throughout Mongolia.	Carry out 2-week bedside training courses at the NCC for oncologists and nurses from each province and districts (4 times). Fifteen participants per course.	International faculty, national faculty 60 participants: oncologist, nurses	2007–2008	19 600
Training of national trainers on palliative care for family doctors	Organize and carry out intensive bedside training for family doctors. Ten courses for 250 family doctors.	International faculty national faculty, 250 participants: family doctors from 228 family hospitals, doctors and nurses from hospices and HSUM.	2009–2010	26 930
Education for caregivers	Develop and publish caregivers guide. Organize two one-day courses for 28 educators of caregivers.	National faculty 28 participants: educators for caregivers from NCC, hospices, districts oncologists.	2007	4358
Quality improvement	Set guides, indicators and systems for monitoring and evaluation.	MOH, HDC, NCC, HSUM, MPCS	2008–2010	2000
Public education on palliative care	Carry out public education on palliative care by television, radio, educational leaflets and brochures.	MOH, HDC, NCC, MPCS	2007–2017	10 000

Developing international cooperation on palliative care.	Education of national trainers abroad and cooperation with international associations.	NCC, district and provincial oncologists, paediatrician	2007–2017	5000
Total:				67 048

NCC, National Cancer Center

Expected outcomes

(1) Education of oncologist and nurses from 21 provinces and nine districts will establish cancer palliative care in all of Mongolia. Palliative care will be available for 4000 cancer patients by 2011.

(2) A caregiver's guide will help doctors and nurses to organize caregiver education.

(3) Education of national trainers for family doctors on palliative care will increase palliative care services at the primary care level.

(4) Public education will increase awareness of population on palliative care.

(5) Consumption of morphine will increase every year according to needs, and constant availability of IRMS and SRMS will be supported with affordable prices.

(6) Registration and reporting of palliative care organizations, services, patients, beds, caregivers and drug consumption and palliative care management and pain control provided.

7. Quantitative data: cancer registry, tests, controlled clinical trials, indicators, monitoring and analysis

7.1 Cancer registry and quantitative data handling needed for the NCCP

In order to introduce a population-based cancer registry system, there is need to establish a functioning system for collecting, handling and analysing data; to replace the existing notification form; to extend the database to include all generalized and specialized health care establishments (such as general practitioners, hospice, pathology, maternal centre, private hospital); and to develop and disseminate the notification form and registration guides. The goal is to strengthen epidemiological research in the cancer field.

For the research areas, there is need to train staff and clinicians by epidemiological study (RCT) and cancer survival; to carry out a national survey for finding cancer risks; to conduct RCT and KAP study on priority issues; and to organize the training of clinicians and doctors on the epidemiological study.

For capacity building, there is need to revise undergraduate and postgraduate curricula and to train and create positions stepwise for all levels of the cancer registry. For this, new training curricula and a corresponding workshop are needed for cancer registry specialists, epidemiologists, oncologists, etc. Local training on the cancer registry and survival should also be organized (covering 21 aimags, nine districts).

New equipment and software need to be acquired and installed. Technology for the cancer registry needs to be updated. For this, Mongolia needs to review software currently used for cancer registry and create data set; purchase selected

software (CANREG4, CANSURV, etc.); purchase statistical software (STATA and SAS); and to buy computers, copy machine and printers.

Monitoring and evaluation activities should cover: needs assessment of the progress and implementation of action plan; monitoring and periodic evaluation of NCCP; evaluation of the accuracy and completeness of the registry coverage; utilization of registry data in planning and evaluating NCCP; and development of indicators and measurement for impact of activities.

The central office of the Cancer Registry is located at the NCC. The NCC routinely obtains data of cancer morbidity and mortality from district hospitals and *aimag* health centres. District hospitals obtain data from FGP, and *aimag* health centres receive data from *soum* hospitals.

Some problems with the current cancer registration system have been documented:

(1) individual patient data are not computerized at all registration levels;
(2) lack of follow-up data;
(3) limitation of data set:
    (a) information on cancer patient is not available and identification (ID) code is not unique;
    (b) limited number of notifications used for data collecting;
(4) poor quality of registration procedure;
(5) lack of quality and completeness of cancer registered data:
    (a) vital status s not recorded;
    (b) duplicate registration of treatment information in NCC and *aimag* level;
    (c) incident and prevalent cases of cancer are not separately recorded in hospital admission note (incidence rates include incident and prevalent cases);
    (d) duplicate registration of patients (separate admissions records for an individual patient, or the patient ID code is not unique);
(6) insufficient technology (system not computerized);
(7) slow data transformation speed (sparsely populated);
(8) lack of qualified personnel and staff; and
(9) lack of clinical research and evidence of treatment cost-effectiveness.

A situational analysis is needed to evaluate and further develop the cancer registry and to estimate cancer survival in Mongolia. Accurate and available data on cancer morbidity and mortality will be analysed and submitted to health authorities, public officials, and health care providers for the planning of preventive and curative services. Setting up a population cancer registry is helpful in the planning, monitoring and evaluating of the cancer control programme.

The following priorities are proposed:

(1) Evaluate the cancer registry situation.
(2) Introduce the population-based cancer registry system.
(3) Computerize general data items for each patient.
(4) Renew and develop all notification forms as recommended by IARC.
(5) Obtain cancer-related data from all sources.
(6) Strengthen capacity and technical support.
(7) Strengthen epidemiological research in the cancer field.
(8) Set up and monitor tests for indicators in the NCCP, such as KAP tests, prevalence of smoking, standardized tumour, node, metastases -classification of malignant tumours- (TNM) data, changes in staging, and randomized clinical trials, supporting the evaluation of the implementation of the NCCP.
(9) Employ the services of a WHO consultant to help with the aforementioned priority, as well as the cancer registry.

7.2 Cancer registry in NCC

The main strategies for the establishment of a cancer registry system are: (1) situational analysis of cancer registry, and (2) needs assessment of human recourse and technical supplement.
Table 20 describes these and other strategies.

Recommendations

(1) External support should be sought from a short-term consultant.
(2) An evaluation of notification for using current cancer registry should be developed.
(3) An assessment of human and technical recourse should be developed.
(4) The consultant and cancer registry should also cover the quantitative tests used as indicators in the NCCP, and monitor and evaluate results, as well as help with clinical randomized studies in the NCC.

Table 20. Action plan on quantitative data

Target	Strategy	Approaches
Establishment of cancer registry system in NCC	Situational analysis of cancer registry Needs assessment of human recourse and technical supplement	- With the technical support (short-term consultant) to improve surveillance of cancer registry and develop guidelines * To develop cancer registry guidelines and procedure manual * Improve human resource capacity * Improve electronic hardware and software capability * Introduce CANREG4 program in to existing cancer registry system. *Improve quality of monitoring and evaluation of cancer registry - Evaluate notification for using current cancer registry - Assess human and technical recourse
	Introduction of population-based cancer registry system	- Establish a system for collecting, handling and analysing data - Replace the existing notification form - Extend database to include all generalized and specialized health care establishment (such as FGP, hospice, pathology, maternal centre, private hospital) Develop and disseminate notification form and registration guides
Strengthened capacity for epidemiological research in the	Identification of priority research area and agenda	- Train staff and clinicians by epidemiological study (RCT) and cancer survival - Conduct national survey for finding cancer risks - Conduct RCT and KAP study on priority issues

cancer field		
Capacity-building	Revision of undergraduate and postgraduate training curriculum Creation of needed positions in all cancer registry levels	- Develop and renew training curricula for cancer specialists, e.g. for cancer registry /statistics, epidemiologist, oncologist - Organize workshop and meeting - Carry out study tours - Conduct local training in 21 *aimags* and nine districts - Conduct international training - Conduct training course on cancer registry and survival
Equipment	Acquisition and installation of equipment and software Updating of technology for registry	- Review software used for cancer registry and create data set - Purchase selected software (CANREG4, CANSURV, etc.) - Purchase statistical software (STATA and SAS) - Purchase computers, copy machine and printers to strengthening capacity
Monitoring and evaluation	Assessment of the progress and implementation of action plan Monitoring and periodic evaluation of NCCP	- Evaluate the accuracy and completeness of the registry coverage - Utilize registry data in planning and evaluating NCCP - Develop indicators and measurement for impact of activities

NCC - National Cancer Center; NCCP - National Cancer Control Programme; FGP-Family Group Practice, RCT-Randomised Controlled Trial; KAP-Knowledge, attitude and practice

8. Management and funding

8.1 Management

A Project Director or Coordinator, designated by the Ministry of Health, should be responsible for the technical and administrative management of the programme as well as for coordinating its activities at different levels. The selected person should be a cancer specialist, part- or full time, with secretarial back up.

An NCCP Technical Board should be constituted for coordination and implementation. The board should include the following people:

At the national level:

- J. Chinburen, NCC Chair;
- G. Tsetsegdary, Ministry of Health, integration into all levels of HCS;
- B. Tsogzolmaa, PHI ,WHO, cancer prevention;
- L. Oyuntogos, HSU, health education;
- J. Chinburen , NCC, early detection and therapy;
- X Baigal, NCC, early detection and therapy;
- G. Chimge, MCH, children' s cancer;
- D. Odontuya, MPCA, palliative care;

,

At the international level:

- S. Govind, WHO; and
- J. Stjernsward, Consultant.

Table 21. NCCP first logistics

Activities	Timeframe	Budget
Hire a part-time NCCP coordinator or director	As soon as possible	Salary for half time Secretarial support and communication costs
Convene a workshop with	2007	One day

national partners		
Convene a workshop with international partners	2007	Workshop expenses
International consultant		WHO Mongolia consultant or temporary adviser (one week)

All countries should have a national cancer control programme, regardless of their specific epidemiological situation or the resources available. The NCCP should be developed with a long-term horizon and a broad scope so that it can serve as the vehicle through which all cancer control activities are organized and coordinated. Limited resources should not be a discouraging factor.

As recommended by WHO, the implementation of the NCCP should be carried out step by step (piecemeal fashion) identifying and undertaking first those activities that are the most urgent and that promise the greatest benefit. The first two steps will be to get on board all national stakeholders and then international stakeholders.

The progress of the project will be periodically (at least once a year) reviewed in accordance with the procedures laid down for the follow-up and execution of the programme. The arrangements, terms of reference, and date of the evaluation will be decided by consultation between the local staff and the international executing agency.

These reviews will be made with the aim of assessing the state of the progress, approving future plans of work and also for reviewing the project document and revising it if necessary (making the necessary changes regarding the activities, the personnel designated and the budget).

The NCC has had little impact on cancer morbidity or mortality and it is suggested that staff within the appointment should be given responsibility and time for implementing parts of the NCCP.

The evaluation will be carried out in accordance with the policies and procedures laid down to that end.

Indicators for monitoring progress would include the following:

(1) For prevention – improvement in knowledge, attitudes and practice of population; changes in prevalence, e.g. of smoking; and enforcement of legislations, e.g. tobacco);
(2) For early detection – down-staging of tumours;
(3) For treatment – change in five-year survival;
(4) For palliative care – morphine consumption, number of doctors prescribing, number of patients covered.

It takes five years to demonstrate a shift in survival, but down-staging of tumours can be evaluated sooner. Baseline indicators should be measured and included in the annual evaluation reports. Other process indicators include integration with other programmes; integration of cancer control in all levels of the HCS including primary health care; introduction of new preventive measures, e.g. vaccination against cervical cancer, inclusion of cancer control in the national health plans, improvements in prescribing of drugs, chemotherapy, palliative care, effective supply of essential drugs, drug availability, education (e.g. curriculum changes), etc.

Once a year, the state of the programme' s progress will be presented in an evaluation report, to be prepared by the national director in consultation with the international executing agency. The report will be published and distributed in order to demonstrate progress and encourage further action.

8.2 Funding: current and pledged resources

To ultimately close the "know-do gap", i.e. the gap between what is known but is not being done, three major problems have to be solved, namely finances, manpower and institutionalization.[67]

For addressing these three critical key points, an inclusion of the NCCP in Mongolia's National Health Plan will be important. This will help to build up needed manpower, institutionalize cancer control at all levels of the country's health care system, mobilize partnerships and support from the international donor countries and the international community, and build partnerships with overlapping programmes in the country, e.g. tobacco control programme and HBV vaccination programme.

Indirectly, financing and manpower are already established for some key priorities, such as tobacco control, HBV mass vaccination (with an experience and knowledge also offering a platform and head start for a future HPV vaccination programme against cervical cancer). The ongoing strengthening of the primary

health care system (PHCS) offers an opportunity to build in cancer control initiatives, like increased cancer awareness, earlier referral of curable cancers by education and inclusion of home care for the terminally ill.

Integration with other programmes of relevance, e.g. prevention of NCD based on common risk factors, the tobacco programme. Many of these programmes are already institutionalized in the Ministry of Health and/or school of public health (and are being included.) Thus most of the preventive measures are guaranteed to be addressed. Palliative care is already being addressed by the National Palliative Care Program, which now is able to absorb considerable funding from donors for its implementation.

A pledge to support the down-staging of cervical and breast cancer is being negotiated with the Millennium Challenge Account (MCA). MCA is also willing to provide necessary equipment, like mammography machines. The international

[67] Bridging the know-do gap in global health. *Bulletin of the World Health Organization*, 2004, 82(10).

donor community should be approached as soon as the NCCP has been officialised and a stakeholder meeting held.

8.3 Nongovernmental organizations

A nongovernmental organization (NGO) is well positioned to advocate for a patient, e.g. if free essential drugs are not available, or if palliative care is not offered because the Government did not enforce agreed legislative measures. NGOs usually play an important role in health education and guiding public interest. They may also be a vehicle for fundraising and mobilizing personnel as well as economic resources from the public. They may also serve as a base for volunteers.

Recommendation

(1) A cancer society should be created or reactivated.

9. Recommendations

9.1 Prevention

(1) The NCCP need not and should not establish a separate approach to tobacco control and other joint NCD risk factors, but join forces with this ongoing programme. Regular KAP tests monitoring the effect of interventions and documentation of prevalence of smoking should be done and may need funding.

(2) An integrated health educational approach, including risk awareness about cervical cancer, should be incorporated in the STI and HIV/AIDS programmes. Also a stepwise establishment of a national vaccination programme against HPV should be explored.

(3) The NCCP should establish an active partnership with the national HBV vaccination programme and reassure long-term monitoring of changes in chronic carrier rates and incidence of primary liver cell carcinomas.

(4) The possibility of introducing vaccination against cervical cancer should seriously be considered as opportune and timely in view of ongoing changes in lifestyles in Mongolia. It should be considered as a cost-effective, long-term approach.

(5) Facts on possible geographic hot spot industries that may expose workers and surrounding populations to cancer-causing agents should be established. Based on this information and education of all involved and introduction of protective measures, including legislation, should be done.

(6) The increased risk of liver cirrhosis, primary liver cell cancer and pancreas cancer should be included in the future comprehensive NCD public awareness programme as an alcohol-related risk factors.

(7) Health education will cover all aspects linked with cancer (in general and for specific cancers), stressing the existing primary prevention measures, prospects for early detection and the advantages of early treatment.

9.2 Early diagnosis and health education

(1) An awareness programme for early detection of cervical and breast cancers should be included in the educational awareness programme for the public on early signs of curable cancers.

(2) The current situation in Mongolia does not support massive breast and cervical screening programmes: resources are low, infrastructure is limited and the majority of cancers are detected in the advanced stages (III/IV). In this situation, "down staging" by increased public awareness and training of health professionals could have a major impact on the disease. Emphasis should be on health education and raised awareness among the public and health professionals.

(3) For breast cancer, women should be taught breast awareness and self-examination, with self-referral to physician if lumps are detected. Mammography should be focused on case finding rather than screening so it is used to confirm presence of a lump that has been detected by the woman or physician.

(4) For cervical cancer, women should self-refer to physician if they have warning signs of post-coital bleeding, post-menopausal bleeding, and foul discharges.

(5) For laryngeal cancer, people should self-refer to physician if they have been experiencing hoarseness for more than one or two weeks. For skin cancer, people should be taught to recognize warning signs.

(6) Earlier referral, diagnosis and therapy of cancer of the breast, cervix and larynx or pharynx are more important for prognosis than any other therapy applied at a late stage of the disease. The possibility of future systematically screening for cancers of the breast and cervix uteri should be explored in a stepwise approach.

9.3 Therapies and treatment

(1) Human resources should be developed.

(2) Technology for radiotherapy should be updated.

(3) Therapy should be standardized through adaptation and dissemination of selected treatment protocols (for diagnosis and therapy) for the most common forms of cancer.

(4) Key manuals should be made accessible in Mongolian.

(5) Clear referral patterns, focal points and possible triage should be established.

(6) Indicators and systems for measurement of the impact of improved cancer care should be developed.

(7) A clear, cost-effective drug policy should be established. Efforts should be made to reassure availability of selected essential drugs.

(8) Cancer chemotherapeutic drugs for children should be classified as life saving to facilitate them becoming free of charge for patients.

9.4 Palliative care

(1) Anyone needing pain relief and palliative care should be covered. It would be unethical to offer this service to cancer patients only. Therefore, palliative care should be addressed by establishing a National Palliative Care Programme (NPCP) and by being incorporated in the National Cancer Control Program (NCCP) as one of the four key priorities necessary for a comprehensive cancer programme. The Institutionalization of palliative care will start through cancer, building up a critical mass of expertise, experience and skills, to support the incorporation of palliative care into all levels of Mongolia's health care system

and into the society/community (more detailed Recommendations are given in Annex 2)

9.5 Cancer registry

(1) A population-based cancer registry is an indispensable foundation of an effective surveillance system.

(2) The cancer registry should also cover the quantitative tests used as indicators in the NCCP, (KAP, TNM, prevalence, etc) and monitor and evaluate results, as well as help with clinical randomized studies in the NCC.

Annex 1. National Palliative Care Program 2007–2017

Present situation on PC in Mongolia:

- Palliative care included in the undergraduate and postgraduate education programme of medical schools.
- Palliative care recognized as a medical specialization and palliative care doctors and nurses specialized with diploma.
- NCC had Palliative Care Department with 15 PC beds.
- Affordable drugs for pain management were available from 2006.
- Consumption of Morphine in Mongolia was 1 kg per year up to 2005, since 2006Consumption of Morphine increased up to 5 kg.Palliative care included in the Master Program of the Ministry of Health
  2006-2015 (Government Resolution N 72, 2005)
- Palliative Care included in the National Program on Noncommunicable Diseases in 2005 ((Government Resolution N 246, 2005).
- Palliative care included in the new Health Law of Mongolia in 2006. ("Government responsible for PC, paragraph 28 part 1.6)
- Palliative care registration formula proved by order of the MoH N20 in 2005.

Adjustment for future development:

- Total death rate in Mongolia is 15 469 (2005). PC needs 9 281 patients
  (60% of total death rate). About 3 000 patients need cancer palliative care. It means that 6 281 patients with non-cancer diseases (patients after stroke, cirrhosis, drug resistant tuberculosis, children with leukaemia and solid tumour, and elderly people with chronic diseases) need palliative care in hall Mongolia, but PC services for these people not available in Mongolia.

- There is not available multidisciplinary palliative care team. Palliative care available only for cancer patients.
- Not enough doctors and nurses educated on palliative care in I, II, III level of medical care.
- There is not available education guide for family caregivers, voluntary caregivers and public education programme on PC.
- Provinces had not PC services and need to develop home care and outpatient care multidisciplinary teams.
- Very poor medical supplies for PC.

Recommendations

1. Education of geriatricians, neurologists, social workers on PC to establish outpatient multidisciplinary palliative care services and home care teams in 21 provinces and nine districts.
2. To work out and publish caregivers guide and organize education for trainers of care givers.
3. To organize public education on palliative care.
4. To develop drug policy according the WHO recommendation and decrease the impediments in drug availability.
5. Establish and develop palliative care registration and reporting system.
6. Education of paediatricians and specialties in infectious diseases on palliative care to establish PC services for children and patients with communicable diseases.

Action plan

N	Target	Strategy	Approach	Time table	Cost
1.	Integration and coordination PC Policy	Organizing one day Workshop for palliative care working groups to introduce palliative care programme to provinces, districts health centres directors, health reporting and registration group, drug policy group, home care service establishing group, education group, MCHSC, HSUM, and NCID. Order of the MoH about establishing PC teams in district and provinces must be established. Order about establishing working groups on PC policy must be proved.	Workshop around 60 people, including MoH, MoSW, WHO, international expert, Policy makers responsible for drug, registration, education, MCHSC, NCID, HSUM, directors of 21 provinces and nine districts.	2007	$5.966
2.	To establish home care and outpatient PC services in 21 provinces and nine districts.	Organizing eight bedside training courses each two weeks for education two doctors and two nurses from each province and districts in PCRTC, hospices.	International faculty, national faculty 120 participants: two doctors (geriatrician, neurologist or surgeon) and two nurses from each 21 provinces and nine districts.	2007-2008	$39.200
3.	Establish	To work out and publish	National faculty 28	2007	$ 4.358

	care givers education and national trainers for care givers.	care givers guide and organize one day two courses for 28 educators for care givers national trainers.	participants: educators for caregivers from neurologists and geriatricians		
4.	Quality improvement	Set guides, indicators and systems for monitoring and evaluation	MoH, HDC, MCHSC, NCID, MPCS, province health directors	2008-2010	$ 2000
5.	Education of paediatricians on PC, and national trainers on PC for children.	Organizing five days bedside training of paediatricians on PC. (Senior paediatrician from each districts and provinces and paediatricians from MCHSC)	International faculty, national faculty MCHSC, HSUM, PCRTC. 40 participants: main paediatrician from each districts and provinces and paediatricians from MCHSC	2011	$ 7.240

6.	Education of Social workers on PC and national trainers of SW.	Publishing SW guide and organizing five days training of SW on PC. (SW from each districts and provinces and teachers of PHS of HSUM)	National faculty, PHS of HSUM, PCRTC 40 participants: main SW from each districts and provinces and teachers from HSUM	2012	$ 7.240
7.	Integration PC in MPCD and prepare national trainers on PC for infectious diseases.	Organizing five days training of main doctors on infectious disease on PC.	International faculty, national faculty, NCID. 40 participants: main doctors on infectious disease from each districts and provinces and teachers from HSUM	2014	$ 7.240
8.	Public education on palliative care	Public education on PC by TV, radio programmess, educational leaflets and brochures.	MoH, HDC, MPCS, MCHSC, NCID	2007-2017	$10.000
9.	Developing international cooperation on PC.	Education of national trainers abroad and cooperation with International Associations.	HSUM, MPCS, MCHSC, MCID geriatrician, paediatrician.	2007-2017	$10.000
10.	Integration and coordination palliative care working groups	Organizing one day Workshop for palliative care working groups. Reporting PC working groups.	Workshop around 60 people, including MoH, WHO, international expert, health policy makers, MCHSC, NCID, HSUM, directors of 21 provinces and nine districts.	2015	$5.966
11.	Reporting of activities.	Encouragement of working groups after reporting activities	Working groups for drug availability, registration, education,	After reporting	$ 6.000

			integration of PC in NCDP, home care service establishing group	successful work	
12.	Transport for home visits for home care teams	Developing transport for home visits for home care teams of 21 provinces and nine districts	MoH, MoSW, health directors of 21 provinces and nine districts	2008-2017	$300.000
13.	PC supplies for new established PC teams.	Develop PC supplies for new established PC teams. $12770 per year for all 21 provinces and nine districts	NCC, health directors of 21 provinces and districts.	2009-2017	$ 102.160
14.	Total:				**$500.130**

$ 97.970 for hall activities in PC in 2007-2017

$ 402.160 for transport and supplies for new established PC team

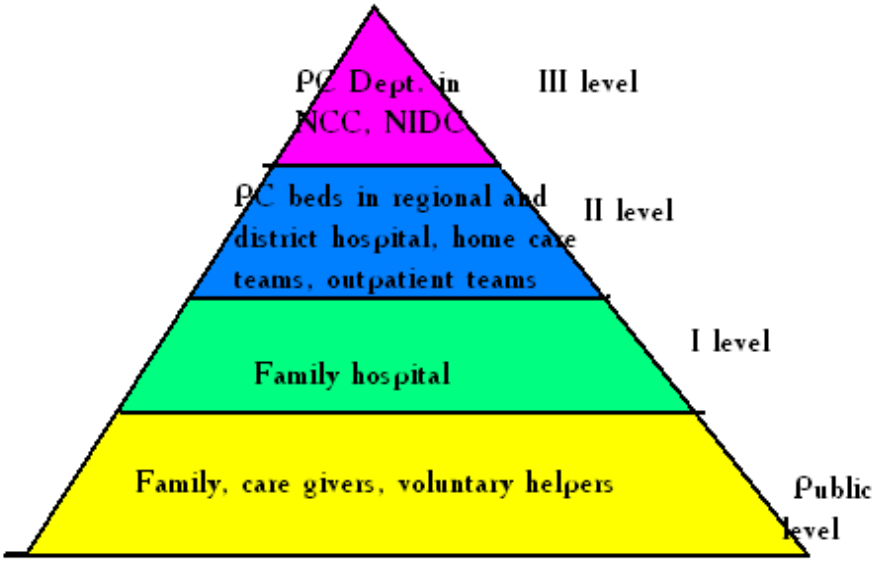
Expected outcomes:

1. Education of doctors and nurses from 21 provinces and nine districts will establish home care and outpatient care multidisciplinary teams in all districts and provinces of Mongolia. As the result, geriatrics and chronic diseases palliative care services will be available in all Mongolia from 0% up to 80%.
2. Publishing caregivers guide and national trainers for education of care givers will help to doctors and nurses to organize caregivers' education constantly.
3. Public education will increase awareness of population on palliative care.
4. Registration and reporting of palliative care organizations, services, PC patients, PC beds, PC caregivers, drug consumption for PC est. will provide PC management and control programme for non-cancer PC patients.
5. PC services for children will be established and will be available from 0% up to 50 % who need it.
6. PC services for communicable disease patients will be established and PC will be integrated into the NPCD. PC services will available for AIDS, drug resistant tuberculosis, brucellosis, chronic hepatitis and other infectious diseases from 0% up to 50% who need it.

Introduction of the effective and inexpensive management of developing palliative care services in Mongolia.

According to Mongolian Palliative Care Standard and three levels of health care we have to develop three levels of palliative care. This project was considered, discussed and highly appreciated at the Palliative Care Policy Development Conference in Budapest in
2005 September. Our management proposal is the cheapest way to develop outpatient, inpatient and home care services on palliative care throughout the country. MPCS and NCC will have responsibility for ten days education of three doctors and three nurses from 21 provinces and nine districts. Health directors of provinces and districts will have responsibility for coordinating works of palliative care team and reporting palliative care services in provinces and districts.

See picture below:



1. **Development of inpatient palliative care services in 21 provinces of Mongolia and nine regions of Ulaanbaatar.** According to the order of the Minister of Health N37, 2005 health directors of provinces and regions receive the right to serve up to five palliative care beds according to the needs of population. According to the WHO recommendation 100 000 population needs about five palliative care beds for inpatient services. It means that Huvsgul aimag with 120 000 population needs about five to six palliative care beds, Zavhan aimag with 70 000 population needs about three to four palliative care beds, Gobi Sumber aimag with 30 000 population needs about one to two palliative care beds. According to the order N37 palliative care beds will be financed by province or regional health budget. But in 2005 only one aimag reported service of palliative care beds to the MOH, others did not give report because of absence budget they did not serve any palliative care patients. If these Orders will function actively, Mongolia will have palliative care inpatients services in all provinces and districts without any additional budget. We have to organize one day seminar in the MOH to develop inpatient palliative care services in 21 provinces of Mongolia and nine regions of Ulaanbaatar by activating orders responsibility and reporting system responsibility. Participants of this seminar will be the Minister of Health, WHO representative in Mongolia, policy development division of the MOH, Health financing division of the MOH, officers of the Master program, Health registration and reporting division of the MOH, directors of provinces and districts health Centres. MPCS, NCC. Policy development and coordination division of MOH will have responsibility for this seminar and developing inpatient palliative care services in Mongolia.

2. **Establishment outpatient palliative care services and home care team in 21 provinces of Mongolia and nine regions of Ulaanbaatar.** According to our study, three medical specializations in Mongolia has more palliative care patients: oncologists (incurable cancer), geriatricians (elderly problems), and neurologists (patients after stroke). For this reason these doctors must be specialized on palliative care by ten days palliative care basic course. After that they will work as oncologists, geriatricians and neurologists with

palliative care knowledge in own outpatient ambulatory of district and province health centres. It means that MOH need not to approve additional palliative care doctor's staffs with additional budget for provinces and districts. WHO can give financial support for palliative care basic education (ten days) to three medical specialists from each provinces and districts. MPCS and NCC will have responsibility for education and director of province and regional health centres, National Licensee Centre will have responsibility for outpatient service. Three medical specialists: oncologists, geriatricians, neurologists after education in ten days basic courses on palliative care will have duty for home care services, each two days of the week will do home visits of terminally ill patients, after stroke patients and elderly patients. These doctors will work four days in outpatient room of health centre and two days do home visits.

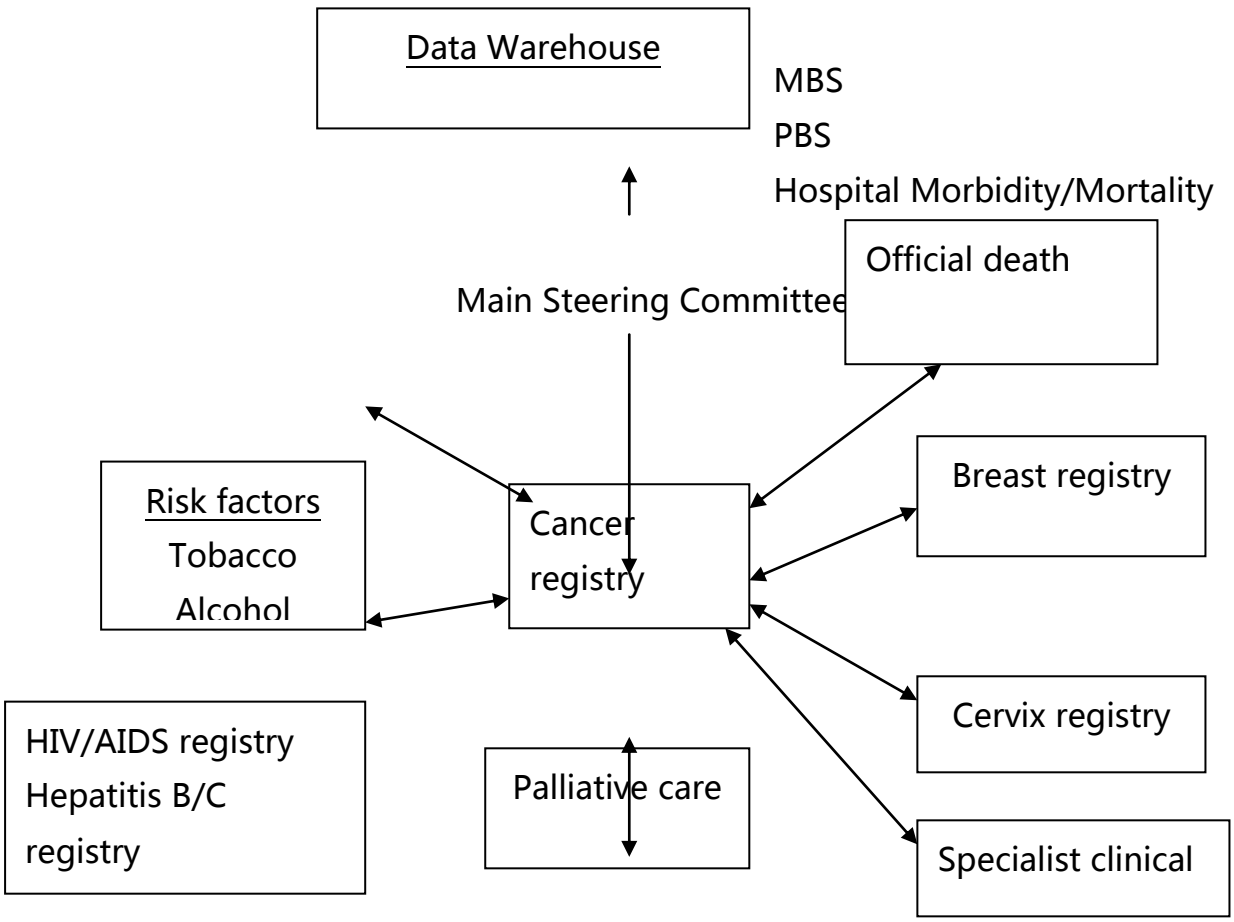
Example of schedule:

Doctors	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Oncologists full staff	Amb	Amb	Amb	Amb	Home care	Home care	
Geriatrician full staff	Home care	Home care	Amb	Amb	Amb	Home care	
Neurologists full staff	Amb	Amb	Home care	Home care	Amb	Amb	
Palliative care nurses	Home care	Home care	Home care	Home care	Home care	Home care	

All districts and provinces will have outpatient and home care services this way. Multidisciplinary palliative care team will provide outpatient and home care services in all provinces and regions in 2nd level of health care.

This management is cheapest way to develop outpatient, inpatient and home care services on palliative care through the country. MPCS and NCC will have responsibility for ten days education of three doctors and three nurses from 21 provinces and nine districts. Health directors of provinces and districts will have responsibility for coordinating works of palliative care team and reporting palliative care services in provinces and districts. MOH will have responsibility for establishing order about establishing inpatient, outpatient, home care PC team in provinces and districts and reporting PC services.

Annex 2. Scheme for Data Warehouse



Proposed by Dr. David Roder, STC on Cancer registry