

BUILDING BRIDGES ACROSS TIME AND SPACE – EXPERIENCE AND SUCCESS OF A TELEMEDICINE PILOT PROJECT IN MONGOLIA

EDITORIAL

The Asia Briefing Paper Series aims to inform the development practitioners and the public about new innovations, results and impacts of Swiss development cooperation in Asia. It shall particularly highlight past and present efforts to achieve aid effectiveness through partnerships between Swiss agencies and local partners.

Pradeep Itty,
Head East Asia Division

The Khuvsgul region, located in the far north on the Mongolian-Russian border, is one of the most beautifully situated, but least accessible provinces of Mongolia. For foreign tourists drawn to the mountains surrounding the lake of the same name, the 700-kilometre journey from Ulaanbaatar can easily be made by plane. In contrast to this, the local population live in the challenging conditions imposed by greatly limited mobility. No railway line or highway connects the most northerly aimag¹, whose approximately 120,000 inhabitants are dispersed over an area of 100,000 km², to the capital. This makes contact and dialogue with Ulaanbaatar, the political, economic and cultural centre of Mongolia, extremely difficult, time-consuming and expensive.

The remoteness, compounded by an underdeveloped transport infrastructure, which Khuvsgul has in common with the 20 other provinces of the country, was

1 The administrative structure of Mongolia below the national level comprises 21 aimags (provinces), 329 sums (counties) and 1,500 bags (communities).



The Mongolian expanse – a big challenge for the Mongolian health system.

once described by a Mongolian historian as “the tyranny of distance and isolation” and thus identified as a decisive handicap to economic and social development. This also applies to the health system and the enormous gap that persists between medical provision for the populations of the few major towns and those of the remote rural areas.

The Khuvsgul aimag can serve as a case study for the challenges faced by Mongolia in expanding and modernising its health system, but at the same time for the innovative approaches adopted with international support. The central aimag hospital is located in the small town of Murun, the administrative centre of the province. With approx. 50 doctors in the principal medical disciplines and comparatively good equipment, it is the contact point for all patients from the region, who cannot be assisted in the sum clinics, which are limited to the provision of primary health care.

One of the critical weaknesses of the healthcare system is the lack of networking between the provincial hospitals and the medical and laboratory know-how

at the disposal of specialists at the large medical and scientific institutions located exclusively in the capital. Access to these is especially essential when the doctors at the aimag hospitals reach the limits of their possibilities and have to rely on the fast and efficient diagnostic and therapeutic decision-making support of their professional colleagues.

Since 2009 the provincial hospital of Khuvsgul has been involved in a pilot project, which is intended to close this gap using the existing telecommunications network in Mongolia. The development of the Mongolian Telemedicine Network (MonTelNet), which now connects the provincial hospitals of all 21 aimags with the leading medical institutions and specialist clinics in Ulaanbaatar, is a new joint undertaking within the framework of development cooperation between Switzerland and Mongolia. It was initiated in 2008 in consultation with the Mongolian Health Ministry and, with total funding of CHF 1.4 million for a period of four and a half years, will largely be financed by the Swiss Agency for Development and Cooperation (SDC).

Special features of the project include the fact that the plan to establish a national, multifunctional telemedical communication and consultation network is the result of many years of practical cooperation between Mongolian and Swiss physicians. A focus on practical requirements and what is feasible has also determined the design and implementation of the project at the operational level, which is the responsibility of the Swiss Surgical Team (SST), an organisation that has been working in Mongolia for 15 years giving advice and providing further training. This has inspired others. For example, the CampusMedicus system platform developed especially for Mon-TelNet is now also used by other organisations. This also applies to the health programmes of the United Nations Population Fund (UNFPA) in Mongolia and to medical projects, which the Millennium Challenge Account (MCA), set up by the US government, operates in the country.

THE MONGOLIAN HEALTH SYSTEM IN TRANSITION

The political changes of 1990, which saw Mongolia put an end to 70 years of Soviet-style socialism and begin to move towards democracy and a market economy, represented a historical turning point. At the same time, however, this was the start of a lengthy and painful transition process affecting all areas of life. Even today, the country suffers from the fact that the expectations of the population, about a third of whom live below the poverty line, regarding a sustained improvement in living conditions, have risen far more quickly than could be met by the country's economic development, accelerated by its wealth of natural resources.

At the start of the transformation, the health system was confronted with three major challenges:

Financing: The collapse of the state-run economy and the unavailability of the medicine and medical equipment mainly supplied until then by the Soviet Union and Eastern European allies plunged the public health system into a financial crisis, which marked the end of guaranteed free medical care for all. In 1994 the national health insurance system was introduced, in which 80% of the population currently participate. As the income from the so-

cially adjusted insurance contributions only covers about 50% of total expenditure, a second phase saw the introduction of private participation in the costs of medical services, from which only primary care is exempt. This is primarily a burden on the socially disadvantaged.

Efficiency: The organisational form of the health service still largely corresponds to the model based on the three-tier management structure gradually developed in Mongolia with Soviet assistance from the 1920s onwards. The low efficiency of the strongly centralised system in relation to high staffing and other costs, together with a one-sided fixation on clinical and therapeutic measures at the expense of prevention and health education, made reform inevitable.

Epidemiological change: Due to changes in lifestyle and eating habits, over the last 20 years Mongolia has also experienced a significant change in morbidity and mortality patterns. While the number of cases of communicable diseases has declined significantly, susceptibility to non-communicable illnesses has risen dramatically. The most common causes of death today are cardiovascular diseases, cancer, in particular liver cancer, diabetes and, as a result of rapid motorisation, road accidents². For example, the need for advanced histological and cytological diagnosis (pathology) and modern methods of surgical and non-surgical therapy is correspondingly great.

Measured in terms of these challenges, the health service in Mongolia has made re-markable progress since the beginning of the transformation with the support of international organisations and bilateral partnerships. This is shown by the findings of the World Health Organisation (WHO) principally in two areas: the successful containment of communicable diseases and a significant decline in maternal and infant mortality. Thus between 2005 and 2010 maternal mortality decreased from 93 to 45.5 deaths per 10,000 live births. Over the same period, the infant mortality rate fell from 44.4 to 19.1 per 1,000 births. In the opinion of the WHO, this development indicates that Mongolia is, ac-

ording to plan, achieving the millennium goals for improving the health of mothers and children³.

However, the country is still far from meeting other targets. Above all, this is true of the key concerns formulated by the government in the 2006–2015 health-policy ten-year plan, namely to ensure "that all people in Mongolia, regardless of their gender or age, place of residence or purchasing power, have equal access to low-cost, high-quality basic medical care and specialised medicine, which are provided by qualified personnel".⁴

There are two main obstacles to the achievement of this goal. One is the vast social gulf created by the introduction of the capitalist market economy and by regionally and sectorally unbalanced economic development in Mongolian society. Together with the partial commercialisation of the health system, this led to medical treatment beyond primary care being excessively costly or unaffordable for lower-income groups.

The second problem results from urban-rural disparities, which have also increased as the country has undergone economic and social change. The sheer size of Mongolia (equivalent to three times the area of Germany, Austria and Switzerland combined), a small population of 2.8 million and the world's lowest population density (1.7 inhabitants/km²) are the worst possible prerequisites for an even distribution of adequate medical provision across the country.

This geographical disadvantage explains, but only in part, the acute lack of provision in rural areas, where about 40% of the population live. It has grown worse as the flat land has suffered the adverse effects of global economic development, and medical professionals seeking better earnings and promotion opportunities and a higher quality of life have migrated to the cities, predominantly to Ulaanbaatar. This has led to 10,000 inhabitants of the capital today having, on average, more than twice as many doctors (43.4) doctors available to them as are available

3 Health Service Delivery Profile. Mongolia 2012, WHO 2012

4 Health Sector Strategic Masterplan 2006 - 2015, Ulaanbaatar 2005

2 WHO-Mongolia. Country Cooperation Strategy 2010 -2015, WHO 2010



In the middle of the Mongolian expanse – a public hospital at community level.

to the same number of rural inhabitants (18.8). This relationship is extremely unfavourable when it comes to the availability of medical specialists.⁵

BUILDING BRIDGES ACROSS TIME AND SPACE

The WHO has defined the concept of telemedicine, that is, the use of modern communications technology for medical purposes, as follows: "Telemedicine is the delivery of health care services in situations, where distance is a critical factor. To be able to bring health care services to remote communities, health professionals use modern information and communication technologies for the diagnosis, treatment and prevention of disease and injuries, for research and the evaluation of results, as well as for the continuing education of health care providers ..."⁶

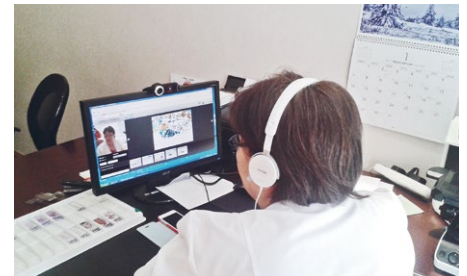
The definition summarises in abstract terms what the Swiss-Mongolian telemedicine project has made a fact: the development of a nationwide medical communication and consultation network, available around the clock, which helps to bridge the physical distances and the gap

in know-how quickly, efficiently and economically, and makes resources available where the need is greatest – where difficult diagnostic and therapeutic decisions have to be taken and medical personnel provided with further and continuing training.

The planning and prompt execution of the project was facilitated by the fact that the project partnership was able to make use of many years of complementary experience and expertise. The project was initiated by doctors from the SST (www.swiss-surgical-team.org), which already since 1998 has been operating in Mongolia on a voluntary basis as the largest surgical aid organisation. This has involved practical cooperation with their Mongolian colleagues in hospitals in Ulaanbaatar and the provinces in the diagnosis of diseases, at the hospital bed, at the operating table and through the regular granting of scholarships for the further training of young physicians in Switzerland. This has created the basis for a network of contacts and for trust, without which a project like this cannot succeed.

On the scientific and technical side, the project has been able to rely on the telemedical competence and experience of two partners – the Institute for Pathology at the University Hospital in Basel and the German company Klughammer GmbH (www.klughammer.com), which specialises in medical hardware and software. As scientific leader of the project team,

the Basel-based pathologist and telemedicine expert, Prof. Martin Oberholzer, brought with him the experience he had gained from his pilot projects on the introduction of telepathology, initially in Switzerland, and later on the Solomon Islands as well as in various other countries in Asia and Africa. Klughammer GmbH took on the task of designing the web-based system with software it had newly developed, which provides the necessary hardware equipment for the different modules of CampusMedicus and trains the medical professionals in Mongolia in its use.



Well connected – two Mongolian doctors hold a phone conference.

When the Telemedicine Center at the Pathology Institute of the Health Sciences University of Mongolia (HSUM) officially went into operation on 1 December 2008, the basis for the subsequent gradual development of the national MonTelNet network was created. Before long, the provincial hospital in Sainshand (Dorno-Gobi aimag), the junction of the Trans-Siberian Railway in the southeast of Mongolia, was the first regional hospital to be connected to the system.⁷ At the same time, courses at various locations began, where Mongolian professionals (thus far about 300 participants in total) were trained by the Klughammer experts and the project coordinator of the Pathology Institute of the Health Sciences University of Mongolia, Dr. Dungubat Erdenetsogt, in how to use CampusMedicus and in the handling of the three standardised hardware packages for TelePathology (manually or remote-controlled microscope with connected digital camera), TeleHospital (light table and digital zoom camera, and, if needed,

5 Health Service Service Delivery Profile. Mongolia 2012, WHO 2012

6 WHO 2007

7 Sainshand was selected in part due to the fast internet connection available there. In most other regions, the telecommunications network is designed for medium speeds.

additionally TeleUltrasound) and Tele-Teaching (webcam, video projector).

After the conclusion of the system expansion financed by SDC and SST, all 21 regional hospitals are now networked with five central medical institutions and special clinics in the capital. These include the university hospital of the HSUM, the National Cancer Center (NCC) and the National Center for Mother and Child Health (NCMCH). The telemedicine dialogue network, based on CampusMedicus, currently comprises five "communities", which are subdivided into specialist groups. Three of these were developed with their respective specialisations within the framework of the project: MonTelNet Mongolian (user interface in Mongolian) with seven specialist groups; MonTelNet Diagnostics (in English and mainly used for the paediatrics project established by Swiss doctors) and the internationally active open community Mongolian Pathologists, which is operated autonomously by Klughammer. The other two communities, which have adopted CampusMedicus as a system platform, are already part of the above-mentioned health projects of the UNFPA and the USA's Millennium Challenge Account.

MONTELNET IN ACTION – RESULTS AND PROSPECTS

Dr. J. Munkhbayar, a pathologist who works at the Khuvsgul aimag hospital, needs only a few sentences to explain the medical-therapeutic and economic benefits of having launched MonTelNet. «A few years ago, we had to send a monthly average of up to 20 tissue samples and smears for histological and cytological examination all the way to Ulaanbaatar. Today, we obtain reliable findings within a few minutes using a microscope, camera and image transmission». This also means that the number of patient referrals to specialist clinics in the capital has declined significantly.

Even though the results of the final evaluation of the project are not yet available, existing data already supply some informative indicators regarding the number of users and their distribution among the individual communities, as well as the case frequency in the different medical areas of application. Of particular note is the importance that the telemedi-

cine network has gained, with its possibility to access modern diagnostics and fast therapeutic aids to decision-making in prevention. Two examples illustrate this.

Of the total number of the 28,323 cases reported, 90% involved the preventative ultrasound examination or treatment of the hip joint of newborn babies. In Mongolia, malformations of the hip joint (hip dysplasia) among infants occur with aboveaverage frequency. Without prompt treatment, this may result in those affected experiencing difficulties in walking and even suffering disablement. To provide assistance, a group of Swiss paediatricians established the Swiss-Mongolian Pediatric Project. The setting up of the MonTelNet Diagnostics community, which specialises in paediatrics, is a further step towards making the early diagnosis and necessary treatment of malformations the norm.

Equally positive is the interim assessment of the telemedicine project, based on CampusMedicus, which the UNFPA has carried out in cooperation with the government of Luxembourg since 2007 in the field of gynaecology, obstetrics and neonatology in Mongolia. On the basis of available results, the UNFPA summarises the situation as follows: «For the pregnant women at risk of complications, this technology frees them from the financial burden of travelling to the capital city just to access adequate diagnostic and treatment care. The most important achievement of this initiative was the reduction of pregnancy and child birth complications in remote hospitals, due to the early identification and proper management of cases using teleconsultation».⁸

At the end of June 2013, the SDC and STT are intending, as planned, to hand the project over to the Mongolian partners. The government in Ulaanbatar would then take on responsibility for its the long-term continuation and, e.g. for the already envisaged additional integration of 372 «sum clinics» (medical stations similar to an expanded doctor's practice) into the telemedicine communication network.

⁸ Telemedicine Support of Maternal and Newborn Health to Remote Provinces in Mongolia, in: Global Telehealth, 2012

Telemedicine will be an important factor in the modernisation and improvement in quality of the health system in the programme of the government, which was newly formed in summer 2012. In the health policy part of their action programme for the coming legislative period, one of the stated priorities is to «create a national telemedicine network and thus improve the possibilities for remote diagnosis».⁹

⁹ Government Platform 2012–2016, Ulaanbaatar 2012

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Editor

Swiss Agency for Development and Cooperation SDC
East Asia Division
Freiburgstrasse 130, CH-3003 Bern
Phone: +41 31 322 35 17
Email: eastasia@deza.admin.ch
www.sdc.admin.ch
www.swiss-cooperation.admin.ch/mongolia

Text Jürgen Kahl

Photos SDC

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eastasia@deza.admin.ch or downloaded from www.deza.admin.ch/fr/Accueil/Documentation/Briefing_Papers/Asia_Brief or www.swiss-cooperation.admin.ch/mongolia