Research Paper

Improving the Healthcare System through Health Technology Assessment

A Case Study of Nepal

Tula Raj Sunuwar

Graduate School of Public Policy

The University of Tokyo

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ABSTRACT

This work proposes a framework for assessing the impact of Health Technology Assessment (HTA) in Nepal. The main purpose of this study is to explore integrated strategies and approaches to addressing the health problem and suggest the potential steps for ensuring better health status of the public in Nepal. In particular, this research investigates the feasibility, utility and policy impact of HTA in Nepal. An in-depth policy review and incubation of the issue has been conducted with a view to better understand the issue and prepare for further analytic studies. HTA is an essential instrument to increase equity, improve health performance, enhance financial security and make healthcare system more transparent, and select efficient medical goods. This research finds that HTA can be a great tool to provide an efficient mechanism for the Government of Nepal to achieve the Universal Health Coverage. Still, many domestic conditions in Nepal appeared to pose considerable barriers for the government to introduce HTA in the country, which include absence of technical committee, lack of evaluation in the area of new technology, inadequate qualified human resources, and limited academic or training programs to build the HTA capacity. The findings indicate that HTA is a necessary step in better understanding the value for money in healthcare for the people in Nepal. This approach could serve as a basis for promoting health status while supporting quality improvement and efficiency. HTA can benefit and improve the health care system of Nepal by valuing and adopting an appropriate and sound technology. Hence, a set of recommendations is proposed for Nepal to pay special attention for introducing HTA as an important tool.

Keywords: HTA, health budget, policy analysis

ABBREVIATIONS

AMRO	American Region
CAPP	Consolidated Annual Procurement Plan
CBS	Center Bureau Statistic
CEA	Cost-effectiveness Analysis
CHE	Current Health Expenditure
EBM	Evidence Based Medicine
EC	European Commission
EU	European Union
EURO	European Region
GDP	Gross Domestic Product
HITAP	Health Intervention and Technology Assessment Program
HIV	Human Immune Virus
HP	Health Post
HTA	Health Technology Assessment
ICER	Incremental Cost-effectiveness Ratio
ISPOR	International Society for Pharmacoeconomics and Outcomes Research
LMIS	Logistics Management Information System
LWG	Logistic Work Group
MD	Management Division
MHLW	Ministry of Health, Labor and Welfare
MTEB	Medical Technology Evaluation Board
MoHP	Ministry of Health and Population
MS	Management Section
NGOs	Non-Government Organization
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
NHIA	National Health Insurance Association
NPR	Nepalese Rupee
PHCC	Primary Health Care Center
PIP	Procurement Improvement Plan
QALY	Quality Adjusted Life Year
OPD	Outpatient Department
OOPS	Out-of-pocket Service
SHA	System of Health Accounts
TSB	Technical Specification Bank
UHC	Universal Health Coverage
UK	United Kingdom
USA	United State of America
USAID	United States Agency for International Development
USD	United States Dollar
USHS	Universal Security Health System
VfM	Value for Money
WHO	World Health Organization

Section 1: Introduction

1.1 Introduction to Health Technology Assessment

Generally speaking, Health Technology Assessment (HTA) is a precise, organized research action devised to incorporate and assess the existing "evidence for medical treatment or health delivery innovation" (1). HTA is increasingly becoming widespread across the world. HTA is adopted to guide healthcare policy and decision-making, especially on how scarce resources can be efficiently used to managing health services and technology. Since there is no single definition of HTA, HTA may be, thus, defined in different ways. HTA is a tool to enhance the implementation of the Universal Health Coverage (UHC) in assessing to whom will be given what treatment and at what cost (2). According to the European Network for Health Technology, HTA is a multidisciplinary process that summarizes the medical, social-economic, and ethical issues related to the use of health technology in a systematic, transparent, unbiased and robust manner. It aims to inform decision-makers of safe, effective health policies that are patient-focused and seek to achieve the best value (3). It contributes to the health sector in many ways by providing information and knowledge for improving the quality of health care. It assists policymakers and health stakeholders in developing and updating a broad spectrum of standards, guidelines, and other health care policies.

The main objective of HTA is to inform the managerial level of the country to formulate and implement appropriate decisions at a different level; the individual or patient, health care institutions, the local level, and the national level. It also advises the regulatory agencies about whether to permit the commercial use of a drug, device, or other technology. HTA informs the patients about the appropriate use of health care interventions for a particular patient's clinical needs and circumstances (4). HTA can be used to inform technology-related policies and decisions to health department officials about undertaking public health programs.

1.2 Purpose of the Study

The principal aim of this research is to find out the integrated strategies and approaches to address the health problem and explore the potential steps for ensuring the better health status of the public in Nepal, where the majority of people are deprived of a

sound health system. Moreover, various diseases are increasing, and there is a need for the Nepal government and health workers to solve the problems in an efficient way. Hence, to upgrade the health sector in Nepal, HTA should be required. My proposition is that HTA benefits and improves Nepal's health care system by valuing and adopting an appropriate technology and promoting the health status of people in the country. On this background, the objectives of this case study are:

(i)   To discover the need for the health technology assessment in Nepal to improve the health care system.

(ii)   To investigate the feasibility and policy impact of health technology assessment in Nepal.

1.3 Methodology

This is a qualitative case study, "an intensive, holistic description and analysis" (5). This qualitative case study is used to conduct an in-depth policy review and incubation of the issue; through the descriptive, explanatory, and interpretive nature of its context to better understand the issue. This research draws on the relevant existing scholarly papers and grey literature, including the Nepal government's reports.

1.4 Structure of the Report

This research paper is structured as follows. Section 1 defines HTA and discusses the key benefits of HTA as well as the need for the case study. Section 2 discusses the Global Scenario of HTA and its prospects and essential components within the healthcare decision-making processes as per the report and findings of an International Society for Pharmacoeconomics and Outcomes Research (ISPOR). Section 3 provides an interpretation and analysis of the health status of the study country, Nepal. Section 4 deals with the situation of HTA in Nepal. Finally, Section 5 includes the conclusion and recommendation of this case study.

Section 2: Global Review of HTA

2.1 Global Review of Health Technology Assessment

The term HTA was formally used by the WHO in the WHO American Region (AMRO) and the WHO European Region (EURO) about three decades ago. There were mainly two reasons behind HTA; one was to strengthen evidence-based selection, and rational use of health technology, and the other was to increase efficiency when these technologies in health care are introduced and used in the real world. The central principle in health technology assessment is to provide decision-makers with the knowledge they need to promote universal healthcare coverage (UHC) (6). The range of HTA began to increase in the late 1980s, and now it has covered almost all the European countries, including some of the wealthier countries in Central Europe, Latin America, and Asia. This spread has been facilitated with favorable support from international organizations such as the World Bank and the WHO.

Around one-third of the public fund has been spent on the wellness of people. In response to this, the Health Technology Assessment (HTA) is designed to minimize the cost of health sector expenditure and prioritize health-related new cost-effectiveness technologies. The HTA has been introduced around the world to minimize health spending costs. The health cost has risen faster than economic growth in many countries over the last 30 years (7). HTA is a multifaceted approach to address the overall influence of technology on health, recognizing its distinct health care competition as well as available alternatives. HTA denotes an action of inspecting and describing the qualities of "medical devices used in the health care system, such as safety, efficacy, feasibility, and indications for use, cost, and cost-effectiveness, as well as social, economic, and ethical consequences, whether intended or unintended" (8). HTA provides information for the policymakers to formulate and implement programs for safer and efficient in clinical settings. HTA helps in identifying the areas that need further attention to improve quality health facilities. It also recommends minimizing the health programs that are less effective and highlights safety for patients. Therefore, HTA can be seen as a valuable tool for making reimbursement decisions for the new technology of health care and determining the prices.

The executive section of the European Union, the European Commission, has operated several programs and funded a series of projects targeting the HTA in Europe. Some of the European countries have adopted HTA as their national programs. The EU

has played a progressive role in the promotion of HTA among EU member countries. The EU is funding for the studies, seminars, meetings related to HTA. "From 1994 to 1997, the EC funded the EUR-ASSESS project, in 2005; the EC funded a project named EUnetHTA to continue development of HTA activities among the present twenty-seven Member States in Europe" (9).

The role of the World Bank cannot be denied in the sector of HTA because it has been funding various conferences and meetings on the subject. It has recommended many countries to include HTA regarding their health services. The earliest known concentrated involvement of the Bank in HTA was in China during 1987 and 1988. Other countries that have received substantial support from the Bank to develop HTA include Malaysia, Poland, Romania, and Serbia. Although the Bank has promoted HTA in Russia and has helped to develop a substantial body of experts, the government has not responded actively to these attempts. To date, no policy approach to HTA has been developed in Russia.

WHO has published several targets for its member states, including one on HTA that states, "... all member states should have established a formal mechanism to assess the appropriate use of health technologies systematically and to verify that they respond to the national health program needs" (10). The WHO took concern on the HTA by the early 1990s. In the beginning phase, the WHO depended on available evidence, particularly on efficacy, in some of its programs, notably essential drugs, diarrheal diseases, tuberculosis, and prenatal problems.

In the United Kingdom, the National Health Service (NHS) was established to provide healthcare to all citizens, and in 1999 National Institute for Health and Care Excellence (NICE) was set up to provide the technical support for NHS. NICE provides guidance and recommendations to the NHS to tackle the economic problem associated with the U.K. The Government of India has committed to ensuring the Universal Health Coverage as a means to minimize catastrophic out of pocket and assure reasonable access to essential health care to the entire population. It has identified ensuring value for money in the health budget as a key priority, and simultaneously the federal government is progressively enacting the task of the strategic purchaser of health care (11). The HTA agencies provide technical support to governments to build their capacity for resource allocation and technology assessment mechanisms on the health care system. The Health Intervention and Technology Assessment Program (HITAP) in Thailand and the UK

(NICE) are two of the best examples in the world. China, India, and Bhutan are going to adopt the HTA mechanism officially. Similarly, HTA in South Korea and Taiwan provides the best examples in Asia.

HTA processes and mechanisms provide a means by which new technologies can be assured and prioritized against the existing health care interventions. It facilitates patients' access to cost-effective health technologies, promoting and improving the health outcomes of patients. It provides clear information on processes and outcomes to stakeholders and ensures the most effective outcomes. HTA aims to advise the decision-makers about what is known and what is not known about technology, to create policies that bring the right care to the right patient at the same time at the right cost. HTA processes provide in-depth knowledge to understand the strengths and limitations of new technology, which can help future investment and research, mainly in the fields where fewer treatments and care exist.

2.2 Future of HTA

HTA is penetrating in many parts of the world, receiving strong political support in many countries. HTA agencies are operating comparative effectiveness since their commencement. This might be because of the scant resources allocated for health. Hence, to respond to the limited resources, rational choices in health care need to be made and informed by robust evidence. "The use of evidence, whether one calls it HTA, Evidence-Based Medicine (EBM), scientifically based health services, or something else, has become an essential element in modern health care at the policy, administrative, and clinical levels." National HTAs of the future will likely shift more closely toward relative effectiveness in the health sector (12).

Public expenditure on health care in many countries of the world remains low. Many people do not have access to essential health treatments. Therefore, policymakers of many countries are likely to undertake HTA methodologies to achieve the utmost benefit for the public of their countries. Mostly in developing countries, inadequate infrastructure and reduced involvement of the concerned group in the HTA process might be the challenges to endorse HTA as a tool for promoting quality health services. HTA process shall eventually contribute to the sustainable development of the health care system in the world.

2.3 ISPOR Report on Good HTA Practice

The International Society for Pharmacoeconomics and Outcomes Research (ISPOR) is an outstanding international society dedicated to promoting and carrying out health research to improve health globally. The goal of the ISPOR HTA Council is to review and research the guidelines on good health practices and other health technologies. It creates a basis for capacity building, education, and improved consistency in approaches to HTA-informed decision-making. The findings of ISPOR suggest that many good practices have been developed in areas of assessment and in some aspects of defining the HTA process. Sound practices are related to the structure, governance, or organizational aspects of HTA and measuring HTA impact. HTA has become a benchmark approach for raising awareness to the decision-makers and managerial staff who are concerned about the use of medical devices, pharmaceuticals, and other technologies according to the health systems, for instance, through reimbursement and pricing.

As per the findings of IPSOR on good health practices, there are "five basic components of HTA within the health care decision-making process." The first step is the request for HTA support. The decision-makers need to identify the level of support. The second step deals with the healthcare technology decision problem, which means framing and scoping the role of HTA. It relates to the problem and research needed. The third step is about policy analysis for exploring the answer to the questions: how should the research be conducted? What does the research say? The fourth step is the recommendation. It tells about how the result should be put into context. What should the decision be? The final step deals with the decision-making process (13). The proposed guidelines address all aspects, including how HTA processes are governed and defined, how research information is identified, analyzed, and interpreted, how these interpretations are applied and weighed to the context of a decision, and how this ultimately supports healthcare decisions. These steps are highly relevant for the policymakers of Nepal to introduce HTA for improving health quality.

Section 3: Health System in Nepal

3.1 Historical Background

The Singhadarbar Vaidyakhana, an ayurvedic hospital based on natural medicinal herbs, was set up some 300 years ago in Nepal, and the modern era of health began after the establishment of the first hospital, the Bir Hospital, 140 years ago in 1890. Most people in the past depended upon traditional healers like *dhamijhakri* (shamans), *jharphuke* (spiritual or shamanistic treatment), *guvaju* (a Hindu scholar or priest), and so on.

Until 1950, only a handful of doctors were present for treating about 8 million Nepalese. It was in 1956 when the first general health scheme became part of Nepal's First Five Year scheme (14). In 1955, the Malaria Eradication Organization was set up, and Family Planning, Leprosy, and Tuberculosis programs were introduced in 1958, 1966, and 1968 respectively. There have been significant developments in Nepal's health sector since the 1950s, providing every Nepalese person with essential health services.

When the periodic development plan came into practice in 1957, a targeted program in the health sector also began. Nepal introduced the first 15 years of long-term health plan and the second 20-year long-term health plan in 1975 and 1997. People were involved in activities such as varicose vein eradication, measles elimination, tuberculosis reduction, polio eradication, filaria exclusion, leprosy, and daily administration of vitamin A for children. The government launched the health programs to eradicate malaria, leprosy, tuberculosis, and promote public access to family planning in 1990.

After the introduction of Nepal Health Policy 1991, private investment in the health sector increased with private medical institutions' mushrooming. In particular, the private sector's position in health issues, particularly drug treatment and manufacture, has made a significant contribution to health care, especially in urban areas. At the same time, the Government of Nepal introduced a health program (2003-2008) to implement the health care system to utilizing the budget of the Government, NGOs, and donor agencies productively. The Nepal government aims to ensure that everyone has access to primary health centers within one to two hours of walking distance.

3.2 Current Health Policy

Nepal has achieved remarkable success in formulating health sector policies. The Government of Nepal has made various constitutional and legal provisions to reform the health sector. Nepal's constitution has regarded health as a fundamental right of the people. According to the provisions made in the constitution of Nepal 2015, all citizens shall have the right to free essential health care services from the State, and no one shall be deprived of emergency health services. Each person shall have the right to get information about his or her medical treatment. Every citizen shall have equal access to health services. All citizens shall have the right of access to clean drinking water and sanitation (15). It is the nation's responsibility to control the development of infant and maternal mortality management disorders, reduce infant or maternal mortality, track the occurrence of non-communicable diseases, and timely management of unforeseen disasters.

The health policy 2019 aims to control communicable diseases, reduce infant and maternal mortality rates, manage medical emergencies, and ensure quality health services to all the citizens. The policy has six objectives, 25 policies, and 146 strategies to improve Nepal's health service. The health policy has been formulated to ensure quality health service as mentioned in the constitution. The government has made the legal procedure for human organ transplantation and donation of a human organ from the brain-dead people. It also aims to develop air ambulance services for people living in rural areas and establish trauma centers in significant highways to provide emergency health services to victims of accidents. The policy also includes the plan to bring all Nepalese under the insurance policy (16). The health policy seems promising in terms of promoting the health status of Nepalese people. However, the government should be sincere and accountable for implementing health policy.

3.3 Current Health Situation of Nepal

With the Nepal government's collaboration, the private sector is contributing to providing health facilities to the people of Nepal. However, health facilities are generally below the level of international standards. The doctor to population ratio for the whole country is 1:1724. Like in most developing nations, doctors in Nepal are unequal across

Nepal. The Kathmandu valley has one doctor for 850 people, but in rural areas, it is one doctor for every 150000 people (17).

Regarding the delivery of health services in rural areas, the ratio of doctor and patient is 1:90,000. Likewise, the ratio of a health post and people are 1:24,000, "which shows the almost total inadequacy of public health care services at the rural level" (18). Nepal has been facing various problems in the health sectors regarding drugs, equipment, and facilities. About 60 % of the drug is imported to meet the domestic demand. Centralized administration and lack of standard and quality equipment of international standard have resulted in low-quality health services. Likewise, a low level of health knowledge among people is liable for poor health services. The single procurement health policy for the whole nation has also hindered Nepal's health services (19). Health care services in Nepal are of inferior quality and have been unable to reach a large population, mainly in rural areas. The people of poor communities have limited access to necessary health facilities due to the low level of health knowledge, high cost for health services, conservative beliefs, and so on.

Though Nepal has 20 medical colleges, the graduate numbers of students are about 90-120 from each medical college. The generation of doctors from medical colleges does not meet the demand for health workers in Nepal. The Doctor-patient ratio in Nepal is "clearly less than the WHO-prescribed limit of 1:1000". This distinctly reflects that Nepal has an acute shortage of doctors (20). This reflects that the government should generate more doctors and health workers to provide quality health services. The findings of USAID states that "micronutrients deficiencies" are on a large scale in Nepal. It is reported that almost half of the pregnant women and children under five in Nepal are likely to suffer from the deficiency of nutrients. The report mentions, "35% of women of reproductive age suffer from anemic, only 24% of children consume iron-rich food, and only half of the pregnant women take recommended iron supplementation during pregnancy" (21). Those facts imply that the achievement of the health care system in Nepal is not satisfactory yet, and still, many people are at the risk of health-related problems.

3.4 National Health Insurance of Nepal

Since the fiscal year 2016/17, the Government of Nepal has commenced the social health insurance scheme in 38 districts (22). After the National Health Insurance Program

was introduced in 2013, the Government of Nepal created the Social Health Planning Committee as a legislative mechanism for introducing the Universal Health Security Scheme (USHS). These initiatives seek to make health care more accessible to the vulnerable, disadvantaged, and residents in remote parts of the country, but funding remains a significant challenge. Various facets of earlier policy architecture, including community-based health insurance programs that had an inadequate enrollment and the retention of participants and pro-rich disposition, should be investigated.

Most health care expenses in Nepal are paid out of pocket, leading to substantial personal health expenditures. The majority of citizens face financial barriers in achieving quality care in health care services. An individual or families with a low income are unable to afford even essential health services. To help people reduce personal health expenditure, the government has endorsed the health insurance policy. The Nepal government has launched its public health insurance plan in the 2016-17 fiscal years to protect the public from unexpected high medical costs.

According to this scheme, the government shall provide compensation for low-income families to pay the premium. This health insurance program "provides coverage to services, such as nutrition, psychological counseling, vaccination, family planning, safe motherhood Out Patient Department (OPD), and emergency services, medications, and preventive services including an ambulance "(23). There is a need for Nepal government and other stakeholders to encourage the public to join the public health insurance plan.

3.5 Health Infrastructure and Human Resource

Significant milestones have been reached in the health sector due to the Nepal government's concerted efforts over the last 60 years. The network of primary health facilities has been accessible to all residents. The private sector's presence has been expanded, albeit the focus has been mainly on urban centers. Many governmental and non-governmental organizations have been set up for ensuring the quality assurance of the human resources, protection, medicines, and the advancement of scientific research (the Medical Board, Patients' Council, Pharmaceutics Council, Ayurvedic Council, and National Health Review Board). Wellbeing awareness among the public has increased with the mobilization of social volunteers by the government of Nepal at the community level.

Health advancement has contributed to significant growth in schooling, connectivity, agriculture, and food supply.

3.6 Achievements in Health

The primary medical challenges posed by malaria, tube, diarrhea, respiratory infections, typhoid, pokey, diphtheria, tetanoid infections, phyllaries, kalazare, trachoma, and HIV have been minimized in Nepal to a great extent. Medical centers and laboratory facilities have been improved and extended. Leprosy and trachoma have been eliminated. Likewise, tetanus has been eradicated from the mom and neonatal disease. Control systems on filarial conditions are in progress. Given these, substantial progress has been made in the health sector, also demonstrated by the indicators in Table 1 (24).

Table 1: Achievements in Health

Indicator	1950	1991	2011
a) Infant mortality rate (per thousand live births)	200	107	46
b) Maternal mortality rate (per thousand live births)	1800	850	170
c) Life expectancy (year)	32	53	68.8
d) Under-five children mortality (per thousand)	280	197	54
e) Total fertility rate	7	5.8	2.6
f) Fully immunized Children (percentage)	NA	70	88/87

Source: Department of Health Service, Annual Report 2017/18

Table 1 reflects a gradual improvement in the health sectors. Despite these significant achievements, there are still many challenges that need to be addressed as a health technology assessment mechanism at the policy level. Currently, there is no particular HTA regulations and process in the government institution.

Table 2: Number of Health Facilities

| Category	National Level	By Province						
		Province 1	Province 2	Province 3	Province 4	Province 5	Province 6	Province 7
Public Hospitals	125	18	13	33	15	20	12	14
PHCCs	198	40	32	43	24	30	13	16
HPs	3808	648	745	640	491	570	336	378
Non-public facilities	1822	133	169	1163	100	168	46	43

Source: Department of Health Service, Annual Report 2017/18

Table 2 shows the total number of health care centers in Nepal, including the public and private health facilities.

3.7 Health Spending of Nepal and Current Health Expenditure

The country's health care system depends heavily on household direct out-of-pocket (OOP) contributions to finance health services. Nepal's out of pocket health care expenditures remain high. According to Gupta and Chowdhury (2014), retail sales stores and suppliers of medical goods, private hospitals, clinics, and laboratories are the primary recipients of out-of-pocket payments. The National Health Academy found that, out-of-pocket payments shared 78% of the total payments in outpatient, function and curative care services. In Nepal, out-of-pocket spending has increased by more than 30% over 15 years, with the share of out-of-pocket spending in consumption expenditure rising from 3.4% in 1995–1996 to 4.5% in 2010–2011. It is still lower than in other South Asian countries such as India (over 7%) (25). The exorbitant OOP expenditure is mostly increasing in the rural areas, the western hilly region, the Terai areas, and among the poor and marginalized communities. Figure 1 below indicates that the total health budget for providing health care services to Nepal's residents at current rates and their GDP shares.

Figure 1: CHE and H.K. in Current Price and CHE and H.K. as a Percentage of GDP
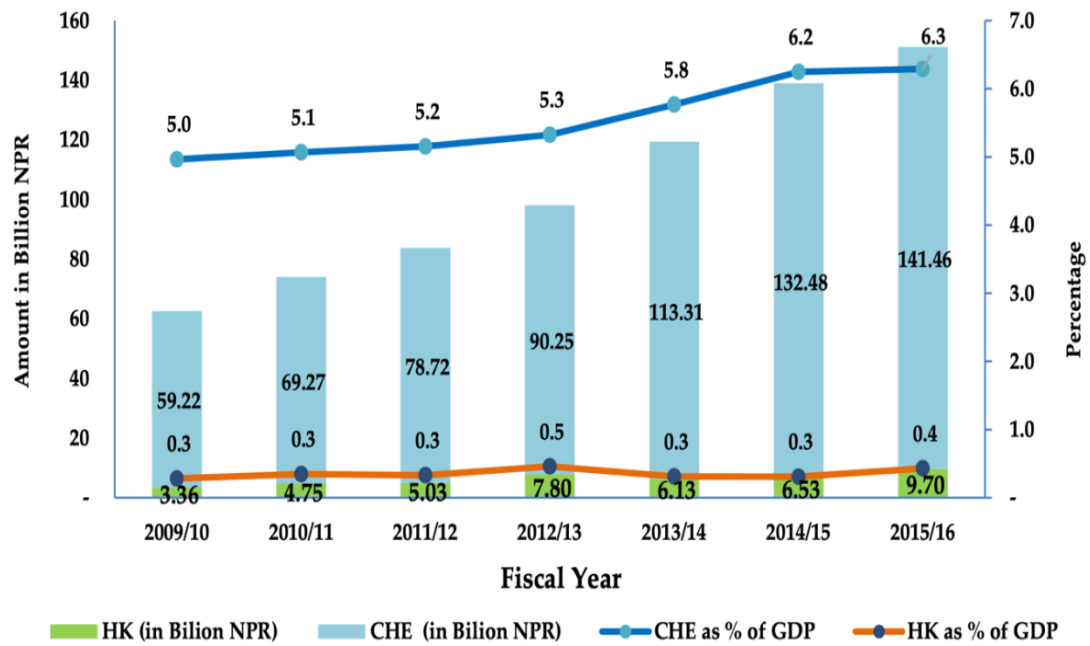
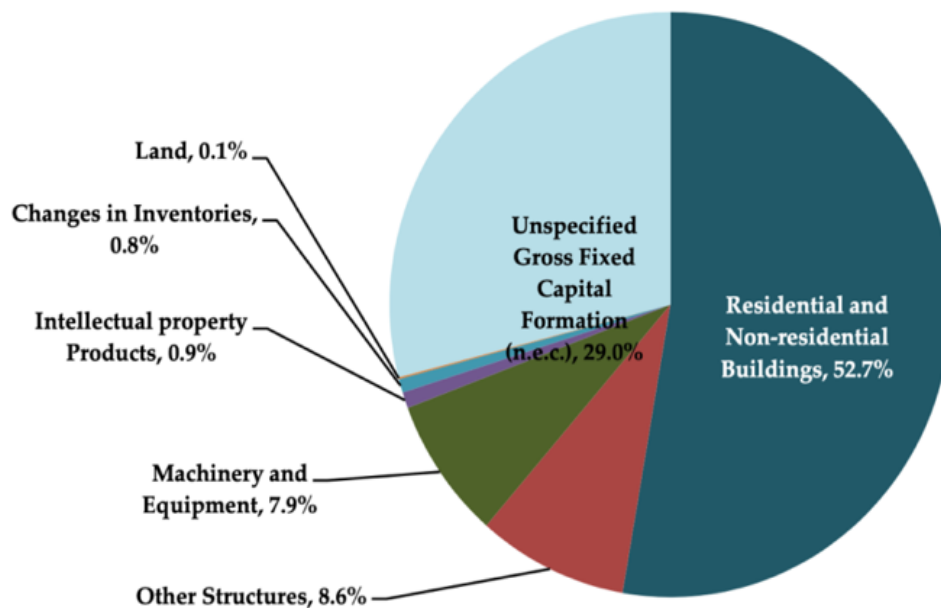*Source: Nepal National Health Accounts 2012/13-2015/16*

According to the Nepal National Health Account (NNHA), estimated Current Health Expenditure (CHE) was NPR 90.26 billion (5.3 percent of GDP), NPR 113.31 billion (5.8 percent of GDP), NPR 132.48 billion (6.2 percent of GDP), and NPR 141.46 billion (6.3 percent of GDP), respectively, in the years 2012/13, 2013/14, 2014/15 and 2015/16. CHE is a significant source of public health spending.

3.8 Capital Formation

The capital development covers all sorts of capital investments made in the public sector for health care, such as facilities including medical devices, machinery, intellectual property, and so on, where the investment interest stretched over a calendar year. In the fiscal years 2012/13, 2013/14, 2014/15 and 2015/16 respectively, the amount spent for capital development in the health sector in Nepal was measured at NPR 7.80 billion (0.5% of GDP), NPR 6.13 billion (0.3% of GDP), NPR 6.53 billion (0.3% of GDP), NPR 9.70 billion (0.4% of GDP). For residential and non-residential buildings such as health facilities, restaurants, etc., the capital investment was made with slightly more than half of

the overall budget followed by unspecified fixed capital development. Besides, 8.6 percent of the total capital expenditure was spent on assets other than the purchased buildings. In 2015/2016, machinery and surgical supplies consumed a 7.9% share of the total expenditure (Figure 2). In the fiscal year 2015/16, increased importance was given to research after the earthquake in 2015.

Figure 2: Breakdown of Capital Expenditure

Source: Nepal National Health Accounts 2012/13-2015/16

3.9 Total Health Expenditure

The net welfare spending includes the existing welfare and capital investment. Although the System of Health Accounts (SHA) 2011 does not collect and consolidate data about the total health expenditure, it is provided for reference to SHA 1.0 previous overall health expenses. The total expense for health insurance was NPR 98,05,000 million in the fiscal years 20012/13, 2013/14, 2014/15, and 2015/2016 (USD 1,42 million), NPR 119,44,000 billion in the years 2014/14, 2014/14, and NPR 139,21 million in the years 2001/14, 2014/15 and 2014/16 (USD 1,43,00 billion). Over the last decade, the total health expenditure has risen almost fivefold, but it has nearly doubled at constant rates with the

current demand levels (from NPR 28.7 to NPR 54 billion) in the base year 2000/1 (Figure 3). State accounts have taken GDP deflator (health) (CBS, 2017).

Figure 3: Trend of Total Health Expenditure in Current and Constant Price
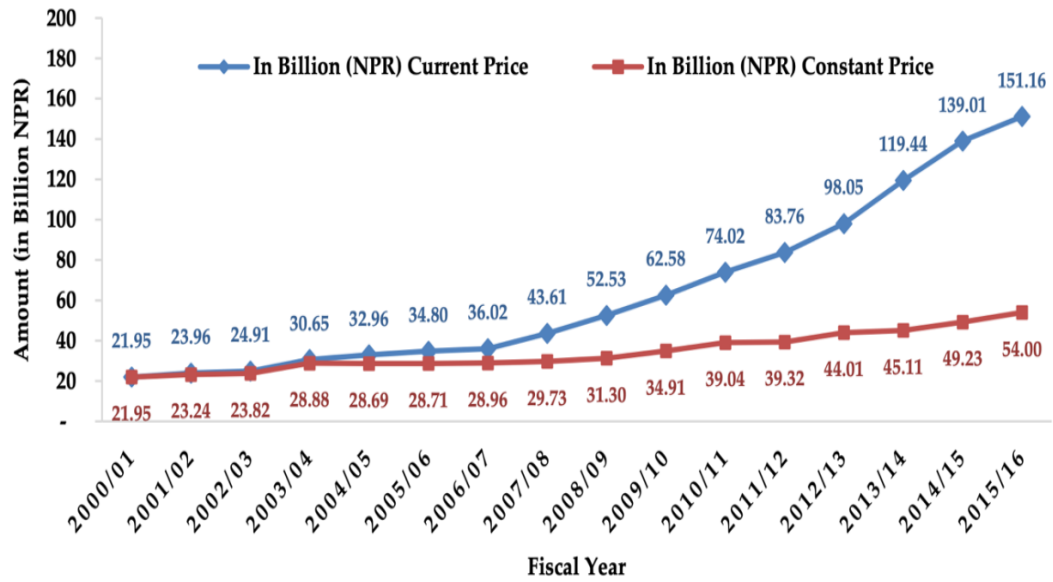
Source: Nepal National Health Accounts 2012/13-2015/16

Section 4: HTA in Nepal

4.1 HTA and its Situation in Nepal

The Government of Nepal is committed to providing sound health care to its citizens at a reasonable and affordable price. The Thirteenth-year Development Plan (fiscal year 2010/11-2012/13) aimed to ensure quality health services guaranteeing easy access to health facilities for all the citizens and providing essential health services free of cost. However, the results in overall health gains do not reflect improved, cost-effective solutions. Although HTA is expected to support decision-makers in delineating the collectively funded benefit packages, there are numerous barriers and prerequisites for properly introducing HTA into Nepal's health system. First, the current spending on public health represents about 15% of the country's overall budget. The ratio of health sector budget spending cannot fulfill the UHC. Second, there is an absence of technical committee and members in the procurement system on a regular basis, and there is a lack of evaluation in the area of new technology, which creates a barrier for ensuring HTA. A value-based pricing system is not used in the procurement system of the hospital facilities. The public is ultimately the buyer of medicines, whether through out-of-pocket payments, private insurance premiums, or taxes for publicly financed health insurance (26). The most critical consideration for health care in rural areas is tax sustainability and cost-effectiveness.

Since the HTA policy is vital to expanding the concept and methods of value assessment in the health care system, most of the Asian countries have been introducing the HTA at the government level. South Korea, Taiwan, Thailand, Japan and also neighboring countries, India, China, and Bhutan, have already established HTA. HITAP and NICE have been playing a vital role in introducing the HTA system in low and middle-income countries. They have the primary goal to institutionalize the policy and research as a mechanism based on the UHC context (27).

Evaluation of health technology is a process of policy analysis that explores the short- and long-term effects of healthcare technology implementation. HTA makes the profit package more precise and comprehensive. HTA operates across several essential attributes: information and process clarity, independence, and participation in the evaluation and use of a threshold based on quality-adjusted life years, methods for coping

with the uncertainty of data and modeling, and the position of "real world" data. HTA can be a great tool and can provide mechanisms for the Government of Nepal, which is dedicated to achieving the Universal Health Coverage that primary health treatment is freely available for the whole population. The government has defined maintaining value for money as a core goal in the health budget as part of its strategy for implementing UHC. The central government has proposed an approach to offer provincial and local governments, which, in effect, will become more significant actors in funding health care schemes.

The relation between HTA and health funding associates strategic procurement with the design of the benefits package. However, the benefits package design does not merely include the definition of a list of interventions. It must be an instrument of policy that can increase the equity of people, improve performance (e.g., value for money in health care), improve financial affordability, make healthcare systems more transparent, and select medical goods and finance systems more transparent. In the case of health insurance plans and other health funding schemes, HTA is essential as one of the structural components for the benefits package (28).

Nepal has not established an HTA institution yet. Some research institutions are undertaking health research but not precisely the HTA. In 2015, the WHO has strongly recommended to establish the HTA institution in Nepal. Despite the WHO's efforts to promote knowledge and encourage the practice of HTA in Nepal, the lack of qualified human resources, academic or training programs to build HTA capacity appeared to be the main barrier for implementing and using HTA. Recognized that HTA must be a tool to support the UHC, Nepal, as a member of the WHO, should comply with the United Nations' resolution. However, it has not come into effect due to the low priority given by the government.

Established in 2007, the HITAP, a semi-self-supporting research arm in Thailand, assisted the Government of Nepal to evaluate the list of free drugs to be supplied at primary health facilities in Nepal. On March 30-April 1, 2015, a joint workshop with the Ministry of Health and Population, Nepal, and HITAP highlighted essential challenges: the lack of a systematic process of selecting the drug list, financial capacity, and mechanism of HTA in Nepal (29). Those experiences are the important lessons learned from HITAP with

the international perspective in Nepal's context to adopt the HTA and ensure the quality management in health facilities.

4.2 Initial Target of HTA in Nepal

Globally the HTA institution initially focused on the health sector organization. The NICE in the UK was established in April 1999 which supports the NHS. HTA is arguably most advanced in the UK (30). It has a structured framework for determining evaluation priorities involving a large NHS consultation and a national Health Technology Assessment Coordinating Centre. The government of India has also set up a Medical Technology Evaluation Board (MTEB) which reviews current and new health-care technologies in India, helps to select comparable health-care technology, and strengthen the way health-care priorities are set (31). This initiative seeks to build a mechanism of decision-making in the allocation of health resources in India with the ultimate goal of open, inclusive, equitable and evidence-based UHC. Japan implemented a "new" HTA in the national health care system in April 2016 by the Ministry of Health, Labor and Welfare (MHLW), and it conducted cost-effectiveness tests on a trial basis of pharmaceutical price decisions (32). China is also enhancing the HTA institution in the mainland and by the end of the 1990s; the political leaders of the Ministry of Health had tried to combine HTA and its policies to improve healthcare quality and efficiency (33). In addition, in the 1990s, HTA was initially established in South Korea and institutionalized within the National Health Insurance Association (NHIA) (34). In Bhutan, the Ministry of Health, and Department of Medical Services has adopted HTA to educate new vaccine distribution and decision-making procedure (35).

The Government of Nepal can review and reform the current organizational structure to adopt the HTA mechanism and assign as a think tank or policy recommendation and technology appraisal group. The government of Nepal can foster multi-stakeholders' dialogue ensuring participation of internal and external expert groups. Initial research should focus on identifying gaps between use of the existing technology and new technology. The recommendation can also be used by private health related institutions. The obligatory work of the core team should include Value-Based Medicine and Economic Evaluation, Cost Effective Analysis, ICER, CEA, and QALY. The core team will produce the result and give feedback to the government.

4.3 Reforming the Organizational Structure

For restructuring the organizational structure, it is first important to develop a mechanism inside the ministry for HTA while also ensuring the role of the private sector for enhancing HTA. Figure 4 shows the existing organizational structure of the Ministry of Health and Population.
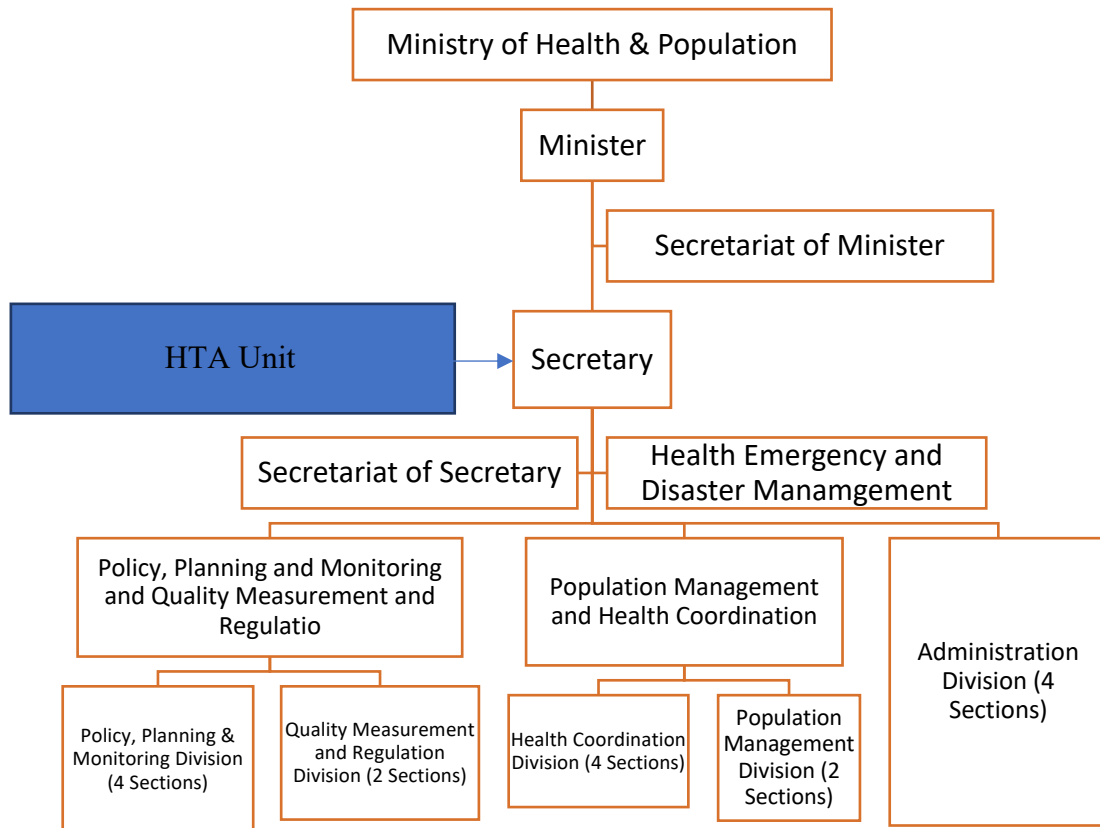
Figure 4: Existing Organizational Structure
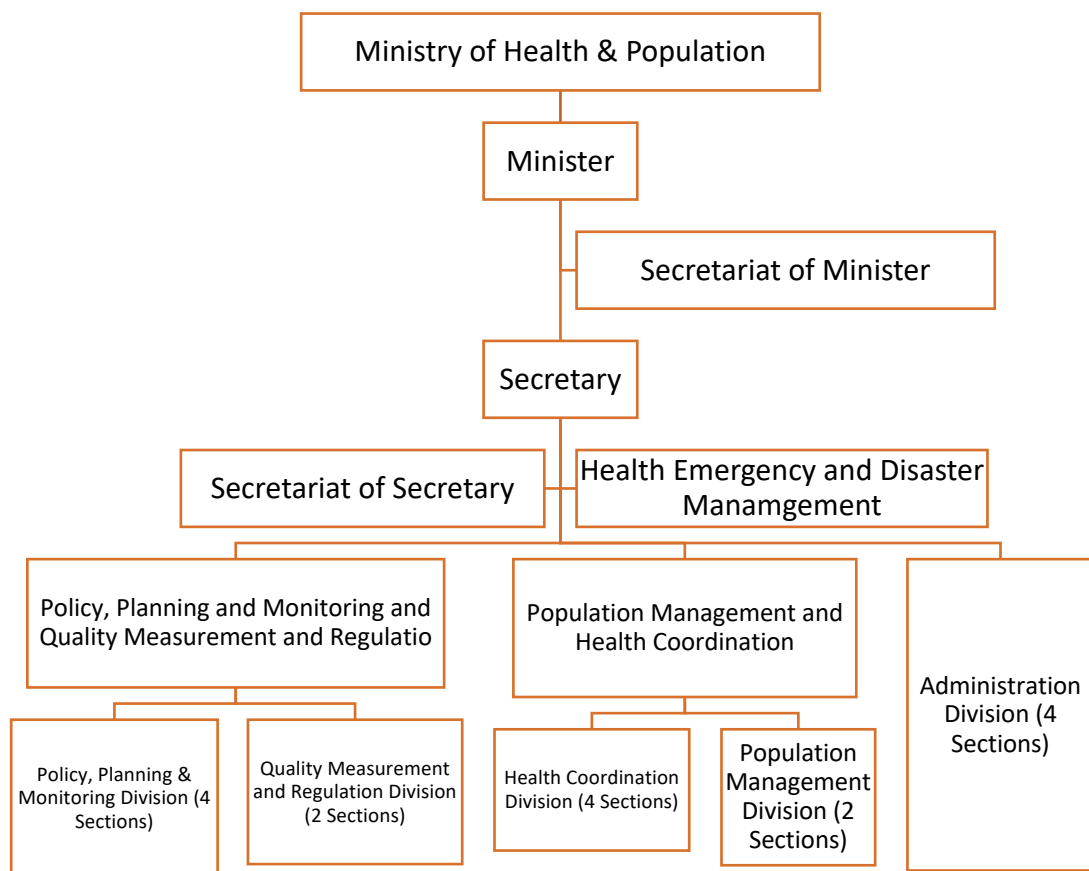
Source: Ministry of Health and Population

Figure 5 presents the proposed organizational structure which includes a HTA Unit within the Ministry of Health and Population.

Figure 5: Proposed Organizational Structure with HTA Unit

Source: Ministry of Health and Population

4.4 Procurement and Supply Chain Management

Economy, productivity, efficiency, competitiveness, accountability and openness are the key considerations behind Value for Money (VfM) procurement procedures. Considering these, the MoHP seeks to provide quality health care as a part of a structural overhaul of the procurement and supplying chain management. The Healthcare Procurement Management consists of preparation, operations and monitoring of the Procurement Improvement Plan (PIP), the Technical Specification Bank (TSB), Logistics Management Information System (LMIS) and CAPP. These processes must be effectively carried out to ensure that medical goods and equipment are delivered and distributed promptly.

The Department of Health Service (DoHS) is the principal, formal apex body for ensuring the logistic demand support for all governmental hospitals in Nepal. The Department of Logistic Management Section procures the medical device, vaccine and medicine based on the Public Procurement Act, 2007, the Public Procurement Regulation, 2007 and other directives. The DoHS uses a transparent, free, competitive bidding model. The most widely used open bidding includes apparatus for hospitals, contraceptive, chain tools, insecticides and so on. This bidding approach is also considered ideal to achieve VfM in the health field. There are no any technological appraisal group and recommendation groups within the current organizational framework. As per the specification, only a biomedical engineer and health expert have been involved in the procurement process. In addition, the Quality Measurement and Regulation Division is also involved to maintain the quality and support of the procurement management system. In fact, there is no standard guidelines to assure the quality assessment in the existing framework.

The Logistics Management (LM)'s key function is to provide quality health care programs through the distribution of critical equipment, medications, family planning materials, and free essential medicines to all of the provinces/districts and health facilities through logistics program divisions and centers. Management Section plays a primary role in the estimation, quantification, acquisition, storage and distribution of health supplies, equipment, instruments and the maintenance and repair of bio-medical facilities and vehicles. The Logistic Information System (LMIS) facilitates quarterly logistic management information system and monthly web-based logistics decision-making as well as initiatives in the field of annual logistics preparation, quarterly pipeline national review meetings, the cooperative health supply prediction and implementation of the pull system. MD consists of 23 members, under the leadership of the MD Chairperson, Logistics Work Group (LWG), which includes divisions and centers, supporting partners and other stakeholders. LWG deals with all problems and challenges related to health services and materials procurement and supply chains at national, regional and local level. Since procurement system is key to improving the health service delivery of Nepal, HTA initiative in Nepal should focus on reforming this system.

Section 5: Conclusion and Recommendation

5.1 Conclusion

Nepal has not yet projected the health sector's expenditure in the long run to the future over 30 to 50 years. Thus, it is time to have an opportunity to discuss with technocrats and experts for seeking suggestions for health sector reform in Nepal. The primary purpose of HTA is planning, budgeting, and reimbursing the value of benefits packages in the healthcare system. Yet, a National HTA organization has not been established in Nepal, although most of the Asian countries have already introduced the HTA within the government body. The Nepal government might have the potential to establish a division or section for HTA within the Ministry of Health and Population. Also, Nepal can learn the lessons from the UK-NICE and collaborate with the HITAP to introduce HTA in Nepal. Such opportunities will inform the policymakers of how to improve health systems, recommend valuable technologies to promote health status and improve quality and efficiency. It also helps the government assess the limiting factors that impede the fiscal sustainability of the health system. Thus, it is suggested that the Government of Nepal should pay urgent attention to introduce HTA.

This case study's strength lies in the review of the essential aspects of HTA, resulting in a broad-minded perspective for the HTA approach that could serve as a basis for promoting Nepal's health sector. However, this paper is a preliminary and exploratory piece meant to explore the need for HTA to improve Nepal's healthcare system by valuing healthcare technologies. The study is limited to the resources accessible on the web and other secondary information. Thus, future research should focus on how HTA implementation in Nepal could quantitatively enhance the value of current healthcare in a particular disease area.

5.2 Recommendations

Based on the policy review and the vision incubation described in the previous sections, the following suggestions on the HTA development in Nepal have been provided:

- The Government of Nepal needs to work on five necessary components as per the report of IPSOR on good health practices of HTA within the healthcare decision-making process to introduce HTA for promoting quality health services.

- Most of the health expenditure is wasted through inefficient use of resources. So, the Government of Nepal should have a strong willingness to introduce HTA because of HTA concerns for cost-effectiveness, technical and financial feasibility, and support quality improvement and efficiency in health sectors.

- The Ministry of Health and Population is launching the Health Insurance program in some districts, but the reimbursement system at the local level is too process-oriented, requiring excessive documentation. HTA may help in the analytical part of the package.

- The rural areas of Nepal lack sufficient infrastructural inputs and equipment, and there is a poor perceived quality of care and behavior in rural areas. HTA can provide a basis for capacity building and improve consistency in approaches to health care. For this, The Government of Nepal can formally establish an HTA institution.

- The Nepal government needs to diagnose and monitor the financial viability of their health systems and assess political and institutional factors and implement policy levers and tools for ensuring greater sustainability of health spending.

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