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Nepal: Different crises, Different Impacts

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Nepal: Different Crises, Different Impacts

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Abstract

Introduction: For a growing number of communities worldwide, man-made and natural disasters have impacted the health systems in significant ways. Both types of crises often produce the same result: an imbalance in the cohesiveness of a regions health system's supporting pillars compromising the population's health care as reflected in health indicators.

Methodology: This dissertation explores the impact on the health system of Nepal from two crises. The first man-made, the civil war (1996-2006). The second by natural disaster, the 2015 earthquake. This paper relies on a review of authoritative literature from peer-reviewed journals, reports and grey literature. This paper utilizes The WHO Health Systems Framework consisting of the six building blocks which form the pillars of a well functioning health delivery system (i.e. governance, service delivery, workforce, sustainable financing, medical drugs and supplies and information) to assess the relative effect of each crisis upon the health system of Nepal.

Results: The financing and information pillars were highly affected in both crises. The governance and workforce pillars were highly impacted by the civil war while the earthquake had a lesser effect. The service delivery and medical drugs and supplies were highly impacted by the earthquake with only moderate impact caused by the civil war. As will be discussed in detail, the reasons for differences in the results lies in numerous factors including the political environment, the massive destruction of infrastructure and various other issues.

Conclusion: The violent ten-year conflict left scars upon the population. Nevertheless, the crisis impact on the fragile health system during the decade of conflict was, in some aspects, mitigated by the Maoist health agenda. The insurgents' efforts to keep health assistance available to the population was crucial to the improvement of the health indicators both during the conflict and after, during the coalition government. On the other hand, the earthquake, unprecedented in its widespread destruction, abruptly disrupted the health system, especially in rural areas. The natural disaster revealed the government's negligence in addressing the health system's vulnerabilities during the years between the civil war and the earthquake. Preparedness stands as an essential investment need in the future to reduce the impact of disasters on the health system and, consequently, on the population.

Key Words: Nepal, Health system, Civil War, 2015 Earthquake, Impact, Preparedness

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Acronyms and Abbreviations

AIDS	Acquired Immunodeficiency Syndrome
ANC	Antenatal Care
CFE	Contingency Fund for Emergency
CPN-M	Communist Party of Nepal-Maoist
DTP	Diphtheria, Tetanus and Pertussis
FMT	Foreign Medical Team
HIMS	Health Information Management System
HIV	Human Immunodeficiency Virus
ICRC	International Committee of the Red Cross
IDP	Internally Displaced Person
INGO	International Non-Governmental Organization
MDG	Millennium Development Goal
MMR	Maternal Mortality Rate
MoHP	Ministry of Health and Population
NDHS	Nepal Demographic Health Survey
NFHS	Nepal Family Health Survey
NGO	Non-Governmental Organization
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
PHC	Primary Health Care
UK	United Kingdom
UN	United Nations
UNICEF	The United Nations Children's Emergency Fund
U5MR	Under Five Mortality Rate
VCD	Village Development Committees
WASH	Water, Sanitation and Hygiene
WFP	World Food Programme
WHO	World Health Organization

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1. Introduction

"Humanitarian emergency is an event or series of events that represents a critical threat to the health, safety, security or well-being of a community or other large group of people, usually over a wide area" [1].

Major crisis, both man-made and natural disasters, as frequently reported by the media, are a reality for a growing number of communities worldwide. According to the OCHA, the funding requirement for humanitarian assistance in 2015 was approximately 19.9 billion, 18% more than in 2014, targeting 82.5 million people in different countries and regions around the world [2]. During the last decade foreseeable crises have become a growing threat to health systems.

Between 2008 and 2010, the ICRC studied 655 violent incidents in 16 countries which affected various health care systems. Different forms of violence were reported including direct attacks on facilities, patients and medical staff. In 2012, around 80% of 900 violent incidents in 22 countries affected health care professionals of which 25% were killed or wounded [3]. This violence has led several health programs to be terminated, health workforce to leave the profession and vulnerable populations to perish. Due to the lack of comprehensive reporting from violent regions and absence of a centralized reporting system, it is reasonable to conclude that statistics concerning the violence against health workers is understated [4][3].

Natural disasters such as earthquakes, volcanic eruptions, floods, landslides, droughts and tsunamis are increasing in frequency worldwide. During the 1950's, there were less than 40 natural disasters per year. In 2015, the number had increased to more than 340. Originating through geological, hydrological and atmospheric causes, the cost of such catastrophic events over the last ten years surpassed 1.6 trillion US dollars [5][6]. During the last decade it is estimated that almost 840,000 people lost their lives as a consequence of natural disasters. From 2005 to 2014, approximately 60% of total deaths due to natural disasters was in especially vulnerable countries with low development [5][6].

Thus, as we have witnessed during recent humanitarian crises, populations are heavily affected by violence, displacement, food insecurity, collapse of health services and other factors. The consequences on the health of affected populations include trauma, crush related injuries, drowning and a high prevalence of both infectious and non-communicable diseases [7]. The disruption of health services not only has increased morbidity and mortality, but also affects the social fabric of communities, depriving people from their rights and perpetuating violence [4].

1.1 Nepal

a. General Information

Located in Southern Asia between China and India, Nepal is a small landlocked country in which Mount Everest, the tallest mountain in the world, symbolizes "the identity and glory of this Himalayan country" [8]. The population of this low-income country is over 28 million (2014) with a ratio of 93.5 males per 100 females and life expectancy at birth of 67.1 for males and 69.3 for females. The infant mortality and fertility rates are 35.5 and 2.3, respectively [9]. The literacy rate of males and females are 75.1% and 57.4%, respectively [8].

The country has a diverse topography and is commonly divided into three physiographic areas: Mountain, Hill and Tera, which directly reflect the different terrain, climate and weather. Further, the topography intrinsically effects the level of difficulty to access different regions. Multi-ethnic and multi-language, there are 123 different languages spoken and 125 different caste and ethnic groups [8].

Divided into five development regions, Nepal has 14 zones and 75 districts. There are 191 municipalities that are considered as urban and 3,276 Village Development Committees (VDCs) which are predominantly rural. The capital city, Kathmandu, is centrally located with an approximate population of 1,142,000 [8][9].

A disaster prone country, Nepal has a young and fragile geology. In the 20th century, there have been three major earthquakes: in 1932, 1980 and 1988. More recently, it is worth noting, the landslides and flood in 2003 and the massive 2015 earthquake [10]. In addition to active tectonics and seasonal rains, the country is struggling with population growth, poverty and unplanned settlements. These factors contribute to the country's vulnerability to natural disasters.

b. Recent History

Closed to the world until 1950 when the century-old hereditary prime minister system was substituted by the monarchy, Nepal was admitted as a member of the United Nations in 1955. Four years later the country approved its first constitution, leading to general elections and forming the first popular government. However, this government was dismissed one year later and the constitution abolished in 1962 [11][12].

In 1990, a new constitution was adopted with a constitutional monarchy and a multiparty parliamentary, inducting a prime minister in 1991 after general elections. Political instability would characterize subsequent years culminating into a civil war (1996 to 2006)

between the government and the Maoists [8][9].

Also known as “People's War”, the civil war's genesis was on 13 February 1996, when members of the Communist Party of Nepal-Maoist (CPN-M) attacked a police post in western Nepal. The Maoists had as their primary objectives the establishment of a people's republic and the creation of a constituent assembly to draft a new constitution reducing the power of the monarchy. Using guerrilla warfare techniques, the insurgents carried out attacks on police posts, army barracks, village council buildings and banks. By 2004, the Maoist insurgency spread to 73 of 75 districts. The insurgents controlled large rural areas whereas the government controlled the district headquarters and urban areas [13][14]. After a turbulent decade of violence and political instability, resulting in more than 16,000 deaths, the parliament approved the abolition of the monarchy as part of the Comprehensive Peace Accord signed in 2006.

In 2008, Nepal became a democratic republic. After an impasse over a new constitution, parliamentary elections were held in 2013. Shortly thereafter, a coalition government was formed. A new constitution became effective in 2015 [11][12][15][16].

1.2 Problem Statement and Research Questions

Every health system forms an intricate mechanism whose parts must work together to create the synergy necessary to effectively provide health care to its population. Aiming to simplify this mechanism the WHO framed the fundamental pillars of the health systems into six building blocks: governance, service delivery, health workforce, sustainable financing, medical drugs and supplies and information, which work promoting, restoring and maintaining health [17]. This balance can be broken during a humanitarian crisis, which often brings major challenges to the health system such as restricted access, damaged infrastructure, workforce upheaval, shortages of essential medicines, inadequate funding, unreliable or destroyed information and sufficient numbers of health workers.

During the last ten years, the health system of Nepal has faced two severe crisis: the civil war (1996-2006), and more recently, a massive earthquake (2015) which affected 5.6 million people with more than 8,700 people dead [18][19]. This paper will analyze those crises regarding the impact to the health system and the consequences to the population's health. Using the WHO six building blocks framework, this paper develops an analysis of Nepal's health system under crisis circumstances, addressing each block and the respective impacts. This research aims to address the following questions:

- What was the impact of the civil war and the earthquake on the Nepali health system?

In what ways did the impact from each crisis differ both in fact and in degree (i.e. high, moderate or low)?

- As a natural disaster prone country, what should be done to prepare the Nepali health system to better respond and reduce the impact of future crisis?

1.3 Methodology

The Nepal crisis was chosen due to the ability to analyze the impact of two different crises on the national health system of one country; the first being a sustained military conflict, the latter a massive natural disaster both occurring within a relatively short period of time. Although protracted over ten years, the civil war has limited documentation with respect to its impact on the health system which would permit a more extensive analysis. Conversely, the earthquake has abundant documentation to promote a rich exploration into the disaster and the impact on the system.

To make this paper as comprehensive as possible, all available resources were used including peer reviewed journals, reports and grey literature. The UN, WHO, World Bank and Nepal government websites provided additional information as did electronic databases such as UNDATA, PubMed, Tandfonline, Sagepub, Wiley, JStor and RERO-Geneva. Terms used on the database search included: Nepal, health system, health care, earthquake, civil war, impact on health system, health system and civil war, health system and earthquake, Nepali humanitarian crisis, WHO building blocks, and health facilities assessment. The material utilized was limited to documentation in the English language.

In order to answer the research questions, the approach consisted in reviewing the literature available concerning the health system during and after the civil war, before and after the earthquake in 2015. Using a qualitative approach, the WHO building blocks framework was used to organize the information available from the various resources. Utilizing a comprehensive approach, each block was explored separately, giving each element separate discussion and analysis of the event's impact on the health system. In order to compensate for the limitation regarding the health sector during the ten-year conflict, the WHO building blocks framework was complemented with health indicators and MDGs, which contributed as proxy indicators in order to interpret the influence of the protracted conflict on the health system.

2. Results

2.1 Definitions and Concepts

2.1.1 Introduction to Health Systems and The WHO's Six Building Blocks

In order to have a rich discussion about the crises effects on the health system, this topic comprises a brief introduction to the definition of a health system and what the WHO six building blocks represent.

“A health system consists of all organizations, people and actions whose primary intent is to promote, restore or maintain health” [17].

This WHO definition brings the concept of several stakeholders involved, working in harmony, with the primary intent to provide health care using different aspects such as prevention, treatment and cure. Expanding the concept adds complexity since health systems can be categorized according to their core functions such as provision of inputs and service delivery/coverage, government and consumers as main actors and outcomes such as health, fairness in financing (providing protection against high treatment costs) and responsiveness (addressing people's expectations) [17].

In order to simplify and promote a common understanding of what elements compose a health system and what outcomes a system should strive to achieve, the WHO created the concept of six building blocks. Based on the functions defined in the World Health Report 2000, this framework with six elements represents the pillars supporting a health system. Thus, health systems have some fundamental elements which the framework has defined as 'building blocks', underpinning all the activities a health system carries out. The artificial separation of those blocks is useful to simplify the complex structure which underlies a health system and create indicators and strategies to invest and monitor development. As demonstrated in figure 1, the six building blocks strive to create a synergy in four key areas: access, coverage, quality of the service and safety to the patients and health workers. That synergy is intended to achieve four principle outcomes: improvement in the health of the population, enhanced responsiveness, stronger social and financial risk protection and increased efficiency.

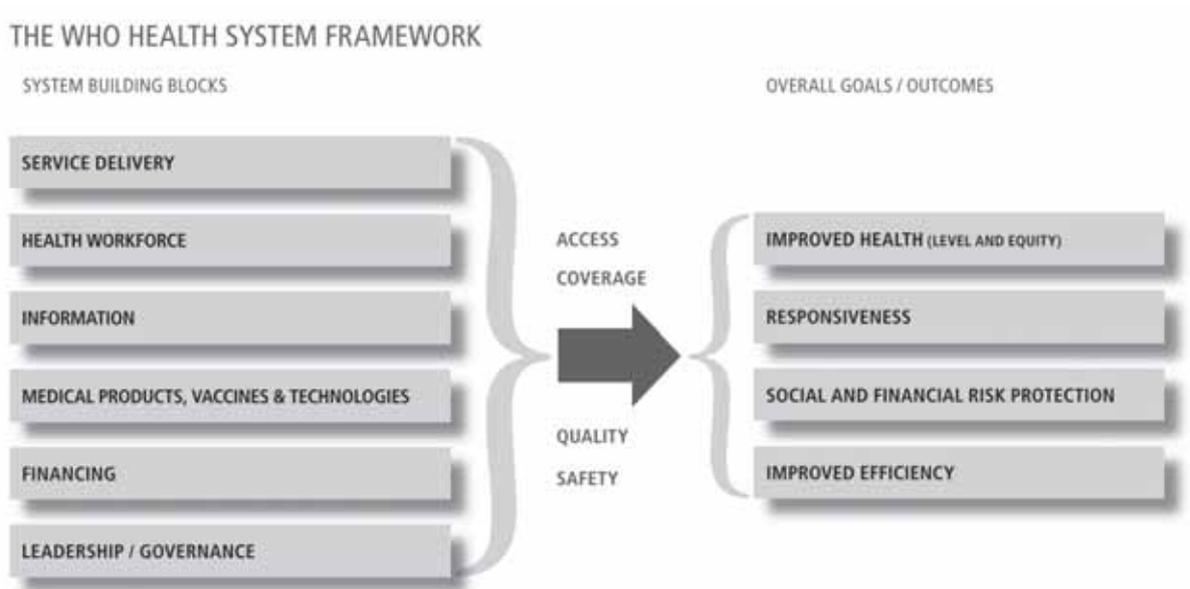


Figure 1: The WHO's six building blocks.
Source: [20]

A well developed health system is expected to provide an efficient, effective, safe and quality service delivery, the first block, addressing the needs in a timely manner and where required. The health workforce, the second block, has to be available, competent, responsive and productive, achieving the best outcomes considering the circumstances and resources available. The third block, information systems, promotes the collection, organization, analysis and dissemination of health information including health determinants, system performance and status. The fourth block ensures equitable access to cost-effective essential medical products, vaccines and technologies, grounded in scientific evidence. Financing, the penultimate block, assures that resources are available to provide health services to those who cannot pay for them and prevent impoverishment due to health costs. And last, the sixth building block, leadership and governance, is about political and technical action in order to regulate, incentivize, revise and apply the system design and be accountable to the stakeholders [20].

As with any simplification model, there are limitations to its use. The WHO framework cannot be used alone to make a comprehensive assessment of a country's system. Focused on health, the framework doesn't address underlying determinants of health such as education, gender, livelihood or housing. Furthermore, it is inadequate in evaluating the interaction between health and the other sectors of society [21].

In summary, this dynamic but simple framework, is a reasonable while imperfect, means of depicting the role of the government and the relation among actors involved in a health system. The figure 2 depicts the synergy in action between the blocks.



Figure 2: Flowchart showing the synergy between the building blocks.
Source: [20]

2.1.2 The Health System in Nepal – A Brief Overview

Profoundly influenced by the 1978 Alma Ata Convention and oriented to provide health assistance at the community level, the national health system has struggled with the unequal distribution of health services, poor infrastructure, lack of essential medicines, lack of health workers in rural areas, presenting as a country, 6.7 health workers per 10,000 inhabitants. By comparison, the Sphere Project recommends at least 22 health workers per 10,000 inhabitants [22]. Thus, the private sector has an important role to play in complementing and supplementing the public health care services to provide adequate workforce resources [23].

The 2007 constitution ensured health care as a fundamental right including that every citizen has the right to basic health services free of cost. In the same year, the public health system started to cover basic health services with 40 essential drugs. For services beyond the basic coverage people have to pay out-of-pocket and frequently depend on private health services [24].

The MoHP coordinates a network of 4,118 health facilities. The health delivery is made through different units and levels of care, ranging from specialized hospitals to health clinics. In addition, the health private sector operates more than 350 health facilities throughout the country. Refer to figure 3 for more details about the health services organizational chart and the number of health facilities per level of care [18].

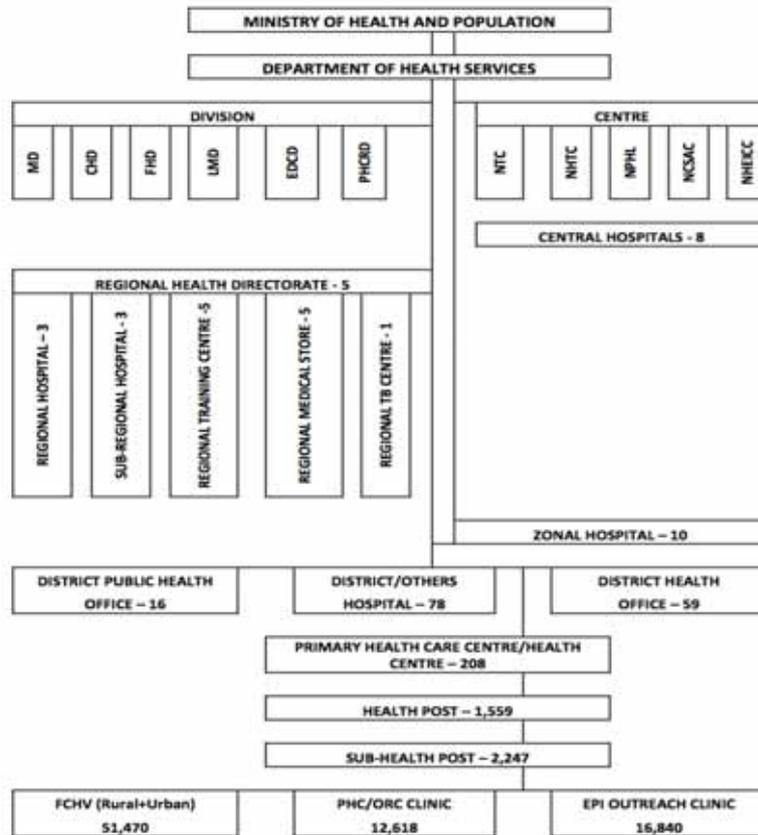


Figure 3: Organogram of Department of Health Services (DoHS) - Source: [25]

Acronyms – Order of appearance on the chart

MD - Management Division, CHD - Child Health Division, FHD - Family Health Division, LMD - Logistic Management Division, EDCD – Epidemiology and Disease Control Division, PHCRD – Primary Health Care Revitalization Division, NTC – National Tuberculosis Center, NHTC – National Health Training Center, NPHL – National Public Health Laboratory, NCSAC – National Center for AIDS and STD Control, NHEICC – National Health Education, Information and Communication Center, FCHV – Female Community Health Worker, PHC/ORC – Primary Health Care Outreach Clinic, EPI – Expanded Program on Immunization.

2.2 The Health System and The Civil War

“One of the first victims of war is the health-care system itself.”

Marco Baldan, the ICRC’s chief war surgeon [26]

The decade-long (1996-2006) violent conflict between the government and Maoists significantly affected the population’s health and the health system. The figures that relate directly to the conflict account for more than 16,000 dead, over 1,200 people disappeared, thousands disabled and internally displaced. In 2004 alone, there were over 16,000 reported victims of torture [27]. Regarding the health system, more than 1,000 health facilities were destroyed, mainly in the rural areas, health workers were killed, harassed, kidnapped, threatened and prosecuted by the warring factions [28][27][16].

But contrary to what is normally seen in conflict zones around the world where the population's health is negatively impacted, in Nepal paradoxically, an improvement in most of the health indicators was observed[28]. A 2010 study which gathered demographic health surveys in 1996 and 2006 (Nepal Family Health Survey - NFHS and Nepal Demographic Health Survey - NDHS, respectively), data from the Ministry of Health and Population (MOHP) and similar sources, compared the health indicators at the beginning and end of the conflict. Despite the conflicts effects on the health system, there was progress in several health indicators using as a reference the MDGs. During the conflict, there was a reduction in infant and child mortality rates, a decline of stunting in children under three years, an increase in child vaccines coverage, the total fertility rate dropped from 4.6 to 3.1, the overall life expectancy improved from 56.5 years in 1996 to 63.3 years in 2006. A total of 16 out of 19 health indicators related to the MDGs improved.

However, the percentage of undernourished children under three years old (weight/height) worsened. The HIV prevalence was not possible to measure due to the lack of 1996 base line data for comparison. Refer to table 1 for the complete health indicators list [28][27].

MDG Goal	Health Indicators*,**	1996 (NFHS)	2006 (NDHS)	Difference	MDG Target 2015
GOAL1 Eradicate extreme poverty & hunger	1. Percent of stunted children under 3 (height/ age)	56	42	14	30
	2. Percentage of undernourished children under 3 wasting (wt/height)	11	15	-4	25
	3. Underweight children under 3 (weight for age)	42	35	7	29
GOAL 4 Reduce child mortality	4. Neonatal mortality rate/1,000 live births	50	33	17	16
	5. Infant mortality rate/1,000 live births	79	48	31	34
	6. Under 5 child mortality rate/1,000 live births	118	61	57	54
Intermediate Indicator	7. DPT 3 immunisation coverage %	76	87	11	100
	8. Measles vaccine coverage %	57	85	28	90
GOAL 5 Improve maternal health	9. Maternal mortality ratio/100,000 live births	631	425	206 [†]	134
	10. Total fertility rate	4.6	3.1	1.5	2.4
Intermediate Indicator	11. Current use of any modern method of contraception among currently married women 15-49 years %	26	51	25	67
	12. ANC visit %	26	75	49	NI
	13. TT shots during pregnancy (2 or more) %	33	63	30	NI
	14. Delivery attended by skilled personnel %	10	19	9	60
GOAL 6 Combat HIV/AIDS, Malaria and other diseases	15. Tuberculosis prevalence rate/100,000 population	310□	280	30	Halt and reverse
	16. Malaria prevalence rate/100,000 population	52□□	25	25	Halt and reverse
	17. Prevalence of HIV in age group 15-49	Na	0.5	-	Halt and reverse
GOAL 7 Ensure environmental sustainability	18. Access to drinking water (improved source)	33	82	49	68*
	19. Access to sanitation %	20	42	22	53

Note: Na = Not available, NI = Not included

□ = The figures are for 2000 as no data was available for 1996

□□ = Universal access target is 100%

Table 1: Main health indicators at the beginning (1996) and end of the conflict (2006).

Source (adapted): [28] [†][29]

It's worth noting conditions existed that could skew the results above such as insecurity, which might have influenced data collection. Divided by the conflict between government and Maoists forces, some areas dominated by the insurgents might have yielded unreliable data since government census workers might have been afraid to approach Maoist communities [28]

2.2.1 The Building Blocks Analysis

Governance

The governance during a social unrest is a sensitive matter. In Nepal, during the conflict, the government lost control of the health units in several rural areas. In addition, the government's decision making process for the health system was centered in the capital, which was controlled by a high-caste elite, far from contact with the inhabitants of other districts [27]. On the other hand, the Maoists were well structured to command the health units in the areas they controlled. The insurgents formally declared that they would not interfere with the health system. They organized their own health agenda creating a local health team including different specialties to promote better health services and education. Additionally, the insurgents advocated for national health programs such as immunization and vitamin supplementation. In those campaigns, they allowed the government's presence in their territories [30]. However, some hindrances were reported from both conflict parties, creating difficulties for international agencies providing humanitarian assistance. The Maoists expelled a number of international agencies from Nepal's western regions, which were extremely vulnerable. Similarly, the government put in place administrative obstacles for international organizations working in the rural areas they did not control [31].

Health Service Delivery

Despite the Maoist official declaration of non-interference, it was reported over 1000 health facilities were destroyed during conflict [28]. The impact on health delivery was attenuated by the fact that often facilities were informed about attacks and given time to move their patients, medical equipment and supplies to a safe place. Generally, facilities did not come under direct attack, but were hit as a result of being in close proximity to targeted government buildings. Furthermore, the Maoists created a plan to work with the local health facilities in order to develop a tailored model of health service delivery addressing community needs. The insurgents worked to sustain an effective health service throughout their territory.

*“The great machine of the civil service goes on regardless”,
commented a UK development worker [27].*

In several areas, identification cards were created to facilitate health workers' movement and patient transfers at checkpoints. Unfortunately, that measure was not adopted for all the regions. As a result, transportation blockades, restricting health workers' movements and patient transfers, were also reported [30].

Workforce

As mentioned above, the Maoists created their own health team to work with the community. Nevertheless, all the pre-conflict health facilities and government staff present in their areas of control were allowed to continue working. In fact, those workers were instructed to remain diligent in assisting the population while remaining available when insurgency leadership and fighters required treatment. Health workers were compelled to pay a levy to the insurgents, with a high proportion of both government and Maoists workers contributing, although the government workers could expect government reprisals if their compliance with the levy became publicly [30].

During and after the conflict, the health workers' frustration with the government public health system was evident. A large number of vacant positions, frequent strikes for better pay and conditions, and absenteeism were frequently reported within the government health services [27].

*“The Maoists were often better at making sure health staff turned up to work” [27]
said a health worker (in comparison to government area).*

The effect of the conflict on the workforce was different depending on the area. As previously noted, in some of areas the health delivery was facilitated with identification cards. In other areas, no such cards existed. However, in the conflict zones, the health workers were consistently harassed either by insurgents or government security forces. In some regions the government security services warned health workers not to provide treatment to the insurgents, arresting and confining one worker who disobeyed for eight months. Interrogation techniques were used against some health workers, forcing them to provide details about patients and activities from the insurgent areas. The Maoists also intimidated some workers accusing them of being informants. Similar to the government security forces, a worker was abducted and held for two months by the insurgents, accused of being an informant. A major cause of stress for health workers was due to being in the middle of two antagonistic forces. The government security forces pressuring them, from one side, not to provide health assistance to the rebels and, from the other side, insurgents demanding continued health service [30].

Financing

Financing was addressed in a pragmatic way by the insurgents, the levy: thirteen days salary for a year or 5% of salary every month. Even though the majority of the health system was based on government workers and facilities, the insurgents charged all health workers the levy to finance diverse activities, not necessarily related to the health service. [30].

Medical Drugs and Supplies

The government policy regarding the public health didn't include free medication. The patients had to pay for the medicine, which was contrary to the Maoist view. They believed that since the drugs came through government channels that they should be free. Some incidents of violent looting of medical drugs and supplies by the insurgents were reported. In other districts, the drugs were confiscated and provided for free in Maoist areas [30].

An additional hurdle in adequate provisions was logistics. Roadblocks, checkpoints, destruction of bridges and vehicles, all made the transportation of essential medical drugs and supplies difficult and at times impossible. The cold chain for vaccines was unsustainable in certain regions [31]. In others, supplies were airlifted, but the provision was not regular, keeping those areas in shortage of some essentials such as oral rehydration solution [30].

Information

One of the most affected parts of the health system was the information system. It was not necessarily affected within a health facility, but rather, between health facilities and their respective district public health offices. With no access to supervision and monitoring visits in insurgent areas, the district health planning was, in various regions, based on information collected on individual verbal and written reports, without means of verification [30]. Despite its sophistication, the Health Information Management System (HIMS) was affected by the difficulty accessing Maoist areas. Dependent on the data collected by the district offices under HIMS supervision, questions were raised about the reliability of the unverified data [32].

2.3 The Health System between the Crises

Although there was considerable progress during the conflict years towards the health MDGs, several obstacles obstructing further progress. The conflict intensified food insecurity, unemployment, political instability, corruption, external aid dependency and the persistent social inequalities, leaving significant gaps in the socio economic development during subsequent years [33]. Despite these obstacles, several of the health indicators continued to improve.

Taking as a reference the 2006 and 2011 Nepal Demographic Health Survey (the last available), it's possible to infer a continued positive trend on the health indicators. In order to facilitate the comparison, this paper will utilize the same 19 health indicators from the conflict period previously discussed.

Regarding nutrition, all of the first three improved after the conflict ended. The percentage of undernourished children (wasting) under five years old dropped from 13 to 11 by 2011. During the conflict that percentage increased, requiring five years after the cease fire to reach 11%, the 1996 level. Another indicator, the proportion of underweight children under five, had a remarkable improvement decreasing from 39% to 29% by 2011, reaching the MDG target. Vaccination coverage was also enhanced, i.e. measles vaccine coverage reached 88% by 2011 quite close to the MDG target of 90%. However, some indicators had little or inadequate progress. In spite of the improvement in the neonatal mortality rate of the previous decade, the indicator became stagnant at 33 per 1,000 live births, far from the MDG target of 17 per 1,000 live births. Maternal mortality showed significant progress reducing by 22%, reaching 328 per 100,000 live births, but that level is more than the double of the MDG target of 134 per 100,000 live births. Although the lack of data on the national prevalence of malaria and tuberculosis, 14 out of 19 health indicators showed some level of improvement. Refer to the table 2 for the complete indicators list.

Health Indicators	2006 (NDHS)	2011 (NDHS)	Difference	MDG Target 2015
1. Percent of stunted children <i>under 5</i> (height/age)	49	41	8	30
2. Percentage of undernourished children <i>under 5</i> wasting (weight/height)	13	11	2	25
3. Underweight children <i>under 5</i> (weight/age)	39	29	10	29
4. Neonatal mortality rate/1,000 live births	33	33	-	16
5. Infant mortality rate/1,000 live births	48	46	2	34
6. Child mortality under 5 rate/1000 live births	61	54	7	54
7. DPT 3 immunization coverage %	89	92	3	100
8. Measles vaccine coverage %	85	88	3	90
9. Maternal mortality ratio/100,000 live births	425	328	97 ¹	134
10. Total fertility rate	3.1	2.6	0.5	2.4
11. Current use of any modern method of contraception among currently married women 15 – 49 years %	44.2	43.2	-1	67
12. Pregnant women receiving prenatal care %	43.7	58.3	14.6 ¹	-
13. Tetanus Toxoid shots during pregnancy (2 or more) %	63	70	7	-
14. Delivery attended by skilled personnel %	18.7	43.4	24.7 ¹	60
15. Tuberculosis incidence rate/100,000 population	280	NA	-	Halt and Reverse
16. Malaria prevalence rate/100,000 population	25	NA	-	Halt and Reverse
17. Prevalence of HIV in age group 15 – 49 years old	0.3	0.3 ³	-	Halt and Reverse
18. Access to drinking water (improved source) %	82	88.6	6.6	68
19. Access to sanitation %	31.5	39.5	8 ¹	53

Table 2: Main health indicators. Source: [28][34]¹[29].

2.4 The Health System and The 2015 Earthquake

On April 25, 2015, a 7.8 magnitude earthquake struck Nepal. The earthquake epicenter was approximately 77 km northwest of Kathmandu. Relatively shallow, consequently more damaging, with an estimate depth of 15 km, the earthquake was accompanied by 14 aftershocks. On May 12, 2015 a second earthquake, 7.3 magnitude, hit a region 76 km east Kathmandu resulting in more landslides, destruction, injuries and deaths [18][35]. The collision between the India and Eurasia tectonic plates promotes the seismicity in the Himalayan region. Those plate movements generate numerous earthquakes, making this area one of the most hazardous seismic places on Earth [36].

The earthquake affected 35 of the 75 districts, including Kathmandu and Pokhara, the largest cities in Nepal. The Ministry of Health and Population identified 14 districts, in central and western Nepal, as severely affected, which correspond to approximately 20% of the country's population. The moderately affected areas account for an additional 17% of the population[18]. The government assessment figures have shown more than 8,700 deaths, 22,300 injured, 1.1 million families affected and 700,000 families displaced, approximately 280,000 homes damaged and 600,000 homes destroyed [19][18]. Refer to figure 4 to the earthquakes epicenter position and the affected districts.

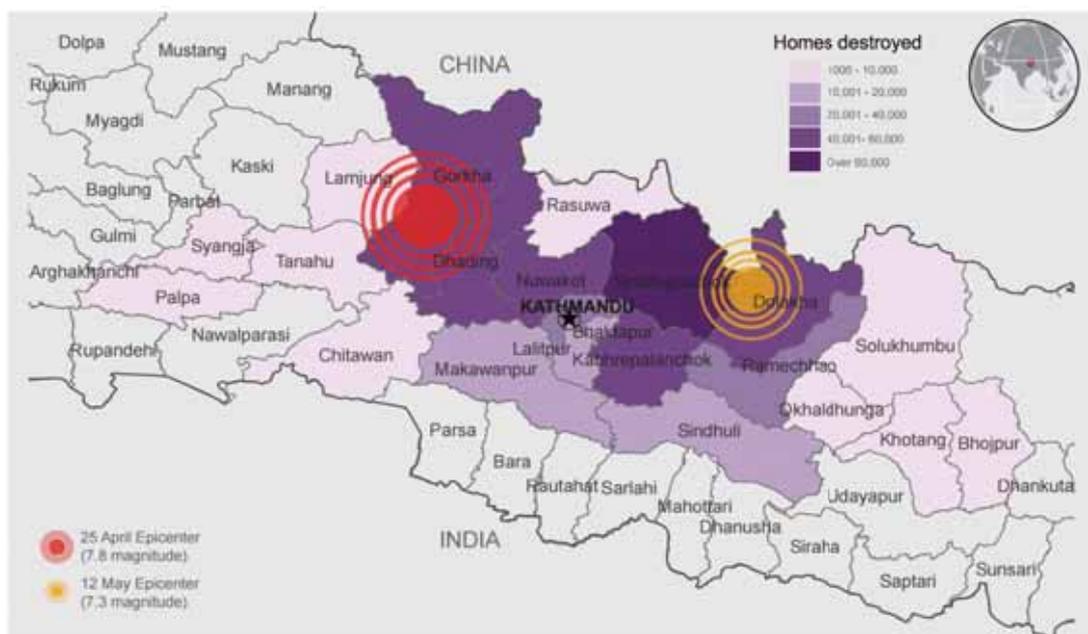


Figure 4: The earthquakes epicenter, the districts affected and level of destruction. Source: [37]

The system of castes, different ethnic groups, and multiple languages created inherent difficulty in this challenging situation. Further, even in normal times, the country lacked basic

infrastructure to support the size of its population, which nearly doubled in 30 years. Add to this, ongoing protests about the new constitution (adopted in 2015) which hampered for months the importation of critical products such as fuel on the border from India during the disaster response [19].

As an additional hindrance, local government elections had not been held even though expected since the end of the conflict in 2006. Consequently, many local government positions remained vacant, including civil servants posts effecting the providing of health care. The Himalayan mountainous geography created more difficulty to access the affected population, even close to the capital, becoming harder in the winter or monsoon rain season [19].

According to government of Nepal, 434 out of 4,118 health facilities were completely destroyed in affected districts (with 793 highly effected, reference Table 3), about 10.5% of the MoHP network in country. Focusing on the 14 most affected districts, 42% of the Hospitals, over 80% of the Primary Health Care Centers and 85% of the Health Posts were partially or completely damaged. It is important to note that those 14 most affected districts contained approximately 84% of the completely destroyed health facilities leaving them with few operational facilities. The earthquake resulted in the death of 18 health workers, additionally 75 were injured [18]. Refer to the table 3 for the number and damage level of public health facilities segregated by districts.

District	Hospitals	PHC Units	Total
Highly affected - 14 districts	26	767	793
Moderately affected - 17 districts	20	926	946
Slightly/not affected - 44 districts	58	2321	2379
Total (affected and not affected facilities)	104	4014	4118

Table 3: Number and damage level of public health facilities segregated by districts
Source: Adapted [18]

2.4.1 The Building Blocks Analysis

Governance

Activating the Health Emergency Operation Centre, the MoHP led the health response in the aftermath of the earthquake. The MoHP worked closely with the District Health Offices, which in turn were coordinating with the District Disaster Response Committee, foreign and national medical teams, Health, WASH, Nutrition and Protection clusters.

During the 2015 earthquake, the Nepali disaster management structure proved to be

inefficient. Even after the crisis there remains no national disaster management authority [38]. That deficiency was evident in the unstable effort to put in place measures to ensure that relief material be in place in a timely manner and free of customs taxes. Although the government had taken measures to ensure the waiver of taxes and fees on relief materials, this measure was temporary. Less than 5 weeks after the disaster, tensions between the Nepal government and international aid organizations began because of the imposition of customs duties and taxes on relief materials which could reach 40% [39].

*"If relief organizations really want to help, they should donate money to the prime minister's relief fund; they have to work according to the priority of the government; they cannot do whatever they want to do according to their agenda",
declared the Nepali Ministry of Home Affairs [39].*

Additional government actions would cause serious detrimental consequences to the humanitarian response. Amnesty International reported that the Nepali government refused to permit access to helicopters and aircrafts from different countries prepared to assist in aid delivery [40]. During all the humanitarian health response the limited air transportation, often the only way to reach isolated regions, hampered aid delivery.

Health Service Delivery

Except for the destroyed facilities, Hospitals, Primary Health Care Centers and Health Posts continued delivering routine health services and, additionally, providing "dignity kits", hygiene kits and reproductive health kits for the most affected population. Adding to the existing public and private health facilities, the health assistance was delivered through temporary field hospitals with national and foreign medical teams (FMTs). Through cooperative efforts, 20 field hospitals with 47 national and 133 FMTs were established [18].

In Lalitpur (south of Katmandu), less than 24 hours after the earthquake, the Alka hospital's tuberculosis treatment center was open, receiving patients, providing treatment and follow-up. Non-communicable diseases like diabetes, hypertension, chronic respiratory diseases, where the loss of follow-up could aggravate the condition and lead to greater health complications, were also a concern for health intervention. FMTs were encouraged to treat patients with chronic diseases along with trauma patients [41].

Kathmandu was relatively privileged to have all major hospitals functioning, although their health delivery capacity was overstretched with the patient influx from the earthquake. It was reported that some buildings were standing but with no electricity and water, not being

able to keep some life-saving and essential equipment functioning after the disaster [42]. The situation was worse in rural areas, where the post-disaster challenge was in providing aid to the thousands of injured in spite of the difficulty of access and virtually no functional health facilities.

“Health facilities are completely non-existent in rural areas post-quake” affirmed during the emergency, Jagannath Lamichhane, coordinator of Kathmandu-based Movement for Global Mental Health [42].

In some places, close to the capital, such as Sindhupalchowk, Banepa, Sankhu and Rasuwa, four days after the disaster, rescue teams could not access the areas. In Sindhupalchowk the total number of deaths surpassed 3,400 with more than 2,000 injured.

Amit Gupta, a trauma care expert who was tasked by India's Ministry of Health to assess the medical needs related to the event, summarized the situation properly when declaring that medical relief was needed more in distant rural areas where health facilities were dysfunctional. Gupta concluded saying that the government's had mishandle the situation, having several FTMs available but failing to deploy them appropriately [42].

The disaster also affected the humanitarian principle of impartiality, especially regarding the health delivery. That principle was disrespected in several locations during the humanitarian response. Vulnerable population such as women, Dalits, indigenous and disabled individuals which historically have been discriminated against in Nepal, faced greater hurdles to access relief assistance. Cases in which the humanitarian assistance was directed primarily to those with political influence and belonging to high castes were reported [43].

Workforce

As mentioned above, Nepal has a chronic deficit on health workers throughout the country. Moreover, the inequality in distribution per region and sector (public and private) is evident. From 8,000 medical doctors estimated in Nepal, only 1,041 work for the MoHP. The other 87% are self employed and/or working for the private sector [23].

Even with human resources difficulties, the MoHP organized 47 national medical teams to the humanitarian response. In addition to the national staff, 133 FTMs were deployed in Nepal, representing 2,385 persons of composed of 1,068 medical doctors, 365 nurses and 952 other team members. A significant influx of workforce in comparison to the MoHP workforce. [44].

In face of that historical lack of health workers in comparison to the need, the

government of Nepal instructed the national health workers, who were still occupying their position to keep working, even long hours of overtime, to compensate for the high number of vacant positions. In Sindhuli, for example, 185 out of 306 positions at the Health Posts were vacant before the earthquake. Consequently, with an already insufficient workforce, the ones that remained in their positions faced an insurmountable increase in workload. Taking into consideration all the 14 most affected districts, in June 2015, the human resources need reached almost 700 health workers in different positions [45]. In addition to that burden they had to deal with their own concerns such as damage to their own homes or to assist the needs of their family members affected by the disaster [18]. According to an official health cluster report, a large part of the health workforce in the Gorkha district was affected by the earthquake. More than 80% lost their homes and many others lost relatives, friends and acquaintances[44].

Financing

As discussed before, the national health system doesn't provide full coverage free of charge. Since 2007 only basic health services are ensured by the constitution. However, these services are of low quality and unequal distribution [24].

One important measure taken by the government after the earthquake was to provide free assistance from simple outpatients' services to minor/major surgeries. The government instructed private hospitals to give free treatment to all the people injured in the earthquake at the governments expense. Otherwise, numerous patients would not have received treatment or would have faced financial ruin since trauma injuries often require specialized care, expensive surgeries and rehabilitation. According to initial health cluster assessment, which corresponded to data from Bir Hospital, Tribhuvan University Teaching Hospital, Patan Hospital, and Bhaktapur Hospital, 60% of injuries involved broken bones, 11% were head injuries and 13% of were spinal cord injuries, requiring expensive specialized treatment and rehabilitation [46]. Nevertheless, even after those financial protection measures, there were reports of private hospitals charging fees from the patients [18].

Another relevant measure from the government was to provide financial means to the affected districts in order to ensure the immediate needs were met for medicines, power generators and the rental of buildings for use as health facilities [18].

Medical Drugs and Supplies

Due to the previous fragility of the provision of essential medicines by the public health system, after the disaster the WHO began constant monitoring the drugs and supplies

availability at district level. From the district level, the priority was the distribution of medical supplies to the rural areas [44], thus creating a logistical chain in order to ensure a minimum stock level of essential medicines. For instance, the district of Gorkha, one of the most affected areas, requested and relied on WHO and health partners to support the provision of medicines and medical supplies for 7-8 months [46]. In order to prevent further complications from chronic diseases, medicines for diabetes, hypertension, and asthma treatments were included in the WHO provision to all districts [41].

However, the country's geography and lack of adequate transportation infrastructure were limiting factors. The transportation of essential medicines, vaccines and supplies was a challenge because of the destruction of the ground transportation infrastructure and the refusal of the government to allow foreign air support to reach remote areas [47].

Information

The information system was one of the first things to be affected by the earthquake. The Health Management Information System (HMIS) was seriously affected in some districts in which patient records and other forms of data were destroyed. In addition to the loss of physical archives, the health workers were extremely overloaded delivering emergency services, consequently not prioritizing the collection of information.

Several facilities, which had lost their archives, faced problems to follow-up with outpatients. Some with non-communicable diseases had complications that aggravated their condition. On the other hand, those with communicable diseases, such as tuberculosis, absent follow-up risked re-started the transmissible phase contributing to further overload the already strained health services. Additional challenges were observed when the population began migrating to different areas changing the health and demographic indicators, fundamental to managing health service delivery, for example, expected number of pregnancies, proportion of men, women, children, elders and others [18].

3. Discussion

Though different in nature and mechanism, the civil war being protracted and violent, the earthquake sudden and catastrophic, both conflicts significantly impacted the supporting pillars of Nepal's health system. The following paragraphs are discussing the impact of the civil war and the 2015 earthquake in the health system's pillars (the WHO six building blocks), considering the historical context.

The civil war bifurcated the health system into two administrations: the government and the Maoist, indicating a *high* impact of the conflict on the health system's governance. The former dominated the main cities and towns, controlled by a high-caste elite. The latter was popular in rural areas, led by politically minded citizens who sometimes used force to promote their agenda. During the civil war, the government continued to provide health services throughout the country, although most of the services were provided within the cities and towns they controlled.

The Maoists understood that health assistance could be used to advance their political agenda. Devkota, et al. [28] notes that the Maoists generally prevented violence from interrupting health services. The government's health facilities were not directly targeted, but suffered collateral damage when located close to targeted government buildings. Mitigation measures such as the issuance of identification cards to facilitate the transit of health workers and patients along the insurgent roadblocks and checkpoints contributed to reduce the conflict's impact on the population. Those actions along with immunization campaigns, orientation programs on health, and the development of an organized health delivery system summarize the Maoist health agenda. Although the impact of the conflict on the health governance, the Maoist diligent attitude regarding that health agenda was the key element which reduced the conflict impact on the population's health and different from other comparable conflicts improved the health indicators. It's worth mentioning that such a rate of improvement would not be repeated during the years immediately following the conflict as demonstrated in the NDHS, 2011.

After the civil war, some conflict effects, such as food insecurity, political instability and corruption, undermined the coalition government's ability to develop a comprehensive national health system that would positively affect Nepal's health indicators.

Following the earthquake, the lack of a national disaster management authority [37] compromised the government's efforts to facilitate cooperation and coordination among the stakeholders involved in the emergency response. Additionally, the government's political

agenda interfered in vital decisions such as its refusal to accept foreign assistance of aircraft and logistical support to provide air transportation services to the affected rural, often remote, areas delaying critical assistance. Approximately three weeks after the first tremor, approximately 36 VCDs of the six most impacted districts were still inaccessible by ground. The limited air support contributed to the mortality in those areas. Another government hindrance was their customs policy, specifically, overtaxing relief materials and delaying the deployment of medicines, supplies and equipment which led to disruption of services to communities in urgent need. The government was more concerned with questionable government policies than with addressing the disaster's direct impact.

In contrast to the conflict, the health governance was more affected by the questionable government policies than by the earthquake's direct impact. Currently missing, the institution of a national disaster management authority would be of great value to strength the health governance. Centralizing the decisions and working with technical support, that disaster management authority is fundamental to improve the efficiency of the health management. Additionally, gives transparency and predictability on the government resolutions, based on technical criteria. Reducing the influence of the political agenda on the health management, as reported in both crises, would naturally increase the confidence and consequently the participation of national and international stakeholders involved in eventual emergency response.

Intrinsically related to all facets of the health system [48], the health service delivery, is highly susceptible to the impact of political conflict or natural disasters. As a result, it was one of the most affected pillars in both crises.

With regards to the civil war, the destruction of the health facilities during the ten-year period was gradual, with the impact on the health delivery service fragmented over the years. As previously noted, direct attacks on health facilities were rare. In addition, mitigation measures, such as identification cards and early warnings to health staff of imminent attacks protected countless patients, medical providers, equipment and supplies, resulting in only a *moderate* impact on the health service delivery.

Conversely, the massive and abrupt characteristic of the earthquake had a substantial impact on the health service delivery, turning into ruins 45% of the health facilities of the 14 most affected districts in a matter of seconds.

Comparing the level of destruction of health facilities with the number of casualties, the civil war resulted in over 16,000 deaths. These fatalities were over a ten years period, whereas the earthquake caused the majority of the 8,700 deaths in the first hours after the

shocks. A direct result of the earthquake was an immediate and massive destruction of health facilities. The correlation between the destruction of the health facilities and casualties was more evident in rural areas such as Sindhupalchowk where health facilities became virtually non-existent after the tremors. In that area only 7% of the public health facilities were functional four weeks after the shocks [49] and represented 40% of the total death toll. Lacking access to basic health care facilities, rural areas struggled to address the increasing demand for services with scarce resources exacerbated by rampant corruption and political instability, similar to that experienced during the civil war.

After the earthquake, a medical system that was weak became nonfunctional for the most of the population. The primary reason for this outcome was the fact that the majority of the damaged facilities were PHC facilities (Primary Health Care, Health Posts). Approximately 85% of the 767 PHC facilities of the most affected areas were completely or partially destroyed leaving the population helpless and inducing multitudes to abandon their communities seeking care at the secondary and tertiary levels (District, Zonal, Regional and Central Hospitals). Those who survived the journey found those centers overloaded, a tragic reality revealing the *high* impact of the disaster in the service delivery.

Following the civil war some preparedness efforts were made, mainly in Kathmandu, in order to update vital health facilities to resist tremors. In 2009, the Government of Nepal launched the comprehensive Nepal Disaster Risk Reduction Consortium and, in the same year, the country adopted the Kathmandu Declaration on Protecting Health Facilities from Disasters. That Consortium published in 2011 the Disaster Risk Reduction Flagship programmes, focusing in areas of immediate action for disaster risk management in Nepal. In 2015, adopted the Sendai Framework for Disaster Risk Reduction. Those agreements included emergency preparedness and response capacity, flood management and measures to strengthen, through stronger building codes and seismic retrofitting, medical facilities across the country to reduce future earthquake damage. However, political instability and slow mechanisms for implementation have hampered progress towards preparedness [42] keeping the majority of PHC facilities across the country out of retrofitting programs. Consequently, the level of destruction at rural PHC facilities was disproportionate to other medical facilities in cities and towns with access to retrofitting funding. This led to disproportionately worse, often tragic, *high* impact service delivery outcome for those utilizing PHC facilities after the natural disaster. In order to strength the health delivery pillar is urgent the prioritization to rebuild the affected health facilities at community and district levels prepared to resist seismic activities. In a country which the transportation infrastructure could be easily disrupted by a natural

disaster, rely only on mobile units to provide emergency aid could increase the casualties in eventual crisis. The earthquake demonstrated the difficulty to deploy response teams due to the Nepali geography. The health facilities already in place are crucial to provide a timely, efficient and effective health care and reduce the disaster's impact on the population. During the last years political hindrances have definitely contributed to rise the vulnerability of the health delivery, recently exposed during the earthquake.

The health workforce was impacted in different ways and intensities during the civil war and after the earthquake. During the civil war, although the Maoists created their own team of health workers, the government's professionals continued to service the health facilities in the areas dominated by the insurgents. This situation put those workers in a delicate position, with both sides of the conflict using them as leverage for their political agendas. Violence, abduction, arrests and torture by both sides of the conflict, induced high levels of stress, apprehension and fear among health workers. The stress, apprehension and fear greatly reduced the health workforce within the conflict zones, demonstrating the *high* impact the conflict caused in the workforce.

The welfare of the health workforce was a key element in the Maoist agenda. The improvement of the health indicators under the Maoists would not have been possible if the remaining workers had failed to adapt to their changing role. Despite the reduced number of workers in the conflict zones, health workers were compelled to regularly service conflict zone facilities and ensure that medical treatment, drugs and supplies were adequate. During the civil war within the conflict zones, 78% of staff positions in hospitals, 75% in PHC units, 96% in Health Posts and 90% in Sub-Health Posts were filled [28], confirming that Maoist effort.

Unlike the civil war which heavily impacted health workers, the earthquake's direct impact was relatively low affecting less than 5% of the workforce. However, in combination with the previously existing inadequate number of workers and the sudden increase in demand, the weakened workforce after the disaster contributed to destabilizing the health system during the crisis. After 4 weeks of Health Cluster operations, 4 out of the 14 most impacted districts (Gorkha, Ramechhap, Rasuwa, Sindhupalchowk) presented an alarming shortage of health workers in 38 VDCs. In Gorkha, the epicenter of the first tremor, acute difficulties were experienced deploying staff, providing medical supplies, and providing shelter and food for the health staff. As a result, several communities suffered from limited health assistance [44]. Although the government incentivized health providers to keep working; overstretching their capacity and poorly distributing them across the country contributed to increased mortality.

The strengthening of the Nepali health workforce requires a long-term policy regarding public sector workers. Expand, train and retain the workforce especially in the countryside are a challenge not only for Nepal but also for several developing and developed countries. This research found that the essential starting point consists in three measures: First, increase the offer of health workers, creating training schools in the regions presenting deficit of health workers. Develop training programs for the communities' health workers to stay in their own locality stimulate the sense of belonging, preventing them to migrate to other regions. Second, develop an attractive career structure for public health worker. Financial benefits for positions in areas poorly served by those professionals contribute to redistribute the health workforce. Third, assure an adequate health infrastructure. The provision of health infrastructure in the public sector is also a determinant element of stimulus to retain the health workers. Giving them conditions to provide treatments, improve the health indicators consequently legitimate their relevance in the community.

There are few authoritative sources assessing the financial impact on the health system for the civil war. However, based on similar crisis worldwide, the ten-year conflict likely resulted in a *high* financial impact on both sides. One source of confirmation is the fact that the Maoists assessed a levy on all health workers to mitigate some of the financial costs.

Government reports shed light on the government's financial challenges related to the earthquake. As mentioned previously, since 2007 the national constitution codifies free basic health care as fundamental right. After the change to the constitution, the population paid out-of-pocket for services not considered "basic" by the government, relying on the private sector to complement the free health provision. After the disaster, in order to prevent additional burden to the population, the government offered free health care to the earthquake victims, bearing all financial costs of disaster care provided by public and private institutions. Even though this measure represented an advance in the humanitarian response, it was not well regulated by the authorities and created room for corruption. Inflated figures related to disaster treatment costs borne by the government reflect overcharges by some private practices. Those overcharges resulted in a *high* impact on the population and public health finances, imposing an additional financial burden while increasing the dependency on the government to address the health demand.

Historically the health finance pillar was chronically neglected by the Nepali government which high level of corruption has been corroding the limited resources. During those crises, the lack of a preparedness plan for health finance kept the country in a weak position to meet its financial commitments, resulting in an excessive external financial

dependency. In order to bear the finance cost of the health assistance, a national fund, along the lines of the WHO Contingency Fund for Emergency (CFE), to be used during crisis, would be of great value to address the immediate health needs. In addition, the institution of mechanisms to reduce the Nepali bureaucracy, which prompts the corruption, is essential to make it timely available and relevant to the affected communities.

Both crises impacted the provision of medical drugs and supplies. In the first, the government and Maoist public health policies diverged. The Maoist policy in providing free medicines to their communities created an impasse with the government which at that time charged patients for drugs. The government's failure to provide free medicine and supplies to the Maoist areas led to some incidents of violent looting of government pharmacies and warehouses. In spite of the violence, those episodes contributed to the government policy change in 2007, creating a list of free medicines. The access to those free medicines was fundamental to maintain the improvement of the health indicators during the civil war and demonstrate the *moderate* impact of the conflict on the medical drugs and supplies.

With respect to the earthquake, the destruction of health facilities and transportation infrastructures highly affected the availability and provision of medical drugs and supplies, notably in the most vulnerable rural areas. Large quantities of drugs, supplies and equipment were destroyed when the health facilities collapsed. The rupture in the transportation network undermined the WHO and partners' efforts to establish supply chains, standing as a constant concern of the Health Cluster during the emergency phase.

Addressing that vulnerable pillar, it's evident the necessity to develop a partnership with the WFP (head of the Logistic Cluster during the 2015 crisis) to develop an air transportation logistics management authority. This effort should focus on increasing the cooperation and coordination, both national and international, of quick response teams to provide assistance to remote areas of this geographically challenging country. Further, foster the development and prepositioning of staging areas, accessed by ground and air, with medical equipment, drugs and supplies, strategically located in the most vulnerable areas to provide and support health workers when urgently needed. Those staging areas might reduce the delay in provide the medical supplies, increasing the efficiency and efficacy of the humanitarian response.

Both crises had a *high* impact affect on the health information system by interrupting communications and/or destroying infrastructure. During the civil war, communications between the health facilities from Maoist areas and their respective District Public Health Office was disrupted. In addition, supervision and monitoring visits were suspended. As a

result, the government's public health planning was based upon unverified and unreliable data. For example: There is a possible limitation on the representativeness of the government data (NHDS) collected during the conflict, since several Maoist areas were not accessible by government workers.

During the earthquake crisis, the health information suffered a double impact. First, the destruction of physical patient data associated with the collapse of facilities, most of them with no data backup. Second, the absence of a national alternative system or method of collection, organization and dissemination of useful information during the crisis. These factors led to a decision making process across the health sector that relied heavily on inaccurate information and assessments from external organizations with different methodologies. Precious time was consumed to accumulate, analyze and process the information into a form useful to support the disaster management.

In the same way as the finance pillar, the health information proved to be extremely vulnerable, receiving limited investment during the last years. Strengthening this pillar is fundamental to improve the health system's capacity to respond an eventual crisis. That effort encompasses the development of a digital information system, centralization of the health data collection, and promotion of a standardized collection method in all districts, and connecting them by internet. All health information could be analyzed, organized and stored digitally with online backup, not relying solely on physical archives which can be destroyed. In addition, a partnership with NCELL (the country largest mobile network provider), which is investing to make its network resistant to seismic activities [38], would be of great value to connect all districts wirelessly. Wireless communication being less affected by natural disasters. Regarding additional emergency communications, an secondary emergency communications system could prove be of great value when normal channels are disrupted. The precursor for this form of communications is currently being developed by the Danish Red Cross in the Kathmandu Valley. Extending that to all districts would be of great benefit to strength not only the information but all health system's pillars, especially the health governance in the context of a crisis management.

Invest in preparedness, strengthening the health system's pillars stands as a fundamental step to reduce the impact of eventual crisis on the health system. This dissertation found that the preparedness measures in place, limited by political and financial factors, were and are until these days insufficient for such a hazard prone country. The crises analysis has demonstrated that the vulnerabilities of each building block not addressed prior the crises prompted the disruption of the health system, exponentially increased the casualties and

delayed the health system recovery. Refer to the table 4 for the summary of the impact analysis on the Nepali health system.

	Civil War (1996-2006)	Earthquake (2015)
Governance	High - The conflict bifurcated the health system into two administrations: the government and the Maoist. The former centered in cities and towns, controlled by a high caste elite. The latter, politically oriented, in rural areas often made use of force to address their health agenda	Moderate - The government decisions regarding customs, taxing of relief material, failure to accept foreign assistance of aircraft and logistical support notably impacted the health system, delaying the health service delivery to the most affected communities
Service Delivery	Moderate - Gradual along the ten years of the conflict and was partially mitigated by the Maoist health agenda	High - Due to the sudden and extensive destruction of the health and transportation infrastructures
Workforce	High - Victims of violence, they were in the middle of two antagonist forces, because of the polarization between government and Maoist forces	Low - Even though there was impact in the health worker's families and communities, the disaster's direct impact affected less than 5% of the health workforce
Financing	High - There are few authoritative sources on this topic, but it is possible to conjecture that the ten-year conflict caused a significant and diffuse negative financial impact on both sides during and after the conflict	High - Because of the extensive destruction of the health facilities, the provision of emergency funds to the affected districts and the government commitment to pay all of the population's health expenses related to the disaster
Medical Drugs and Supplies	Moderate - Although the insurgents advocated for the provision of free medicines to the population, roadblocks and occasional looting of pharmacies and warehouses affected their availability in conflict zones	High - In addition to the collapsing of hundreds of health facilities which destroyed tons of medical drugs and supplies, the disruption of the transportation infrastructure hampered the development of an effective supply chain
Information	High - The rupture in the communication between the Maoist health facility and the government district office limited the representativeness of the health data used as a reference to the health indicators	High - Was double impacted with the destruction of the existing physical patient data, with no backup and with the lack of an alternative method to independently collect, organize and analyze health information during the crisis

Table 4: Comparison between the crises' impact on the health system of Nepal

Level of Impact: **High**: Hindered the health system functioning in most of the affected districts. **Moderate**: Occasional hindrance affecting the health system in some restricted areas of the affected districts. **Low**: minor restraint which insignificantly affected the health system functioning.

4. Conclusion and Recommendations

Over the last 20 years Nepal has faced different humanitarian crises, from conflicts to natural disasters. This dissertation aims to analyze the impact of the civil war (1996-2006) and the 2015 earthquake on the national health system, scrutinizing the most affected, often rural areas. The ten-year conflict left scars of violence on the country's history. Nevertheless, the Maoists developed a public health agenda addressing the governance and workforce which was zealously implemented. Such effort to provide health assistance to the rural population during that protracted crisis, even though somewhat deficient in both coverage and comprehensiveness of care, allowed the country to keep improving its health indicators (based on the Millennium Development Goals).

After the civil war, some conflict consequences, such as food insecurity, political instability and corruption undermined the country's progress as measure by the health indicators. Most continued to improve but at a reduced rate. Subsequent to the conflict, the government failed to address known vulnerabilities in the health system.

The earthquake brought major challenges to an already weak health system. Once the health facilities were turned into ruins, especially the PHC units located in rural areas, the health system's effectiveness was severely impaired. Medical equipment, drugs, supplies and patient records were turned into debris. The health workforce deprived of its infrastructure, equipment, medicines, supplies and information worked with their hands tied to provide effective assistance. The financial burden related to the health assistance further added to the Nepal's budgetary challenges. All these factors impacted the health system's service delivery throughout the country, with the brunt of the disruptions heavily borne by the rural communities. Owing to the destruction of the transportation infrastructure and questionable government decisions, several of remote communities were inaccessible for weeks delaying the humanitarian response and contributing to increased mortality.

The difference between the impact of the two crises becomes clearer when considering the extent of the damage and the number of people affected in relation to the period of time of each crisis. During the first crisis, the effects were relatively moderate given the protracted period of the conflict. However, the second crisis caused devastating effects following a natural disaster taking place over a short period. The sudden and wide ranging destruction critically disrupted the health system, increasing the severity of mortality of casualties and challenging the humanitarian response. The effort to reorganize the Nepali health system in order to be prepared to respond effectively during a future natural disaster is urgent. Strengthening the

national capacity to better address crises requires a well designed preparedness project in order to strengthen the health system's pillars, especially those found to be the most vulnerable.

Historically, Nepal is more prone to natural disasters than conflicts of war. Therefore, the intention of the recommendations below is to address preparedness measures in the context of the 2015 earthquake and highlight key thoughts based on a review of the current pertinent literature.

- The creation of a national disaster management authority is essential to improving the *governance* efficiency and facilitating the assistance of foreign humanitarian organizations through better coordination, deployment, and support, reducing the obstacles which hampered humanitarian aid in the last crisis.
- According to priority number 4 of the Sendai Framework, which addresses the concepts of rehabilitation and reconstruction [50], the government should prioritize seismic retrofitting of substandard health facilities at community and district levels. This effort is fundamental to increasing the national capacity to handle the acute demands on *service delivery* during crises.
- Expand (train and retain) an adequate *workforce* in the country, especially in areas which historically lack health workers. Make the public health service attractive as a lifelong career by developing a career structure. Provide adequate infrastructure, giving the conditions to the health practitioners legitimate their relevance in the community. Work could begin at the community level to provide educational health support and stimulate a sense of belonging.
- In order to bear the increased *finance* cost of health assistance, a national fund should be created for use only during crisis. Moreover, creating mechanisms to reduce the bureaucracy to make such funds available in a timely manner.
- In partnership with the WFP develop an air transportation logistics to improve the access to remote areas, cooperation and coordination among the stakeholders involved in the emergency response. Develop and set in position staging areas, accessed by ground and air, with *medical equipment, drugs and supplies*, strategically located to support the health assistance in the most vulnerable areas.
- Develop a national health digital *information* system, centralizing the collection of health data, promoting standardized collection methods in all districts, and connecting them by internet. There is a clear necessity to further develop the Danish Red Cross' initiative which is implementing an additional emergency communications system to be in place when normal channels are disrupted. Extend this emergency system to all districts is important to strength not only the *information* pillar but also the health *governance* during a crisis.

References

- [1] Humanitarian Coalition, “What Is a Humanitarian Emergency?” [Online]. Available: <http://humanitariancoalition.ca/info-portal/factsheets/what-is-a-humanitarian-crisis>. [Accessed: 29-May-2016].
- [2] United Nations - OCHA, “Global Humanitarian Overview 2016,” *United Nations*, pp. 1–36, 2016.
- [3] ICRC, *Violence against health care*, vol. 95, no. 889. 2013.
- [4] J.-L. Carmichael and M. Karamouzian, “Deadly professions: violent attacks against aid-workers and the health implications for local populations.,” *Int. J. Heal. policy Manag.*, vol. 2, no. 2, pp. 65–7, 2014.
- [5] J. T. Watson, M. Gayer, and M. A. Connolly, “Epidemics after natural disasters,” *Emerg. Infect. Dis.*, vol. 13, no. 1, pp. 1–5, 2007.
- [6] Universite Catholique de Louvain, “EM-DAT Disaster Trends 1900 - 2015,” 2016. [Online]. Available: http://www.emdat.be/disaster_trends/index.html. [Accessed: 05-Jun-2016].
- [7] F. Checchi, M. Gayer, R. F. Grais, and E. J. Mills, “Public health in crisis-affected populations,” vol. 44, no. 61, 2007.
- [8] Central Bureau of Statistics - CBO - Government of Nepal, “Statistical Pocketbook of Nepal,” 2014.
- [9] United Nations, *World Statistics Pocketbook 2015 Edition*, no. 37. 2015.
- [10] Nepal Centre for Disaster Management (N.C.D.M.), “NCDM on Disaster Management,” 2016. [Online]. Available: http://www.ncdm.org.np/home_aboutus.php. [Accessed: 22-Aug-2016].
- [11] British Broadcasting Corporation - BBC, “Nepal profile - Timeline,” 2015. [Online]. Available: <http://www.bbc.com/news/world-south-asia-12499391>. [Accessed: 15-Feb-2016].
- [12] Encyclopaedia Britannica, “Nepal.” [Online]. Available: <http://www.britannica.com/place/Nepal>. [Accessed: 15-Feb-2016].
- [13] Q. T. Do and L. Iyer, “Poverty, Social Divisions and Conflict in Nepal,” *SSRN Work. Pap. Ser.*, vol. WPS4228, pp. 1–16, 2007.
- [14] Q.-T. Do and L. Iyer, “Geography, poverty and conflict in Nepal,” *J. Peace Res.*, vol. 47, no. 6, pp. 735–748, 2010.

- [15] CIA - Central Intelligence Agency, “The World Factbook - Nepal.” [Online]. Available: <https://www.cia.gov/library/publications/the-world-factbook/geos/np.html>. [Accessed: 03-Jul-2016].
- [16] “BBC NEWS | South Asia | Nepal raises conflict death toll.” [Online]. Available: http://news.bbc.co.uk/2/hi/south_asia/8268651.stm. [Accessed: 04-Nov-2016].
- [17] World Health Organization, “WHO | Health Systems.”
- [18] Ministry of Health and Population - Government of Nepal, “A Report on Post Disaster Needs Assessment and Recovery Plan,” pp. 1–34, 2015.
- [19] IFRC, “Nepal: Earthquake - one-year progress report,” 2016.
- [20] World Health Organization, “Everybody’s business: strengthening health systems to improve health outcomes: WHO’s framework for action.,” *Production*, pp. 1–56, 2007.
- [21] World Health Organization, “Monitoring the Building Blocks of Health Systems: A Handbook of Indicators and their Measurement Strategies,” pp. 1–92, 2010.
- [22] *The Sphere Project - Humanitarian Charter and Minimum Standards in Disaster Response Title*, Third Edit. 2011.
- [23] RTI International and Ministry of Health and Population, “Overview of Public-private mix in health care service delivery in Nepal,” vol. 1, 2010.
- [24] S. R. Mishra, P. Khanal, D. K. Karki, P. Kallestrup, and U. Enemark, “National health insurance policy in Nepal: Challenges for implementation,” *Glob. Health Action*, vol. 8, no. 1, pp. 8–10, 2015.
- [25] Government of Nepal - Ministry of Health and Population, “Annual Report - Department of Health Services 2070/71,” vol. 71, 2015.
- [26] International Red Cross, “Health Care in Danger: Making the case,” pp. 1–24, 2011.
- [27] S. Collins, “Assessing the health implications of Nepal’s ceasefire,” *Lancet*, vol. 368, 2006.
- [28] B. Devkota and E. R. van Teijlingen, “Understanding effects of armed conflict on health outcomes: the case of Nepal.,” *Confl. Health*, vol. 4, no. 1, p. 20, 2010.
- [29] World Bank, “World Bank Data - Nepal.” [Online]. Available: <http://data.worldbank.org/country/nepal?display=graph>. [Accessed: 03-Jul-2016].
- [30] M. D. Devkota, “An Assessment on Impact of Conflict on Delivery of Health Services,” no. June, 2005.
- [31] S. Singh, “Impact of long-term political conflict on population health in Nepal,” *Can. Med. Assoc. J.*, vol. 171, no. 12, pp. 1499–1501, 2004.

- [32] O. Bornemisza and F. Checchi, “Health interventions in crisis-affected communities of Nepal Mission report,” no. October, p. 33, 2006.
- [33] P. Gautam and P. Bomzan, “The long road to achieve the MDGs | Social Watch,” 2014. [Online]. Available: http://www.socialwatch.org/node/15726#_ftn14. [Accessed: 23-Aug-2016].
- [34] S. S. Ghimire, C. D. Constraints, P. Division, M. Health, N. Era, and I. C. F. International, “Nepal,” pp. 163–171, 2011.
- [35] World Health Organization, “Humanitarian crisis after the Nepal earthquakes 2015,” no. May, 2015.
- [36] U.S. Geological Survey, “M7.8 - 36km E of Khudi, Nepal,” 2015. [Online]. Available: <http://earthquake.usgs.gov/earthquakes/eventpage/us20002926#general>. [Accessed: 30-May-2016].
- [37] Unite Nations - OCHA, “Nepal: Earthquake Humanitarian Snapshot (as of 14 May 2015),” 2015. [Online]. Available: <http://reliefweb.int/report/nepal/nepal-earthquake-humanitarian-snapshot-14-may-2015>. [Accessed: 03-Jul-2016].
- [38] S. Carpenter and F. Grunewald, “Disaster preparedness in a complex urban system: The case of Kathmandu Valley, Nepal,” *Disasters*, vol. 40, no. 3, pp. 411–431, 2015.
- [39] V. Arora, “Tensions rise as Nepal imposes taxes on relief materials,” *Nikkei Asian Review*, 2015. [Online]. Available: <http://asia.nikkei.com/Politics-Economy/Policy-Politics/Tensions-rise-as-Nepal-imposes-taxes-on-relief-materials>. [Accessed: 07-Jun-2016].
- [40] Amnesty International, “Nepal must end discrimination in earthquake relief effort,” 2015. [Online]. Available: <http://www.amnestyusa.org/research/reports/nepal-must-end-discrimination-in-earthquake-relief-effort>. [Accessed: 05-Jul-2016].
- [41] States News Service, “Continuing care for tuberculosis, diabetes and heart patients in earthquake hit Nepal,” *Expanded Academic ASAP*, 2015. .
- [42] D. C. Sharma, “Nepal earthquake exposes gaps in disaster preparedness,” *Lancet*, vol. 385, no. 9980, pp. 1819–1820, 2015.
- [43] Amnesty International, “Nepal: Earthquake Recovery Must Safeguard Human Rights,” pp. 1–21, 2015.
- [44] World Health Organization, “Health Cluster Bulletin #3 - Nepal Earthquake - 11 - 17 May 2015,” 2015.
- [45] World Health Organization, “Health Cluster Bulletin #5 - Nepal Earthquake - 28 May - 03 June 2015,” 2015.

- [46] World Health Organization, "Health Cluster Bulletin #1 - Nepal Earthquake - 25 April - 03 May 2015," 2015.
- [47] World Health Organization, "Health Cluster Bulletin #2 - Nepal Earthquake - 04 - 10 May 2015," 2015.
- [48] W. Mutale, V. Bond, M. T. Mwanamwenge, S. Mlewa, D. Balabanova, N. Spicer, and H. Ayles, "Systems thinking in practice: the current status of the six WHO building blocks for health system strengthening in three BHOMA intervention districts of Zambia: a baseline qualitative study.," *BMC Health Serv. Res.*, vol. 13, no. 1, p. 291, 2013.
- [49] World Health Organization, "Health Cluster Bulletin #4 - Nepal Earthquake - 18 - 26 May 2015," 2015.
- [50] UNISDR - The United Nations Office for Disaster Risk Reduction, "Sendai Framework for Disaster Risk Reduction - UNISDR." [Online]. Available: <http://www.unisdr.org/we/coordinate/sendai-framework>. [Accessed: 04-Sep-2016].