

Factors Influencing Access to Preventive Services for Cervical Cancer among Women in Bolivia

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Masters of International Health
September 2012- February 2017

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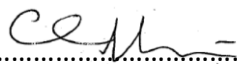
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A thesis submitted in partial fulfillment of the requirement for the degree of
Master in International Health

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Signature:.....

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Abbreviations

BNPCC	Bolivian National Plan for prevention, control and monitoring of Cervical Cancer (<i>Plan nacional de prevención control y seguimiento de cáncer del cuello uterino</i>)
CC	Cervical Cancer
CAI	Committees of Informational Analysis
CDC	Centers for Disease Control
DHS	Demographic and Health Survey
DNA	Deoxyribonucleic Acid
GDP	Gross Domestic Product
GOB	Government of Bolivia
HIC	High Income Country
HPV	Human Papilloma Virus
HR-HPV	High-Risk Human Papilloma Virus
IARC	International Agency for Research on Cancer
INE	<i>Instituto Nacional de Estadísticos</i> (Bolivian Institute of Statistics)
LEEP	Loop Electrosurgical Excision Procedure
LMICs	Low- and Middle-Income Countries
MSD	<i>Ministerio de Salud y Deportes</i> (Bolivian Ministry of Health)
NGO	Non-Governmental Organization
PAHO	Pan American Health Organization
Pap	Papanicolaou
PSCC	Preventive Services for Cervical Cancer
SAFCI	<i>Salud Familiar Comunitaria Intercultural</i>
SEDES	<i>Servicio Departamental de Salud</i>
SNIS	<i>Sistema Nacional de Información en Salud</i> (National Health Information System)
SPAM	<i>Seguro Público del Adulto Mayor</i>
SRHR	Sexual and Reproductive Health and Rights
STI	Sexually Transmitted Infection
SUMI	<i>Seguro Universal Materno Infantil</i>
UDAPE	Social and Economic Policy Analysis Unit in Bolivia (<i>Unidad de Análisis de Políticas Sociales y Económicas</i>)
VIA	Visual Inspection of the cervix with Acetic acid
WHO	World Health Association

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Abstract

Problem: Cervical cancer (CC) kills over 250,000 women each year worldwide and most deaths occur in low- and middle-income countries (LMICs) due to insufficient access to preventive services for CC (PSCC). The government of Bolivia (GOB) provides CC screening for free to targeted women yet access remains low and Bolivia has some of the highest rates of CC in the world.

Methods/Objectives: This thesis identifies factors influencing access to PSCC in Bolivia by conducting a literature review. A conceptual model on access to healthcare is used to organize the influencing factors. The study compares the national guidelines for CC screening to international standards, searches for effective interventions in similar countries, and offers recommendations to the GOB to reduce the country's burden of disease.

Findings: The main factors influencing access to PSCC in Bolivia are barriers arising from inequalities of socioeconomic status, gender, and culture (demand-side) and from the low quality, weak capacity and maldistribution of resources of the public health system (supply-side). Bolivia's guidelines are not in line with international standards. Countries with similar contexts have improved access to PSCC by employing participatory strategies and by task shifting the screen-and-treat approach to midlevel providers.

Conclusions/recommendations: Access to PSCC in Bolivia is low but can be improved. Stakeholders planning interventions for PSCC should utilize participatory strategies to improve access, especially for rural and indigenous communities. Cytology-based screening in the public sector should be replaced with the screen-and-treat approach done by midlevel providers.

Key words: Access, Barriers, Screening, Cervical Cancer, Bolivia

Word count: 13,085

Introduction

Over half a million women worldwide will develop CC this year and about half of that number will die from this preventable disease. (1) More than 80% of the burden of CC resides in LMICs where a lack of resources and infrastructure has impeded widespread screening for this cancer. (1,2) On the other hand, many high-income countries (HICs) have reduced their CC rates by half with successful screening programs over the past half century. (3)

I traveled to Bolivia in 2014 and 2015 working on short-term projects with a Non-Governmental Organization (NGO), Hope Worldwide. While there, I realized there were many health disparities among its citizens and I was struck by very high rates of childhood malnutrition, maternal mortality, cervical cancer, and the number of children living on the street. I chose to write on the topic of cervical cancer because, as a medical professional, I deal with skin cancer on a daily basis. Although cancer is generally considered a non-communicable disease, it is interesting that the primary cause of cervical cancer is a highly communicable virus, the Human Papilloma Virus (HPV). Since the advent of the HPV vaccine in 2006 to prevent cervical cancer, we have learned that this virus is associated with other cancers and it is possible to think that this vaccine may be a viable primary preventive strategy for penile cancer, anal cancer and oropharyngeal cancer as well. It is exciting to me as a physician that a vaccine has the potential to help reduce the worldwide cancer burden for the next generation. For now most strategies to prevent CC worldwide rightly focus on secondary prevention (screening and treatment of precancerous lesions of the cervix) due to the large cohort of at-risk women worldwide who have already been exposed to HPV. The GOB offers all at-risk women free screening for CC through an entitlement program yet the country has some of the highest rates of CC in the world. This ostensible paradox made me curious to find out what is going on with access to PSCC in Bolivia. There are good examples in the literature of LMICs combating this disease despite their limited resources and I believe Bolivia can be more successful in reducing their rates of CC. This will involve addressing some of the barriers to access to PSCC and by learning from experiences in LMICs in similar contexts also working to reduce their burden of CC.

Chapter 1: Background information on Bolivia

1.1 Geography and climate

The Plurinational State of Bolivia is a landlocked country in South America east of Peru and Chile, southwest of Brazil and north of Argentina and Paraguay (Figure 1). Bolivia is situated just below the equator and traversed by the great Andean mountain range giving it three distinct geographic zones and climates: the high plateau or *Altiplano* is cool and dry and sprawls between two parallel ranges (*cordilleras*), the temperate valleys and semitropical *Yungas* zone of the eastern slopes, and the hot humid tropical lowlands plains (*llanos*). (4,5) A rainy season extends from November to March where many rural roads become impassable due to mud and rock slides especially in the lowlands and valleys. (6)

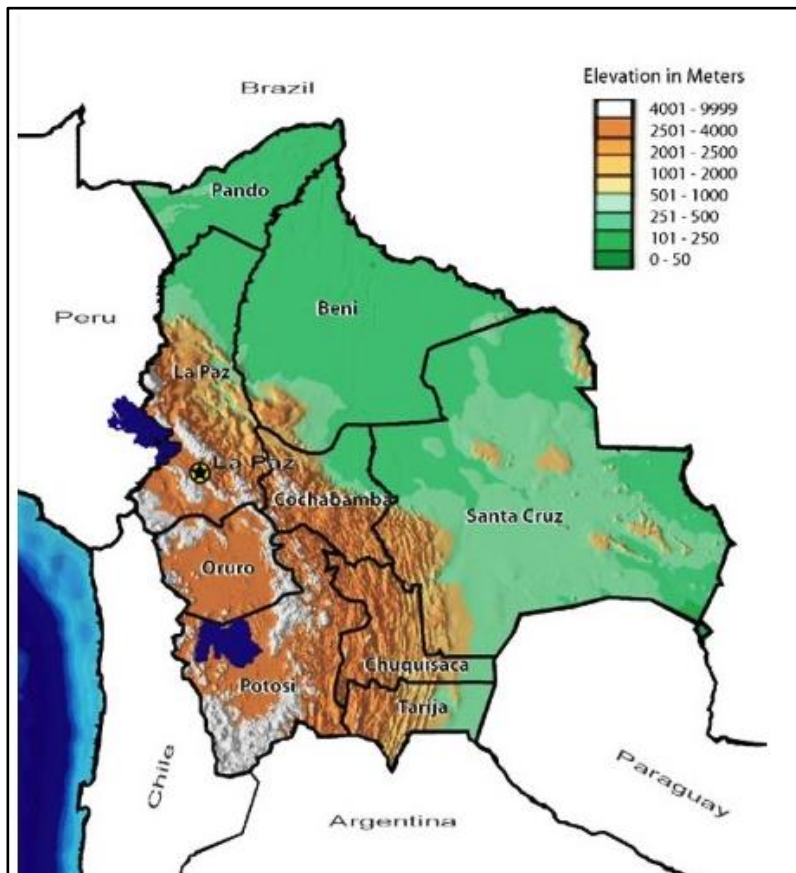


Figure 1 Map of Bolivia (7)

1.2 Demography

Bolivia has a population of almost 11 million people and is in a demographic transition. 30% of the population is under 15 years old and the fertility rate has fallen over the past 30 years from five to three children per woman. (8,9) Currently the Human Development Index for Bolivia is

119 out of 188 countries, one of the worst in the region. (10) Adult literacy rate and primary school enrollment rates are 91%. (11)

About two thirds of the population is now living in urban areas, most residing in the 2 largest departments of La Paz and Santa Cruz. (9) The de facto capital of Bolivia is La Paz, which sits high in the Andes at about 3600 meters above sea level. (4) Just above the city of La Paz on the edge of the *Altiplano* lies the sister city of El Alto ¹ where over 80% of the inhabitants identify as indigenous. (12)

1.3 Cultural context

Bolivia is a diverse country with the highest proportion of indigenous people in South America made up of 36 ethnic nations each with their own spoken language. (5,13) 62% of Bolivians are indigenous mainly of *Quechua* or *Aymara* descent, 30% are considered to be mixed or “*mestizo*”, and the rest European and other ethnicities. (14,15) The majority of indigenous people live in the western highlands and valleys whereas the eastern lowlands are over 80% non-indigenous. (16) Three quarters of the urban population consider Spanish their primary language compared to only about 40% in rural areas. (9) The majority of Bolivians are Roman Catholic (78 percent) and the rest protestant, evangelical christian, other religions or beliefs; however, in rural indigenous communities a mix of Catholicism and traditional beliefs are commonly practiced. (17) La Paz and El Alto combined have about 1.7 million inhabitants (18) and these cities create a mixing bowl of Spanish and indigenous cultures.

1.4 Economic context

Bolivia is one of the poorest countries in Latin America and is classified as a lower middle-income country by the World Bank with a gross national income per capita of \$2,870 in 2014. (8) Bolivia has made strides to reduce poverty rates and inequality in the past 15 years (19) but about 40% of Bolivians still live below the national poverty line and half of those live in extreme poverty. (20,21) The country is resource rich with some of the largest reserves of natural gas and lithium in South America. (22,23) Infrastructure is considered weak in Bolivia with only 28% of the rural population having access to improved sanitation (24) and the lowest density of paved roads in Latin America (about 10%). (25)

¹ El Alto is considered to be “the *Aymara* capital of the world”. (118)

1.5 Political context

Bolivia is divided into nine departments and 337 municipalities. (18) The country gained independence from Spain in 1825 and this was followed for the next century and half by political instability, military coups, and three wars that resulted in loss of vital territories. (4) After a series of military right wing coups, procedural democracy was reestablished in 1982 but governmental turnover remained high until the landmark election in 2005 of the country's first indigenous and still current president, Evo Morales. (26) Mr. Morales is himself ethnic *Aymara* and a former coca farmer (*cocalero*) union leader and he has prioritized an agenda of social and economic inclusion for the poor and indigenous population. (27) Mr. Morales has made some controversial political decisions most notably renationalizing of much of the hydrocarbon, electric and telecommunications industries. (28)

1.6 Health profile

Bolivia has some of the worst health indicators in Latin America (Table 1). However, the situation is improving with under-five child mortality, infant mortality and maternal mortality rates reduced over half since 1990. (11,24) Bolivia is in the middle of the epidemiologic transition with a double burden of persistent communicable diseases and rising rates of non-communicable diseases as the population ages. (11,29) There is a pattern of inequality between the rural and urban populations that is reflected in health indicators. (30) For example, childhood mortality rates in rural areas are almost twice that of urban areas. (29)

Indicator	Bolivia	Latin America	LMICs	HICs
Life expectancy (both sexes) 2013	68	75.5 (2015)	66	79
Infant mortality rate (per 1,000 live births) 2013	31	15.5	44	5.3
Under five child mortality rate (per 1,000 live births) 2013	39.1	18.9	59	6.3
Maternal mortality ratio (per 100,000 live births) 2013	200	85	240	17

Table 1 Key health indicator comparison (11,24)

1.7 Health system

Overall health expenditure in Bolivia is only 5.8% of Gross Domestic Product (GDP). (11) The health system is challenged by fragmentation and insufficient coordination. (31) Although a new constitution in 2009 guaranteed all Bolivians the right to health, (32) most of the population face problems with access to healthcare. (33) Traditional medicine is still used by half of the population and is often the first place many Bolivians seek care. (31,33) The government created a free basic health service package for women of childbearing age and children up to five years in 2003 called *Seguro Universal Materno Infantil* (SUMI). In 2006 it was expanded to include sexual and reproductive health and screening services for CC up to aged 60. (32) The *Ministerio de Salud y Deportes*² (MSD) created a program called *Salud Familiar Comunitaria Intercultural* (SAFCI) in 2008 with the goal to reduce the exclusion of the majority indigenous population from health services. Its aim is to foster community participation, to understand cultural beliefs and practices and to find intercultural solutions to health problems. (5,34) See annex 1 for additional information on the Bolivian health system.

² Bolivian Ministry of Health

Chapter 2: Study Design Summary

2.1 Problem Statement

CC is the fourth leading cause of cancer mortality worldwide with more than 500,000 new cases and 265,000 deaths each year. (1) Over 80% of this burden occurs in LMICs where access to screening and treatment services for CC is lacking. (1,35,36) The worst affected countries are in Sub-Saharan Africa, South and East Asia, Latin America and the Western Pacific. The fact that the majority of CC deaths occur in the developing world is a serious health inequity that reminds us that where you are born in this world can determine your health risk. (37,38) Worse still, CC strikes most often during the prime years of a woman's life, which impacts work, child rearing, and care for older family members. (39,40) As such, CC disrupts or destroys far more than a quarter million lives per year and this represents a major public health problem and a threat to human development in LMICs. (41)

HPV is the most common sexually transmitted infection (STI) worldwide and has been found to be the cause of 99% of CCs. (39,42) Because it can take up to 10 or more years for precancerous lesions of the cervix to progress to cancer, a large window for secondary prevention measures exists (Figure 2). (43) Women from the ages of about 35-55 are at the highest risk to develop CC. (39)

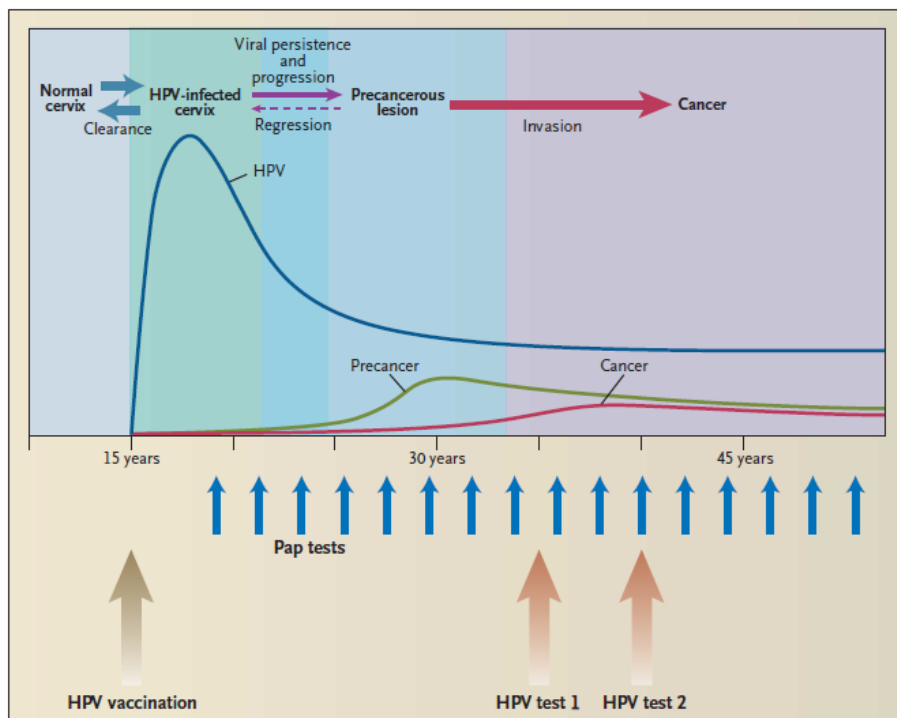


Figure 2 Natural history of HPV, cervical cancer, and the window of prevention (44)

Nowadays CC is mostly preventable by early detection with screening and by vaccination with the HPV vaccine at an age before exposure to the virus. (45) Over the past half century,

developed countries have used the Papanicolaou smear (**Pap**) as the foundation for CC screening programs and have reduced by half their incidence and mortality rates of CC. (3) However, implementing cytology-based screening programs is complex and poorly suited in low resource settings as it is costly, requires laboratories with high technical capacity, and can take up to three visits to complete the process of screening and treatment. (2,46) Furthermore, due to the low sensitivity for a single Pap smear, the success of cytology-based screening programs relies on repeated testing at three to four year intervals, which is difficult to implement in LMICs. (47)

In the past twenty years new strategies have emerged for primary and secondary prevention of CC which may be better suited than the Pap smear to prevent CC in LMICs (annex 2 provides a detailed comparison). The World Health Association (WHO) now recommends that LMICs use visual inspection of the cervix with acetic acid (**VIA**) or high risk (**HR**)-**HPV deoxyribonucleic acid (DNA) testing** for CC screening instead of the Pap smear. (48) Unlike cytology-based screening, these two strategies can be done as a single visit “**screen-and-treat**” approach at less cost and without the need for follow-up or an outside cytology laboratory. (36)

CC is the second leading cause of cancer mortality in **Latin America** killing an estimated 31,303 women in 2015. (1,49) Although mortality rates are slowly trending downward in the region, the poorest countries still carry the highest burden and overall death rates in Latin America remain three times that of North America. (1,50) Cytology-based screening programs have had little impact on the overall burden of CC in Latin America mostly due to access barriers, low coverage rates, and difficulty implementing quality Pap screening programs. (51,52) Some countries like Chile, Mexico and Costa Rica have seen declining rates of CC but it is unclear how much of this is due to PSCC and how much is due to improving socioeconomic factors. (51) VIA is now in national guidelines of nine countries in Latin America but indicators of uptake were not identified in this study. (53) The HPV vaccine is in the national guidelines of 14 of the 33 countries in the region but estimated coverage (2014) of targeted girls is only about 30-40% in the region. (54)

Bolivia has the ninth highest incidence rate of CC in the world (47.7 cases per 100,000 women) and the second highest mortality rate (21 deaths per 100,000 women) in Latin America. (1) It is the leading cause of cancer deaths among all Bolivians with death rates more than twice the average for Latin America. (1) In 2015, the MSD estimated there were 2.4 million women between the ages of 25 and 64 who were at risk for CC, almost a quarter of the population. (55) In 2011, women aged 35 to 64 had an incidence rate of CC of 192 per 100,000 women highlighting a group at very high risk for the disease. (56)

Although screening with the Pap smear has been a free service for at-risk women since 2005, coverage rates for the test remain less than 15%³ and incidence and mortality rates of CC have not fallen in the last decade. (1,56) A governmental report by the Social and Economic Policy Analysis Unit in Bolivia (UDAPE) estimated that up to 77% of Bolivians were at-risk of exclusion from the health system (33) and this exclusion also affects access to PSCC and has hindered efforts by the MSD to reduce the burden of CC in Bolivia. (55)

An updated Bolivian National Plan for Prevention, Control and Monitoring of Cervical Cancer 2009-2015 (**BNPCC**) was released by the MSD in 2009 and continued to emphasize the Pap smear as the principal method of CC screening. It projected coverage for screening would increase to 35% by 2014 (by taking 705,000 Pap smears nationwide), however the official number of Pap smears taken for 2014 was only 441,000. (18,55) Currently, there is no national vaccination program for HPV vaccine. (57) In short, access to PSCC in Bolivia is poor and CC rates are high. (41,55)

2.2 Justification

The main justification for this study is that there is a very high burden of CC in Bolivia and a paucity of literature that specifically addresses the reasons for this epidemic or how to control it. Meanwhile, there are many studies about CC prevention in Latin American countries and some of these countries have similar demographics, geography and sociocultural issues as Bolivia and have utilized strategies to overcome some barriers of access to PSCC. Without adequate access to CC screening services, this epidemic will continue in Bolivia which makes this study a timely review of the problem and addresses a gap in the literature. This research study seeks to explore the factors influencing access to PSCC among Bolivian women and analyze some strategies that have been effectively implemented to improve access in a few similar countries. I will discuss to what extent these may be adapted and implemented in Bolivia. I will conclude with some recommendations that may be useful for stakeholders involved in planning, implementing PSCC such as the MSD, regional and local governments, NGOs, healthcare workers and community representatives.

³ Coverage rates of 80% are recommended for national cancer screening programs. (119)

2.3 Objectives

Overall objective: To analyze the problem with delivery of PSCC to at-risk women in Bolivia by identifying factors that are influencing access to these services and to make recommendations for stakeholders to achieve a reduction in the burden of CC in Bolivia.

1. To identify and analyze the factors influencing access to PSCC among targeted women in Bolivia.
2. To describe and discuss the current national health policy and programs for CC prevention in Bolivia and compare with current international standards.
3. To analyze some strategies that have been effective to improve access to PSCC in other LMICs with similar contexts.
4. To offer recommendations to the provincial and national governments and relevant stakeholders that may improve access to PSCC in Bolivia in order to reduce its burden of disease.

2.4 Methodology

An exploratory study was done to determine what are the factors influencing access to PSCC in Bolivia. The research method was a literature review on the subject and will be done using search engines (Pub Med, Google Scholar), and websites (World Bank, WHO, Pan American Health Organization [PAHO], International Agency for Research on Cancer [IARC], and the Bolivian governmental websites) and libraries (VU catalogue), grey literature, and the Science Direct database. The review was primarily in English using the **search terms** in text box below but documents in Spanish were included from relevant governmental policy papers and literature.

Search terms

cervical cancer, prevention, screening, control, barriers, access, determinants, enablers, facilitators, exclusion, factors, coverage, approachability, acceptability, affordability, availability, accommodation, knowledge, beliefs, attitudes, cultural, indigenous, health promotion, gender, health systems, control, geographical, location, urban, rural, indigenous, outreach, information, health literacy, trust, values, norms, quality, autonomy, direct costs, indirect costs, insurance and Bolivia, Latin America, Peru, Ecuador, Mexico, Guatemala, developing countries, low and middle income countries,.

Terms in Spanish: Cáncer del cuello, prevención, tamizaje, control, acceso, salud, urbano, rural, mundo desarrollando, América Latina, exclusión, Bolivia.

2.4.1 Search Strategy

The overall search strategy is presented in Figure 3. After the literature review, I had a conversation with a key informant to fill informational gaps and solidify some ideas on how certain factors relate to access and to each other. Topics included general perceptions of the Bolivian public health system, preventive medical services, and informant’s opinions on PSCC in the public sector. The key informant is a Bolivian medical doctor with over ten years of experience in an urban private sector hospital and spent some obligatory time during training in rural facilities of the public sector. I chose to keep informant’s identity anonymous.

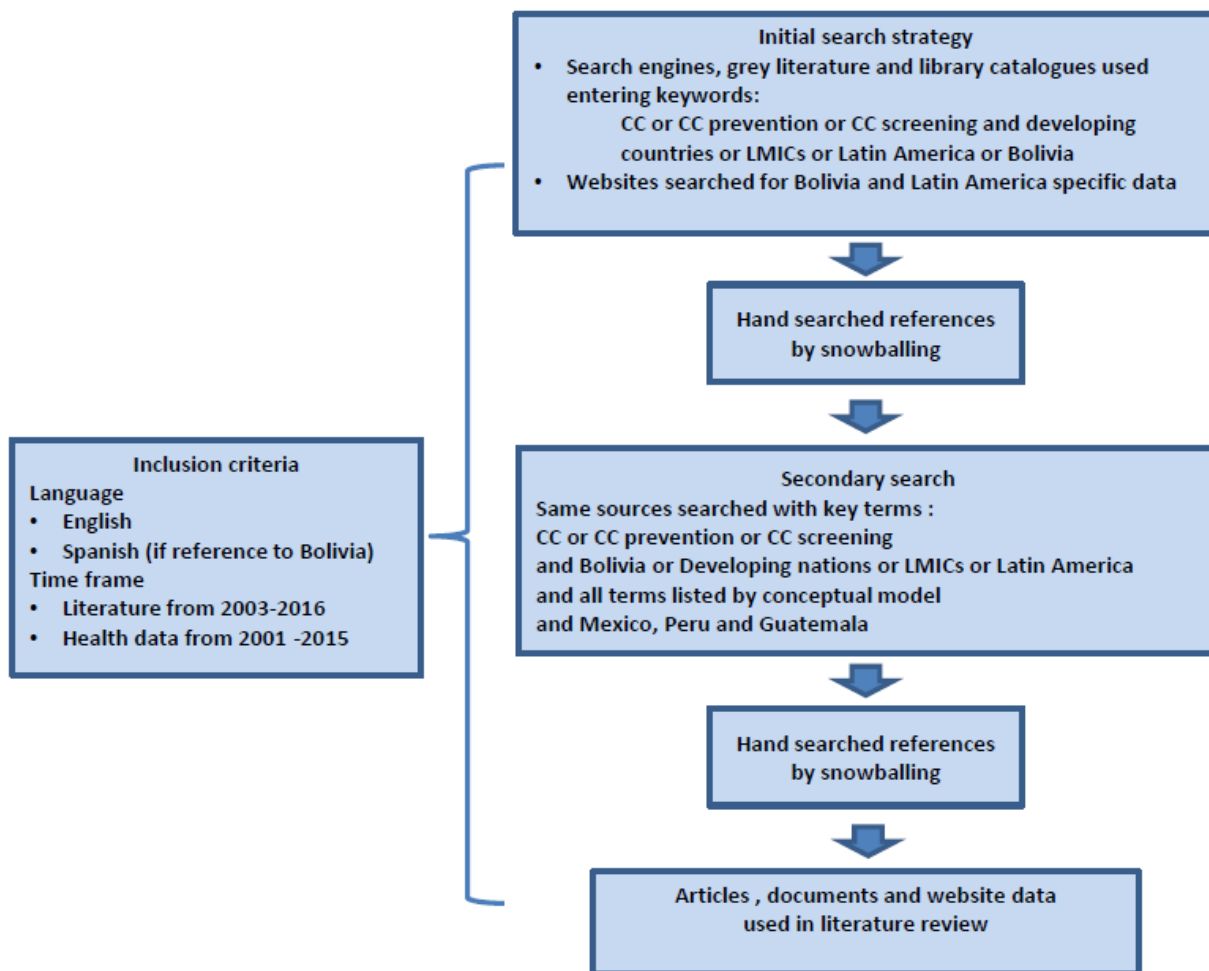


Figure 3 Study search strategy

2.4.2 Conceptual Model

One of the best known frameworks for access to health care comes from a seminal paper by Penchansky and Thomas (58 p.139) that puts forth the concept of access as “a measure of the ‘fit’ between characteristics of providers and health services and characteristics and expectations of clients” viewed through five dimensions of availability, accessibility, accommodation, affordability, and acceptability. Peters (59), Cooper and Ensor (60) built upon this model and divided the dimension of access into supply and demand-side factors.

The study will use a framework created by Levesque, Harris and Russell (61) that includes five dimensions of access arranged along a process of seeking and obtaining healthcare (Annex 3). I have chosen this model because of its ability to analyze supply and demand-side factors within the dimensions of access along the process of addressing a health care need. After an initial review of the subject, I decided to modify the framework in order to tailor it to PSCC (Figure 4).

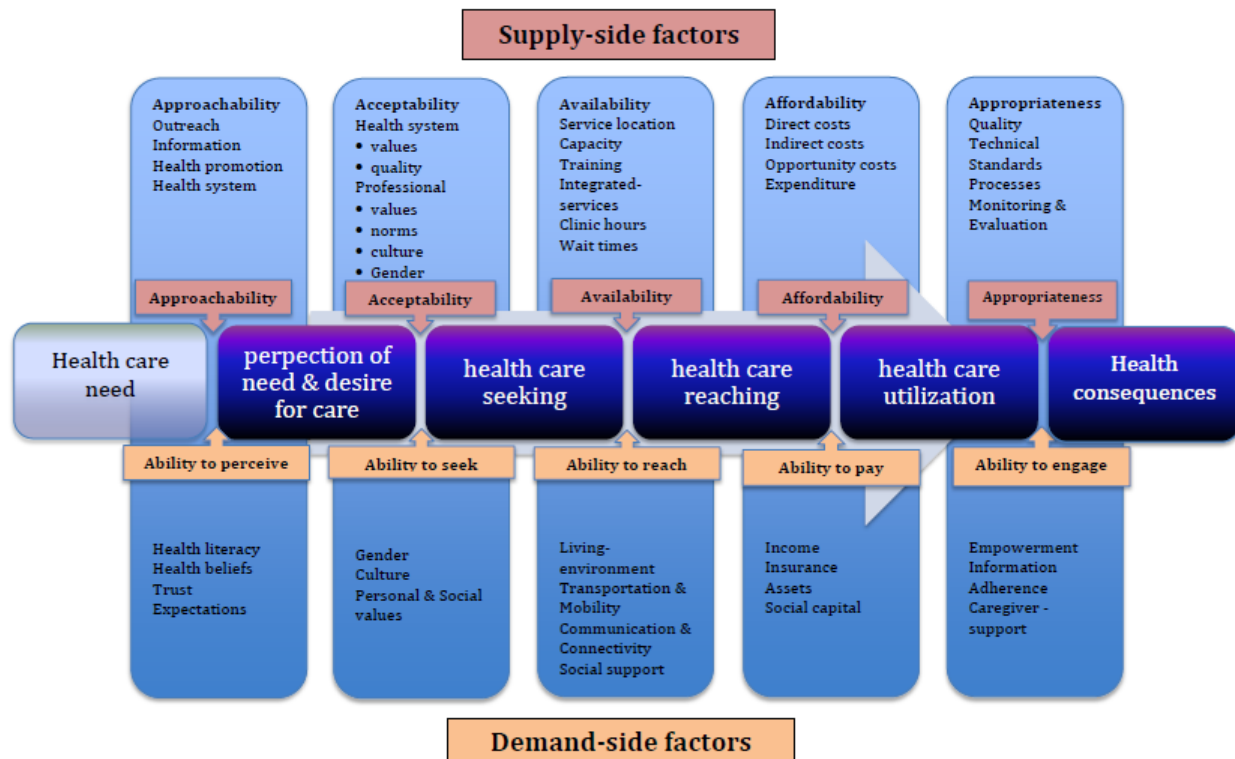


Figure 4 Conceptual framework for access to PSCC (61): modified by author

I added relevant factors *a priori* that I felt were not listed within the dimensions and reorganized a few existing factors into other dimensions where I felt they belonged. In addition, the first box of health needs was not utilized in the study as it was beyond the scope of my objectives. During the analysis, I found information gaps about the situation in Bolivia and

chose to use proxy information on access to sexual and reproductive health and rights (SRHR), overall access to the health services or data from similar countries in the region in order to shed light on what may be going on in Bolivia. I used the conceptual model to guide my search strategy and to organize the factors influencing access to PSCC in Bolivia (chapter 3). The five dimensions of access from the model were used to summarize my findings in the beginning of the discussion chapter.

2.4.3 Limitations to study: This study is primarily a literature review. Data collection for cancer epidemiology is limited in Bolivia, which may negatively affect my analysis and leave an incomplete picture of the situation of access to PSCC there. Data from other health services or from similar countries may not be ideal and comparing what interventions that have had success in other countries has an inherent limitation vis-a-vis what works in one setting cannot be simply translated to the Bolivian context. Some of my objectives would be better answered by a larger scale qualitative study or perhaps a mixed methods approach that could gather quantitative data to back up a generated hypothesis.

Chapter 3: Findings

In the following chapter, the conceptual model will be used to identify factors that may be influencing access to PSCC in Bolivia. For each step along the health seeking process, demand and supply-side factors will be discussed.

3.1 Perception of needs and desire for care

3.1.1 Demand-side factors: Ability to perceive

A woman must first be able to perceive what CC is and that early detection can save her life before she can seek preventive services. A **lack of knowledge** about PSCC among the general population is a barrier to access of these services in Bolivia. (55) Soneji (62) estimated that over a quarter of Bolivian women had no knowledge of the Pap smear and found a positive correlation between **educational level** and knowledge of the Pap smear. In fact, women with a secondary education were 30% more likely to have had a recent Pap smear compared to those with no education. (62) There exists a cultural and urban-rural divide vis-a-vis educational levels in Bolivia. For example, secondary school completion rates are about twice as high among nonindigenous women compared to *Aymara* or *Quechua* women (63) and almost three times as high for women living in urban areas versus rural ones. (64) Lower educational level among rural and indigenous women may be negatively impacting their **health literacy** and contributing to lower knowledge about and participation in PSCC.

Health beliefs and expectations can restrict a woman's ability to understand the need and desire for PSCC. Among the rural and indigenous population in the Andean region, many people believe in folk illnesses caused by supernatural spirits or by *Pacha Mama* (mother earth) that must be treated with **natural remedies** and by traditional healers. (65,66) A study from a rural and indigenous municipality in Potosí showed that these beliefs can be at odds with doctor's views on biomedicine and engender feelings of **mistrust** by patients. (66) It is plausible that a mistrust of doctor's among some indigenous women may diminish their desire to seek PSCC.

Fear of the Pap test results may prevent women in Bolivia from getting screened. (67) This may be related to fatalistic **attitudes** towards cancer as some Bolivian women believe that CC is a painful "death sentence". (68) Hospitals are frequently thought of as places to die not to cure illness (personal communication with Anon, MD, 2017) which may restrict access to PSCC since most colposcopic biopsies are done there. **Expectations** of the costs associated with PSCC have also been noted and can restrict access. (69)

3.1.2 Supply-side factors: Approachability

Information on CC can be obtained through health promotion and the WHO recommends that screening programs engage not just women, but also their male partners and the community to overcome barriers and improve access to PSCC. (35) Dzuba (67) found a scarcity of **health promotion** campaigns about PSCC in Bolivia and this is a restricting factor to access. Although Intercultural health promotion is a principle policy objective of SAFCI (5), no data was discovered on any health promotion activities for PSCC by SAFCI. In 2013, SAFCI did introduce a community **outreach** program, *Mi Salud*, that employs home visits by physicians in order to improve access to general healthcare to poor and rural citizens (70,71) but no evidence linking this program to PSCC was found.

This study was unable to find data on health promotion activities by the GOB but there are examples from Bolivian NGO experience. In 2002, PROSALUD, used **community participation** strategies to provide health promotion and **empowerment** to women in rural communities of Bolivia that resulted in improved access to reproductive health services. (34,72) Another NGO, CIES⁴, in 2009 **integrated health promotion** into a school-based HPV vaccination program for girls by utilizing various educational methods such as presentations to the community, flyers, posters, radio, and television. Aside from vaccinating over 80,000 girls, the project increased interest in accessing PSCC among female teachers and mothers of vaccinated girls. (73,74) These examples by NGOs show that health promotion can facilitate access to PSCC.

The **approachability** of the public health system is an important factor influencing access because it provides the majority of CC screening in Bolivia (Figure 5). (55)

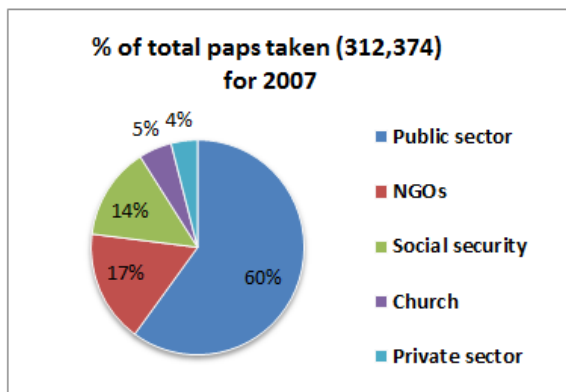


Figure 5 Pap screening providers in Bolivia (55)

Problems intrinsic to the **public health system** can restrict access to healthcare. For example, cytology-based screening programs are highly complex and require extensive quality control (36) but a study by the GOB found that the **fragmentation** of the public health system caused

⁴ Centro de Investigación, Educación y Servicios.

problems with compliance with standards in healthcare. (33) The MSD has acknowledged that a **lack of standards** has affected clinical and laboratory technical quality of CC screening and in 2009 published clinical and laboratory standards for CC prevention and control. (75) However, no evidence of compliance with these standards was found.

This study found a **dearth of official statistics** on screening activities, health promotion and outreach related to PSCC from governmental programs like SUMI and SAFCI. A systematic review of primary health care research in Bolivia concluded there was an **absence of research, monitoring and evaluation** of the SAFCI program and it would benefit from increased funding, capacity building and a system for collection of programmatic indicators. (76)

3.2 Healthcare seeking

3.2.1 Demand-side factors: Ability to seek

The ability for woman to seek PSCC is influenced by factors of culture, gender and the social values of women, men, the community and the health system. **Gender inequality** in Bolivia is historical where women were considered subordinate and assigned traditional roles of reproduction and child care. (77) Along with persistent patriarchal **social norms** in Andean culture, gender inequality and **stigma** affect women's access to health services in general and sexual and reproductive health services in specific. (78,79) Many Bolivian women **lack autonomy** with their male partners deciding whether to access PSCC. (67) The 2008 Demographic and Health Survey (DHS) in Bolivia found almost a quarter of women needed permission to visit a health facility. (80) Men often lack knowledge about what CC is, the role of screening and their own roles in health promotion of their partners. (67) A study in Sucre by the NGO, Marie Stopes, showed that 90% of men disagreed with the idea of their partners getting a Pap smear. (81) Some male partners associate a positive Pap smear with infidelity. (69) Conversely, **spousal support** for CC screening was found to be a positive predictor of past participation in screening in a study in Northern Peru. (82)

Although Bolivian women are increasingly seeking higher education, there remains a gender gap in educational levels with 15% of adult women having no formal education compared to only about 5% of men. Most women work at **lesser-paid jobs** in the informal sector and perform the vast majority of **unpaid domestic work** and childcare. (64) This creates **time constraints** for seeking healthcare and is a barrier to access to health care. (66) As shown by the PROSALUD example, **empowerment** of women to make their own decisions can enable access PSCC. (72)

Indigenous groups in Latin America have worse health indicators, less education and less access to health compared to the nonindigenous population. (83) The **rural indigenous** population in

Bolivia is a particularly vulnerable group with two-thirds living in **extreme poverty**. (79) In fact, as a department becomes more rural and indigenous, the **risk of exclusion** from health care there increases (Figure 6). Although no data was found on CC rates by department to associate this exclusion with the burden of CC, the MSD stated that the department of Potosí (the most rural and indigenous) has the highest incidence of CC. (55) Few cancer registries in Latin America collect data on indigenous status but in some areas of Brazil, Ecuador, and Guyana, higher rates of CC in indigenous populations have been noted. (84) Indigenous women in Bolivia earn less income and are more likely to work in the informal economy compared with nonindigenous women. They face a double burden of **discrimination** for being indigenous and for being a woman, which leads to lower access to education and healthcare. (64) Indigenous women in Bolivia usually dress in traditional clothing⁵ and are easily noticed wearing their bowler hats, colorful dresses and shawls. (85) For years they faced discrimination in society but that is now changing with president Morales prioritizing indigenous inclusion and empowerment in his policies. (28,85) In some rural areas of Bolivia, indigenous women do not speak Spanish and a **language** barrier between providers and patients has been noted as a restricting factor to CC screening programs. (67)

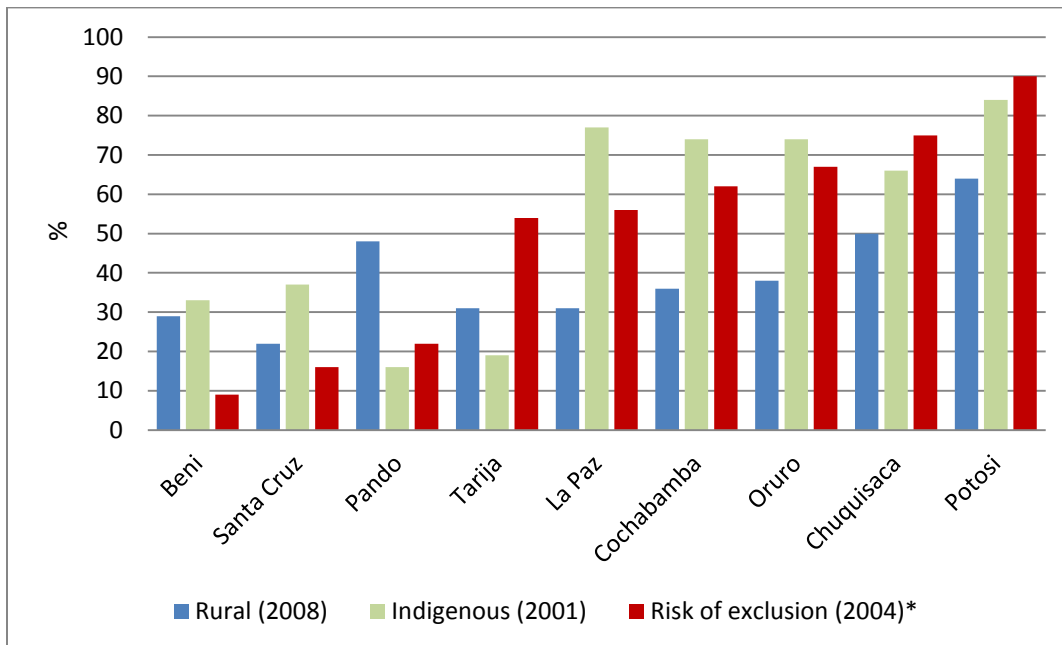


Figure 6 Risk of exclusion from health system by department in Bolivia

Graph created by author (14,33,80)

*calculation of the risk of high or severe exclusion from health system

⁵ Indigenous women who dress in traditional clothing are called “cholitas” by most Bolivians. Although the term Chola was originally a derogatory word for indigenous, in my experience and discussions with Bolivians it is mostly used descriptively and with affection.

Personal and social values affect the ability for a woman to seek PSCC. Moral values on sexuality in Latin America are influenced by socially conservative views of the Catholic and Protestant church and open discussions on sexual matters are often seen as **taboo**. (86,87) This sense of taboo can create a barrier to PSCC in Bolivia (88) with women sometimes ashamed to ask for a test which can carry a **stigma** of being a STI or associated with promiscuity. (67) In fact, feelings of **shame** and **fear** are often the greatest barriers to Bolivian woman's decision to get a Pap smear. (81) Also a woman's **embarrassment** with having her genitals touched and a lack of privacy during an exam have been noted as barriers to getting screened in some Latin American countries. (68) By contrast, teaching women the concept of having "**self-love**" and to take care of one's self was a positive determinant of accessing PSCC in Honduras. (89)

Preventive medicine is not generally a norm of **health seeking behavior** among Bolivians and this is a restricting factor to access of PSCC. Most people tend to wait until symptoms arise before seeking health care and often will try traditional remedies first before they finally will go to see a doctor (personal communication with Anon, MD, 2017). For example, some women will ask for a Pap test when they develop a discharge in the belief that it tests for vaginal infections. (67)

3.2.2 Supply-side factors: Acceptability

The acceptability of health services among rural and indigenous populations in Latin America is limited by the **health system's insensitivity to cultural values and norms** (83) and cultural factors limit access of PSCC in Bolivia. (88) The SAFCI program trains health providers in the *Quechua* and *Aymara* languages (34) and other cultural sensitivities in order to increase acceptability of health services among indigenous patients. However, even when these intercultural strategies were employed in a rural hospital in Potosí, access was still hindered by differing cultural values between doctor's and their indigenous patients. (66) Conversely, PROSALUD increased the acceptability of Pap screening by training some indigenous women in their **health promotion** of reproductive health services. (72) The success of school-based HPV vaccination programs by CIES in Bolivia suggest that acceptability of PSCC can be achieved when combined with health promotion activities to the community. (74)

Professional values and norms within the health system can be restricting factors to access to PSCC. Anecdotally, preventive medicine is not a part of the curricula of medical training in Bolivia where the treatment of symptoms and overt disease is emphasized (personal communication with Anon, MD, 2017). This may result in many doctors not offering routine health promotion to their patients, including PSCC. A **resistance to change** from medical professionals was noted in training sessions for VIA services by the MSD in 2011. (90) This study found that 30% of Bolivian healthcare providers expressed **distrust** and resistance to using VIA as an alternative to the Pap smear. Furthermore, a traditional hierarchical order of physicians over nurses exists in Bolivia and this norm can limit task shifting of newer strategies for PSCC

like VIA to nurses. (66,90) For example, during the VIA training sessions, half of the participating doctors expressed reservations about training nurses to treat precancerous lesions with cryotherapy. (90)

Gender of a doctor can also be a barrier to access to PSCC (67,68) as well as reproductive health in general. (78) The 2008 DHS in Bolivia reported that half of all women worried their health provider would not be a female. (80) In some parts of Latin America providers may ask for a husband's permission if a female patient wants to get an IUD or a tubal ligation procedure showing gender inequality can also be present within the health system. (78)

The perception that a health service has **quality** is largely due to intrinsic factors of the **health system** and can influence access to PSCC. Experiences of unhygienic facilities have been barriers to using public hospitals for Pap screening in Bolivia. (67) **Lack of courtesy** and respect from staff affects quality and were found to be barriers to access of PSCC in some Latin American countries. (69) Insufficient and **poor quality** instruments (for example, cervical brushes and specula) in screening facilities can be a restricting factor to access of PSCC in Latin America. (69) Bingham (68) noted that women in Peru perceived quality of care for CC screening when there was **privacy** for pelvic exams and when the facility, equipment and provider appeared clean. There is a common perception among Bolivians that rural first level health facilities are poorly equipped and of low quality (personal communication with Anon, MD, 2017) which may restrict seeking PSCC there.

3.3 Health Care Reaching

3.3.1 Demand-sided factors: Ability to reach

Whether a woman lives in an **urban or rural environment** in Bolivia greatly affects their ability to reach health services and is a powerful social determinant of health. (29,30) Rural residents of the *Altiplano*, western highlands and valleys are at very high risk of exclusion from accessing health services with some living four to five hours walking distance from the nearest health facility. (33) As an example, only 60% of rural indigenous women give birth at a health facility compared to over 90% of indigenous women living in urban areas. (64) Bolivian women who live in urban areas are about 50% more likely than rural women to report having a Pap smear within the past 3 years. (80) This study found no official statistics of rates of CC between urban and rural populations in Bolivia.

Transportation and mobility are factors that influence access to healthcare. The 2008 DHS reported that half of all women and 75% in the poorest quintile found **distance** to a health facility was a barrier to accessing health services. (80) This barrier has also been noted for rural women in Bolivia seeking PSCC. (67) 21% of the urban households own a car compared with

only 7% in rural areas. (80) Most Bolivians get around on crowded public buses, micros (fixed route minivans) or taxis but in rural areas they often must walk or hitchhike as buses pass infrequently, if at all (personal observations). A study in Nicaragua showed that for every hour a woman is from a health center providing CC screening, her probability of getting a Pap smear decreased by 12%. (91) Difficulties with transportation appear to create barriers of opportunity cost, money, and inconvenience that are **magnified for rural women** seeking PSCC.

Access to **telecommunication** can affect whether a woman can gather information about CC and PSCC. According the Bolivian census of 2012 two thirds of Bolivian households have a television and telephone (fixed or mobile), and only about 10% have internet **connectivity**. (9) **Cellular phone** signals can be weak or absent in remote areas of Bolivia, and some communities may share just one cellular phone amongst everyone which can affect **tracking** of lab test results at first level facilities (personal communication with Anon, MD, 2017). Health promotion campaigns that use these media may miss the population that does not own them and thus can restrict access to PSCC.

Social support from family and friends is an enabling factor to access to PSCC in Latin America. (69,89) Knowing other women who had been screened and a supportive husband (as noted under gender) were positive determinants of a woman getting a Pap smear in Peru. (82)

3.3.2 Supply-side factors: Availability (and accommodation)

The availability of health services provided by the health system and its ability to accommodate clients affects access to PSCC in Bolivia. In order to have PSCC available, there must be an adequate **capacity** of qualified human resources and infrastructure in place to deliver the services. **Insufficient medical staffing, lack of equipment** and a concentration of service delivery in urban areas have been noted as barriers to access of PSCC in Bolivia, especially for rural women. (67) (88) Bolivia has a shortage of physicians compared to the rest of Latin America (24) and most qualified physicians and nurses practice in urban areas leaving an **undersupply in rural municipalities**. (33,92,93) The primary providers of Pap screening in rural health facilities are usually **nurse auxiliaries**, who are not properly trained in sampling techniques. Insufficient staffing of public sector CC screening programs at times has resulted in women being sent on to private clinics where they must pay out-of-pocket. Inadequate equipment for colposcopy in Potosí often required women to be referred to another department (67). Taken together these are powerful restricting factors of the availability of PSCC in Bolivia.

Training is essential to building capacity and can influence the availability of PSCC. A collaboration between the Centers for Disease Control and Prevention (CDC) and the MSD conducted five training sessions for doctors and nurses to use VIA from 2010 to 2012. However, 42% of health providers trained felt implementation of a screen-and-treat with VIA strategy

was not feasible due to a lack of equipment, capacity and staffing. (88) The MSD was planning to scale up capacity building for VIA in the department of Beni for 2013 (90) but no evidence was found that this has been carried out.

Integration of health promotion for PSCC when at-risk women come to a health center for any reason can enable access to PSCC. This is suggested by a study in Peru that found women who had sought care at a health facility were more likely to have been screened for CC. (82) In Bolivia, a study estimated that women who had visited a doctor within the past year were 48% more likely to have had a Pap smear. It concluded that antenatal and postnatal care were opportunities for health promotion for PSCC. (62) Older women in Latin America could particularly benefit from integrated health promotion and CC screening in health centers as they do not participate in vertical programs like maternal health or family planning clinics and thus are at risk of not being screened at all. (69)

The MSD has made attempts to overcome **geographic barriers** to improve access to health in remote areas of the country through **outreach programs** and **integration** of services. For example, the *Mi Salud* program has 5000 providers deployed around Bolivia and has integrated immunizations into their services. As a result, EPI coverage is now greater in rural areas than in cities. (94) Another governmental outreach program, *Extensa*, has 100 mobile health brigades providing basic health services to 300,000 Bolivians living in geographically remote areas of the highlands and amazon basin. (32) The notable success of EPI coverage through outreach to rural areas, suggests that integrating PSCC into these two programs could enable access for vulnerable rural women in Bolivia.

Clinic hours and appointment times are related to the accommodation by the health system to serve its clients. **Inadequate clinic opening hours** and **long waiting times** for visits were found to be barriers to access for CC screening in five Latin American countries. (69) In contrast, a study in Northern Peru found reasonable wait times were associated with women being satisfied with getting a Pap smear. (82) My personal experience in hospital clinics in Bolivia, Peru and Ecuador is that the appointments are often on a first come, first serve basis. People queue up in the morning to receive their “*turnos*”, and then wait potentially for the rest of the day for their number to be called. By midday many patients with high “*turno*” numbers have abandoned the clinic out of frustration or having to go back to work.

3.4 Health care utilization

3.4.1 Demand-side factors: Ability to pay

Poverty affects the ability to pay for health services and restricts access to health services. (59) The etiology of poverty is complex and is intertwined with other social determinants of health

like living environment, gender, employment, education and culture. **Rural poverty rates** are almost twice that of urban areas of Bolivia (18) and extreme poverty rates (<\$2.50/day) are three times higher for indigenous compared to nonindigenous people. (95) Bolivian women earn less than men and **indigenous women** earn 40% less than nonindigenous women. (64) These gaps in income can affect access to PSCC in Bolivia and are underscored by a strong **wealth gradient** with regards to the likelihood of getting screened with a Pap smear in Bolivia (Table 2). (62) Although screening with the Pap is free in Bolivia, there are other costs associated with utilizing services (discussed in the next section) and there remains the perception that obtaining any health services is costly. For example, 60% of surveyed women in the 2008 DHS listed money as a problem with accessing health care. (80)

Wealth Quintile	Relative risk	95% Confidence interval
Poorest	0.60	0.56-0.66
Poorer	0.79	0.74-0.84
Middle (reference value)	1	--
Richer	1.12	1.07-1.18
Richest	1.79	1.24-1.35

Table 2 Relative risks of having recent Pap smear in Bolivia (62)

Estimates vary but up to 75% of Bolivians work in the **informal economy** (21) and thus do not qualify for social security or employer provided health **insurance coverage**. As noted earlier, accessing the health system can improve the likelihood of a woman being screened for CC but if women choose not access the health system because they must **pay out-of-pocket** for non-covered health services, this would decrease their likelihood of learning about and receiving free PSCC.

Assets and social capital

A World Bank report estimates that 90% of rural indigenous Bolivians own their homes but only 61% of indigenous people living in cities are homeowners. The report notes that “Urban migrations also disrupt social safety nets and traditional land tenure systems, potentially exposing indigenous people to further marginalization”. (95 p.11) Loss of assets may increase household concerns about the ability to pay for any health service and restrict access. No information was found on social capital.

3.4.2 Supply sided factors: Affordability

The cost of CC screening and treatment can be broken down into the **direct costs** (medical cost like visits and procedures and nonmedical like travel) and the **indirect costs** of time and productivity lost to visits, treatment, morbidity and death. No data could be found on the

breakdown of these costs in Bolivia but a study in Peru found that the nonmedical costs of time (indirect cost) and travel expenses (direct cost) were over half of the estimated total cost for one visit for PSCC (VIA, Pap or HPV test). (46) The authors calculated that in Peru, one lifetime screening at 35 years of age with **VIA** or **HR-HPV testing** can reduce the lifetime risk of CC for a woman by 31 and 35%, respectively. The Pap smear would require two to three interval screenings and significantly higher lifetime costs to achieve similar risk reductions. (46) In Bolivia the predominant screening strategy is still the Pap smear (88) and its higher lifetime costs make this a restricting factor to access to PSCC.

Opportunity costs associated with CC screening are related to the time lost for a woman or any accompanying person when they could have been working or caring for family. As most Bolivian women work in the informal sector this is difficult to quantify but given the long wait times, distance to a facility and appointment mechanisms, it can be surmised that a three visit Pap screening strategy could tax a woman three to six days of opportunity costs.

Bolivia's **expenditure** on healthcare is only 5.8% of GDP and it has no specific budget for the CC control program. (96) The opportunity cost of the GOB not spending resources on healthcare is a weaker capacity and infrastructure of the public health system. A study of developing nations and PSCC estimated that for each 1% increase of GDP spending on healthcare, the risk of having a Pap smear increased by 50%. (97)

3.5 Health care consequences

3.5.1 Demand-side factors: Ability to engage

The empowerment of women and information on PSCC have been discussed under previous dimensions. **Adherence** and **caregiver support** are not addressed as they are more related to treatment of CC as opposed to preventive services.

3.5.2 Supply-side factors: Appropriateness

Appropriateness and adequacy are related to the **quality** of PSCC and in Bolivia the Pap is the main screening strategy for targeted women. The quality of a cytology-based screening program is dependent upon adequate processes, outputs and monitoring. (51) However, in many Latin American countries, inadequate quality of Pap sampling/analysis, **technical training, standards** and **quality improvement** are significant barriers to implementing effective screening programs. (51,69) Furthermore, tests results can take two to three months to come back which can negatively affect the quality and utilization of PSCC. (69) Some Bolivian doctors recognize these barriers in the public sector and use private cytology labs instead (67) which can raise costs for women.

Screening tests must be linked to treatment of precancerous lesions if CC is to be prevented. However, **loss to follow-up** and a resultant **lack of treatment** is an important factor in the failure of national screening programs to reduce the burden of CC in Latin America. (51) Dzuba (67) estimated that in Bolivia the majority of women screened in the public health system are lost to follow-up and the DHS found 30% of women never received results from their Pap test. (80) **Coordinated systems** for transporting specimens and the **tracking** of positive Pap tests for treatment are insufficient in Bolivia. (55,67) These problems are compounded in **rural health facilities** where tracking a positive Pap smear is nearly impossible if a woman does not return for follow up. In this case, a busy healthcare worker would have to walk hours to hand deliver the results to a women living in a remote village (personal communication with Anon, MD, 2017). These issues are major restricting factors to access to the treatment phase of a Pap screening program.

This study has found a scarcity of **indicators for monitoring and evaluation** of screening programs in Bolivia. Although, many indicators were proposed by the MSD in 2009 (55), the only indicators found to be tracked were the number of Paps taken and coverage rates. (18) (55) There is no population-based **cancer registry** in Bolivia to analyze the burden of disease or measure the impact of interventions for CC prevention. (98) A lack of statistical data collection by the GOB on CC prevention is an obstacle to evaluation of the problem. (67)

Chapter 4: A comparison of the BNPCC to international standards⁶

This chapter compares the BNPCC 2009-2015 to a benchmark of best practices for CC screening in LMICs in order to see if Bolivia is using the most effective strategies to combat its high burden of disease. The WHO guidelines in 2013 for *Screening and treatment of precancerous lesions for cervical cancer prevention* (48) are evidence based recommendations directed at policy makers, program managers and providers in LMICs to assist in choosing the best method of screening for their context.

4.1 BNPCC

The GOB released the BNPCC in 2009 that updated the previous guidelines from 2004-2008. (55) In the opening statement the plan stressed that all Bolivian's had the right to health and living well and that that all cultural practices would be preserved and barriers would be overcome through the SAFCI program. The committee did a situational analysis and identified the main problems to reducing the burden of CC in Bolivia many of which are consistent with the findings of this study in chapter three. The overall objective of the BNPCC was:

“To reduce morbidity and mortality from cervical cancer nationally by implementing strategic interventions of health promotion, prevention, detection, diagnosis, follow up, treatment and monitoring of cervical cancer within the establishments of the national health system, under the SAFCI policy.” Author's translation (55 p. 25)

Specific objective activities of the NPCC are listed in annex 4. A short summary of specific objectives of the plan are:

1. To increase education and health promotion on PSCC for patients and providers.
2. To build capacity for PSCC.
3. To strengthen health system inputs and processes to provide PSCC.
4. To strengthen information systems for tracking, follow up and referral of women screened.
5. To improve surveillance, monitoring and evaluation of PSCC and submit final impact evaluations of activities and interventions in 2015.
6. To stimulate research into HPV typing and CC epidemiology.
7. To support community participation for surveillance and control activities for CC.

Screening for CC in Bolivia is free for targeted women through the SUMI entitlement program and in 2012 Bolivia enacted a law to give women a paid day off to get screened. (99) The

⁶ Chapter 4 is derived from the following sources unless otherwise noted: (35,48,55,75,100)

national plan lists both the Pap and VIA as options for screening women aged 25 to 64, however, SUMI only offers free screening until aged 60. The frequency of testing is every three years following two consecutive negative yearly tests. The Pap smear is the primary screening strategy and the BNPCC noted that with the resources available, the country should be able to reach coverage rates that will impact the burden of disease. (55) **Screen-and-treat with VIA** is an alternative considered in facilities without access to cytology labs only if trained providers and cryotherapy units are available. If no cryotherapy is available, VIA can be used for screening followed by referral of positive cases to a hospital for colposcopy. (75) The BNPCC calls for investigating and designing a plan to integrate the **HPV vaccine** into current the health system but does not commit to carrying it out. This study was unable to find evidence that proposed final impact evaluations of BNPCC program activities have been done (annex 4; objective 5).

4.2 WHO guidelines 2013

The WHO guidelines were created to assist stakeholders in decision making and can be tailored to the individual country’s health system resources and constraints (Figure 7). (48) Although not a part of screening guidelines, the WHO also recommends primary prevention of CC by using the **HPV vaccine** for girls aged 9-13 with a two dose schedule (three doses if age > 15 years). (100)

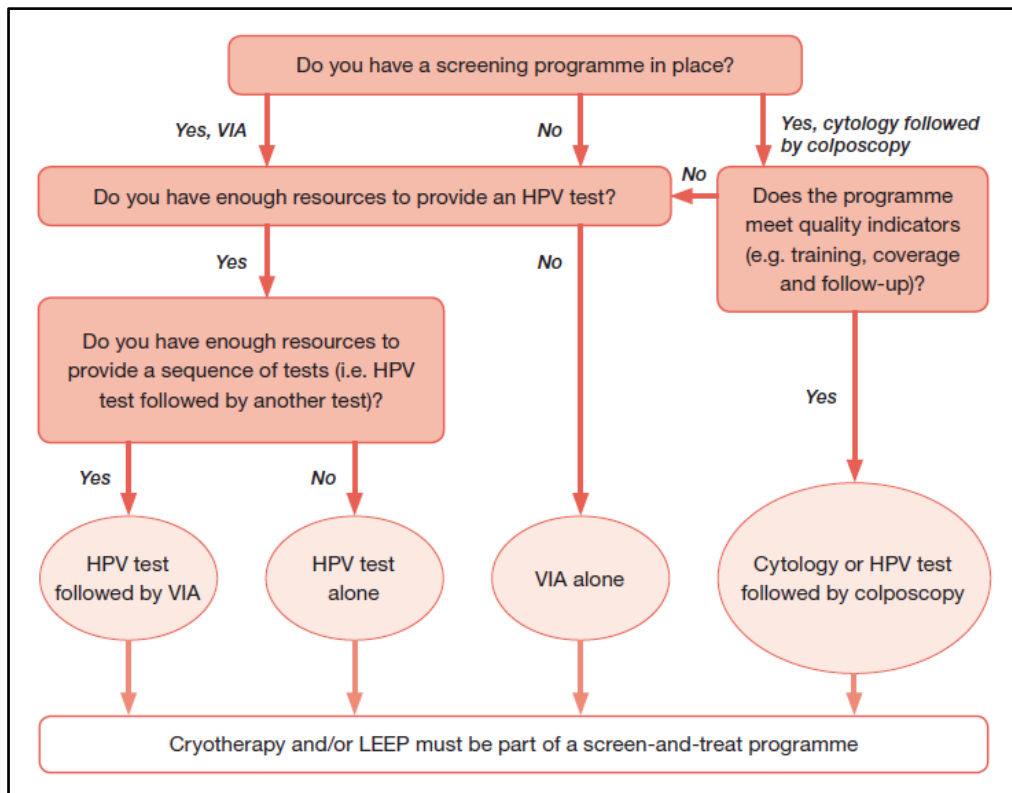


Figure 7 Decision algorithm for CC screening programs (48)

The 2013 guidelines recommend that national screening programs target only the highest risk age group and to use a one visit **screen-and-treat** approach over a multiple visit cytology-based screening method. If resources are available, the **HR-HPV test** is the screening test of choice otherwise **VIA** is recommended. Cytology-based screening is not recommended unless acceptable indicators of quality, coverage and follow up are met.

4.3 BNPCC versus WHO guidelines analysis

A side by side comparison of some essential criteria from the WHO screening guidelines and the BNPCC reveals some interesting differences (Table 3).

Screening parameters	WHO Guidelines 2013	Bolivia National Guidelines 2009
Target population age	30-49	25-64
Preferred screening method	1.HR-HPV 2.VIA	1. Pap 2. VIA
Screening frequency	If VIA (-), every 3-5 years HR-HPV every 5-10 years	Every 3 years after 2 (-) consecutive yearly paps
Screen and treat strategy	Yes with cryotherapy or LEEP*	No with Pap Sometimes with VIA**
Post-treatment follow up	1 year	Every 6 months until 2 (-) paps, then every 2 years

* Loop electrosurgical excision procedure; frequently not available in low resource settings

** See section 4.1

Table 3 Comparison of CC screening guidelines (35,48,55,75)

Firstly, the target age group of Bolivia's program is 20 years broader than the WHO guidelines, which prioritize the highest risk group of 30-49. (48) The BNPCC estimated that in 2015 there would be about 2.4 million women between 25 and 64 years of age. (55) That means that almost a quarter of all Bolivians need CC screening. Secondly, despite the BNPCC acknowledging multiple barriers to access and low coverage rates for screening with the Pap smear, the guidelines still recommend it as the first line screening strategy. The WHO recognizes problems with access to PSCC in developing countries and recommends screen-and-treat in order to decrease the number of visits, the need for follow up, the reliance on cytology labs, and costs of screening. (35) It recommends screening with the HR-HPV test and VIA followed by treatment of precancerous lesions with cryotherapy or loop electrosurgical excision procedure (LEEP) when sustainable high quality cytology-based programs do not exist. Bolivia recommends screen-and-treat with VIA in limited circumstances but a study suggests that VIA screening is still in a very nascent stage. (90)

Lastly, the frequency of screening and post-treatment follow-up testing in the BNPCC is higher than the WHO guidelines and this would require more direct and indirect costs to the health system as well as opportunity cost to women.

Along with the 2013 guidelines, the WHO published a guidance note on *Comprehensive cervical cancer prevention and control*. (35) This expands on the 2013 guidelines and addresses primary, secondary, and tertiary prevention of CC as well as monitoring and evaluation. A review of this publication is beyond the scope of the objectives but a **checklist for stakeholders** on prevention and control of CC is included (Figure 8) to give a framework of goals for best practices in Bolivia. It appears the first three goals are being achieved by the GOB but this review has found no published evidence that goal four through eleven have been reached. The objectives of the BNPCC do address in some form most of these WHO goals, however, without execution of these objectives, their impact on CC will not be felt.

A CHECKLIST FOR A COMPREHENSIVE CERVICAL CANCER PREVENTION AND CONTROL PROGRAMME		
1	A functional multi-disciplinary platform to foster partnership and collaboration and set the national agenda	✓
2	A comprehensive national policy or plan on cervical cancer prevention and control	✓
3	National guidelines for health workers for all components of comprehensive cervical cancer prevention and control	✓
4	Financial and technical resources to implement the policy/plan and ensure that services are accessible and affordable to girls and women	✓
5	Communication strategies to educate the community and advocate for support of national policies	✓
6	A training plan in place, as well as supervisory mechanisms for quality control and assurance of the programme	✓
7	HPV vaccination as a population based strategy to an appropriate cohort in the target age group of 9 and 13 year old girls	✓
8	Cervical cancer programme to 'screen and treat' every women between 30 and 49 years old at least once in her life time	✓
9	A functioning referral system that links screening services with the treatment of precancerous lesions and invasive cancer	✓
10	Functioning monitoring systems to track coverage of HPV vaccination, screening and follow-up treatment	✓
11	Existence of a cancer registry as part of the health information system to monitor cervical cancer incidence and mortality	✓

Figure 8 WHO checklist for screening programs (35)

Chapter 5: Effective strategies implemented in similar countries

5.1 Countries similar to Bolivia

Peru, Mexico and Guatemala are LMICs that share some socioeconomic, cultural and geographical characteristics as Bolivia (Table 4). Most notably, 80% of all **indigenous people** in Latin America live in these four countries. (95) All four countries still use the Pap as the principle screening method yet coverage rates remain low (57) and rates of CC are high relative compared to HICs (Figure 9). This study will look at some of the effective strategies used for PSCC in these three countries to provide ideas for what may work to improve access to PSCC in Bolivia and ultimately reduce the burden of disease.

Country	Population (millions) 2015	GDP per capita 2014 USD	GINI coefficient 2014	% Indigenous (year of census)	% GDP spent on healthcare 2014	% rural 2014	% female literacy 2012
Bolivia	10.7	3124	48.4	62%(2001)	6.3%	32	92
Peru	31.4	6549	44.1	26%(2007)	5.5%	22	91
Guatemala	16.3	3666	48.7	41%(2002)	6.2%	49	72
Mexico	127	10,350	48.2	15%(2010)	6.3%	21	93

Table 4 Socioeconomic and demographic factors (14,24,95,101)

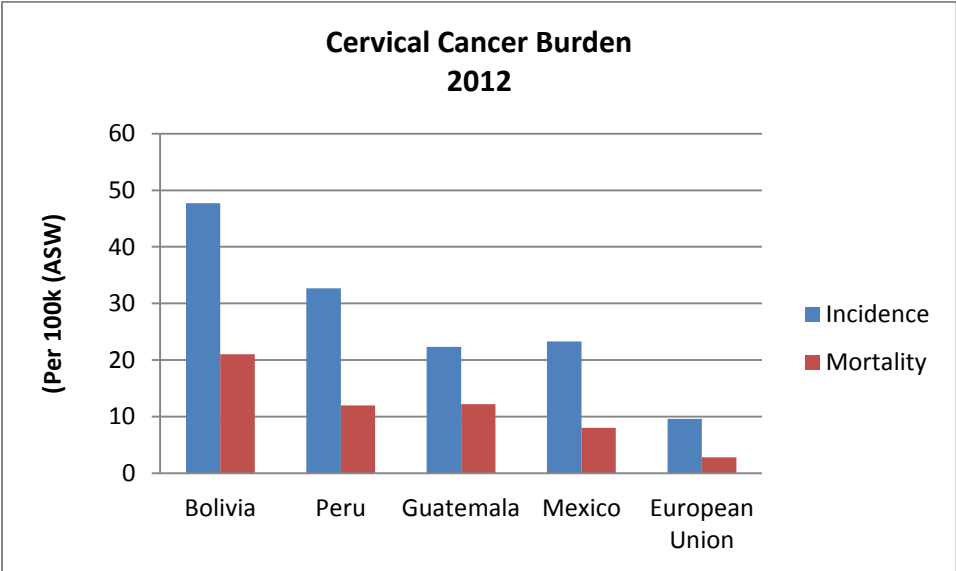


Figure 9 Country comparison of cervical cancer burden (1)

5.2 Peru

As neighbors, Peru and Bolivia share some similar geography and Andean culture. Peru also has high rates of CC and low coverage for Pap screening. (57) Over a decade ago, a VIA demonstration project, TATI⁷, was carried out in a low resource area of Peru and found that **VIA** was more cost effective, reduced the number of visits and decreased loss to follow-up compared to with the Pap smear. (102) The program exhibited a **task shifting** strategy where midwives did the screening and physicians did the treatment with cryotherapy. **Community participatory** strategies were used to create advisory groups for **health promotion** and were important to the success of the project. High rates of satisfaction with the screen and treat strategy were reported by women as well as improved relationship equity with their male partners and increased **empowerment** in their communities. Continuous **quality improvement** was included with repeated interim exit interviews of screened women to improve factors such as privacy, consent, and improving access to services. (102)

With technical assistance from an NGO, PATH⁸, the ministry of health of Peru conducted a school-based **HPV vaccine** pilot program in 2008 in three areas (Ayacucho, Piura, and Ucayali) targeting girls in fifth grade older than nine and achieved 80% coverage. (103) The HPV vaccine was added to national guidelines in 2011 and HPV testing in 2015 but estimated uptake and coverage is unpublished. (53,57)

The PERCAPS⁹ studies tested new models for delivering PSCC in a shanty town outside Lima and a remote Amazonian community in Peru with poor access to healthcare. (104,105) Both studies used a dual mother-child intervention that screened mothers with **self-collected vaginal samples for HR-HPV testing** and vaccinated girls with the **HPV vaccine**. Strategies of **community based participatory research (CBPR)** were incorporated into the projects whereby community health leaders were the decision makers in the design and implementation the interventions. Most health promotion on the project was done by health leaders going door to door explaining the project, the process and its goals. Over 95% of women who registered for the two studies submitted self-collected samples for HR-HPV testing and more than 80% of HR-HPV positive women were subsequently triaged with VIA for treatment with cryotherapy. Almost 90% of the girls who registered for the vaccine arm of the PERCAPS studies received two doses of the HPV vaccine. 97% of women in both studies expressed **high satisfaction** with the services and the authors concluded that the success of CBPR in their studies may provide a framework for large scale interventions facing barriers to access of health services.

⁷ Tamizaje y Tratamiento Inmediato

⁸ Program for Appropriate Technology in Health

⁹ Peru Cervical Cancer Screening Studies

5.3 Mexico

CC mortality in Mexico have been falling since 2000. (50) In 2009, Mexico began a **national immunization program for HPV** (54) and by 2010 coverage for 3 doses was 67%. (53)

A randomized community trial in Mexico of over 20,000 women was conducted by a governmental public health research program and found screening with **self-collected vaginal samples for HR-HPV** was over 4 times more sensitive than Pap cytology at detecting CC. (106) The study also noted HR-HPV screening had the advantages of lower cost, less complex implementation and **higher acceptability** to women compared to the Pap smear. They concluded that using self-collected HR-HPV samples can increase coverage rates and acceptability of CC screening in low resource areas of Mexico especially in rural women. Mexico was the first country in the world to incorporate HR-HPV testing into its national screening program. (107)

From 1996 to 2012, Grounds for Health, an NGO, conducted a program for **capacity building for CC screening** of women who work on coffee farms in three states in Southeastern Mexico. (108) The program worked in mostly rural and poor communities with significant indigenous populations and key activities included training providers on best practices in screening techniques and health promotion to the community. Over the length of the program, more than 14,000 women were screened for CC and 212 community health promoters were trained. An integral part of the success of the program was **training local women as community health promoters to engage** women, men and the community to obtain their **trust** and overcome barriers of culture, gender inequality (*machismo*), and social taboos. These community health promoters educated women and some men about CC, improved access to screening services and assisted in **navigating** patients through the process of screening and treatment. Health providers were also trained by Grounds for Health to learn how to do pelvic exams with less pain and more sensitivity to women's feelings and become more effective communicators for educating patients. (108)

5.4 Guatemala

There has been a downward trend in CC deaths in Guatemala since 2000, however, no studies were found as to what may be causing this. (50) In 2008, with the help of PAHO, Guatemala implemented a **capacity building** program to address the country's high burden of CC. A central component of the plan involved **task shifting the screening process to midlevel providers**. In 2008, 991 midlevel providers were trained to perform VIA screening and 167 to perform VIA followed by cryotherapy. (109) CC rates from 2007 were analyzed by Guatemala's 29 health care areas and eight areas with the highest rates were targeted. (110) Most vulnerable women lived in peri-urban and **rural areas** with poor access to Pap screening. Focusing on these eight

areas, capacity building was carried out to train providers to **screen-and-treat with VIA** in designated CC early detection centers. (110)

The program included health promotion sessions and educational material distributed to all 29 areas in Guatemala. A system for **monitoring and evaluation** was established in 17 of the 29 health care areas using 20 **quality standards** and data on VIA screening was entered into the **health information system**. (110) In addition, Guatemala established an **accreditation process** for VIA practitioners and now provides yearly continuing education programs at the local level. (109) Although the program focuses on VIA, some capacity building for cytology and colposcopy services was also carried out. As a result of these efforts, 80% of VIA providers in Guatemala are **nurses or nurse auxiliaries**. (109) In 2010, 61% of all CC screening provided by the public sector was done by VIA and almost half of precancerous lesions found were treated on the same visit. (110) A pilot study in the Atitlan region using self-collected vaginal samples for HR-HPV for PSCC found indigenous women preferred this method over having a clinic visit. (111) In 2014, Guatemala included HR-HPV testing in its national guidelines but this study was unable to verify if uptake has taken place. (112)

Chapter 6: Discussion

6.1 The main factors influencing the dimensions of access

This study has identified factors that influence access to PSCC in Bolivia and has shed light on reasons why the country is facing such a high burden of disease. These factors influence on the supply-side and the demand-side, some act as barriers while others act as facilitators to access. Analyzing the situation of access to PSCC in Bolivia through the five dimensions of the conceptual model has revealed the following.

The **main barriers** from an **approachability** standpoint appear to be low health literacy and knowledge of PSCC on the demand-side and a lack of outreach and health promotion for PSCC on the supply-side. Whereas the **acceptability** of PSCC in Bolivia is being restricted by factors of culture, gender, and social taboos on the demand-side and by low quality of the public health system services on the supply-side. The **availability** of PSCC is limited by the low capacity and maldistribution of health system resources on the supply-side and by factors of rural residency, transportation, and communication on the demand side. Unfortunately, Bolivia's unique geographical characteristics worsen most aspects of the availability dimension. Although CC screening is a free service in Bolivia, its **affordability** is hampered on both the demand and supply-side by barriers created from widespread poverty, opportunity costs (time off from unpaid childcare, informal employment) and transportation costs for women who seek care. Finally in the **appropriateness** dimension, the main supply-side barriers are a lack of quality control, inadequate processes for implementation, and weak guidance, monitoring and evaluation of PSCC by the MSD. On the demand-side, the factors of information and empowerment were analyzed in previous dimensions.

Two examples of **facilitating access** to PSCC in Bolivia were found from NGO demonstration projects that improved the acceptability and approachability of services. PROSALUD used **local women as health promoters** to empower other women to seek care for PSCC and CIES used **integrated health promotion** during a school-based HPV vaccine program to increase knowledge and desire for services. Further examples of supply-side interventions from similar countries will be analyzed later in this discussion.

6.2 Multidimensional influence on access to PSCC

During the analysis of the study findings, it became clear that several factors appear to cross dimensions and also combine with other factors to influence the entire pathway of obtaining PSCC. These **crosscutting issues** are restricting access in all dimensions and merit a closer examination that can lead to recommendations to improve interventions of PSCC.

6.2.1 Demand-side

Socioeconomic factors exert a strong influence on a woman's access to PSCC in Bolivia and are related to other demand-side factors of access like beliefs, health literacy, culture, living environment (rural versus urban), mobility, and employment. Women who cannot afford costs associated with seeking health services may not interact with the health system often. Women with less education may not understand complex health information even if it is available to them. Women of lower socioeconomic status are more likely to be indigenous, live in rural areas, and work in the informal economy. This creates barriers of discrimination (addressed below), opportunity cost and distance to screening services.

Gender is a sociocultural construct that also has a strong influence on the dimensions of access to PSCC. It is perhaps the most germane factor influencing access to CC screening in Bolivia due to the intimate nature of a woman getting a pelvic exam, stigmas attached to testing, gender gaps in socioeconomic status, imbalances of power in relationships and societal gender roles. Gender inequality is historical in Latin America and also related to Andean culture and socioeconomic status. Women do the majority of unpaid childcare and this limits their ability to seek care. Women can face sexual discrimination when seeking healthcare and face barriers like stigma and feelings of fear and embarrassment. Male partner's behavior and attitudes can restrict access to PSCC.

Cultural factors influence access to PSCC and Bolivia has the largest proportion of indigenous people in Latin America which likely amplifies this influence. Rural indigenous women are especially subject to a double discrimination based on sex and from wearing traditional clothing that identifies them as indigenous. They have lower literacy levels, less income, and live farther away from health facilities compared to nonindigenous women. Discrimination against their cultural beliefs, like folk medicine, may engender attitudes of fear, anger or mistrust towards the health system and restrict access to PSCC. Interestingly, factors that are considered a part of the Bolivian culture can restrict access on both the demand and supply-side; for example, the Bolivian norm of doctors not promoting and patients not utilizing preventive medical services. This norm would likely decrease at-risk women's knowledge, desire, and utilization of PSCC.

6.2.2 Supply-side

Perhaps the most tangible barrier to access to PSCC found in this analysis was the **low capacity** and weak infrastructure of the public health system in Bolivia. The public health system does not appear to be able to handle the complex processes involved with a cytology-based screening program due to an inadequate amount, maldistribution and low quality of inputs like equipment, human resources, laboratories and screening facilities. This restriction of access is magnified at first level health facilities in rural areas that are often underequipped and staffed by inexperienced nurses or nurse auxiliaries. Systems of tracking test results are insufficient. If

most women with positive Pap tests are lost to follow-up and do not receive treatment, then screening them at all serves little purpose.

The **quality** of PSCC in Latin America is negatively affected by long wait times, nonfunctional equipment, privacy issues, poor attitudes and communication by providers which understandably reduce a woman's desire to seek these services. In Bolivia, there appears to be the perception that public sector services are of low quality especially at rural first level facilities. If a rural woman chooses to bypass a first level facility and seek care at a higher level hospital where a gynecologist is on staff, the opportunity cost can be enormous; perhaps two or three days lost to walking, bus rides, and overnight stays in order to arrive early in the morning to the hospital clinic.

6.3 Improving access on the demand-side

Improving the socioeconomic conditions of Bolivian women will indirectly improve access to PSCC but this will take years. On the other hand, experiences from the NGOs, Grounds for Health (Mexico) and PROSALUD (Bolivia) as well as the TATI (Peru) and PERCAPS (Peru) studies suggest that when interventions address trust, culture and gender related barriers, they can have a rapid impact on access by improving the approachability and acceptability of PSCC for women and their communities. For example, **participatory strategies** can overcome cultural barriers and improve access to PSCC for marginalized women in peri-urban, rural and indigenous communities. When local indigenous women are trained as **community health promoters**, they can increase knowledge and trust about PSCC among women and their communities. By engaging women, male partners and the community to promote the benefits of PSCC, the stigma and taboos surrounding PSCC can be addressed and social support strengthened for women to access these services.

These strategies also decrease gender inequality and empower women to seek PSCC. Furthermore, when communities are allowed to design and plan the implementation of PSCC, very high rates of participation and satisfaction can be achieved. This strategy (**CBPR**) appears to be one of the most powerful facilitators of access to PSCC and could be used in rural indigenous areas of Bolivia.

Alternatives to Pap screening could also overcome demand-side barriers to access to PSCC in Bolivia. Studies from Mexico and Guatemala suggest that **self-collected vaginal HR-HPV tests** are more acceptable for women than the Pap, especially for rural and indigenous women. Experience in Peru, suggests participation rates greater than 95% can be achieved for self-collected samples. Training female midlevel providers to perform **VIA** like in Guatemala could reduce a woman's embarrassment and fear of getting a pelvic exam.

6.4 Improving access on the supply-side

Addressing supply-side barriers could also improve access to PSCC in Bolivia. Barriers of geography and low capacity could be overcome if **outreach** programs like *Mi Salud* and *Extensa* were to **integrate PSCC** into their healthcare in rural areas. The creation of a national population-based cancer registry with the collection of epidemiologic data on CC broken down by department, age, indigenous status, rural or urban-living, risk factors, referral, and treatment status of CC would allow a more in-depth understanding of the problems and trends of access to PSCC. Stakeholders involved in planning and implementing interventions for PSCC would benefit if the MSD collected and published indicators of inputs, processes, outputs and outcomes of their program activities. Governmental enforcement of standards, norms and the creation of processes of accreditation to provide screening services, like Guatemala did for VIA, would improve technical quality and may lead to improved clinical outcomes. Addressing these supply-side barriers in the public health system would eventually improve the overall quality of PSCC and increase trust from women and their desire to access services.

VIA could address many access barriers to CC screening in Bolivia as it links screening to treatment in one visit, reduces cost, the need for tracking positive tests, or the reliance on distant cytology labs. VIA could be done by midlevel providers on a national level to expand coverage of screening services. **Task shifting** to a nurse or if necessary, nurse auxiliaries can be beneficial if combined with adequate training as Guatemala has proven. This could overcome barriers of low capacity of qualified Pap providers and laboratories in rural and remote areas of Bolivia.

Evidence from Mexico shows that **HR-HPV testing** can detect far more CC than the Pap with lower cost, easier implementation and suggests it may improve coverage rates compared with the Pap. The sensitivity is so high that the WHO has suggested screening intervals can be as infrequent as every 10 years.

6.5 International standards

At present, the BNPCC veers away from the WHO guidelines by targeting too large of a group to screen for CC and by using a method (Pap smear) that has proven ineffective in most LMICs after decades of experience. The WHO guidelines emphasize screening the most at risk group (age 30 to 50) with the least costly, most efficient and effective method (VIA or HR-HPV testing) at longer intervals (5-10 years). Screening just once with these alternative methods can reduce the lifetime risk of CC by about a third whereas achieving a similar result with the Pap would require two to three interval tests at higher lifetime cost.

Although, the HPV vaccine is not a part of the 2013 guidelines, the WHO recommends it to LMICs if feasible and affordable. NGO experience in Bolivia suggests the vaccine has good acceptability and rolling out a national program for HPV vaccination alongside a screen-and-treat program would eventually have a high impact on CC rates. However, Bolivia's current financial and capacity constraints suggest that scaling up both of these interventions to a national level would be unfeasible. For the near future, it makes sense to prioritize screen-and-treat which has an immediate effect over a vaccine that will take decades to impact the burden of disease.

6.6 Conceptual model and study limitations

Overall, the conceptual model created by Levesque, Harris and Russell (2013) and modified for this review has served well. I believe it captured the majority of the factors that influence access to PSCC but has revealed some limitations. Firstly, the overarching concept of quality is not articulated well in this model. Like access, quality is hard to define as it pervades all five dimensions of access and greatly influences the interaction between the health system and its users. The five dimensions have significant overlap and also influence different stages along the process of accessing care so at times this model was confusing and felt constrictive during the analysis. This is why I structured the discussion to focus on what I felt were main issues that were affecting all dimensions of access.

Limitations to this study were that it relied heavily on qualitative studies with smaller sample sizes and one key informant to identify the factors influencing access to PSCC in Bolivia. Quantitative survey data that is self-reported is susceptible to recall and response bias and may have affected the results of the studies reviewed. Quantitative data with larger sample sizes and some randomized controlled studies were found for PSCC in LMICs, however no quantitative data was found for PSCC in Bolivia with the exception of the number of Pap smears taken per year by department.

Chapter 7: Conclusion and Recommendations

7.1 Conclusion

The lack of success of Bolivia's national screening program highlights the country's persistent problem with access to PSCC. Sound public health policy and programs created to prevent and control CC should strive to help the greatest amount of women at risk with the least amount of resources and screening for CC with the Pap smear in Bolivia is failing to achieve this goal.

The main factors influencing access to PSCC are barriers created from gaps or inequalities in socioeconomic status, culture, and gender on the demand-side and by the low quality, weak capacity and maldistribution of inputs of the public health system on the supply-side. These issues affect all five dimension of access and serve as key elements to address when stakeholders are planning interventions to improve the current epidemic of CC in Bolivia. The **demand-side barriers** in the dimension of acceptability are most amenable to interventions and **community participation** strategies have been shown to overcome barriers related to gender and culture to improve access for PSCC. **Self-collected vaginal HR-HPV tests** can further improve the acceptability of initial screening for the most vulnerable group in Bolivia, rural indigenous women. Meanwhile, the **supply-side barriers** in all five dimensions of access can be influenced by interventions. Using **VIA to screen-and-treat** in all facilities of the public health system of Bolivia can improve the availability, affordability, and the appropriateness of PSCC. **Integrating PSCC and health promotion** into **outreach** programs and **task shifting** VIA to female midlevel providers can improve the approachability and acceptability of PSCC in Bolivia.

The BNPCC is not in line with the WHO guidelines which are a benchmark of international standards for PSCC. The BNPCC attempts to screen too many women, too often, using a technique (Pap smear) that its public health system is incapable of handling effectively. The WHO guidelines specifically address these issues by recommending the more efficient **screen-and-treat** approach and targeting a narrow age group (30-50) with less frequency (every five to ten years). This approach allows LMICs to screen the greatest amount of women at risk for the least amount of public expenditure while minimizing the critical risk of unlinking positively screened women to getting treatment of their cervical precancer.

Although this study helped to show the factors affecting access to PSCC and posits which ones may be most important, it only serves as an exploration of possibilities to generate hypothesis as to what is causing the epidemic of CC in Bolivia and why the GOB, up till now, cannot control it. Studying who is most affected, at what age and where will help to find better solutions to factors restricting access to PSCC in future. Studies linking screening and treatment activities to outcomes will allow program managers to change and improve their interventions to suit the needs of different women in different contexts in Bolivia. Better data collection from public

sector screening programs, a national cancer registry and by SAFCI could provide the data sets to allow these studies to be done.

7.2 Recommendations

7.2.1 Policy

1. The MSD should create a task force for CC prevention that includes outside experts to make a plan and timeline to restructure the entire screening program of the public health system. Collaborations with outside experts have worked before (CDC, PAHO and NGOs) and can facilitate decision making and provide guidance based on their collective experience in other LMICs.
2. The BNPCC should be revised and aligned to reflect the current WHO guidelines on PSCC by prioritizing screen-and-treat approach with VIA and phasing out Pap smear screening in the entire public health system. This will allow the country to increase coverage of PSCC to the women most at risk with the least amount of public resources. A transition period of two years should be feasible to incrementally scale up VIA and replace Pap screening.
3. The task force should develop standards, quality improvement indicators and an accreditation process for all screen and treat activities (namely VIA followed by cryotherapy). Standards can reflect those issued by the WHO. (35,38,48) Guatemala has shown that this is feasible in a similar context to Bolivia.

7.2.2 Capacity and infrastructure

4. Build capacity and infrastructure for VIA that includes task shift screening to midlevel providers especially for rural and peri-urban areas. VIA should also be integrated into the *Extensa* and *Mi Salud* outreach programs. This will require outside expertise from the stakeholder to conduct training workshops for all first level providers. It will also be necessary to assure that cryotherapy is available in all screening facilities at all times. These measures will allow the implementation of the second recommendation. This should be feasible based on the success by the government of Guatemala.
5. A demonstration project should be carried out for self-collected vaginal HR-HPV testing in highly indigenous rural areas to study its cultural acceptability, cost, and its impact in extending access to these vulnerable women. This is feasible as it has been done in

Guatemala and Mexico. Demonstration projects can guide task force decisions about HR-HPV testing integration into the BNPCC.

6. CBPR strategies to improve access to PSCC should be carried out in rural areas at first level health facilities. This will allow local people to plan and organize PSCC activities in their communities. Local women should be the leaders of these interventions and also should be trained as community health promoters to increase knowledge and the desire for PSCC in rural communities. CBPR strategies will increase the acceptability and participation rates of screen-and-treat activities.
7. Health promotion campaigns should be planned and carried out on a large scale in urban and rural areas that use media sources like TV, radio, billboards and flyers to educate the public on the importance of utilizing preventive medical services in general and of PSCC. This can help to change societal norms of seeking healthcare only if symptoms develop. This is feasible and can be overseen by the MSD in collaboration with media outlets and local business leaders.
8. All medical universities and health provider training programs should include preventive medicine, health promotion, and epidemiology courses in their curricula. This will help to change norms on the supply-side and eventually improve access to PSCC.

7.2.3 Research

9. Research on the epidemiology of CC, and the impact of interventions for PSCC should be carried out by the MSD and by private sector research groups (Universities, NGOs). This will require the creation of a national population-based cancer registry and the systematic collection of programmatic indicators of activities for PSCC, like health promotion, community participation, outreach, screening coverage and treatment rates. Systematic data collection is an essential task for the MSD in order to understand trends in CC and to monitor, evaluate, and assess the impact of all public health interventions to prevent and control cancer in Bolivia.

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Annex 1

Additional information on the health system in Bolivia

Access to the Bolivian health system in general is low. Although 70% of the Bolivian population is in some aspect covered by the public health system, only half of those people are estimated to have access to it. (31) Rural areas of the western highlands and valleys have risks of exclusion from healthcare greater than 90%. (33)

The health system in Bolivia consists of a public sector, social security and private sector, the latter of which includes NGOs, for-profit providers, and traditional medicine practitioners. (31) (29) The system is fragmented with the Ministry of Health or MSD at the national level only responsible for health policy and standards. Below that are autonomous health offices (*SEDES*) at the departmental level in charge of human resources allocation. At the lowest level municipalities own the infrastructure of the health facilities. Although there is some coordination among these levels, problems manifest with duplication of administrative roles, wasted expenditure, and geographically uneven coverage of basic services. (33)

There are 3 levels of care; a first level of health posts and health centers that make up over 90% of all health facilities, a second level of basic hospitals (7% of facilities) which provide pediatrics, gynecology, internal medicine and traumatology and a third level of specialized hospitals (3% of health facilities) concentrated in the major cities of La Paz and Santa Cruz. (29)

Overall health expenditure is broken down as follows: 35% in the social security system, 30% in the public sector, 28% out-of-pocket and 7% in the private sector (church, NGOs, and private insurance). (31,33) 27% of Bolivians are covered by social security (mostly formal sector workers) (31), 10% use the private sector (mostly wealthier Bolivians) and another 10% are covered by the church and NGOs (mostly poor and marginalized groups of society) (33,113). In addition to SUMI, another entitlement program called *Seguro Público del Adulto Mayor* (SPAM) offers a basic package services) offers a basic package of health benefits for elderly Bolivians. (76)

Annex 2

A comparison of preventive services for cervical cancer

Operational Aspect	Primary prevention	Secondary Prevention		
	HPV Vaccine	Pap smear	VIA	HR-HPV DNA test
Cost	High \$40/dose, some LMICs \$120/dose, U.S. (114)	Moderate to high \$10-25/test	Low < \$5/test	Low < \$8/test
Provider(s)required	nursing auxiliary	MD or midlevel, lab technician, & cytopathologist (MD)	midlevel	lab technician
Training requirement	minimal	substantial	relatively modest	relatively modest
Quality assurance	Minimal	substantial	substantial	moderate
Sensitivity of test (36,115)	not applicable	50%	80%	careHPV 86% HC2 96%
Minimum number of visits	2*	2-3	1	1 (careHPV) 2 (HC2)
Screening linked to treatment?	not applicable	no	yes screen-and-treat	yes screen-and-treat
Self-testing possible?	not applicable	no	no	yes (106)
Inter-observer variation?	not applicable	yes	yes	no
Evidence of effectiveness?	yes 50% potential future reduction in CC rates (114).	yes 50% reduction in CC rates of HICs over 30-50 years (3).	yes 35% reduction in CC mortality over 7 years in tested areas of India (116)	yes 48% reduction in CC mortality over 8 years in tested areas of India. (117)
Weaknesses	cold chain required, cultural acceptability, cost, no effect on women already HPV+, delayed benefit (up to 20 years).	low sensitivity, highly technical, & requires quality control, lab & tracking system of + tests for treatment.	poor specificity; risk of overtreatment of visualized lesions. cryotherapy or LEEP unit required.	poor specificity. + test still needs triage test. HC2 requires a lab. careHPV gives point of care results (<3h) but has limited availability.
Mechanism of action & operational process	Immunity to HPV 16 & 18 responsible for 70% of CC worldwide (114). 2 dose regimen*	Cervical cytological screening test, followed by a biopsy, then ablative treatment	Direct visual screening test that can be linked to immediate ablative treatment.	Molecular screening test, followed by triage with VIA, then ablative treatment

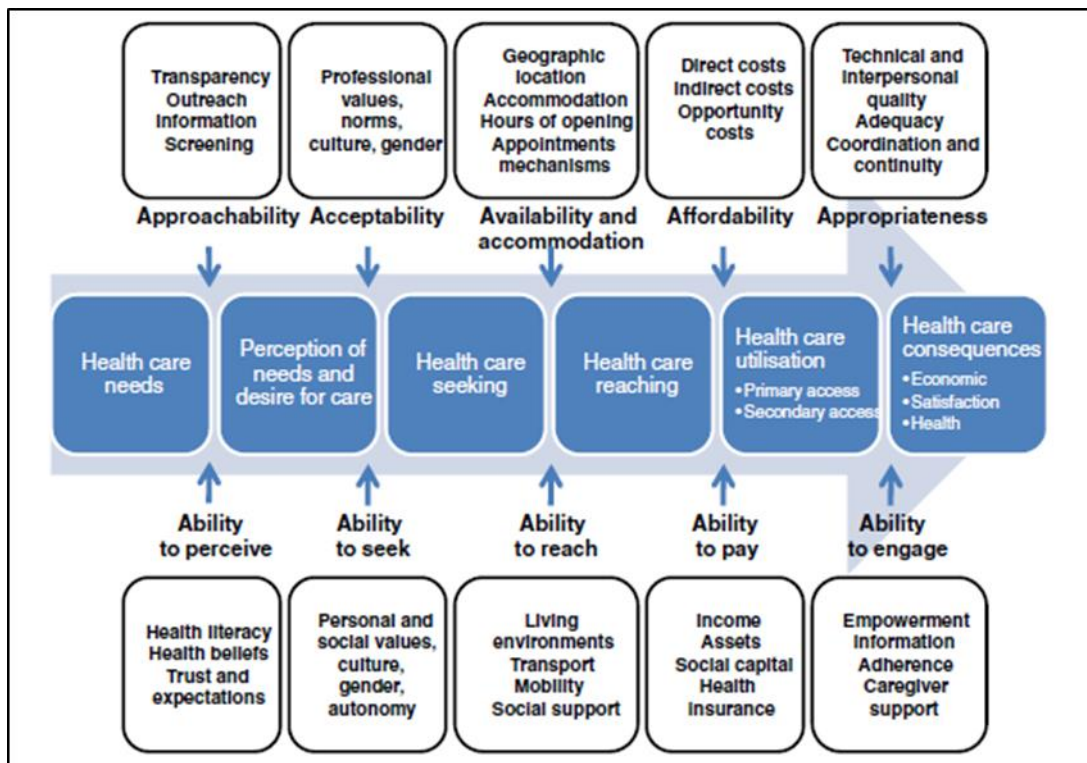
*2 doses now recommended (100).

Table adapted from: (2)

Expanded by author with additional sources: (3,36,106,114,115,116,117)

Annex 3

A conceptual framework for access to healthcare by Levesque, et al. (61)



Annex 4

Specific objectives of the BNPCC 2009-2015

Paraphrased and translated by author (55)

Objective 1

To educate the population on CC and PSCC by:

- Creating and distributing educational and health promotional material
- Training health personnel to use material to communicate to patients
- Holding periodic meetings with social organization to analyze the problem of CC in Bolivia

Objective 2

To hire and train technically qualified providers of PSCC and treatment by:

- Updating and implementing protocols and standards for detection and control of CC
- Training human resources in the activities of Pap, VIA, cytology, colposcopy and treatment of precancerous lesions.
- Collaborating with universities to update and implement standards for training

Objective 3

To strengthen the national health system with regards to detection, control and treatment of CC by

- Assuring adequate inputs, infrastructure and equipment to provide Pap and VIA in all health facilities
- To assure adequate inputs, infrastructure and equipment to provide colposcopy and biopsy in all second and third level hospitals
- To assure a system of tracking and follow up of invasive cancers for treatment
- Assuring adequate inputs, infrastructure, and equipment for the treatment of precancerous lesions in second and third level hospitals

Objective 4

To strengthen the national health information system (SNIS) to optimize tracking and follow up of screened women and improve health interventions.

- To insert data variables on cervical cancer into SNIS
- To create identification cards for all women for the SAFCI program to follow screening activity
- To assure the collection and sending of data from laboratories and health facilities to SNIS
- To manage human resources responsible for a functioning tracking system for women with positive cervical biopsies

Objective 5

To design and implement a system of surveillance, monitoring and evaluation of activities and results of the national plan for cervical cancer

- To create an instrument for tracking and evaluation of planned activities
- To perform periodic analysis of results of tracking
- To submit midterm and final (2015) impact evaluations of the activities and interventions of the national plan for CC

Objective 6

To organize, strengthen, and promote research on CC in Bolivia

- To create a program of scientific research on HPV epidemiology and cancer surveillance systems
- To create investigative projects on cervical cancer and HPV typing
- To design a strategy for inclusion of the HPV vaccine into the national plan for CC control

Objective 7

To encourage and promote community participation in surveillance and control activities for CC

- To improve detection by creating community surveillance networks with participation in community members in committees of informational analysis (CAI)
- To analyze alternative approaches suggested by the community CAI and use community participation in prioritizing, planning, supervising and evaluation of PSCC
- To create registries with reliable records of cervical mortality and epidemiology teams to analyze the results of data collected.