

University of Groningen

## Access to cancer medicines in public hospitals in Mexico

Moye-Holz, Daniela; Dreser, Anahi; van Dijk, Jitse P; Reijneveld, Sijmen A; Hogerzeil, Hans V

*Published in:*  
Research in Social and Administrative Pharmacy

*DOI:*  
[10.1016/j.sapharm.2019.11.015](https://doi.org/10.1016/j.sapharm.2019.11.015)

**IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.**

*Document Version*  
Publisher's PDF, also known as Version of record

*Publication date:*  
2020

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*

Moye-Holz, D., Dreser, A., van Dijk, J. P., Reijneveld, S. A., & Hogerzeil, H. V. (2020). Access to cancer medicines in public hospitals in Mexico: The view of stakeholders. *Research in Social and Administrative Pharmacy*, 16(9), 1255-1263. <https://doi.org/10.1016/j.sapharm.2019.11.015>

### Copyright

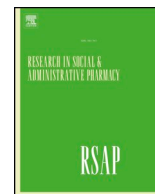
Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

### Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

*Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.*



## Access to cancer medication in public hospitals in a middle-income country: The view of stakeholder



Daniela Moye-Holz<sup>a,\*</sup>, Anahi Dreser<sup>b</sup>, Jitse P. van Dijk<sup>a</sup>, Sijmen A. Reijneveld<sup>a</sup>, Hans V. Hogerzeil<sup>a</sup>

<sup>a</sup> Department of Community and Occupational Medicine, University Medical Center Groningen, University of Groningen, Hanzeplein 1, 9713, GZ, Groningen, the Netherlands

<sup>b</sup> National Institute of Public Health (Instituto Nacional de Salud Pública), Avenida Universidad 655, Santa María Ahuacatlán, 62100, Cuernavaca, Morelos, Mexico

### ARTICLE INFO

#### Keywords:

Cancer  
Stakeholders  
Access to medicines  
Barriers  
Mexico

### ABSTRACT

**Background:** Access to cancer medicines is a core component of comprehensive cancer care; as such, it is included in Mexico's public health insurance: Seguro Popular de Salud (SPS). Learning about stakeholders' experiences on processes and barriers influencing access to essential cancer medicines within healthcare facilities allows identifying needed policies to improve access to cancer care.

**Objective:** The aim of this study was to obtain the insights of health professionals in public hospitals in Mexico on how SPS influences access to cancer medicines regarding medicine selection, financing, and procurement and supply systems. The purpose is to identify policy areas that need strengthening to improve access to cancer medicines.

**Methods:** Semi-structured interviews were conducted with 67 health professionals from 21 public hospitals accredited by SPS across Mexico. A framework analysis was used with categories of analysis derived from the World Health Organization's Access framework.

**Results:** Most stakeholders reported that the availability of listed cancer medicines was sufficient. However, cancer specialists reported that medicines coverage by SPS was restrictive covering only basic cancer care. Public hospitals followed SPS treatment protocols in selecting and prescribing cancer medicines but used different procurement procedures. When essential cancer medicines were unavailable (not listed or stocked-out), hospitals reported several strategies such as prescribing alternative therapies, resorting to direct purchases, and assisting patients in obtaining medicines elsewhere. Other reported barriers to access to treatment were: distance to health facilities, poor insurance coverage, and financial restrictions.

**Conclusions:** Health professionals have encountered benefits and challenges from the implementation of SPS influencing access to cancer medicines and care in Mexico, pointing to areas in which action is necessary. Finding the right balance between expanding the range and cost of cancer treatments covered by insurance and making basic cancer care available to all is a challenge faced by Mexico and other middle-income countries.

### Introduction

The burden of cancer is increasing around the globe, particularly in low- and middle-income countries (LMIC).<sup>1–3</sup> To provide comprehensive cancer care, health systems need to overcome several barriers to provide timely, equitable, and adequate access to treatment, including surgery, radiotherapy, and cancer medicines.<sup>4</sup>

Cancer medicines are a core component of cancer care and control, but many LMIC face barriers to access cancer medicines such as budgetary constraints, poor insurance coverage, and unreliable procurement procedures.<sup>5</sup> To improve access to cancer medicines, several

middle-income countries (MIC) in Asia and Latin America (LATAM) have included cancer care within their efforts to reach universal health coverage (UHC),<sup>1,6,7</sup> providing financial protection to patients and improving health outcomes.<sup>7</sup> This requires an increase in health expenditure, the development of cost-effective intervention packages, and infrastructure, in addition to improved procedures at the healthcare delivery level (e.g. procurement and supply systems, treatment guidelines, etc.) to guarantee access to cancer care.<sup>1,8</sup> Mexico, for example, has developed several policies to reach UHC that include access to healthcare for high-cost diseases such as cancer. Most cancer care, including medicines, has been provided in the public sector through

\* Corresponding author.

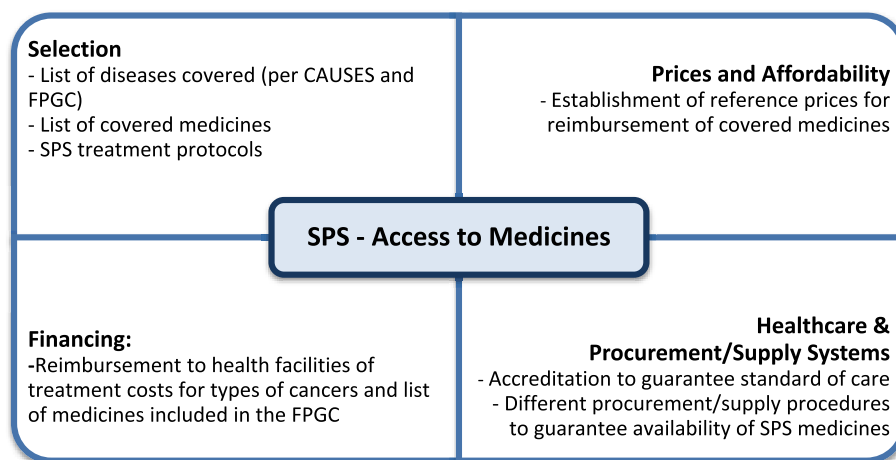
E-mail addresses: [danymoyeholz@gmail.com](mailto:danymoyeholz@gmail.com) (D. Moye-Holz), [anahi.dreser@insp.mx](mailto:anahi.dreser@insp.mx) (A. Dreser), [j.p.van.dijk@umcg.nl](mailto:j.p.van.dijk@umcg.nl) (J.P. van Dijk), [s.a.reijneveld@umcg.nl](mailto:s.a.reijneveld@umcg.nl) (S.A. Reijneveld), [hans.hogerzeil@kpnmail.nl](mailto:hans.hogerzeil@kpnmail.nl) (H.V. Hogerzeil).

<https://doi.org/10.1016/j.sapharm.2019.11.015>

Received 30 January 2019; Received in revised form 26 November 2019; Accepted 26 November 2019

Available online 27 November 2019

1551-7411/ © 2019 Elsevier Inc. All rights reserved.



SPS – People’s Health Insurance (Seguro Popular de Salud); CAUSES – Universal Catalogue (Catálogo Universal de Servicios de Salud); FPGC - Fund against Catastrophic Expenditures (Fondo de Protección contra Gastos Catastróficos)

**Fig. 1.** Key components of the WHO Access Framework addressed by SPS" is the title of the figure.

SPS – People’s Health Insurance (Seguro Popular de Salud); CAUSES – Universal Catalogue (Catálogo Universal de Servicios de Salud); FPGC - Fund against Catastrophic Expenditures (Fondo de Protección contra Gastos Catastróficos).

different social health insurance (SHI) schemes providing comprehensive healthcare to formal employees and their families, covering approximately 50% of the population. For people not eligible for SHI, the government has implemented, since 2004, the People’s Health Insurance (Seguro Popular de Salud – SPS),<sup>9</sup> covering about 40% of the population.

In Mexico, the design of SPS as an effective health insurance addresses the four components that determine access to essential medicines, as described by the World Health Organization’s (WHO) Access Framework (Fig. 1).<sup>10</sup> Essential medicines are those that satisfy the health needs of the population and should be available at all times and without financial hardship.<sup>11,12</sup> The WHO Access Framework outlines four major components that determine access to essential medicines<sup>10</sup>: rational selection, affordable prices, sustainable financing, and reliable health and supply systems. The SPS has a list of covered diseases and interventions with their respective treatment protocols and medicines,<sup>13,14</sup> based on the national formulary (Mexico’s equivalent of a national essential medicines list). SPS has also set reference prices for all medicines it reimburses.<sup>15</sup> The SPS coverage for primary and secondary healthcare is outlined in its Universal Catalogue (Catálogo Universal de Servicios de Salud (CAUSES)). SPS also provides coverage to a limited number of high-cost interventions, including all children cancers and the most prevalent cancers in adults, through its Fund against Catastrophic Expenditures (Fondo de Protección contra Gastos Catastróficos (FPGC)). To guarantee health financing for the diseases it covers, the SPS is financed by contributions from the federal government, the state governments, and contributions from its affiliated members according to their level of income.<sup>16</sup> SPS seeks to guarantee the quality of healthcare delivery<sup>6,7,17</sup> through accreditation of health facilities.<sup>18,19</sup> Accredited facilities should provide medicines listed by SPS and follow SPS treatment protocols.<sup>15,19</sup> However, each institution can decide on the procurement procedure.<sup>20</sup> Accredited health facilities (mostly public, and occasionally private<sup>19</sup>) can receive reimbursement by SPS for some specified types of cancers only.<sup>17,19</sup> Only a limited number of facilities, mostly tertiary level and specialized hospitals, have been accredited by SPS to provide cancer care. These hospitals are the focus of the present study.

The interaction between access to essential medicines and healthcare delivery may help to understand barriers in access to cancer medicines.<sup>21</sup> Previous quantitative studies<sup>1,22–25</sup> and few qualitative

studies<sup>5,26</sup> have documented geographical differences in access, and factors influencing access to cancer medicines such as market shortages, unreliable supply, prices, lack of insurance coverage, distance to health facilities, among others.<sup>27–29</sup> Little research has focused on the views and experiences of healthcare professionals in health facilities regarding the various factors influencing access to medicines in Mexico.<sup>10</sup> Healthcare professionals can provide additional information to understand<sup>29,30</sup> how processes enable or hinder access to cancer medicines at the point of healthcare delivery.<sup>31</sup> Using qualitative research can, therefore, help to analyze and further understand the different phenomena that influence access to medicines and healthcare.<sup>32</sup> The aim of this study is to obtain additional information on how the SPS’s implementation processes and other aspects related to healthcare delivery influence access to cancer medicines, from the insights and experiences of healthcare professionals in public hospitals accredited by SPS to provide cancer care in Mexico. The purpose is to identify policy areas that need to be strengthened to improve access to cancer medicines in Mexico, which may be relevant as well for other MIC seeking UHC. Based on the WHO framework, we focused on the following processes or ‘components’: selection of essential cancer medicines, financing of essential cancer medicines, and aspects related to healthcare delivery, procurement and supply systems. We do not systematically report on affordability, as this aspect requires a quantitative approach, although we have noted some participants’ observations on affordability as part of the discussion of financing.

## Methodology

A qualitative study was conducted using the Framework Analysis as the methodological approach. This is a highly systematic approach commonly used for thematic analysis of semi-structured interview transcripts where a priori issues or themes of analysis have been pre-identified. This approach is not concerned with the generation of social theory, but allows to contrast data across and within identified themes to shed light on the phenomenon under investigation.<sup>31,33</sup> Framework analysis was chosen as it is suited for applied policy research allowing the assessment of policies and procedures from the view of the people they affect; it has been widely used in healthcare settings.<sup>31,33,34</sup>

Semi-structured interviews were conducted with 67 key informants in 21 public hospitals providing cancer medicines.

**Table 1**  
Characteristics of selected states for hospital sampling.

State	Level of Marginalization	OECD Health well-being indicator	Number of public hospitals
Campeche	High	Low	1
Oaxaca	High	Low	2
Veracruz	High	Low	3
Chihuahua	Medium	Low	2
Guanajuato	Medium	Medium	3
Yucatan	Medium	Medium	2
Jalisco	Low	High	4
Mexico City	Low	High	4

OECD - Organization for Economic Co-operation and Development.

### Sample

We selected 8 out of a total of 32 states in Mexico, based on their level of marginalization, the number of hospitals for cancer care in the state, and the OECD's health well-being indicator, with the intention to create a heterogeneous sample of socioeconomic regions where hospitals are located. Within these states, we studied 21 specialty hospitals of the Ministry of Health (MoH) accredited by SPS to provide cancer care (Table 1). In most states, all public hospitals providing cancer care were included in the sample.

We interviewed 67 health professionals from these 21 hospitals, following a purposive sample; i.e. we sought a variety of informants that had direct experience in the processes that were under study: selection, financing, and supply and procurement of medicines.<sup>35</sup> We thus selected health professionals involved in prescription, supply, and procurement of cancer medicines. This included procurement officers, pharmacists, and oncologists. In some hospitals, other participants were also interviewed. In total, 23 oncologists, 21 pharmacists, 16 procurement officers, and 7 SPS managers, social services personnel and/or hospital directors were interviewed (Table 2).

### Data collection

The data used in this research was information gathered through interviews with participants at the health facilities. From March to June 2017, the first author conducted face-to-face interviews with each participant in their workplace. Interviews were conducted in Spanish

**Table 2**  
Demographics and Characteristics of participants.

Demographic	Number of Participants (n = 67)
Occupation	
Pharmacist	21
Oncologist/Clinician	23
Procurement and supply officer	16
Hospital director/subdirector	1
Social worker	1
SPS officer	3
Hospital manager	2
Gender	
Male	38
Female	29
Location	
Campeche	3
Oaxaca	7
Veracruz	9
Chihuahua	11
Guanajuato	9
Yucatan	7
Jalisco	11
Mexico City	10

SPS – People's Health Insurance (Seguro Popular de Salud).

(the participants' native language), using open-ended questions and a semi-structured interview guide (See Supplemental Material 1). The interviews lasted 30–45 min; participants were allowed to provide as much detail as they wanted in their answers. The interview guide used was based on the WHO Access Framework<sup>10,36</sup> covering the following topics: the selection of medicines to be procured, prescribed and supplied at the hospital, the supply and procurement system, the participant's perceptions on availability of cancer medicines and various actions taken when medicines are unavailable, other barriers that the institution and patients may face to have access to cancer medicines, and their personal practical solutions to the problems they encountered. Interviews were audio-recorded and verbatim transcribed.

Ethical approval was obtained from the Research Ethics Committee of the National Institute of Public Health (INSP) in Mexico (CI-1406). Before the interview, the purpose of the study was explained to participants, who also read and signed an informed consent form.

### Data analysis and reporting

A framework analysis was used to describe, compare, and interpret aspects that influence access to cancer medicines in the hospital setting in order to generate policy-oriented findings.<sup>31,33,34</sup> In data analysis and reporting, we also considered the Coreq-32 checklist guidelines (Supplemental Material 2).

First, each transcript was read independently until the content was fully understood to distinguish concepts and categories.<sup>33,35,36,37</sup> This initial framework defined the following themes and sub-themes (codes): selection of medicines (including selection of medicines for procurement, prescription practices, insurance coverage); financing of medicines (resources and budget for medicines, sources of funding); and procurement and supply mechanisms (procurement planning and procedures; actions to guarantee supply of medicines). Coding and discussing a first set of 7 transcripts using these initial themes allowed refining codes and identifying emerging sub-themes, particularly those that were categorized as “other barriers” preventing effective access to cancer medicines, with which the final analytical framework was constructed and applied to all subsequent transcripts. Coding was carried out using a qualitative data management software (Atlas.ti®), to identify, compare, and analyze commonalities, differences, and patterns within the data.<sup>31,33,34</sup> Next, we rearranged the data according to the themes and codes, and finally interpreted and reduced them into final results.<sup>33</sup> Coding and data analysis were conducted in Spanish by the first and second authors (both Mexicans, and Spanish native speakers) to prevent translation biases or misinterpretation of the data. Final results were translated into English to be discussed with all authors and for reporting purposes.

## Results

### Selection of cancer medicines in public hospitals

Informants reported that selection of medicines for procurement and prescription followed the SPS protocols. Most procurement officers and pharmacists considered the hospital list of selected cancer medicines as appropriate and complete, as they are the “*minimum*” required by SPS protocols, involving mainly “*first lines*” of treatment.

“Because those [medicines] are the ones described in the SPS protocols, those are the minimum required that we need to have to treat a patient who has any of the cancers...” (Participant 44\_Pharmacist, Jalisco)

However, most oncologists considered the SPS protocols to be too restrictive: because second or third lines of treatment are not covered and are, therefore, not available. Oncologists, mainly focusing on the individual patient's interest, felt that they do not have the appropriate medicines to prescribe, as some of their patients do not respond to SPS

protocols and need other medicines.

“No, it's not enough. Our hospital works with SPS, and for the cancers that are covered by the SPS we follow the SPS protocol. We have to adapt to these protocols and give medicines according to these protocols. But in more than half of the cases, at some point in their treatment, patients do not respond to the treatment in this protocol and need a treatment that is not covered by SPS...” (Participant 33\_Oncologist, Guanajuato).

“No. Because suddenly the protocols leave some medicines out ... [... and some innovative medicines] are not covered by SPS. I do not know how often they update these protocols, because it is illogical that we have these medicines listed in the national formulary, and yet in the SPS protocols [these medicines] are not covered” (Participant 55\_Pharmacist, Veracruz)

Prescription of treatment regularly followed the SPS protocols and/or the national clinical guidelines (NCG), particularly for diseases covered by SPS, as these regulate the coverage of medicines and prescription of treatment. Physicians reported that they feel limited on clinical decisions, and feel obliged to prescribe following these protocols, as SPS only covers and reimburses medicines listed in these.

“We have to comply [with the SPS protocols]...because they indicate the authorized medicines.” (Participant 3\_Oncologist, Campeche)

However, although clinicians must follow the SPS protocol, clinicians also regularly referred to international clinical guidelines (e.g. the US National Comprehensive Cancer Network (NCCN) and European clinical guidelines), for educational activities and to prescribe to patients or diseases without SPS coverage.

“NCG, SPS and NCCN. Any of these serve as a guide for prescription or procurement...But regarding SPS, it is SPS, because that's what they pay you for and you're only going to use that type of medicines because that's what the SPS protocols say”. (Participant 39\_Oncologist, Jalisco)

Reference to treatment guidelines other than SPS protocols usually led to the prescription of medicines without coverage and therefore not available at health facilities. All participants agreed that the SPS protocols are outdated as a basis for reimbursement, and must be frequently updated to expand coverage and include some new medicines already listed in the national formulary.

#### Financing of medicines

Hospitals receive reimbursement from the SPS to finance a range of cancer care and medicines. All hospitals, except one hospital in Campeche, received additional financial resources from the MoH (state or federal). However, participants reported that this budget is limited and may not cover all patients' needs.

“[We] do not have the budget availability to the extent that we need it. The central MoH offices cannot buy the necessary and sufficient supply of medicines...There are the two factors: one, that they do not have the budget, and another, that with the income that we generate [in the hospital], [we] cannot buy [the medicines we need]. (Participant 61\_Procurement officer, Veracruz)”

Furthermore, delays on the SPS reimbursement were also reported, which can push hospitals into debt with suppliers, who in turn may stop supplying. Some participants also reported that the SPS budget per patient per disease is insufficient, thus requiring additional resources to cover the patient's treatment.

“...From the government... [financial] resources do not arrive on time to make the payments. [Cancer] patients are usually covered by SPS. When [SPS] does not pay in time..., or the proper

administrative procedure is not done or there are issues in the process, the money does not arrive, the supplier is not paid, and the supplier does not supply the medicines. In many cases, they have agreed to supply the medicine(s) but the hospital goes into debt. That has forced them to stop supplying”. (Participant 36\_Pharmacist, Jalisco)

“Most of the patients we treat here, are “lucky” patients with SPS coverage...The problem is when there is a budget assigned by the SPS, and this budget is exhausted...the budget assigned to the patient is not enough to cover the whole treatment...The budget [allocation] and diagnosis is made only once.” (Participant 2\_Pharmacist, Campeche)

When medicines without SPS coverage are prescribed, many hospitals try to absorb the costs of such treatments, totally or partially in order to serve the patient. When the hospitals cover these costs, they use resources from other areas or other programs. In some cases, patients would only pay an income-dependent co-payment, and the hospital would cover the rest. However, when hospitals do not have the financial resources to cover all patients' needs, patients are referred to charity organizations or to private pharmacies to get medicines at discounted prices. In practice, many patients lack the resources to pay for (high-cost) cancer medicines and other associated costs, and their treatment is often interrupted.

#### Reliable healthcare and supply systems

The views about the timely availability of cancer medicines differed between hospitals. The minimum required amount of medicines with SPS coverage was available, particularly for cancers for which the hospital was accredited for. However, many oncologists and procurement officers reported on an irregular supply of medicines.

“...within the annual pharmacy budget, a fixed budget is always considered for cancers where we have SPS accreditation. In this regard, we cannot have poor availability, therefore there is always [availability of medicines] for these [cancers]. But we do not have medicines available for those [cancers] where we are not accredited [by SPS].”(Participant 51\_Direccion Medica, Oaxaca)

Hospitals plan medicines procurement following annual and/or monthly statistical records on medicine utilization and projections of patient numbers. Hospitals consider diseases they are accredited for, prescription practices and SPS coverage. To ensure the timely supply of medicines and to prevent stock-outs, some hospitals request medicines one or two months in advance and request 10–20% additional amounts. Following the administrative requirements for SPS reimbursement has led to better procurement planning.

“The supply and procurement projection considers all the medicines covered by SPS and included in the treatment protocols for the accredited oncological pathologies. ...The [procurement] projections [also] consider the number of patients that we are attending and... we increase the coverage ceiling up to 20% after observing the increase in the demand through new cases every year, so that we do not fall below the demand for patient care.” (Participant 54\_Direccion Medica, Veracruz)

Hospitals used a variety of procurement procedures to guarantee the timely supply of medicines, as summarized in [Table 3](#).

Overall, hospitals are satisfied with outsourced services (compounding pharmacies and outsourced pharmacies) as these services have guaranteed the timely supply of medicines and have allowed for the transfer of pharmacy management responsibilities.

“What is given to the patient is the only thing that is paid. With this, we avoid having an inventory that could fall into slow or null movement or that can expire, which would be detrimental to the

**Table 3**  
Medicines procurement procedures.

Procurement and Supply Procedure	Characteristics
Centralized Procurement by MoH (n = 6)	<ul style="list-style-type: none"> <li>- Planning, procurement and distribution of medicines to facilities carried out by the MoH</li> <li>- Hospitals send medicines requirements and the MoH routinely supplies and distributes medicines according to requirements</li> </ul>
Tender (n = 4)	<ul style="list-style-type: none"> <li>- Public tenders according to law and contracting with several suppliers</li> <li>- Routine supply according to contract (e.g. monthly or every 2–3 months)</li> </ul>
Outsourced Pharmacy (n = 5 (+2 with a compounding pharmacy <sup>a</sup> ))	<ul style="list-style-type: none"> <li>- Contract with a private company that provides comprehensive pharmacy services and medicines according to list in the contract</li> <li>- Risk transfer of stock management that guarantees supply and availability in a timely manner</li> <li>- One single contract and payment of only medicines used</li> </ul>
Compounding Pharmacy (+outsourced pharmacy or tenders) (n = 6)	<ul style="list-style-type: none"> <li>- Contract with a private company with the infrastructure and personnel to carry out medicines compounding procedures</li> <li>- Provides chemotherapy mix according to patient's prescription and requirements. Supplied max. every 24 h according to patient's appointments</li> </ul>

<sup>a</sup> 2 hospitals reported having an outsourced pharmacy for all non-intravenous medications supplied in the hospitals in addition to a compounding pharmacy providing intravenous medicines and chemotherapy bags. n – number of hospitals surveyed out of 21; MoH – Ministry of Health; max. = maximum.

budget of the institute...A risk transfer was made to the awarded [outsourced] suppliers...and the responsibility for surveillance, expiration, storage, and delivery of the product is in their hands". (Participant 22\_Procurement Officer, Mexico City)

Hospitals supplied centrally by the MoH reported more supply delays and stock-outs. These delays were caused by poor procurement planning at the MoH level without considering the hospital's demand; participants were not able to provide more in-depth reasons. Additionally, some hospitals resort to direct purchases to meet demand and complement their procurement procedures. However, the high costs of medicines and the bureaucracy related to administrative procedures may limit the capacity of the institution to get treatments in a timely manner, particularly for medicines without SPS coverage.

"With change of [state] government, there have been administrative issues and then we started with shortages [in the supply]. Right now, we have many medicines shortages..." (Participant 8\_SPS officer, Chihuahua)

A common reason explaining the unavailability of medicines was that suppliers failed to supply due to shortages related to a lack of production or importation problems, thus showing the vulnerability of the supply system.

"[Shortages in the market] means that no supplier can provide [the medicine], normally it happens when...imported medicines going through customs are quarantined to verify that the lots are correct. However, during that period [the quarantine] there is no medication. Then we are in trouble...nobody can sell [the medicine] and we cannot buy it [elsewhere]." (Participant 9\_Admin, Chihuahua)

"I have seen bad habits of the companies...When there is a cheap medicine available and an innovative medicines is going to be launched...companies take off the market the cheap medicine to force you to buy the expensive one." (Participant 16\_Pharmacist, Mexico City)

Hospitals resort to several mechanisms to guarantee access to treatment for individual patients when urgently needed medicines are unavailable (out of stock, not supplied, not in the contract/tender, market shortages, procurement issues or not covered by SPS). Initially, the hospital looks for alternatives: other product presentations or generic alternatives, and in some cases therapeutic alternatives. If an alternative is not possible, then the hospital will try to get the medicine(s) through other means and requests the patients to wait and come back when the medicine(s) is available. The following practical solutions were also mentioned: threatening with administrative sanctions to suppliers to enforce medicine delivery; borrowing medicines from other institutions; direct purchase; referring patients to social services of the

hospital where their socio-economic status is assessed and patients can be supplied at (special) lower prices; or referring patients to the hospital board, charity organizations, or governmental institutions for medicine donations.

"If [the medicine] is not available in another health institution [for a loan] or at [the MoH] warehouse, the doctor is consulted to see if he can prescribe an alternative that may be in existence. If it is definitely the only medication that can be used, donations are sought through other institutions, such as civil associations, to obtain the medication... We ask the patient to wait." (Participant 15\_Pharmacist, Chihuahua)

At the healthcare delivery level, another main condition limiting access to cancer care and medicines is the lack of SPS accreditation. Healthcare providers are restricted in providing cancer care when the hospital has no SPS accreditation for some diseases. In this case, patients are referred to other accredited facilities or patients pay out of pocket for treatment at a minimum cost. Receiving patients from other facilities, or even from other states, can cause an unforeseen increase of demand at accredited healthcare facilities, which may exceed the hospital's projections on medicines' supply.

"...since SPS has a portability character, patients with SPS can come here to receive healthcare. That unforeseen flow of patients affects the medicine supply". (Participant 1\_Direccion, Campeche)

"There are no medicines for other [non-accredited] pathologies. We need accreditations to have access to the federal resources and be able to supply [medicines for other pathologies]". (Participant 45\_Admin, Oaxaca)

"If we are not accredited for certain pathologies, we refer the patients to other [accredited] facilities, to which the patient may not go" (Participant 55\_Pharmacist, Veracruz).

Furthermore, there are additional barriers influencing access to cancer care and medicines at the healthcare delivery level, as presented in Table 4.

"The State is large and the population we serve is of very low social, cultural, and economic level. The problem is the proximity to their treatment, as these patients need to pay out of pocket for transportation to get from remote places to the hospital...it sets a pattern in treatment compliance and ultimately it considerably impacts the success of the treatment." (Participant 64\_Oncologist, Yucatan)

"Many [patients] do not know how to read and...there is misinformation, as sometimes they think that they will have to pay [for healthcare]....They do not know that the SPS is an insurance....and ignore that [medicines] are [cost] free and that they are entitled to

**Table 4**  
Additional barriers influencing access to cancer medicines at the healthcare delivery level.

Barriers	Characteristics
Hospital's infrastructure and capacity	- Not enough space and beds to provide timely ambulatory treatment to meet demand
Delayed diagnosis and provision of information	- Lack of awareness on cancer early detection, prevention, and timely diagnosis; patients are diagnosed at late stages of cancer where treatment is more complex
Distance to healthcare facility	- Lack of proper guidance and information provision to patients about SPS entitlements and access to healthcare - Patients living in remote rural areas or in places far away from cities where hospital(s) is located; or patients referred to an accredited hospital in other city or state - Associated traveling and accommodation costs may prevent patients from seeking care or accessing medicines. These costs are not covered

SPS – People's Health Insurance (Seguro Popular de Salud).

their medicines...There are several (indigenous) people that are afraid to ask [for information and about the SPS]. [The hospital] they do not guide them well...". (Participant 63\_Pharmacist, Yucatan)

## Discussion

Mexico has developed several policies to increase access to cancer care. SPS was introduced in 2004 aiming to expand health coverage and access to medicines, influencing the selection, prices, procurement, and financing of medicines as well as healthcare provision for cancer patients. However, little is known about the actual accessibility of cancer care and medicines at the healthcare delivery level, and how health facilities deal with processes to guarantee access to cancer medicines in Mexico. The results report on the insights of participants on how the SPS policies and processes impact on access to cancer medicines at health facilities. The selection of medicines by SPS has contributed to the better availability of these, although this selection has also been considered as limiting. Due to untimely reimbursement, health facilities have faced challenges to finance medicines. Most hospitals have resorted to outsourced procurement procedures, which have contributed to the availability of medicines and the efficient use of resources. Other barriers were identified hindering equitable access to cancer treatment. The following sections detail how the SPS has influenced the selection and availability of medicines, their financing, and the procurement procedures within accredited cancer hospitals.

### *How the SPS coverage influences the selection and availability of cancer medicines in health facilities*

The availability of listed medicines is generally regarded as sufficient in hospitals providing cancer care, particularly for medicines with SPS coverage. However, the list of medicines and SPS protocols determining coverage and used for the selection and prescription of medicines was regarded as too restrictive and thus insufficient for providing appropriate cancer care, particularly for the treatment for advanced stages of cancer or for patients not responding to standard treatment. This is worrisome, as many patients in Mexico are diagnosed at advanced stages and thus require treatment accordingly.<sup>38</sup>

Although the SPS protocols are based on international and national clinical guidelines, they were frequently regarded as outdated<sup>30,38</sup> making clinicians refer to other clinical guidelines (e.g. NCCN) and, thereby, pushing patients towards getting treatments without insurance coverage. On the government's website, treatment protocols dated 2011–2012 were updated only until 2017–2018.<sup>14</sup> The regular revision and update of SPS protocols is necessary to guarantee that the covered treatment provides adequate cancer care. This update to expand coverage with the most cost-effective interventions should consider scientific and health-economic evidence, clinicians' and experts' opinions and experiences to avoid clinical disagreement, and budgetary space. Previous research has reported on the challenges on the implementation of clinical guidelines in Mexico.<sup>39</sup> These challenges include the lack

of training of health professionals, the lack of incentives to use such guidelines, and the lack of resources for an implementation process. Therefore, investments are necessary to regularly update and properly implement the SPS protocols across the country to harmonize cancer treatment.<sup>30,38,40,41</sup>

### *How SPS influences the financing of cancer medicines in health facilities*

Because of the limited budget for cancer treatment and late reimbursement by SPS, hospitals have failed to cover all patient's treatment needs. When medicines are not covered by SPS and/or hospitals are not timely reimbursed by the SPS,<sup>42,43</sup> some hospitals cover (some of) these costs or patients are pushed to pay out-of-pocket.<sup>43,44</sup> Reimbursement delays by SPS have been reported by previous studies,<sup>17</sup> which have underlined the need to simplify and support administrative procedures both in hospitals and SPS offices. Hospitals paying for medicines without SPS coverage may jeopardize their budgets, and the costs of cancer medicines can impoverish patients, which can lead to treatment cessation.<sup>45</sup> Considering that many patients are only diagnosed at advanced stages of disease and not all prevalent cancers are covered yet (e.g. lung cancer, stomach cancer),<sup>38,46</sup> SPS needs to consider expanding coverage to other treatable cancers, and consider policy options for those patients that do not respond to covered treatment. These actions will require measures to guarantee the timely availability of resources to health facilities without compromising the financial sustainability of the system. European countries, the US, Russia, Turkey, and other LATAM countries<sup>5,26,47,48</sup> have also reported that poor coverage, lack of resources and high costs of medicines can push physicians to decide not to treat or prescribe less-effective treatments. Mexico and other countries need to address coverage, as well as administrative and budget constraints in order to guarantee access to cost-effective interventions and promote the best level of cancer care to the largest possible number of patients.

### *How procurement and supply procedures influence access to cancer medicines in health facilities*

Results report on different procurement and supply procedures, and other related aspects that have influenced the availability of cancer medicines in public hospitals in Mexico. The most common procurement procedure was outsourcing the pharmacy service to private companies and/or compounding pharmacies. It was regarded that handing over the full responsibilities of pharmacy management and services to private providers has resulted in an efficient use of resources, timely supply and availability of essential cancer medicines, and stable medicine prices.<sup>20,49</sup> However, facilities could face problems related to inadequate procurement planning and provider non-compliance.<sup>20,42</sup> The UK, the US, Kenya, and South Africa have also outsourced pharmaceutical service delivery.<sup>50–53</sup> In these countries, outsourcing pharmacy services has provided savings by reducing pharmacy staffing costs and the prices of medicines; it has allowed maintenance of stocks and efficiency in the use of available medicines preventing

damages caused by market shortages. These experiences show that contracting pharmacy services can drive efficiency in healthcare delivery.<sup>50,53,54</sup>

It was regarded that hospitals using tender processes or supplied by the MoH through centralized procurement faced more problems with timely supply of medicines. Facilities encountered problems related to administrative changes, corruption at the governmental level, poor planning, procurement, storage, and supply by the MoH<sup>20,42</sup> resulting in unavailability and unreliable supply of medicines. In other countries, a centralized procurement has had mixed outcomes. In India and China, some provinces have guaranteed availability of medicines, lower procurement prices and a satisfactory inventory management, while other provinces have reported unreliable supply, frequent stock-outs, and inefficient distribution mechanisms.<sup>55,56</sup> Health facilities should identify and tackle, at the MoH and institutional level, those aspects that influence and prevent efficient procurement and supply procedures of medicines to health facilities.

When medicines were unavailable, hospitals have made strong efforts to guarantee access to treatment to avoid disruptions in care. The most common solution was to look for therapeutic alternatives that might be available at the time. However, some experts believe that using alternative therapies can interfere with procurement planning projections, increase the cost of care, provoke medication errors, and lead to disease progression when clinicians substitute originally prescribed treatment for another less effective that is available at that moment to avoid disruption of care.<sup>57–60</sup> Furthermore, direct purchases were used to complement medicines procurement for unavailable and urgently needed medicines, and more frequently for medicines without SPS coverage.<sup>42</sup> Particularly, the prescription and use of medicines without SPS coverage should be discouraged; direct purchases should only be allowed for medicines with SPS coverage. However, the WHO<sup>61,62</sup> discourages direct purchases, as these may interfere with procurement projections,<sup>20</sup> medicines could be overpriced,<sup>42</sup> and institutions may inefficiently use resources from other programs<sup>63</sup> to cover these medicines. The practical application of the concept of essential medicines demands that the originally prescribed treatment should always be available to prevent treatment delays, treatment failure and disease progression.<sup>47</sup> The use of direct purchases points to procurement inefficiencies and calls for action to improve such processes.

#### *How other barriers influence access to cancer medicines in health facilities*

Additionally, there were several barriers affecting access to treatment by patients at the healthcare delivery level. Travel costs from rural areas to the few accredited cancer centers were regarded as a substantial barrier to access cancer treatment.<sup>64</sup> SPS and health institutions should invest resources to increase the number of accredited facilities in strategic regions to reduce the distance to health facilities for rural populations<sup>30,64,65</sup> and relieve the current load of patients in third level hospitals. Other LATAM countries and the USA<sup>5,7,19</sup> have also reported distance to health facilities and the inability to pay transportation costs to impede access to cancer treatment. In addition to improving road infrastructure and transportation by the government, it is necessary to expand accreditation and cancer care into a wider range of health facilities to bring healthcare closer to patients.

#### *Strengths and limitations*

This study provides additional information based on stakeholder views on processes and barriers that health facilities face to provide access to cancer medicines to patients with SPS coverage. To our knowledge, this is the first large-scale qualitative study using stakeholder interviews to explore key components of access to essential cancer medicines in Mexico from the point of view of health professionals at public health institutions. Using the WHO Access Framework

on access to medicines has allowed for the identification of key areas in which action is necessary. Using this framework also allows international comparisons with countries exploring these components of access to medicines in their healthcare delivery settings.

This study has some limitations. Healthcare is decentralized in Mexico, which has resulted in heterogeneous healthcare management and delivery across states.<sup>66,67</sup> Therefore, although we gathered information from a vast amount of participants from many regions of the country, our results might not capture some specific issues faced by regions not included in the study. Furthermore, data and information reporting on aspects and processes influencing access to cancer medicines and actual access to cancer medicines in other SHI is not available. This limits the possibility to compare access to cancer medicines in health facilities accredited by SPS against SHI health facilities. Further research should explore access to cancer medicines in SHI and compare it against SPS. Additionally, although we strived to analyze and compare our results with the literature, evidence lacked on the views of other relevant stakeholders, such as policymakers and particularly patients. The policymakers<sup>17</sup> and patients' experiences on availability, affordability, and accessibility to cancer medicines and care were not considered. Future research can explore the views and experiences of other stakeholders and consider these to improve the quality of cancer care and effective access to medicines.

#### *Implications*

This study shows that SPS, a policy aiming towards UHC, includes relevant components directed to improve access to essential cancer medicines. However, within procedures pertaining to each of these components, challenges remain. Using other financial resources was considered as a hindering aspect on better access to cancer medicines. Thus, improving the efficiency of SPS's reimbursement procedures can promote timely reimbursement and guarantee the timely availability of financial resources. Insurance coverage was also regarded as a challenge for patients with advanced stages of cancer or with cancers not covered by SPS. Since geographical access is still unequal and the overall cancer burden continues to grow in Mexico,<sup>64,65</sup> expanding coverage geographically, by a wider number of facilities, and in the range of diseases and medicines could address barriers to access to cancer care and medicines. Accreditation of facilities could include secondary level and private healthcare facilities,<sup>19</sup> based on SPS's defined package of services at defined costs.<sup>68</sup> Care and treatment for other prevalent treatable cancers could be considered to expand SPS coverage (e.g. lung and stomach cancer).<sup>69</sup> The regular update of treatment protocols was regarded as a key aspect to be addressed in order to respond to the needs of patients. Therefore, the regular revision and update of treatment protocols can ensure that the most cost-effective treatments for cancer are covered. The latter would reduce the need for *ad-hoc* treatment decisions by clinicians, and work towards equity and harmonization of cancer care throughout the country. All these actions could be considered in the National Cancer Control Plan.<sup>38,70</sup>

The differences in the procurement procedures were also considered as one of the aspects influencing the availability of medicines. Hence, monitoring and, where necessary, revising procurement procedures can benefit hospitals and cancer institutions by ensuring that the most cost-effective and efficient procurement mechanisms and procedures are in place. Hospitals need to guarantee the availability of necessary resources to meet the full and justified health requirements of patients, rather than referring patients to charity.<sup>71</sup> Reliance on charity indicates a lack of resources to meet the full and justified health requirements of patients, which is a basic responsibility of the government.

Furthermore, the current government (entering office since late 2018) has proposed the substitution of the SPS with a new system for universal access to health services and medicines. Although details of this new system are unknown, the findings of this research could



provide relevant lessons to be considered for the new system's functioning.<sup>72</sup>

## Conclusions

The implementation of the SPS in Mexico has addressed key components to favor equitable access to cancer medicines, which, however, face several barriers in health facilities. Health professionals have encountered benefits and challenges from the implementation of SPS influencing access to cancer medicines and care. SPS's coverage and timely availability of resources need to improve and expand to address patient's needs and the availability of cancer medicines in health facilities. The procurement processes in place need to guarantee timely and efficient access to covered cancer medicines. The right balance needs to be found between expanding the range and cost of cancer treatments covered by insurance, and making basic cancer care available to all - a challenge that other middle-income countries will also face.

## Funding sources

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

## Declaration of competing interest

None.

## Acknowledgements

This work was supported by CONACYT (National Council of Science and Technology Mexico) (scholarship 217161).

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.sapharm.2019.11.015>.

## References

- de Lima Lopes G, De Souza JA, Barrios C. Access to cancer medications in low- and middle-income countries. *Nat Rev Clin Oncol*. 2013;10:314–322. <https://doi.org/10.1038/nrclinonc.2013.55>.
- Knaul FM, Frenk J, Shulman L. *For the Global Task Force on Expanded Access to Cancer Care and Control in Developing Countries. Closing the Cancer Divide: A Blueprint to Expand Access in Low and Middle Income Countries*. Boston, MA: Harvard Global Equity Initiative; 2011.
- Stewart BW, Wild CP. *World Cancer Report 2014*. Lyon: International Agency for Research on Cancer; 2014.
- Hanna TP, Kangolle AC. Cancer control in developing countries: using health data and health services research to measure and improve access, quality and efficiency. *BMC Int Health Hum Right*. 2010;10:24. <https://doi.org/10.1186/1472-698X-10-24>.
- Cherny NI, Sullivan R, Torode J, Saar M, Eniu A. ESMO International Consortium Study on the availability, out-of-pocket costs and accessibility of antineoplastic medicines in countries outside of Europe. *Ann Oncol*. 2017;28:2633–2647. <https://doi.org/10.1093/annonc/mdx521>.
- Farmer P, Frenk J, Knaul FM, et al. Expansion of cancer care and control in countries of low and middle income: a call to action. *Lancet*. 2010;376:1186–1193. [https://doi.org/10.1016/S0140-6736\(10\)61152-X](https://doi.org/10.1016/S0140-6736(10)61152-X).
- Strasser-Weippl K, Chavarri-Guerra Y, Villarreal-Garza C, et al. Progress and remaining challenges for cancer control in Latin America and the Caribbean. *Lancet Oncol*. 2015;16:1405–1438. [https://doi.org/10.1016/S1470-2045\(15\)00218-1](https://doi.org/10.1016/S1470-2045(15)00218-1).
- Gelband H, Sankaranarayanan R, Gauvreau CL, et al. Costs, affordability, and feasibility of an essential package of cancer control interventions in low-income and middle-income countries: key messages from Disease Control Priorities, third ed. *Lancet*. 2016;387:2133–2144. [https://doi.org/10.1016/S0140-6736\(15\)00755-2](https://doi.org/10.1016/S0140-6736(15)00755-2).
- Gómez Dantés O, Sesma S, Becerril V, Knaul FM, Arreola H, Frenk J. Sistema de salud de México [The health system of Mexico]. *Salud Publica Mex*. 2011;53:S220–S232.
- World Health Organization. Equitable access to essential medicines: a framework for collective action. *WHO Policy Perspect Med*. 2004;6.
- Wirtz VJ, Hogerzeil HV, Gray AL, et al. Essential medicines for universal health coverage. *Lancet*. 2017;389:403–476. [https://doi.org/10.1016/S0140-6736\(16\)31599-9](https://doi.org/10.1016/S0140-6736(16)31599-9).
- Robertson J, Barr R, Shulman LN, Forte GB, Magrini N. Essential medicines for cancer: WHO recommendations and national priorities. *Bull World Health Organ*. 2016;94:735–742. <https://doi.org/10.2471/BLT.15.163998>.
- de Salud Secretaria. *Catálogo Universal de Servicios de Salud.CAUSES, Mexico: Comisión Nacional de Protección Social en Salud. Seguro Popular*; 2018:950.
- General de Salubridad Consejo. *Protocolos técnicos de Gastos Catastróficos*. <http://www.csg.gob.mx/contenidos/priorizacion/gastos-catastrofos/protocolos.html>, Accessed date: 26 December 2018.
- Chemor Ruiz A. Lineamientos para la adquisición de medicamentos con recursos transferidos a las entidades federativas por concepto de cuota social y de la aportación solidaria federal del Sistema de Protección Social en Salud asociados al Catálogo Universal de Servicios de Salud y para la adquisición de medicamentos asociados a las intervenciones cubiertas por el Fondo de Protección contra Gastos Catastróficos. DOF [https://dof.gob.mx/nota\\_detalle.php?codigo=5536906&fecha=05/09/](https://dof.gob.mx/nota_detalle.php?codigo=5536906&fecha=05/09/); 2018, Accessed date: 26 December 2018 Published 2018.
- Lozano R, Garrido F. *Improving Health Systems Efficiency, Mexico: Catastrophic Health Expenditure Fund*. Geneva: World Health Organization; 2015.
- Aracena-Genao B, González-Robledo MC, González-Robledo LM, Palacio-Mejía LS, Nigenda-López G. El fondo de Protección contra Gastos Catastróficos: tendencia, evolución y operación [Fund for protection against catastrophic expenses]. *Salud Publica Mex*. 2011;53:S407–S415.
- Nigenda G, González-Robledo LM, Juárez-Ramírez C, Adam T. Understanding the dynamics of the Seguro Popular de Salud policy implementation in Mexico from a complex adaptive systems perspective. *Implement Sci*. 2016;11. <https://doi.org/10.1186/s13012-016-0439-x>.
- González-Block MÁ.. ¿Qué compra, cómo y de quién el Seguro Popular de México? Experiencia con la compra estratégica nacional y en una entidad pionera [What is purchased, how and from whom by Seguro Popular in Mexico? Experience with strategic purchasing at national level and in a pioneer institution]. *Salud Publica Mex*. 2017;59:59–67. <https://doi.org/10.21149/7768>.
- López-Moreno S, Martínez-Ojeda RH, López-Arellano O, Jarillo-Soto E, Castro-Albarrán JM. Organización del abasto de medicamentos en los servicios estatales de salud. Potenciales consecuencias de la mezcla público-privada [Organization of the drug supply chain in state health services. Potential consequences of the public-private mix]. *Salud Publica Mex*. 2011;53:S445–S457.
- Bigdeli M, Jacobs B, Tomson G, et al. Access to medicines from a health system perspective. *Health Policy Plan*. 2013;28:692–704. <https://doi.org/10.1093/heapol/czs108>.
- Wilson A, Cohen J. Patient access to new cancer drugs in the United States and Australia. *Value Health*. 2011;14:944–952. <https://doi.org/10.1016/j.jval.2011.05.004>.
- Vitry AI, Thai LP, Lu CY. Time and geographical variations in utilization of endocrine therapy for breast cancer in Australia. *Intern Med J*. 2011;41:162–166. <https://doi.org/10.1111/j.1445-5994.2010.02304.x>.
- Wilking N, Jönsson B. *A Pan-European Comparison Regarding Patient Access to Cancer Drugs*. Stockholm: Karolinska Institutet; 2005.
- Sarwar MR, Iftikhar S, Saqib A. Availability of anticancer medicines in public and private sectors, and their affordability by low, middle and high income class patients in Pakistan. *BMC Canc*. 2018;18. <https://doi.org/10.1186/s12885-017-3980-3>.
- Cherny NI, Sullivan R, Torode J, Saar M, Eniu A. ESMO European Consortium Study on the availability, out-of-pocket costs and accessibility of antineoplastic medicines in Europe. *Ann Oncol*. 2016;27:1423–1443. <https://doi.org/10.1093/annonc/mdw213>.
- Wagner EH, Aiello Bowles EJ, Greene SM, et al. The quality of cancer patient experience: perspectives of patients, family members, providers and experts. *BMJ Qual Saf Health Care*. 2010;19:484–489. <https://doi.org/10.1136/qshc.2010.042374>.
- Lawson MK, Lcsw M. Barriers to accessing quality health care for cancer patients: a survey of members of the association of oncology social work. *Soc Work Health Care*. 2010;49:38–52. <https://doi.org/10.1080/00981380903018470org/10.1080/00981380903018470>.
- Patel MI, Periyakoil VS, Blayney DW, et al. Redesigning cancer care delivery: views from patients and caregivers. *J Oncol Pract*. 2017;13:e291–e302. <https://doi.org/10.1200/JOP.2016.017327>.
- Hess LM, Pohl G. Perspectives of quality care in cancer treatment: a review of the literature. *Am Health Drug Benefits*. 2013;6:321–329.
- Srivastava A, Thomson SB. Framework analysis: a qualitative methodology for applied policy research. *J Adm Gov*. 2009;4:72–79.
- Pope C, Mays N. Qualitative Research: reaching the parts other methods cannot reach: an introduction to qualitative methods in health and health services research. *BMJ*. 1995;311. <https://doi.org/10.1136/bmj.311.6996.42>.
- Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Med Res Methodol*. 2013;13. <https://doi.org/10.1186/1471-2288-13-117>.
- Green J, Thorogood N. *Qualitative Methods for Health Research*. first ed. London: Sage Publications; 2004.
- Saks M, Allsop J. *Researching Health Qualitative. Quantitative and Mixed Methods*. second ed. London: Sage Publishing; 2012.
- Duong MH, Moles RJ, Chaar B, Chen TF. Stakeholder roles in facilitating access to essential medicines. *Res Soc Adm Pharm*. 2018;15:260–266. <https://doi.org/10.1016/j.sapharm.2018.04.034>.
- Kirkcaldy A, Jack BA, Cope LC. Health care professionals' perceptions of a community based 'virtual ward' medicines management service: a qualitative study. *Res Soc Adm Pharm*. 2018;14:69–75. <https://doi.org/10.1016/j.sapharm.2017.02.001>.
- Reynoso-Noverón N, Meneses-García A, Erazo-Valle A, et al. Challenges in the development and implementation of the national comprehensive cancer control program in Mexico. *Salud Publica Mex*. 2016;58:325–333.

39. Gutiérrez-Alba G, González-Block MÁ., Reyes-Morales H. Desafíos en la implantación de guías de práctica clínica en instituciones públicas de México: estudio de casos múltiple [Challenges in the implementation of clinical practice guidelines in major public health institutions in Mexico: a multiple case study]. *Salud Publica Mex.* 2015;57:547–554.
40. Hogerzeil HV, Liberman J, Wirtz VJ, et al. Promotion of access to essential medicines for non-communicable diseases: practical implications of the un political declaration. *Lancet.* 2013;381:680–689. [https://doi.org/10.1016/S0140-6736\(12\)62128-X](https://doi.org/10.1016/S0140-6736(12)62128-X).
41. Lincoln SB, Soto-Perez-de-Celis E, Chavarri-Guerra Y, Covarrubias-Gomez A, Navarro M, Goss PE. Cancer pain management in Mexico. *BMJ Support Palliat Care.* 2019;0:1–6. <https://doi.org/10.1136/bmjspcare-2019-001871>.
42. Granados-Cosme JA, Tetelboin-Henrion C, Garduño-Andrade M de los A, Rivera-Márquez JA, Martínez-Ojeda RH. Análisis cualitativo del abasto de medicamentos en México. Evaluación en los servicios a población no asegurada [A qualitative approach to drug supply in Mexico. Evaluation in the services for population with no medical insurance]. *Salud Publica Mex.* 2011;53:S458–S469.
43. Knaul FM, González-Pier E, Gómez-Dantés O, et al. The quest for universal health coverage: achieving social protection for all in Mexico. *Lancet.* 2012. [https://doi.org/10.1016/S0140-6736\(12\)61068-X](https://doi.org/10.1016/S0140-6736(12)61068-X).
44. Sesma-Vázquez S, Gómez-Dantés O, Wirtz VJ, Castro-Tinoco M. Abasto, surtimiento y gasto de bolsillo en medicamentos en hospitales públicos de México en 2009 [Supply prescription filling and out-of-pocket expenditures on medicines in public hospitals in Mexico in 2009]. *Salud Publica Mex.* 2011;53:S470–S479. <https://doi.org/10.1590/S0036-36342011001000010>.
45. Servan-Mori E, Heredia-Pi I, Montañez-Hernandez J, Avila-Burgos L, Wirtz VJ. Access to medicines by Seguro Popular beneficiaries: pending tasks towards universal health coverage. *PLoS One.* 2015;1–13. <https://doi.org/10.1371/journal.pone.0136823>.
46. Mohar-Betancourt A, Reynoso-Noverón N, Armas-Texta D, Gutiérrez-Delgado C, Torres-Domínguez JA. Cancer trends in Mexico: essential data for the creation and follow-up of public policies. *J Glob Oncol.* 2017;3:740–748. <https://doi.org/10.1200/JGO.2016.007476>.
47. de Vries E, Buitrago G, Quitian H, Wiesner C, Castillo JS. Access to cancer care in Colombia, a middle-income country with universal health coverage. *J Cancer Policy.* 2018. <https://doi.org/10.1016/j.jcpo.2018.01.003>.
48. Baer li WH, Maini A, Jacobs I. Barriers to the access and use of rituximab in patients with non-Hodgkin's lymphoma and chronic lymphocytic leukemia: a physician survey. *Pharmaceuticals.* 2014;7:530–544. <https://doi.org/10.3390/ph7050530>.
49. Contreras-Loya D, Reding-Bernal A, Gómez-Dantés O, et al. Abasto y surtimiento de medicamentos en unidades especializadas en la atención de enfermedades crónicas en México en 2012 [Supply of essential drugs in units specialized in the treatment of chronic diseases in Mexico in 2012]. *Salud Publica Mex.* 2013;55:618–626.
50. Magrath M. *Outsourcing NHS Hospital Pharmacy Dispensing: The Benefits and Commercial Model.* 2015; 2015 [https://www.linkedin.com/pulse/outourcing-nhs-hospital-pharmacy-dispensing-benefits-mark-magrath/?lipi=urn%3Ali%3Apage%3Ad\\_flagship3\\_profile\\_view\\_base](https://www.linkedin.com/pulse/outourcing-nhs-hospital-pharmacy-dispensing-benefits-mark-magrath/?lipi=urn%3Ali%3Apage%3Ad_flagship3_profile_view_base), Accessed date: 30 April 2018 Published.
51. Guharoy R, Noviasky J, Haydar Z, Fakh MG, Hartman C. Compounding pharmacy conundrum: “We cannot live without them but we cannot live with them” according to the present paradigm. *Chest.* 2013;143:896–900. <https://doi.org/10.1378/chest.13-0212>.
52. Strother RM, Rao KV, Gregory KM, et al. The oncology pharmacy in cancer care delivery in a resource-constrained setting in western Kenya. *J Oncol Pharm Pract.* 2012;18:406–416. <https://doi.org/10.1177/1078155211434852>.
53. Summers R, Möller H, Meyer D, Botha R. “Contracting-out” drug procurement and distribution: experience with a primary distributor system in South Africa. *Essent Drugs Monit.* 1998:10–11.
54. Lagarde M, Palmer N. The impact of contracting out on health outcomes and use of health services in low and middle-income countries. *Cochrane Database Syst Rev.* 2009;7:CD008133. <https://doi.org/10.1002/14651858.CD008133>.
55. Vikram Singh P, Tatambhotla A, Kalvakuntla R, Chokshi M. Understanding public drug procurement in India: a comparative qualitative study of five Indian states. *BMJ Open.* 2013;3:e001987. doi:10.1136/bmjopen-2012-001987.
56. Yang L, Huang C, Liu C. Distribution of essential medicines to primary care institutions in Hubei of China: effects of centralized procurement arrangements. *BMC Health Serv Res.* 2017;17. <https://doi.org/10.1186/s12913-017-2720-3>.
57. Pauwels K, Huys I, Casteels M, Simoens S. Drug shortages in European countries: a trade-off between market attractiveness and cost containment? *BMC Health Serv Res.* 2014;14. <https://doi.org/10.1186/1472-6963-14-438>.
58. Dranitsaris G, Jacobs I, Kirchoff C, Popovian R, Shane LG. Drug tendering: drug supply and shortage implications for the uptake of biosimilars. *Clin Outcomes Res.* 2017;9. <https://doi.org/10.2147/CEOR.S140063>.
59. Kehl KL, Gray SW, Kim B, et al. Oncologists' experiences with drug shortages. *J Oncol Pract.* 2015;11:e154–e162.
60. Levy BP, Thorn M, Roitman J, et al. Impact of oncology drug shortages on patient therapy: unplanned treatment changes. *J Oncol Pract.* 2013;9:e122–e128. <https://doi.org/10.1200/jop.2012.000799>.
61. World Health Organization. *Practical Guidelines on Pharmaceutical Procurement for Countries with Small Procurement Agencies.* Manila: World Health Organization Regional Office for the Western Pacific; 2002.
62. Nguyen TA, Knight R, Roughton EE, Brooks G, Mant A. Policy options for pharmaceutical pricing and purchasing: issues for low- and middle-income countries. *Health Policy Plan.* 2015;30:267–280. <https://doi.org/10.1093/heapol/czt105>.
63. Granados Cosme JA, Garduño Andrade M de los A, Jarillo Soto EC, Garrido Latorre F. Cadena de Abasto de Medicamentos en México: evaluación cualitativa. *XXVII Congr Asoc Latinoam Sociol VIII Jornadas Sociol Univ Buenos Aires.* Buenos Aires: Asoc Latinoam Sociol; 2009.
64. Lozano Ascencio R, Aracena Genao B, Orozco Nuñez E, Franco Marina F, Villarreal Garza C, Garnelo Bibiano N. *Evaluación Externa Del Fondo de Protección Contra Gastos Catastróficos Del Sistema de Protección Social En Salud 2013.* Cuernavaca: Instituto Nacional de Salud Pública; 2013.
65. Strasser-Weippl K, Chavarri-Guerra Y, Villarreal-Garza C, et al. Progress and remaining challenges for cancer control in Latin America and the Caribbean. *Lancet Oncol.* 2015;16:1405–1438. [https://doi.org/10.1016/S1470-2045\(15\)00218-1](https://doi.org/10.1016/S1470-2045(15)00218-1).
66. Homedes N, Ugalde A. Twenty-five years of convoluted health reforms in Mexico. *PLoS Med.* 2009;6. <https://doi.org/10.1371/journal.pmed.1000124> e1000124.
67. Arredondo A, Orozco E. Effects of health decentralization, financing and governance in Mexico. *Rev Saude Publica.* 2006;40:152–160. <https://doi.org/10.1590/S0034-89102006000100023>.
68. Seguro Popular. Tabuladores del Fondo de Protección contra Gastos Catastróficos. <http://www.transparencia.seguro-popular.gob.mx/index.php/transparencia-focalizada/24-gestion-de-servicios-de-salud/50-tabuladores-del-fondo-de-proteccion-contra-gastos-catastrofos>, Accessed date: 15 March 2019.
69. International Agency for Research on Cancer. *Cancer Today.* World Health Organization; 2018 [https://gco.iarc.fr/today/online-analysis-multi-bars?v=2018&mode=cancer&mode\\_population=countries&population=900&populations=484&key=asr&sex=0&cancer=39&type=0&statistic=5&prevalence=0&population\\_group=0&ages\\_group%5B%5D=0&ages\\_group%5B%5D=17&items=10&](https://gco.iarc.fr/today/online-analysis-multi-bars?v=2018&mode=cancer&mode_population=countries&population=900&populations=484&key=asr&sex=0&cancer=39&type=0&statistic=5&prevalence=0&population_group=0&ages_group%5B%5D=0&ages_group%5B%5D=17&items=10&), Accessed date: 15 March 2019 Published.
70. Mellstedt H. Cancer initiatives in developing countries. *Ann Oncol.* 2006;17. <https://doi.org/10.1093/annonc/mdl984.viii24-viii31>.
71. Dorantes-Acosta E, Zapata-Tarrés M, Liliána Miranda-Lora A, et al. Apoyo de organizaciones no gubernamentales a pacientes pediátricos con leucemia linfoblástica aguda afiliados al Seguro Popular en México [Support from nongovernmental organizations to pediatric patients with acute lymphoblastic leukemia affiliated with the Seguro Popular insurance program in Mexico]. *Bol Med Hosp Infant Mex.* 2012;69:212–217.
72. Reyes-Morales H, Dreser-Mansilla AC, Arredondo-López A, Bautista-Arredondo S, Ávila-Burgos L, Análisis y. Reflexiones sobre la iniciativa de reforma a la Ley General de Salud de México 2019. *Salud Publica Mex.* 2019;61:685–691. <https://doi.org/10.21149/10894>.