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Strengthening Health Systems of Developing Countries: Inclusion of Surgery in Universal Health Coverage

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Abstract

Introduction Universal health coverage (UHC) has its roots in the Universal Declaration of Human Rights and has recently gained momentum. Out-of-pocket payments (OPP) remain a significant barrier to care. There is an increasing global prevalence of non-communicable diseases, many of which are surgically treatable. We sought to provide a comparative analysis of the inclusion of surgical care in operating plans for UHC in low- and middle-income countries (LMIC).

Methods We systematically searched PubMed and Google Scholar using pre-defined criteria for articles published in English, Spanish, or French between January 1991 and November 2013. Keywords included "insurance," "OPP," "surgery," "trauma," "cancer," and "congenital anomalies." World Health Organization (WHO), World Bank, and Joint Learning Network for UHC websites were searched for supporting documents. Ministries of Health were contacted to provide further information on the inclusion of surgery.

Results We found 696 articles and selected 265 for full-text review based on our criteria. Some countries enumerated surgical conditions in detail (India, 947 conditions). Other countries mentioned surgery broadly. Obstetric care was most commonly covered (19 countries). Solid organ transplantation was least covered. Cancer care was mentioned broadly, often without specifying the therapeutic modality. No countries were identified where hospitals are required to provide emergency care regardless of insurance coverage. OPP varied greatly between countries. Eighty percent of countries had OPP of 60 % or more, making these services, even if partially covered, largely inaccessible.

Conclusion While OPP, delivery, and utilization continue to represent challenges to health care access in many LMICs, the inclusion of surgery in many UHC policies sets an important precedent in addressing a growing global prevalence of surgically treatable conditions. Barriers to access, including inequalities in financial protection in the form of high OPP, remain a fundamental challenge to providing surgical care in LMICs.

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Background

Despite the proliferation of non-governmental organizations and donor programs, global inequities in health persist, reinforced by insufficient financial and human resources, poor infrastructural capacity, weak health information systems, and a lack of transparency and accountability in the health care delivery systems of developing nations [1]. As an alternative to the traditional dichotomy of vertical vs. horizontal interventions, Frenk et al have proposed the "diagonal approach" to health systems strengthening, which uses large scale, explicit intervention priorities across multiple areas to drive improvements of the health system overall [2]. A component of this diagonal approach is the concept of universal health coverage (UHC), which has its roots in the 1948 Universal Declaration of Human Rights and is receiving increasing attention as essential to health systems strengthening [3].

Even while developing countries increasingly work toward adopting the right to health, many countries' health systems continue to be inequitable [4, 5]. "Strengthening Health Systems to Improve Health Outcomes: WHO's Framework for Action" describes many health systems as regressive and unsafe [6]. Each year, more than 100 million people are pushed into poverty because of catastrophic health care expenditures, defined by the WHO as out-of-pocket payments (OPPs) for health care that are greater than 20 % of total household expenditure [7]. Table 1

Table 1 A comparison of selected low-, middle-, and high-income countries in terms of health care expenditure

Country	HCE, % GDP	Government Spending, % HCE	External Resources[a], % HCE	OPP, % HCE[b]
Canada	10.9	70.1	0	14.4
Chad	2.8	31.3	15.1	70.5
Ethiopia	3.8	48.4	44.3	33.8
France	11.7	76.9	0	7.5
Haiti	6.4	22.8	29.5	22.1
Mozambique	6.4	44.3	69.8	9.0
South Africa	8.8	47.9	46.3	7.2
U.K.	9.4	82.5	0	9.2
U.S.A.	17.9	46.4	0	11.3
Brazil	9.3	46.4	0.3	31.3
Chile	7.2	48.6	0	37.2
Colombia	6.8	75.8	0.2	17.0
Estonia	5.9	79.9	0	18.6
Kyrgyz Republic	7.1	60.1	12.2	33.0
Mexico	6.1	51.8	0	46.5
Rwanda	10.7	57.3	46.3	21.4
South Korea	7.5	54.4	0	32.9
Thailand	3.9	76.4	0.6	13.1
Ghana	5.2	76.4	14.2	29.1
India	4.0	33.1	1	59.4
Indonesia	3.0	39.6	1.2	49.9
Kenya	4.7	38.1	38.8	46.4
Malaysia	4.0	55.0	0	34.9
Mali	5.8	29.0	31.5	60.7
Nigeria	6.1	31.1	5.4	60.4
Philippines	4.6	37.7	1.8	52.0
Vietnam	6.6	42.6	3.1	55.7

Countries are selected to represent a variety of income levels, with data derived from the WHO Global Health Data Repository 2012. In orange are countries that are included for comparison but are not included in the study. In yellow are countries in advanced stages of reform according to the Joint Learning Network criteria (except for Taiwan for which country data is unavailable). In green are countries in beginning stages of implementing UHC

[a] The external resources indicator traces the financing flows from external sources who provide the funds to public and private financing agents, including in kind and in cash resources provided as loans and grants

[b] Many countries have catastrophic levels of OPP, defined by the WHO as OPP >20 % of HCE

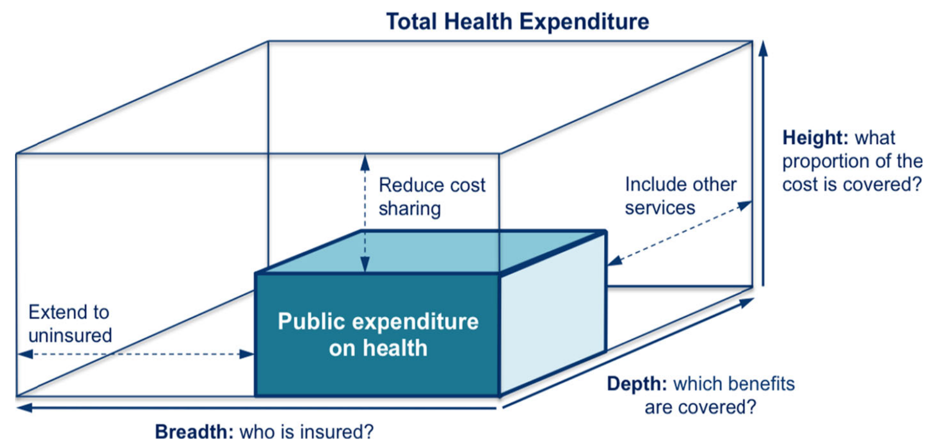

Fig. 1 Schematic of UHC. Source: Health systems financing: The path to universal coverage. World Health Organization, The World Health Report 2010

illustrates the heavy global reliance on OPP in a selection of low-, middle- and high-income countries around the world, with many countries in Africa and Asia still using private expenditures to cover close to 100 % of health care costs [8]. In fact, roughly 5.6 billion low- and middle-income country (LMIC) residents depend on OPPs to cover more than half of all health care expenditures [9].

An effective operating plan for UHC, defined by the WHO as a system that provides "access to key promotive, preventive, curative and rehabilitative health interventions for all at an affordable cost, thereby achieving equity in access," maximizes the three dimensions illustrated in Fig. 1, including the breadth, depth, and height of coverage [10]. The *breadth* represents the proportion of the population with health protection; the *depth* denotes the range of essential services necessary to meet the demand for health care resources; and the *height* represents the proportion of health care costs covered by risk pooling and pre-payment mechanisms, for example the abolition of user fees for basic services such as obstetric care and vaccinations. A country with UHC must examine the opportunity costs and trade-offs between breadth, depth, and height of services provided.

To date, there has been little analysis of how countries are including access to emergency and essential surgical services in their operating plans for UHC. Our objective in this systematic review is to provide a comparative analysis of the inclusion of access to surgical services in operating plans for UHC in a selection of LMICs which have recently undergone or are currently undergoing UHC reform, as defined by the Joint Learning Network. We accomplish this through a summary of the inclusion of surgery in the UHC operating plans of these LMICs, followed by a discussion of achievement of breadth, depth, and height of coverage of surgical conditions in the selected countries with an examination of coverage in obstetric, trauma, and cancer care, the three most commonly covered categories of conditions frequently requiring surgical intervention.

Methods

Search strategy

Countries included in our analysis were selected based on classification as member countries (countries currently implementing reform) or resource countries (countries in advanced stages of reform) by the Joint Learning Network for Universal Coverage, which compiles information from government documents, interviews with policy experts, and peer-reviewed work on UHC (Table 2). We searched PubMed and Google Scholar for articles published in English, Spanish, or French between January 1991 and November 2013. MeSH and free-text terms such as "social health protection" and "cancer" were combined when searching in PubMed to identify relevant articles pertaining to the selected countries. MeSH terms to capture insurance included "catastrophic health expenditure(s)," "health (care) financing," health care reform(s)," "health insurance," "health system(s) financing," "insurance," "national health program(me)(s)," "OPP(s)," "resource allocation," "social health protection," and "universal (health) coverage." MeSH terms to capture surgically treatable conditions included "accidents," "cancer care," "cataracts," "cleft lip," "cleft palate," "club foot," "congenital anomalies," "injury," "injuries," "labor and delivery," "neoplasm/therapy," "obstetrics," "operative," "organ transplantation," "perinatal (care)," "trauma," "surgical procedure(s)," 'wounds and injuries." Each abstract was reviewed for content related to health insurance and financing mechanisms. Relevant articles were reviewed in full for data on essential benefit packages and which surgical

Table 2 Comparative analysis of the inclusion of surgery in UHC

	Cancer	Obstetrics	Trauma	Congenital anomalies	Cataracts & glaucoma	Organ transplant
Countries in advanced stages of reform						
Brazil	✔	✔	✔	✔	✔	✔
Chile	✔	✔	✔	✔	✔	✔
Colombia	✔	✔	✔	✔	✔	✔
Estonia	–	✔	✔	–	✔	✔
Kyrgyz Rep.	–	✔	–	–	–	–
Mexico	✔	✔	✔	✔	✔	✔
South Korea	✔	✔	✔	–	–	✔
Rwanda	✔	✔	–	–	–	–
Taiwan	✔	✔	✔	–	–	✔
Thailand	✔	✗	–	–	✔	✔
Countries currently implementing reform						
Ghana	✔	✔	✔	–	✔	✗
India	✔	✔	✔	✔	✔	✔
Indonesia	✗	✔	–	–	–	✗
Kenya	–	✔	–	–	–	–
Malaysia	–	–	–	–	–	–
Mali	–	✔	–	–	–	–
Nigeria	–	✔	–	✗	✔	–
Philippines	–	✔	–	–	–	–
Vietnam	–	✔	–	–	–	✔

Stage of reform was determined according to criteria set by the Joint Learning Network, including funding, population covered, benefits package, service delivery system, institutional structure, and provider payment mechanisms. (Data derived from examination of policy documents, UHC operating plans, and other supporting documents as described in the Methods section) ✔ = included; ✗ = excluded; – = no data available

services are included. A manual cross reference of identified articles was performed to elicit additional articles relevant to this study.

Additional data sources

We searched the WHO websites, World Bank UHC Series, European Observatory on Health Care Systems in Transition, and the Joint Learning Network for Universal Coverage for supporting documents on inclusion of surgery in each LMIC's operating plans for UHC. Supporting references from these resources were searched for information relevant to this paper. Additionally, Ministries of Health were contacted via e-mail to provide further information on access to surgical care in their countries.

Exclusion criteria

We excluded articles discussing access to surgical care without the context of health coverage, risk pooling, or financing mechanisms for healthcare. Articles discussing delivery of surgical care through rotating missions or expatriate teams were also excluded as were articles that did not refer to LMICs or were not available in full text.

Results

We found 696 PubMed articles published between 1991 and 2013 using the search strategy described above. Of these, 431 were excluded based on titles and abstracts, with 265 articles selected for further review. We found varying levels of detail in the descriptions of surgical conditions and services included in the health plans of many LMICs (Table 2). Generally, surgery was mentioned broadly, without reference to specific conditions or operations. Only a few countries' policies included lists enumerating specific conditions; India and Mexico list 947 and 60 surgical conditions, respectively, and Chile's national plan, Fonda Nacional de Salud (FONASA), lists 56 health conditions of which 24 are surgically amenable. Categories of surgical conditions and/or procedures most commonly covered included general surgery (e.g., appendectomy, herniorrhaphy, cholecystectomy), obstetric and gynecologic surgery (e.g., hysterectomy, oophorectomy, emergency obstetric care), trauma (e.g., exploratory laparotomy, critical care, poly-trauma), specialty surgery (e.g., plastic, neurosurgery, cardiothoracic, ENT, orthopedic surgery, urology), and ophthalmologic conditions. Obstetric care, trauma, and cancer care receive priority in most countries.

Solid organ transplantation was among the least covered of surgical services, with coverage found only in Taiwan [11], Colombia [12], South Korea [13], Thailand [14], Brazil [15], and Chile [16].

UHC dimensions: breadth, depth, and height of coverage

We found a diverse range of *breadth*, or proportion of people covered, in the countries analyzed, ranging from 3 % of the population covered Nigeria and Mali to close to 100 % coverage in Taiwan and South Korea. Many of the countries we analyzed (Kenya [17], Brazil [18], India [19], Thailand [14], Nigeria [20], Mali [21], Vietnam [22], Colombia [23], Indonesia [24], Philippines [25], Mexico [26], and Ghana [27]) began reform by providing coverage for vulnerable or specific populations such as people below the federal poverty line, children under five, informal sector, women, etc. before expanding coverage to the entire population. This was typically implemented by the abolition of user fees, reflecting the practice of priority setting in a resource-limited context.

We found that the *depth* of coverage, or the range of essential services provided, in surgical care varies with service delivery, healthcare work force, and strength of primary health services in each country. Several countries (Thailand [14], Chile [28], Brazil [15], Nigeria [20], and Estonia [29]) have policies using primary care providers as gatekeepers for surgical services, with OPP levied on referrals for surgery made outside of primary care networks. In India [19] and Kenya [17], where hospital care presents a more significant mode of delivery than primary care, surgery was covered directly at the inpatient level.

We found that *height* of health care coverage, or the proportion of health care costs covered by risk pooling and pre-payment mechanisms, which we analyzed through the proportion of OPP in each country, remains a challenge for many countries despite progress toward achieving UHC. While many countries that have implemented reform experienced a reduction in OPP of close to 3–8 %, we nonetheless found a significant burden of catastrophic payments, defined by the WHO as OPP exceeding 20 % of total household expenditure, in almost all countries analyzed with the exception of 17 % in Colombia and 18.6 % in Estonia (Table 1) [8]. Cost-sharing strategies varied among the countries analyzed. Income-stratified co-payment systems with exemptions for the poor were identified in Estonia [29], Kyrgyz Republic [30], Taiwan [11], Vietnam [22], Chile [16], South Korea [31], and Rwanda [32]. We found that the National Health Insurance Schemes of Ghana [33], Brazil [15], Indonesia [24], and India [19] did not require any cost sharing in the form of co-payments, co-insurance, or deductible.

We found evidence in several countries of mixed reliance on the public and private sectors to address gaps in access. The Brazilian national health insurance, Sistema Único de Saúde (SUS), contracts many of its services to private providers[15], and 25 % of the Brazilian population has supplemental private insurance [8].In Estonia, many private patients access specialist care outside the primary care referral network due to long waiting times, and the government has responded by implementing policies that protect particular populations such as the elderly from delay in diagnosis and treatment [29]. Kenya determines cost sharing based on type of hospital, with comprehensive coverage for government hospitals and a cap for non-profit private hospitals and mission hospitals, resulting in up to 80 % co-payment per individual for private non-profit hospitals [17].

Inclusion of obstetric care in UHC

Obstetric care was the most commonly covered with 19 countries including access to obstetric care. While we did not find any specific gaps in coverage of obstetric care, only Nigeria [20], Estonia [29], Indonesia [24], Ghana [34], Taiwan [11], and Mexico [35] have UHC plans that cover therapeutic abortion services (albeit with legal restrictions). In countries with complete coverage of obstetric care, barriers to utilization of UHC included high demand for delivery at health facilities, proportionately low supply of skilled birth attendants, and demographic factors such as age and socioeconomic status that affect cultural perceptions of delivery in a skilled facility [36]. Regardless, expansion of insurance coverage has been associated with improved safe delivery practices in LMICs, including increased probability of safer delivery in Rwanda [37], increased likelihood of delivery in a skilled care facility in Ghana [38], and higher penetration of prenatal care with lower maternal mortality ratios in an ecological study of countries in sub-Saharan Africa [39].

Inclusion of trauma

We found that access to trauma and injury care was dependent on the organization of health facilities and service delivery. UHC plans in Nigeria [40] and Rwanda [41] require enrollees to seek emergency care at nationally accredited health facilities in order for charges to be covered, while Chile allows beneficiaries of either the public (FONASA) or private (ISAPRE) plans to obtain stabilizing care at any facility before being transferred to the preferred provider network [42]. Countries whose UHC plans provide free access to emergency services without any cost sharing include Indonesia [43], Ghana [24], Kyrgyz [30], Philippines [25], and Colombia [23]. We did not find

specific procedures mentioned under the coverage of trauma or emergency care in the UHC plans of the countries in our analysis, and we found no countries where all hospitals are required by law to provide trauma or emergency services regardless of ability to pay.

Inclusion of cancer care

Cancer care was included in the UHC plans of many countries in our analysis and was frequently represented as a listing of different types of cancers included in the insurance scheme, rather than as coverage of specific therapies e.g., chemotherapy, radiotherapy, surgery, or multimodality treatment. We found breast cancer and cervical cancer to be most commonly mentioned, with coverage of specific therapies and stages of disease varying among countries. Chile [44] and Taiwan [45] both have national cancer programs with registries funded by the Ministries of Health. Ghana covers treatment with surgery and chemotherapy for breast and cervical cancer only, with chemotherapy coverage limited to first-line therapy only [46]. Mexico has adopted a focus on preventative cancer care; late stage breast cancer is currently not covered due to cost [47].

Discussion and recommendations

Our objective was to provide an overview of the inclusion of emergency and essential surgical care in national health insurance schemes of LMICs in stages of UHC as defined by the Joint Learning Network. Our analysis shows that many of these LMICs include access to essential surgical services in their national health insurance schemes, with most national health plans referring to disease categories that frequently require surgical intervention rather than to surgical procedures themselves. Surgery related to obstetric care is most commonly covered, followed by surgical treatment related to cancer and trauma. A definitive assessment of the breadth, depth, and height of coverage is limited by the fact that the national health insurance schemes of the countries we reviewed are all in various states of reform, and we imagine that more evidence on coverage, financing, and outcomes will become available as reform progresses. Directions for future investigation, summarized in Fig. 2, include studies at the level of individual countries or regions focusing on quality, access, and equity. Continued assessment of metrics of quality and patient satisfaction is important since UHC operates on a social contract, the sustainability of which depends on public perception of, and trust in, the quality of a national health care system. Access may be measured through analysis of billing data gathered by national health plans in order to capture *de facto* rates of utilization. Assessment of the impact of infrastructure on delivery of care and logistical access to health facilities is also recommended. As achievements are made in both quality and access, ongoing evaluation of distribution of health resources will be important to the sustainability and equity of UHC.

Recommendations for future investigations

- Country- and region-level studies
- Assessment of patient satisfaction and quality of care
- Analysis of itemized billing data to capture utilization as a measure of access
- Evaluation of the impact of infrastructure on access and delivery
- Ongoing assessment of distribution of health resources

Fig. 2 Recommendations for future investigations

Our findings suggest several policy recommendations to improve the achievement and sustainability of UHC in LMICs (Fig. 3):

1. Stronger financial risk protection mechanisms, particularly for the poor. It is concerning that OPPs remain catastrophic even in countries with UHC. OPPs are a particular barrier for people whose incomes fall below the poverty line, a population that tends to be more price sensitive and whose demand for health services is more elastic [48]. Medicines and equipment are currently the greatest contributors to OPPs in most LMICs with UHC, and improved cost sharing for these goods through co-payment policies and price ceilings can improve access and enhance social protection for the poor and other vulnerable populations. Another policy that countries could consider to decrease OPPs is the incorporation of catastrophic health plans for costly conditions, similar to ones identified in Chile[28], South Korea[31], and Mexico[49].
2. Coordination of care and bolstering of internal financing. Significant efforts should be made to improve existing mechanisms for internal financing of health care, i.e., payroll taxes, government revenues, and member contributions. This is important so that reliance on external funding, which is highly dependent on the political economy of foreign countries, may be reduced. In those countries that rely heavily on external resources, significant benefit may be derived by coordinating the terms of external funding (e.g., foreign aid) with internal policies to strengthen health systems, reducing the donor-induced demand associated with vertical disease programs. Strengthening relationships between multiple ministries and departments in all countries is likely to improve the ability of governments to direct priority setting in the context of limited resources.

Policy recommendations:

- Stronger financial risk protection mechanisms for the poor, targeting reduction of OPP for medicine and equipment
  - Co-payment policies
  - Price ceilings
  - Catastrophic health plans
- Coordination of care and financing
  - Streamline relationships between multiple ministries and departments
  - Improve existing mechanisms for internal financing of health care
  - Decrease reliance on external funding
- Primary care systems strengthening
- Investment in human resource development and provider retention
- Health information technology development and data collection

Fig. 3 Policy recommendations

3. Primary care systems and other infrastructure strengthening. Strengthening primary health systems has a significant impact on the responsiveness of the health systems, and shifting delivery of minor surgeries to ambulatory care settings by trained non-surgical primary care providers may reduce costs. Expanding the training and scope of practice for primary care physicians may facilitate efficient use of resources given the limited supply of specialists in many LMICs.
4. Investment in human resource development and provider retention. Human resources remain a challenge, as the shortage of physicians and nurses in many LMICs is even more notable for surgeons and anesthesia providers. Task shifting and training more community health workers have been proposed; however, it is unlikely that social protection plans can provide adequate access without significant human resources investment in increased physician training and provider retention incentives, since utilization of health services is expected to rise after implementation of insurance.
5. Health information technology development and improved data collection. Health information technology represents another significant area that could be expanded. Databases based on disease registries such as the local and national cancer registries in Chile and Taiwan would allow monitoring of the impact of insurance programs on financial risk protection, outcomes, and overall patient satisfaction with health reform. The development of information technology would certainly contribute to better coordination of care, and facilitate data collection to better identify target areas for ongoing and future priority setting.

The inclusion of surgery in the operating plans for UHC in the countries we analyzed sets an important precedent for global health systems strengthening. This is especially true in the context of persistently high rates of catastrophic level OPPs in LMICs and a growing global prevalence of non-communicable diseases, many of which are surgically treatable. Although there is significant variability among the countries we analyzed in achievement of the three dimensions of UHC, continued investigation and intervention in the area of health systems strengthening has increasing relevance in the intersecting fields of global surgery and health policy. Shifting the focus of global health financing discussions from vertical or horizontal aid programs to health systems strengthening and surgical capacity building, including consideration of the policy recommendations suggested by our findings, will be essential to addressing this changing aspect of the landscape of global health.

Conflicts of interest All authors declare no conflicts of interest.

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