

Supplementary file #4: review of country-level evidence, current status, and trajectories

As described in the methods of the article, we sought to assess the current state of primary health care in the 14 countries profiled by Kruk et al. in their 2010 paper—the last summative review of primary health care initiatives in LMIC. (1) Below, we summarize progress made (or lack thereof) across the three performance domains addressed in Kruk (2010): effectiveness, equity, and efficiency. The end of this document summarizes levels of evidence and current trajectories of these PHC systems in Table 1.

Afghanistan

Overview

Impression of primary care health system: Improving (moderate evidence base)

Despite a history of decades of conflict, Afghanistan has made concerted systematic efforts to develop primary care systems dating back at least 20 years. Most recently, in spite of ongoing political strife and violence, the government has continued to make further investments in primary care, moving in a generally positive direction. Specific improvements to the primary health system include improvements in the health systems services, infrastructure, and consumables via the Basic Package of Health Services, the implementation and expansion of integrated management of childhood illnesses (IMCI) services, and the removal of user fees in 2008.

Detailed Evidence Summary

Effectiveness:

Afghanistan has made significant improvements in under-five, infant, and newborn mortality from 1990 to 2015. (2) Multiple reforms that have contributed to these improvements are described in the literature. In 2001, Afghanistan began implementing a Basic Package of Health Services which over time led to the number of facilities more than doubling, leading to improved access and utilization of health services; increased rates of deliveries attended by a skilled birth attendant; improved supplies of essential medicines; and strengthened health ICT systems.(3) These successes were facilitated by a focus on translating policy and strategy into practical interventions; focusing health services on priority health problems; clearly defining services to be delivered at each service level; and contracting out the provision of the Basic Package of Health services to non-governmental organizations and private entities.(3)

During this time, Afghanistan also strengthened its focus on improving HRH systems, leading to a fivefold increase in midwives within the country between 2002 and 2010s. (4) Additionally, Afghanistan also initiated implementation and scale-up for facility-based IMCI in 2003 and introduced CHW-based IMCI protocols in 2008. (2) These efforts have led to improved assessments, more rationale use of antibiotics, and improved counseling on home care. (2) Finally, along with these other reforms, Afghanistan also introduced a national balanced scorecard system. A study of over 600 facilities between 2004 and 2008 found that the scorecard led to improved: patient and community satisfaction

with services; provider satisfaction; capacity for service provision; quality of services; improvements in IMCI indices; and a stronger overall vision for pro-poor and pro-female health services in the country. (5)

Equity:

Implementation of the Basic Package of Health Services led to improved access to care for rural populations and women, and an assessment of rural versus non-rural facilities found that the quality of care is similar. (3,5,6)

However, persistent inequities remain; for example, literate women and wealthy women were found to be 84% and 70% more likely to have a skilled birth attendant, respectively, than illiterate women and women in the poorest quintile. (7,8)

Efficiency:

The assessment of rural versus non-rural facilities described above found that systems costs for similar services at remote versus non-remote facilities were 1.49 times as high, representing an “equity-efficiency trade-off.” (6) Pre-2008, facilities that implemented user fees were found to have a slower increase in service utilization than facilities that did not. (9) In 2008, user fees were removed leading to increased utilization with no loss of quality. (10)

Bolivia

Overview

Impression of primary care health system: Indeterminate (low evidence base)

There is a significant lack of published evidence regarding the Bolivian primary health system. There have been some documented attempts by the government to improve primary health care, including policy reforms to guarantee health as a human right, but the overall lack of evidence makes it “virtually impossible to draw definite conclusions” about the current status or trajectory of the health system.(11)

Detailed Evidence Summary

Effectiveness:

In 2007, it was documented that 45% of primary health care centers throughout the country did not have a physician. (12) The 2007 reforms in Bolivia guaranteed health as a human right, but very little, if any, articles or data are available describing changes since this reform. A recent review found that while “it is clear that Bolivia has made important and significant progress in the development of a national health system focused on primary care in an intercultural setting,” the dearth of available evidence “make it virtually impossible to draw definite conclusions.” (11)

Equity:

Despite the 2007 reforms, limited healthcare access has been described for as much as 77% of the population of Bolivia. (12) In 2009, 57% of all Bolivians lacked health insurance and only 12% were able to pay for private insurance. Access barriers for the non-Spanish speaking indigenous population (35% of Bolivia’s total population) have been documented.

Efficiency: no data

Brazil

Overview

Impression of primary care health system: Improving (high evidence base)

There is extensive evidence to document forward progress in the Brazilian primary health system. While there remain many gaps and challenges, the system is functioning at the level and quality of many systems in wealthier nations, is incurring lower costs per patient for similar outcomes, and is focused on progressive policy and implementation reforms to continue its progress in the near future. Specific initiatives that have documented impact include the Family Health Strategy (FHS) and the Mais Medicos program.

Detailed Evidence Summary

Effectiveness:

The Family Health Strategy implemented in Brazil is a robust, progressive, team-based and community-centered primary health strategy. (13,14) The FHS has focused on improving access and making primary care the first point of contact, in part through the formation of family health teams that include community health agents. FHS expansion has resulted in improvements in child health, including large and sustained reduction in infant mortality. Among adults, the FHS has increased rates of “usual source of care” within PHC, which has contributed to reductions in hospitalization rates for ambulatory care-sensitive conditions, reductions in complications from chronic conditions, and, ultimately, large reductions in mortality secondary to cardiovascular and cerebrovascular causes.(14–17) Additionally, implementation of the FHS has been described as increasing the institutionalization of evaluations. (13)

The FHS also has many challenges. Management of FHS at the municipal level has led to large variability in service availability and quality.(14) The rapid expansion of FHS led to shortage of doctors, which the government has responded to with the “controversial” Mais Medico program, which has imported approximately 15,000 physicians from Cuba and other countries. (14) Multiple studies have documented challenges in patient-provider communication and coordination of care, which has been compounded by a lack of health ICT. (14,15,18,19) Despite improvements in continuity, 66% of adults still do not have a regular doctor and access to care remains an issue. (18)

To address some of these challenges, Brazil recently introduced the National Program for Improving Primary Care Access and Quality. (20) This is likely the largest primary care PBF program in the world, and has led to a near doubling of investment in primary care. However, no data is yet available on the program’s outcomes or its ability to address the shifting epidemiological burden of disease in Brazil.

Equity:

The Family Health Strategy focused on the poorest segment of the population and has been shown to have reduced inequities and have had the strongest effect in improving usual source of care in the

poorest areas of the country. (14,21) However, the FHS has struggled to reach the middle class, who often prefer to seek private sector services. (14)

Efficiency:

It is estimated that Brazil spends \$50 per person per year on the FHS program, making it “extremely” cost-effective.(14)

Costa Rica

Overview

Impression of primary care health system: Stable to improving (low evidence base)

There is a dearth of published evidence regarding the Costa Rican primary health system, but what has been written seems to imply that there is stability and possible improvement of an already high-functioning system in recent years. HRH-strengthening programs for both physician and non-physician cadres, integration of public health and primary health services, multidisciplinary teams, geographic empanelment, and improved monitoring and evaluation systems all imply forward progress within the government primary health system, but effectiveness or impact data do not yet exist.

Detailed Evidence Summary

Effectiveness:

A recent case study detailed four critical health reforms undertaken in Costa Rica over the last 25 years, including integration of public health and primary care services, the formation of high-functioning multidisciplinary teams, geographic empanelment of the population to these teams, and strong measurement systems with data feedback loops.(22) Additionally, various human resource-strengthening interventions have been undertaken to improve access to services; however, no effectiveness data is presented.(23) A study of the managerial and financial reimbursement structures in Costa Rica concluded that these systems consume too much time, reducing the comprehensiveness of clinical consultations and inducing disproportionate consumption of hospital emergency services.(24) The authors suggest that these systems should be restructured to optimize for access, quality of care, patient-centeredness, and efficiency.

Equity: No Data

Efficiency: No Data

Cuba

Overview

Impression of primary care health system: Indeterminate (low evidence base)

While there is historic documentation of a robust and progressive focus on primary health system development within the Cuban system, there is scant recent literature describing the current status or

trajectory. Historical data suggests that the Cuban system functions at or even above the quality levels of many wealthier nations, for significantly lower costs; however, there is no recent update to these data, so it is impossible to say if this trend has continued, is improving, or has stagnated.

Detailed Evidence Summary

Effectiveness:

Limited evidence is available about recent progress or performance of the Cuban primary health care system. However, a time-agnostic description of the system highlights low under-five mortality and infant mortality; high life expectancy; complete empanelment such that everyone has a primary care provider with access to referral specialist care; and an absence of user fees. (25)

Equity:

Campion et al. describe essentially complete universal coverage.(Campion and Morrissey 2013)

Efficiency:

No cost data is available in the literature, but in general a low-cost and highly-efficient system is described. (25)

Gambia

Overview

Impression of primary care health system: Indeterminate (low evidence base)

There is almost no published data, historically or recently, to describe the effectiveness of the Gambian primary health system, nor its current trajectory. The articles that have been published do not present sufficient data to make responsible conclusions about status or trajectory.

Detailed Evidence Summary

Effectiveness: No data.

Equity:

It has been shown that access to care—measured as severity of disease presentation and delay of presentation—is decreased for villages that lack free transportation to clinics. (26) Access was not linked to age or gender.

Efficiency: no data

Ghana

Overview

Impression of primary care health system: Improving (moderate evidence base)

The Ghanaian primary health system is making forward progress, with documented evidence to support improved coverage and expanded service provision. National health insurance and the development and scale-up of the national community-based health planning and services (CHPS) have resulted in improved antenatal care and postnatal care coverage, increased rates of skilled deliveries, and reductions in under-five mortality. A focus on expansion of services to previously marginalized rural communities and pro-poor health financing have resulted in improved equity gaps. Despite these improvements, the Ghanaian system faces persistent challenges, including access barriers, poor quality service implementation in certain areas, and increasingly rising costs, especially in the context of aging populations and epidemiologic transitions.

Detailed Evidence Summary

Effectiveness:

The Community Health Planning and Strategy (CHPS) program was initiated in 1990 through a small pilot, which found a 50% reduction in under-five mortality within three years. (27) Since then, the program has been scaled nationally, although progress has been strongest in one region. The CHPS program provides evidence of the importance of deep community engagement to ensure that service planning and delivery is response to local needs. The CHPS program employed several strategies to do so, including: recruiting community health nurses from neighboring communities so that they had knowledge of local culture but could also remain a socially-neutral source of care; involvement and advocacy with local politicians to get buy-in and mobilize start-up funds; engaging community groups in assessing healthcare quality to increase accountability of leaders and health workers. (27–30) The introduction of a national health insurance scheme in Ghana in 2003 has been associated with increases in utilization of antenatal care, postnatal care, and skilled delivery in insured compared to non-insured women. (31) Additionally, patients with government insurance report higher approval ratings than non-insured patients. (32) Through the Population Health Implementation and Training Program, Ghana made significant improvements to its health ICT systems, including simplifying data collection registers to reduce data collection time and speed the analysis and feedback of data to frontline users. (33) Multiple innovations in care delivery in Ghana have also been described, such as an emergency referral program for rural clinics without access to emergency surgical care, which showed a reduction in in-facility maternal mortality and strong community approval. (29)

Despite this progress, Ghana faces many challenges, including the finding that only 33% of the population has access to basic chronic care services. (34) Additionally, dissatisfaction from providers has been documented, including delays in reimbursement of insurance claims, insufficient coordination across the system, inadequate funding for primary health services, and lack of robust services—particularly lab services—at PHC facilities. (35)

Equity:

The elimination of user fees and establishment of a national health insurance scheme are pro-poor progressive financing mechanisms, however data shows that the poorest women have lower facility delivery rates and that there are significant differences between wealthy and poor, urban and rural, and insured versus non-insured populations in access to basic chronic care management services. (34,36)

Furthermore, 65.5% of households were reported to have faced catastrophic health expenditures in the last year, and 54.8% at the last outpatient visit.

Efficiency:

In 2012, Ghana introduced capitation payments to contain costs related to fee-for-service and diagnostic-related groups.(37)

Iran

Overview

Impression of primary care health system: Stable (moderate evidence base)

The Iranian health system has historically already been functioning at a high level, with outcomes equivalent to many wealthier nations, despite significantly lower spending. Recent evidence suggests that the health system is facing many challenges including the ineffective design and implementation of the Family Physician program, rising costs with prohibitive out-of-pocket expenditures, fragmented health information and financing systems, persistent rural versus urban disparities, and an aging population and resulting epidemiologic transition that the system is struggling to accommodate. Nonetheless, the government has continued to attempt further reforms, including the recent Health Sector Evolution Plan, which has shown some early promise as a positive step forward. Generally, the problems that the Iranian system is facing are similar to challenges found in many high-income countries and, while very real, there is evidence that the public sector is taking steps to address these challenges.

Detailed Evidence Summary

Effectiveness:

In the last decade, Iran has faced multiple challenges, including rising costs, poor referral systems, high OOP payments, an increasing chronic disease burden, and issues regulating an expanding private sector.(38,39) A Family Physician Program initiated in 2005 alongside a Rural Health Insurance Program was reportedly unsuccessful at improving continuity in rural primary care and resulted in fragmentation of and conflict within the purchases/provider relationship. (40–42) To address some of these challenges, a payment reform has been initiated in which family physicians are to be reimbursed on a risk-adjusted capitation basis to decrease costs while ensuring primary care access and quality. This system will also include performance-based rewards for value-based healthcare. The program is demonstrating early successes, but no robust data is available yet. (38)

Multiple resources were found describing Iran's national community health worker program and efforts to inculcate a culture of patient safety in the primary health care system, however no effectiveness data was available.(43,44)

Equity:

Despite government efforts, persistent rural/urban inequities remain.(38,40–42)

Efficiency: no data

Kerala

Overview

Impression of primary care health system: Indeterminate (low evidence base)

Kerala has a strong history of a high-quality primary health system with near universal coverage and outcomes at the levels of many wealthier nations, for much lower costs. There is, however, a dearth of recent published evidence to clearly understand the current status or trajectory of the health system. Documentation of “higher-level” primary health services, such as palliative care provision and adolescent-specific services, imply that the system is moving in a positive direction, but in the absence of evidence, it is not possible to make determinate conclusions.

Detailed Evidence Summary

Effectiveness:

Examples of new palliative care and community adolescent-specific pediatric practices exist but do not have robust effectiveness data. (45,46)

Equity: no data

Efficiency: no data

Liberia

Overview

Impression of primary care health system: Stable to improving (low evidence base)

Despite many continued weaknesses, and the recent devastation of the Ebola epidemic, the Liberian health system seems to be making forward progress. Evidence is very limited, but suggests that the implementation of a Basic Package of Health Services and, subsequently, the essential package of health services, along with a burgeoning CHW and integrated community case management (iCCM) infrastructure, are all moving the system in a positive direction. The system still struggles with profound equity gaps, service coverage gaps, and some of the worst outcomes globally, but, given Liberia’s status as a fragile state, the health system has some evidence of progress.

Detailed Evidence Summary

Effectiveness:

The initiation of the implementation of a Basic Package of Health Services in 2003 was effective, with 80% of government clinics meeting minimum standards by 2010.(47) Following this success, implementation was expanded to an Essential Package of Health Services. Between 2007 and 2013, Demographic and Health Survey data indicate improvements in antenatal, postnatal, and IMCI-related care. Nevertheless, at the time of the Ebola outbreak Liberia’s health system still lacked sufficient

human resources; drugs and supplies; adequate facility infrastructure; effective health ICT systems; and policies to address NCDs, mental health, and HIV/AIDS, particularly in rural areas.(47–49) The Ebola outbreak is known to have exacerbated these pre-existing weaknesses.(48)

Equity:

Notable inequities between rural/remote regions and more urban areas have been noted. (47,49)

Efficiency: no data

Mexico

Overview

Impression of primary care health system: Stable to improving (moderate evidence base)

Historically, Mexico's primary health system has been known to be quite strong, and the implementation of Seguro Popular dramatically improved coverage and outcomes in many areas throughout the country. Recent evidence is not very robust, but suggests continued forward progress. Specifically, the PREVENIMSS primary care program has shown significant impacts on NCD outcomes and mortality, in line with the national priorities to address an aging population undergoing an epidemiologic transition. Further evidence shows that, among insured patients, chronic care access and outcomes are improved. Nonetheless, many challenges remain, including access gaps for poorer patients, gaps in insurance coverage, low rates of empanelment and access to primary care providers, low patient satisfaction scores in primary care facilities, high OOP expenditures, and fragmented referral systems.

Detailed Evidence Summary

Effectiveness:

The PREVENIMSS program was initiated in 2002 to improve primary health care and reduce the burden of disease in Mexico. (50) Since then, the program has demonstrated improvements, including decreased incidence of cervical cancer, breast cancer, and cerebrovascular disease as well as decreased mortality from diabetes mellitus, hypertension, ischemic heart disease, cerebrovascular disease, cervical cancer, and breast cancer. Additionally, 80% of respondents in a recent study reported that the care they received was excellent, very good, or good. (15)

However, many challenges remain. For example, only 21% of adults over the age of 50 were reported to have access to basic chronic care, and significant proportions of adults reported having no regular doctor, difficulty communicating with their doctor, and a lack of coordination in primary care. (15,18,34) Significant heterogeneity between states in terms of primary care hospitalizations exist, implying varying degrees of quality. (51)

Equity:

Access to basic chronic care services is more likely for individuals with health insurance, wealthier individuals, and those living in urban areas. (34) Higher rates of hospitalization for poorer populations have been found. (51) Indigenous populations are enrolled in Seguro Popular and use services at greater

rates than non-indigenous people, leading researchers to conclude that socioeconomic conditions in general (and not ethnicity specifically) determine healthcare utilization.(52) Catastrophic expenditures are disproportionately worse in the poorest quintiles, an individuals with insurance are less likely to have catastrophic OOP expenditures than those without insurance. (34)

Efficiency: No data.

Niger

Overview

Impression of primary care health system: Indeterminate (low evidence base)

There is a significant dearth of published evidence regarding Niger's primary health system. There is some discussion in the literature surrounding the removal of user fees, and the implementation of iCCM and CHW programs, which collectively imply progressive and forward-thinking public sector strategy. There is, however, no data regarding the effectiveness of these initiatives, thus it is not possible to conclude much about the current status or the trajectory of the health system

Detailed Evidence Summary

Effectiveness:

Integrated community case management and community health worker programs have been implemented in Niger, however no evidence of impact has been reported. (53,54) Lagarde et al. report on the removal of user fees and show mixed results on utilization in different districts, with some showing improved and some showing decreased utilization. (55)

Equity:

The removal of user fees may be assumed to be a pro-poor policy, however the evidence of this is complex and contextually mediated. (55)

Efficiency:

Sri Lanka

Overview

Impression of primary care health system: Stable to improving (moderate evidence base)

Sri Lanka's primary health system has historically been quite strong, with extensive PHC coverage and under—five mortality rates and life expectancies at levels equivalent to much wealthier nations. Recent evidence suggests that the health system continues to be strong, and possibly improving, although with the limited published data it is difficult to conclusively determine a trajectory. Recent literature has documented equally high quality of care provision in both the private and public sectors with excellent patient satisfaction scores, and generally low costs. The government has prioritized pro-poor

progressive health financing mechanisms, and while not completely absent, equity gaps are considered to be lower than many similar nations.

Detailed Evidence Summary

Effectiveness:

Equally high quality of care has been demonstrated in the public and private sector, with levels approaching quality seen in high-income country health systems.(56) Additionally, very high levels of patient satisfaction and perception of quality of care have been reported. Despite gaps in NCD diagnostic capacity and essential medicine availability, performance overall was higher than other countries included in the same study (including Benin, Bhutan, Eritrea, Sudan, Suriname, Syria, and Vietnam).(57)

Equity:

Sri Lanka has maintained a pro-poor financing structure throughout the health system, with progressive distribution of health financing burden.(36)

Efficiency:

Rannan-Eliya et al. demonstrated generally low expenditures throughout the public sector while achieving very good outcomes.(58)

Thailand

Overview

Impression of primary care health system: Stable to improving (high evidence base)

The Thai health system has a robust history of high-quality service provision with nearly universal care and good outcomes. Historic programs expanding services to rural populations made great impact in the health outcomes and health equity domains. There is a good amount of recently published literature, but the data presented overlaps with the period of time described by Kruk 2010, making it difficult to determine if the system has maintained high-functioning stability, or if it is truly improving. Specifically, the literature describes low levels of unmet health needs, a focus on chronic care programs, generally widespread access of services even in rural areas, pro-poor health financing, and initiatives aimed at reducing OOP expenditures which have reduced equity gaps. However, the system continues to struggle with problems that many other high-functioning health systems have, including epidemiologic transitions and aging populations, and the effective implementation of pay-for-performance financing schemes.

Detailed Evidence Summary

Effectiveness:

Overall, Thailand has low levels of unmet health needs and “nearly universal” health insurance coverage. (36,59) Although persistent differences in travel time to PHC clinics exist among those clinics service the poorest and illiterate populations, even these populations of high rates of public insurance

coverage and access to primary health care.(60) The implementation of national health insurance has led to increased overall sales (reimbursed by insurance) of essential medicines, specifically for NCDs such as hypertension, diabetes mellitus, and hyperlipidemia. (61)

Equity:

Overall, Thailand has equitable access to health services.(36) However, there is a persistently inequitable distribution of health workers in rural areas.(62) To address this, in recent years, Thailand has undertaken initiatives to increase the supply of generalist physicians, particularly in rural areas; provide fiscal incentives to rural practitioners to increase retention; and eliminate co-payments.(63)

Following the introduction of national insurance, use of primary health care facilities became more concentrated among the poor while use of provincial/general hospitals became more concentrated among wealthier populations.(64) The authors of this study suggest that there is a need for future policies to focus on the quality of primary care across facility levels and equitable referrals to secondary and tertiary health facilities when required.

Efficiency:

Overall, Thailand has maintained a pro-poor distribution of healthcare benefits and adopted progressive health financing mechanisms.(36) Catastrophic OOP expenditures are low and, though greater in poor than non-poor populations, occur primarily through use of private clinics and drugstores implying that such events are rare within the public system. (65,66) Finally, though the 2013 introduction of a PBF financing scheme was seen as initially problematic, but the government has worked to re-formulate the policies and structure of the program to be more locally responsive and relevant. (67)

Conclusions

There is good evidence to show significant progress in several of the reviewed countries. Clear progress has been made in the scope of services, quality of services, access for marginalized populations, and progressive health financing initiatives. There are, of course, many persistent challenges. Some of these challenges seem to be improving, while others appear to be stable from Kruk's prior descriptions.

In some of the higher-performing health systems such as Mexico, Sri Lanka, Iran, Brazil, and Ghana, it is notable that the challenges are similar to those faced by the health systems of

Country	Evidence base	Trajectory
Afghanistan	Moderate	Improving
Bolivia	Low	Indeterminate
Brazil	High	Improving
Costa Rica	Low	Stable to improving
Cuba	Low	Indeterminate
Gambia	Low	Indeterminate
Ghana	Moderate	Improving
Iran	Moderate	Stable
Kerala	Low	Indeterminate
Liberia	Low	Stable to improving
Mexico	Moderate	Stable to improving
Niger	Low	Indeterminate
Sri Lanka	Moderate	Stable to improving
Thailand	High	Stable to improving

Table 1: Summary of the quality of evidence and impression of the trajectory of each health system

much wealthier nations (e.g. chronic care provision, effective empanelment, patient satisfaction scores, epidemiologic transition, and aging populations). This can reasonably be interpreted as a positive finding, given these health systems' lower costs but similarly high-quality outcomes.

Interestingly, none of the countries assessed in this review was found to be clearly worsening. On the one hand, this could be interpreted as an encouraging finding. On the other hand, this may be bias simply due to a lack of "negative" publications, or due to the lack of overall published data about these countries (see Limitations, below). In particular, with regards to the seven countries with "Low" levels of evidence, it is quite possible that the system is overall performing poorly, but in the context of such poor performance, published evaluations have understandably been de-prioritized by health system leaders. Thus, there may be a selective bias for the worst performing health systems to be described even less

than slightly higher-performing health systems. In juxtaposition, in more well-resourced settings such as Brazil (the country with the strongest evidence base in this review), even though there are many persistent gaps in the system, robust academic institutions provide sufficient evidence across the spectrum of "positive" and "negative" studies, to more adequately evaluate accomplishments and persistent challenges.

Limitations of this review

Generally speaking, this review is significantly limited by a lack of robust evidence for the countries being assessed. Available evidence was graded as low if fewer than seven articles were available; moderate if 7-13 articles were available; and high if 14 or more articles were available. Eight (57%) of the fourteen countries reviewed were categorized as "Low" for the quality of the evidence, with six of those eight having three or fewer articles published during the period of review. Five of those six were ultimately categorized as an "Indeterminate" trajectory given the dearth of evidence. Only three countries (21%) were qualified as "High" quantity of evidence. In this context, any conclusions arising from this review must be interpreted with conservative caution, recognizing that a lack of positive or negative evidence in the published literature does not necessarily reflect the true realities of those health systems, only the realistic constraints of a health systems review based only in the published literature. Finally, given the short period of time between the Kruk evaluation and our current evaluation, it is important to recognize that population-level interventions may not yet have had sufficient time to demonstrate their potential impact, and that some of the interventions that were undertaken even prior to the Kruk 2010 evaluation may still have benefit in the future, even if their impact has not yet been documented.

References

1. Kruk ME, Porignon D, Rockers PC, Van Lerberghe W. The contribution of primary care to health and health systems in low- and middle-income countries: a critical review of major primary care initiatives. *Soc Sci Med*. 2010 Mar;70(6):904–11.
2. Mansoor GF, Chikvaide P, Varkey S, Higgins-Steele A, Safi N, Mubasher A, et al. Quality of child healthcare at primary healthcare facilities: a national assessment of the Integrated Management of Childhood Illnesses in Afghanistan. *Int J Qual Health Care*. 2017 Feb 1;29(1):55–62.
3. Newbrander W, Ickx P, Feroz F, Stanekzai H. Afghanistan's basic package of health services: its development and effects on rebuilding the health system. *Glob Public Health*. 2014 May 28;9 Suppl 1:S6-28.
4. Fogarty L, Kim YM, Juon H-S, Tappis H, Noh JW, Zainullah P, et al. Job satisfaction and retention of health-care providers in Afghanistan and Malawi. *Hum Resour Health*. 2014 Feb 17;12:11.
5. Edward A, Kumar B, Kakar F, Salehi AS, Burnham G, Peters DH. Configuring balanced scorecards for measuring health system performance: evidence from 5 years' evaluation in Afghanistan. *PLoS Med*. 2011 Jul 26;8(7):e1001066.
6. Johns B, Steinhardt L, Walker DG, Peters DH, Bishai D. Horizontal equity and efficiency at primary health care facilities in rural Afghanistan: a seemingly unrelated regression approach. *Soc Sci Med*. 2013 Jul;89:25–31.
7. Tappis H, Koblinsky M, Doocy S, Warren N, Peters DH. Bypassing Primary Care Facilities for Childbirth: Findings from a Multilevel Analysis of Skilled Birth Attendance Determinants in Afghanistan. *J Midwifery Womens Health*. 2016 Apr;61(2):185–95.
8. Alonge O, Gupta S, Engineer C, Salehi AS, Peters DH. Assessing the pro-poor effect of different contracting schemes for health services on health facilities in rural Afghanistan. *Health Policy Plan*. 2015 Dec;30(10):1229–42.
9. Steinhardt LC, Rao KD, Hansen PM, Alam S, Peters DH. The effects of user fees on quality and utilization of primary health-care services in Afghanistan: a quasi-experimental health financing pilot study in a post-conflict setting. *Int J Health Plann Manage*. 2013 Dec;28(4):e280-97.
10. Steinhardt LC, Aman I, Pakzad I, Kumar B, Singh LP, Peters DH. Removing user fees for basic health services: a pilot study and national roll-out in Afghanistan. *Health Policy Plan*. 2011 Nov;26 Suppl 2:ii92-103.
11. Alvarez FN, Leys M, Mérida HER, Guzmán GE. Primary health care research in Bolivia: systematic review and analysis. *Health Policy Plan*. 2016 Feb;31(1):114–28.
12. Piette JD, Valverde H, Marinec N, Jantz R, Kamis K, de la Vega CL, et al. Establishing an independent mobile health program for chronic disease self-management support in bolivia. *Front Public Health*. 2014 Aug 13;2:95.

13. Arantes LJ, Shimizu HE, Merchán-Hamann E. The benefits and challenges of the Family Health Strategy in Brazilian Primary Health care: a literature review. *Cien Saude Colet*. 2016 May;21(5):1499–510.
14. Macinko J, Harris MJ. Brazil's family health strategy--delivering community-based primary care in a universal health system. *N Engl J Med*. 2015 Jun 4;372(23):2177–81.
15. Doubova SV, Guanais FC, Pérez-Cuevas R, Canning D, Macinko J, Reich MR. Attributes of patient-centered primary care associated with the public perception of good healthcare quality in Brazil, Colombia, Mexico and El Salvador. *Health Policy Plan*. 2016 Sep;31(7):834–43.
16. Rasella D, Harhay MO, Pamponet ML, Aquino R, Barreto ML. Impact of primary health care on mortality from heart and cerebrovascular diseases in Brazil: a nationwide analysis of longitudinal data. *BMJ*. 2014 Jul 3;349:g4014.
17. Ferrer APS, Brentani AVM, Sucupira ACSL, Navega ACB, Cerqueira ES, Grisi SJFE. The effects of a people-centred model on longitudinality of care and utilization pattern of healthcare services--Brazilian evidence. *Health Policy Plan*. 2014 Sep;29 Suppl 2:ii107-13.
18. Macinko J, Guanais FC, Mullachery P, Jimenez G. Gaps in primary care and health system performance in six latin american and caribbean countries. *Health Aff (Millwood)*. 2016 Aug 1;35(8):1513–21.
19. Vargas I, Mogollón-Pérez AS, De Paepe P, Ferreira da Silva MR, Unger J-P, Vázquez M-L. Barriers to healthcare coordination in market-based and decentralized public health systems: a qualitative study in healthcare networks of Colombia and Brazil. *Health Policy Plan*. 2016 Jul;31(6):736–48.
20. Macinko J, Harris MJ, Rocha MG. Brazil's national program for improving primary care access and quality (PMAQ): fulfilling the potential of the world's largest payment for performance system in primary care. *J Ambul Care Manage*. 2017;40 Suppl 2 Supplement, The Brazilian National Program for Improving Primary Care Access and Quality (PMAQ):S4–11.
21. Dourado I, Medina MG, Aquino R. The effect of the Family Health Strategy on usual source of care in Brazil: data from the 2013 National Health Survey (PNS 2013). *Int J Equity Health*. 2016 Nov 17;15(1):151.
22. Pesec M, Ratcliffe HL, Karlage A, Hirschhorn LR, Gawande A, Bitton A. Primary health care that works: the costa rican experience. *Health Aff (Millwood)*. 2017 Mar 1;36(3):531–8.
23. Dal Poz MR, Sepulveda HR, Costa Couto MH, Godue C, Padilla M, Cameron R, et al. Assessment of human resources for health programme implementation in 15 Latin American and Caribbean countries. *Hum Resour Health*. 2015 Apr 28;13:24.
24. Soors W, De Paepe P, Unger J-P. Management commitments and primary care: another lesson from Costa Rica for the world? *Int J Health Serv*. 2014;44(2):337–53.
25. Champion EW, Morrissey S. A different model--medical care in Cuba. *N Engl J Med*. 2013 Jan 24;368(4):297–9.
26. Rees CP, Hawkesworth S, Moore SE, Dondeh BL, Unger SA. Factors Affecting Access to Healthcare:

- An Observational Study of Children under 5 Years of Age Presenting to a Rural Gambian Primary Healthcare Centre. *PLoS ONE*. 2016 Jun 23;11(6):e0157790.
27. Awoonor-Williams JK, Sory EK, Nyonator FK, Phillips JF, Wang C, Schmitt ML. Lessons learned from scaling up a community-based health program in the Upper East Region of northern Ghana. *Glob Health Sci Pract*. 2013 Mar 21;1(1):117–33.
 28. Awoonor-Williams JK, Phillips JF, Bawah AA. Catalysing the Scale-Up of Community-Based Primary Health Care in a Rural Impoverished Region of Northern Ghana. *International Journal of Health Planning and Management*. 2015;(July 2015):273–89.
 29. Patel S, Koku Awoonor-Williams J, Asuru R, Boyer CB, Awopole Yepakeh Tiah J, Sheff MC, et al. Benefits and Limitations of a Community-Engaged Emergency Referral System in a Remote, Impoverished Setting of Northern Ghana. *Glob Health Sci Pract*. 2016 Dec 23;4(4):552–67.
 30. Alhassan RK, Nketiah-Amponsah E, Spieker N, Arhinful DK, Ogink A, van Ostenberg P, et al. Effect of Community Engagement Interventions on Patient Safety and Risk Reduction Efforts in Primary Health Facilities: Evidence from Ghana. *PLoS ONE*. 2015 Nov 30;10(11):e0142389.
 31. Browne JL, Kayode GA, Arhinful D, Fidler SAJ, Grobbee DE, Klipstein-Grobusch K. Health insurance determines antenatal, delivery and postnatal care utilisation: evidence from the Ghana Demographic and Health Surveillance data. *BMJ Open*. 2016 Mar 18;6(3):e008175.
 32. Fenny AP, Enemark U, Asante FA, Hansen KS. Patient satisfaction with primary health care - a comparison between the insured and non-insured under the National Health Insurance Policy in Ghana. *Glob J Health Sci*. 2014 Apr 1;6(4):9–21.
 33. Mutale W, Chintu N, Amoroso C, Awoonor-Williams K, Phillips J, Baynes C, et al. Improving health information systems for decision making across five sub-Saharan African countries: Implementation strategies from the African Health Initiative. *BMC Health Serv Res*. 2013 May 31;13 Suppl 2:S9.
 34. Goepfel C, Frenz P, Grabenhenrich L, Keil T, Tinnemann P. Assessment of universal health coverage for adults aged 50 years or older with chronic illness in six middle-income countries. *Bull World Health Organ*. 2016 Apr 1;94(4):276–85C.
 35. Awoonor-Williams JK, Tindana P, Dalinjong PA, Nartey H, Akazili J. Does the operations of the National Health Insurance Scheme (NHIS) in Ghana align with the goals of Primary Health Care? Perspectives of key stakeholders in northern Ghana. *BMC Int Health Hum Rights*. 2016 Sep 5;16(1):23.
 36. Asante A, Price J, Hayen A, Jan S, Wiseman V. Equity in Health Care Financing in Low- and Middle-Income Countries: A Systematic Review of Evidence from Studies Using Benefit and Financing Incidence Analyses. *PLoS ONE*. 2016 Apr 11;11(4):e0152866.
 37. Andoh-Adjei F-X, Cornelissen D, Asante FA, Spaan E, van der Velden K. Does capitation payment under national health insurance affect subscribers' trust in their primary care provider? a cross-sectional survey of insurance subscribers in Ghana. *BMC Health Serv Res*. 2016 Aug 24;16(1):437.

38. Esmaeili R, Hadian M, Rashidian A, Shariati M, Ghaderi H. The Experience of Risk-Adjusted Capitation Payment for Family Physicians in Iran: A Qualitative Study. *Iran Red Crescent Med J*. 2016 Apr;18(4):e23782.
39. Moghadam MN, Sadeghi V, Parva S. Weaknesses and challenges of primary healthcare system in Iran: a review. *Int J Health Plann Manage*. 2012 Jun;27(2):e121-31.
40. Heshmati B, Joulaei H. Iran's health-care system in transition. *Lancet*. 2016 Jan 2;387(10013):29–30.
41. Jahromi VK, Mehrolohasani MH, Dehnavieh R, Anari HS. Continuity of Care Evaluation: The View of Patients and Professionals about Urban Family Physician Program. *Int J Prev Med*. 2017 Feb 20;8:7.
42. Takian A, Rashidian A, Doshmangir L. The experience of purchaser-provider split in the implementation of family physician and rural health insurance in Iran: an institutional approach. *Health Policy Plan*. 2015 Dec;30(10):1261–71.
43. Javanparast S, Baum F, Labonte R, Sanders D, Rajabi Z, Heidari G. The experience of community health workers training in Iran: a qualitative study. *BMC Health Serv Res*. 2012 Aug 31;12:291.
44. Tabrizchi N, Sedaghat M. The first study of patient safety culture in Iranian primary health centers. *Acta Med Iran*. 2012;50(7):505–10.
45. Thayyil J, Cherumanalil JM. Assessment of status of patients receiving palliative home care and services provided in a rural area-kerala, India. *Indian J Palliat Care*. 2012 Sep;18(3):213–8.
46. Nair MKC, Leena ML, George B, Sunitha RM, Prasanna GL, Russell PS. A panchayat level primary-care approach for adolescent services. *Indian J Pediatr*. 2012 Jan;79 Suppl 1:S6-10.
47. Kentoffio K, Kraemer JD, Griffiths T, Kenny A, Panjabi R, Sechler GA, et al. Charting health system reconstruction in post-war Liberia: a comparison of rural vs. remote healthcare utilization. *BMC Health Serv Res*. 2016 Sep 7;16:478.
48. Siekmans K, Sohani S, Boima T, Koffa F, Basil L, Laaziz S. Community-based health care is an essential component of a resilient health system: evidence from Ebola outbreak in Liberia. *BMC Public Health*. 2017 Jan 17;17(1):84.
49. Lee PT, Kruse GR, Chan BT, Massaquoi MB, Panjabi RR, Dahn BT, et al. An analysis of Liberia's 2007 national health policy: lessons for health systems strengthening and chronic disease care in poor, post-conflict countries. *Global Health*. 2011 Oct 10;7:37.
50. Borja-Aburto VH, González-Anaya JA, Dávila-Torres J, Rascón-Pacheco RA, González-León M. Evaluation of the impact on non-communicable chronic diseases of a major integrated primary health care program in Mexico. *Fam Pract*. 2016 Jun;33(3):219–25.
51. Lugo-Palacios DG, Cairns J. Using ambulatory care sensitive hospitalisations to analyse the effectiveness of primary care services in Mexico. *Soc Sci Med*. 2015 Nov;144:59–68.
52. Leyva-Flores R, Servan-Mori E, Infante-Xibille C, Pelcastre-Villafuerte BE, Gonzalez T. Primary health care utilization by the mexican indigenous population: the role of the Seguro popular in

- socially inequitable contexts. *PLoS ONE*. 2014 Aug 6;9(8):e102781.
53. Bennett S, George A, Rodriguez D, Shearer J, Diallo B, Konate M, et al. Policy challenges facing integrated community case management in Sub-Saharan Africa. *Trop Med Int Health*. 2014 Jul;19(7):872–82.
 54. Leon N, Sanders D, Van Damme W, Besada D, Daviaud E, Oliphant NP, et al. The role of “hidden” community volunteers in community-based health service delivery platforms: examples from sub-Saharan Africa. *Glob Health Action*. 2015 Mar 12;8:27214.
 55. Lagarde M, Barroy H, Palmer N. Assessing the effects of removing user fees in Zambia and Niger. *J Health Serv Res Policy*. 2012 Jan;17(1):30–6.
 56. Rannan-Eliya RP, Wijemanne N, Liyanage IK, Jayanthan J, Dalpatadu S, Amarasinghe S, et al. The quality of outpatient primary care in public and private sectors in Sri Lanka—how well do patient perceptions match reality and what are the implications? *Health Policy Plan*. 2015 Mar;30 Suppl 1:i59–74.
 57. Mendis S, Al Bashir I, Dissanayake L, Varghese C, Fadhil I, Marhe E, et al. Gaps in capacity in primary care in low-resource settings for implementation of essential noncommunicable disease interventions. *Int J Hypertens*. 2012 Nov 29;2012:584041.
 58. Saleh S, Alameddine M, Mourad Y, Natafqi N. Quality of care in primary health care settings in the Eastern Mediterranean region: a systematic review of the literature. *Int J Qual Health Care*. 2015 Apr;27(2):79–88.
 59. Somkotra T. Measurement and explanation of horizontal (in)equity in health care utilization among Thais after universal coverage policy implementation. *Asia Pac J Public Health*. 2011 Nov;23(6):980–95.
 60. Yingtaweesak T, Yoshida Y, Hemhongsap P, Hamajima N, Chaiyakae S. Accessibility of health care service in Thasongyang, Tak Province, Thailand. *Nagoya J Med Sci*. 2013 Aug;75(3–4):243–50.
 61. Garabedian LF, Ross-Degnan D, Ratanawijitrasin S, Stephens P, Wagner AK. Impact of universal health insurance coverage in Thailand on sales and market share of medicines for non-communicable diseases: an interrupted time series study. *BMJ Open*. 2012 Nov 28;2(6).
 62. Thoresen SH, Fielding A. Inequitable distribution of human resources for health: perceptions among Thai healthcare professionals. *Qual Prim Care*. 2010;18(1):49–56.
 63. Strasser R, Kam SM, Regalado SM. Rural health care access and policy in developing countries. *Annu Rev Public Health*. 2016 Jan 6;37:395–412.
 64. Yiengprugsawan V, Carmichael G, Lim L-Y, Seubsman S, Sleigh A. Explanation of inequality in utilization of ambulatory care before and after universal health insurance in Thailand. *Health Policy Plan*. 2011 Mar;26(2):105–14.
 65. Intaranongpai S, Hughes D, Leethongdee S. The provincial health office as performance manager: change in the local healthcare system after Thailand’s universal coverage reforms. *Int J Health Plann Manage*. 2012 Dec;27(4):308–26.

66. Weraphong J, Pannarunothai S, Luxananun T, Junsri N, Deesawatsripetch S. Catastrophic health expenditure in an urban city: seven years after universal coverage policy in Thailand. *Southeast Asian J Trop Med Public Health*. 2013 Jan;44(1):124–36.
67. Khampang R, Tantivess S, Teerawattananon Y, Chootipongchaivat S, Pattanapesaj J, Butchon R, et al. Pay-for-performance in resource-constrained settings: Lessons learned from Thailand's Quality and Outcomes Framework [version 1; referees: 1 approved, 1 approved with reservations]. *F1000Res*. 2016 Nov 18;5:2700.