Identification of research gaps to enable better financing of primary health care in low- and middle-income countries

Felicity Goodyear-Smith on behalf of the WONCA team

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Table of Contents

List of Tables

List of Figures

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Abbreviations

AAAPC	Australasian Association of Academic Primary Care
ABFM	American Board of Family Medicine
HIC	High income country
LIC	Low income country
LMIC	Low and middle income country
MIC	Middle income country
NAPCRG	North American Primary Care Research Group
NZ	New Zealand
OECD	Organisation for Economic Co-operation and Development
PHC	Primary health care
PHCPI	Primary Health Care Performance Initiative
PPP	Public private providers
RGC	Robert Graham Center
SAPC	Society for Academic Primary Care
UK	United Kingdom
US	United States
WHO	World Health Organization
WONCA	World Organization of Family Doctors
WP-R	Working Party on Research

"There is no question that part of improving health in poorer countries, as in richer, is the provision of comprehensive primary care."

-Sir Michael Marmot

Introduction

In 1978, the Declaration signed at Alma-Ata labelled primary health care (PHC) the central *central function and main focus [of a] country's health system*, calling for it to be strengthened, particularly in low and middle income countries (LMIC).[1] Timely access to affordable, acceptable primary health care from competent providers is crucial to achieving prevention, diagnosis, treatment and ongoing management of health problems.[2-6] A strong PHC sector with an ongoing responsibility for integrating and addressing multiple care needs is key to doing this in a cost-effective and proactive way that maximises patient empowerment and also addresses population health needs.[7] Delivery of PHC requires a well-trained and well-resourced workforce which is adequate and appropriate for specific regional and national contexts. This requires a shared understanding of how primary care is financed or otherwise resourced, to provide the PHC functions that produce equity and value across health systems.

The initial response to Alma Ata was the introduction of vertical programmes for specific populations,[8] but contemporarily PHC is now expected to give access to range of services spanning health promotion, prevention, acute and chronic care management, palliative care and rehabilitation for the whole population using multidisciplinary teams.[9] These should be 'people-focused' and community-based 'horizontal' services (providing comprehensive care) for both individuals and families.[10] The Declaration recognised that key factors in its effectiveness would be individual and community engagement in PHC organisation.[1] In its closing sentences, the Declaration called on the "whole world community to support national and international commitment to primary health care and to channel increased technical and financial support to it, particularly in developing countries." For the subsequent forty years, most PHC research focused on high-income nations and even there, scant research attended to what adequate financial support entailed. Even among wealthy nations, the importance of investment in PHC research has been poorly recognised.[11,12] The thirtieth anniversary of Alma Ata precipitated acknowledgement of differences in PHC financing as a potential explanation of differences in effectiveness.[13] In 2016, the World Bank, WHO, OECD, and the Gates Foundation began to explore the capacity to measure national spending on PHC, and in late 2017, the Robert Graham Center and American Board of Family Medicine convened an international conference that achieved consensus on the high-level methods needed to measure and compare PHC spending.[14-16] However, there remained a need to scan the literature for evidence about how to measure PHC financing, what levels of financing are associated with better outcomes, and to learn from LMICs about how they might approach research on PHC financing.

As part of the ongoing drive towards universal health coverage, and recognising the issues above, governments are increasingly considering how to improve their PHC sector. As

already mentioned, there is a global move to enable assessment of PHC financing and of the associated outcomes. There is also an expectation that accurate data can be provided to support international comparison of PHC financing, and research to provide evidence on better models.

Direct engagement with the PHC sector to identify gaps in research is critical if we are to ensure that their views on the current models, key changes, and market factors are identified, and that their ability to provide relevant data for future studies is tested. In doing so, we are likely find that, while there will be common underlying principles, different settings may need different models of care with different financing needs. For example, while patients in high-income countries may benefit from resources that secure robust PHC teams providing comprehensive care, this goal may be unrealistic in areas of Africa with fewer clinical resources where instead a different care model may require resources to support limited teams that are supported by investments in telehealth and air-evacuation for acute conditions. For example, a region such as Africa with many LMICs and a low ratio of trained PHC workforce for the populations has historically relied on NGOs as well as government funding, so models which bring both sectors together to co-deliver new developments and equitable coverage may be needed.

Financing of PHC is key to provision of equitable universal care. This includes the need to better understand how public private providers (PPP) in LMIC may enhance or impede quality of care, and how PPP might be leveraged to enable scaling to provide services that are accessible for the 'last mile' populations isolated by rurality or poverty. Different payment systems will influence cost effectiveness and efficiency. Per capita spending for a health system does not necessarily equate with quality and safety, but an international benchmark of the minimum spend required might be possible to determine. Finding a balance between sustaining a model that provides for universal health coverage and ensuring maximised quality and access is challenging.

In 2017 the Primary Health Care Performance Initiative (PHCPI) developed a conceptual framework of the five domains of highly functioning primary health care (PHC): system - inputs, service delivery processes, outputs and outcomes,[17]**17** and subsequent mapping of 35 research topics across these domains.[18] The Primary Health Care Measurement & Implementation Research Consortium identified four prioritised research areas, with associated potential research questions (see Appendix 1 Priority and specific research areas & potential research questions). Financing and outputs for cost are part of this prioritisation agenda.

Aims and Objectives

The aim of this study is to address the priority innovation area #4: Financing (market structure, political economy and uptake of evidence).

Our aim is to identify and prioritise the knowledge needs of PHC practitioners, researchers

and policy-makers in LMIC, leveraging on the work previously conducted by Primary Health Care Measurement & Implementation Research Consortium, also further informed by a scoping literature review.

Specific objectives are to:

1. Produce a list of 16 prioritised research questions.
2. Produce a gap map, including areas where there is existing evidence for questions perceived to be knowledge gaps, and where there are major gaps in evidence regarding questions about PHC financing.
3. Prepare research implementation plans for the top four research questions.

Methodology

Development of prioritised research questions

Stakeholder engagement

Prior work confirms that the successful engagement of PHC providers in research enquiries requires fostering the belief that the project outputs will be helpful to their constituency, efficient use of time and resources, clear conceptual and linguistic communication, and trust in the agency making the enquiry.[19] Limiting replies to governmental responders may miss important emergent examples of PHC research and innovation. It is essential to engage academic and clinical staff already working in PHC sectors, who understand the context of their own settings.[20] For this study we drew on our extensive collective networks, including WONCA (World Organisation of Family Doctors), Robert Graham Center, The American Board of Family Medicine, and the Besrour Centre (see Appendix 2 Collective networks of the research team). We also enlisted the support of Primafamed (an institutional network of family physicians, health professionals, academics and researchers in sub-Saharan Africa); The North American Primary Care Research Group (NAPCRG); the South Pacific Community (SPC); Global Health at the School of Population Health, University of Auckland; and the International Council of Nurses to disseminate information about this project. Furthermore, we specifically targeted rural networks, including WONCA Rural, recognising that the rural voice is important, and these communities are often neglected in the global discussions.

Study design

We used a modified Delphi panel of PHC experts from LMIC. This is an iterative technique in which sequential surveys are answered anonymously by a range of relevant experts, with summarised feedback to enable reaching a consensus.[21] LMIC were determined from the World Bank list of economies (see Appendix 3: List of low and middle income countries).[22] We aimed for a diverse sample, with representation from LMIC in each of the following six regions as defined by WONCA (http://www.globalfamilydoctor.com/AboutWonca/Regions.aspx): Africa, Asia / Pacific; South Asia; Latin America and the Caribbean; Eastern Mediterranean, and Europe. Ethical

approval was obtained from the University of Auckland Human Participants Ethics Committee, 18 January 2018 (Ref 020630).

Participants were invited using the member networks of the organisations listed above, augmented by 'snowballing' sampling techniques (allowing invitees to steer us towards or disseminate the details to others who they deemed eligible).[23] We used a sampling matrix to ensure that our panel represented diversity in gender, age, residing country, location (rural or urban), role and discipline, and years of experience. Inclusion criteria were PHC practitioners, researchers or policy-makers residing and working in a LMIC. They required experience deemed relevant to provide opinions on regional or national research needs on the key area of PHC finances (the way services are funded). While it would have been preferable to provide translations of the survey into the first languages of our participants, the limited time and resources available precluded this, hence an exclusion criterion was insufficient fluency in written English. People of LMIC origin now living and working in a HIC were excluded, as their knowledge and experience might now be more related to HIC settings. Our approach was to use advisory stakeholders (providers, researchers, policy-makers) who may identify gaps not identified by a literature review, by providing them with key categories and conducting an iterative review throughout the process.[24]

We had a timeline of three months to recruit the expert panel and conduct three survey rounds. The first round was qualitative with the aim of generating as many ideas as possible, while the remaining two followed a modified Delphi method, providing anonymised summaries of experts' responses to facilitate group convergence.

Participant recruitment took place in January 2018 via email. Responders whose details met study criteria were enrolled as panellists. The surveys were delivered using Qualtrics software, a web- based tool. Respondents had one week to complete each round. All rounds were anonymous. Round 1 survey was piloted among WONCA executive members prior to panel circulation to assess that it was comprehensible to non-native English-speakers, and easy and quick to respond to.[25] Modifications were made in response to feedback.

To protect the identity of panellists in subsequent dissemination of research findings, participant demographics were limited to residing region and country; rural or urban; age (range); gender current role(s) (practitioner including type, academic, policy-maker), and years of experience.

In Round 1, participants were asked to generate research questions which addressed gaps in knowledge in PHC finance (such as payment systems, public / private funding, budgets, PHC spending). Enrolled participants were invited to respond through individual links to the survey. Extracted questions generated by the panellists were collated and coded into domains, categories and sub-categories using a general inductive thematic approach.[26] Categories included those already identified from existing frameworks, as well de novo ones that arose from the data. Two researchers independently coded the first 25 respondent replies and Cicchetti-Allison kappa co-efficients (a measure of inter-rater reliability) calculated to check

for consistency in coding. Data were sorted by codes, collapsed, and synthesised to a list of 31 questions. Where there were similar questions from multiple participants, these were combined into representative questions for Round 2.

In Round 2, all enrolled participants were invited to rate each of the 31 questions on a four-point Likert scale for what they considered to be the level of importance for this topic to be researched in their country. The question lists were randomly presented to each participant to prevent response bias from the order of presentation. The participants' responses were used to calculate agreement, which was indicated by mean score, where a larger mean demonstrated more agreement. Collated responses were ordered in degree of importance, and the top 16 research questions were selected for both areas.

In Round 3, panellists were asked to prioritise the research questions by dragging and dropping them into order of importance for their country. The question lists again were randomly presented.

Ariadne Lab is concurrently funding similar work on PHC quality and safety, and on policy and governance. We identified that some of the questions related more to these areas than PHC financing, and these were removed. We were separately conducting the same exercise for PHC organisation, and one of the top-ranking questions in finance fitted better into PHC organisation, so we moved this to organisation. The four highest-ranking questions for PHC financing were selected for the subsequent formulation of research implementation plans.

Analyses

We used a general inductive approach to thematic analysis for Round 1.[26] Statistical analyses were performed with SAS version 9.3 (SAS Institute Inc., Cary, NC).

Scoping literature review

The literature review was conducted to test whether there was already a LMIC literature base for each of the research questions generated by the panel or was this truly a gap in the PHC literature. A two-dimensional coding matrix was constructed based on the PHCPI conceptual framework and the dimensions of PHC financing identified through coding the questions generated in Round 1 of the panel. We wish to acknowledge David Peiris and his team at the George Institute for Global Health whose work informed our coding matrix, and to thank them for sharing their material with us and recommending use of Eppi-Reviewer 4. Some of the searches were conducted by two researchers independently to avoid researcher bias and check for coding consistency.[27]

This was followed by MeSH and / or text words [tw] / or title and abstract words [tiab] relating to the specific domain or sub-domain from the coding matrix.

Inclusion criteria were studies conducted in a low income country or countries within the last 15 years in primary health care or family practice with MeSH or key terms pertaining to the questions of interest. Commentaries were excluded. Only covering a limited time period is an

accepted technique for conducting rapid reviews. [28] The studies were screened for relevance, and those not meeting the inclusion criteria were excluding initially by reviewing the title, secondly the abstract, and thirdly on a rare occasion, the full paper as necessary.

The search was conducted in PubMed through Eppi-Reviewer 4 literature management software with shared review. The literature review was confined to research published in peer reviewed journals. Time and resources precluded any search for possible grey literature reporting studies that had not been published in journals. A two-dimensional coding matrix was constructed based on the PHCPI conceptual framework and the dimensions of PHC finance identified through coding the questions generated in Round 1 of the panel. We wish to acknowledge David Peiris and his team at the George Institute for Global Health whose work informed our coding matrix, and to thank them for sharing their material with us and recommending use of Eppi-Reviewer 4.

Using our matrix, selected articles relevant to the question were coded for both axes, and for filters to be added to the map. These consisted of a list of the global regions and a list of all LMIC countries.

Gap map

A gap map does not answer a specific research question; rather it provides a broad overview of existing evidence and the spaces between. Our gap map is based on the generated questions of interest by our panellist, and our subsequent literature reviews to determine whether there is in fact existing evidence relating to these. It requires development of a framework of the interventions and outcomes of interest.[28] In our case we used the domains, categories and sub-categories developed from the generated research questions to inform our conceptual framework, as well as the PHCPI conceptual framework (see Appendix 6: PHCPI conceptual framework), and informed by similar work being conducted by Dr David Peiris and his team at the George Institute, Australia.

Once all our selected articles were coded, the software providers at Eppi-Reviewer 4 generated our gap map for us, to enable visualisation of the 'bubbles' of available evidence and the evidence gaps related to the 31 research questions.

Research implementation plans

A key component of the PHC perspective is the 'bottom-up' approach, ensuring that research is conducted by and with, not on, the people whose sector (ie PHC) is the main focus. Therefore, once the five top five questions were determined, we asked our panellists, members of the Working Party on Research, and the Besrour Fellows to indicate if they placed particular priority on one; and if so, what methods might they use to answer the question. They were also asked if they knew of any relevant datasets or innovative programmes in their country or region that might be evaluated or scaled up. Interest was considerable and rapid, with 45 responses within a few days.

Research questions were allocated on the basis of judgement of the applying team to be able to deliver, based on their previous work, plus spreading the work throughout different countries and regions of the world. They we provided with a template to produce a three to five-page outline research implementation plan to include specific aims, study design, targeted geographic regions, potential research team and partners, overview work plan, and estimated total budget needed to conduct the research. Research teams were offered a mentor from a HIC (member of the project research team or other) to provide support and feedback.

Draft plans were used at a workshop run by members of the research team in Krakow, Poland in late May 2018. During the workshop, small groups of participants critiqued the plans and provided feedback, given back to those preparing the plans for their LMIC to refine them.

Results

Development of prioritised research questions

There were 141 participants enrolled in the study from 50 LMIC from all global regions (Figure 1).

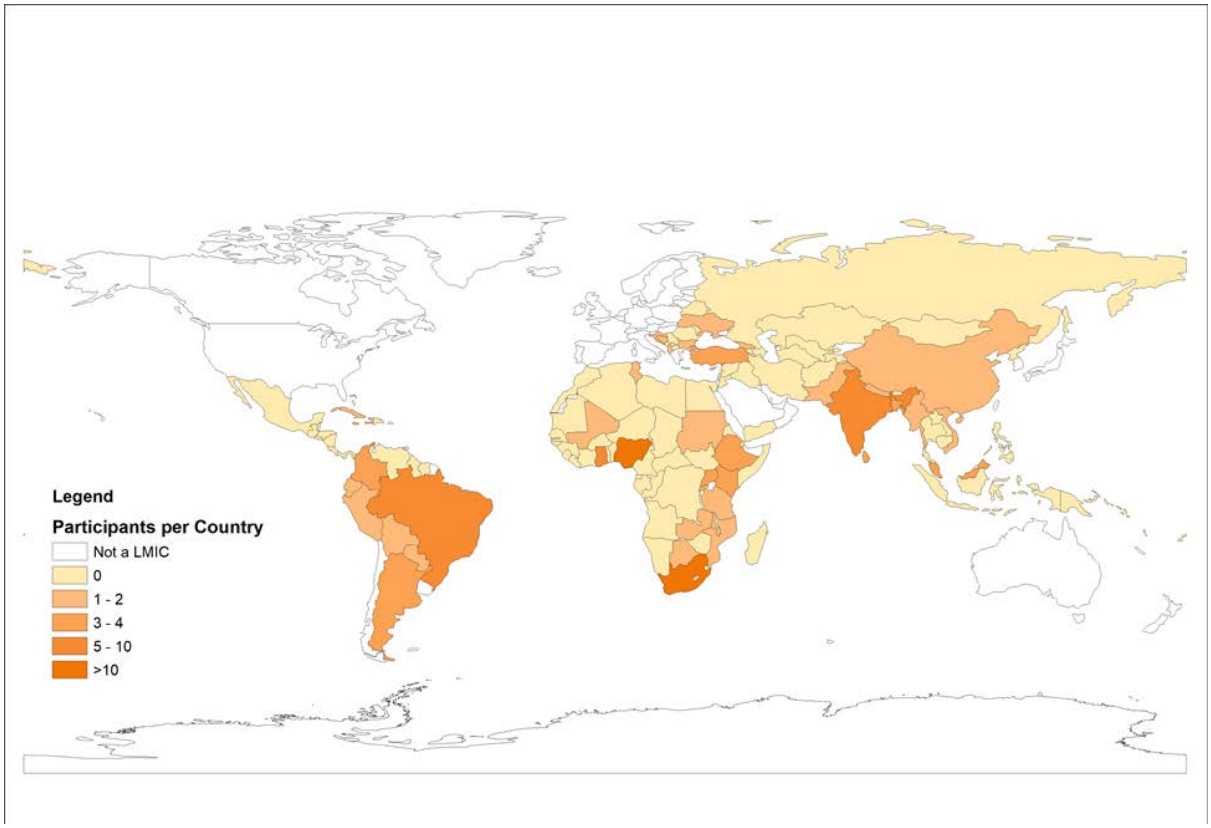

Figure 1 Countries of enrolled participants

Africa had high representation including four low-income countries (LIC). Asia Pacific and the Eastern Mediterranean (i.e. North Africa and the Middle East) were relatively under-represented. See Table 1.

Table 1 Numbers of enrolled participants residing and working in low and middle income countries

Global region*	Number of MIC / number MIC in region (%)	Number LIC / number LIC in region (%)	Number of enrolled participants
Europe	8/22 (36)	0/0 (0)	14
Africa	11/20 (55)	4/27 (15)	69
South Asia	4/6 (67)	1/1 (100)	19
Asia Pacific	6/23 (26)	0/1 (0)	11
North American Caribbean	3/6 (50)	1/1 (100)	5
South America	9/19 (47)	0 (0)	19
Eastern Mediterranean	3/13 (23)	0/1 (0)	4

Seventy (50%) completed Round 1 with a broad range of demographic characteristics (Table 2).

Table 2 Demographics of LMIC panel responders

	Round 1 N=70 (50%) n (%)	Round 2 N=84 (60%) n (%)	Round 3 N=68 (48%) n (%)
Gender			
Male	42 (60)	46 (55)	39 (57)
Female	28 (40)	38 (45)	29 (43)
Age in years			
Under 30	2 (3)	4 (5)	3 (4)
30-39	16 (23)	21 (25)	15 (22)
40-49	22 (31)	24 (29)	18 (27)
50-59	18 (26)	22 (26)	22 (32)
60 and over	12 (17)	13 (15)	10 (15)
Location			
Urban	50 (71)	62 (74)	52 (76)
Rural	20 (29)	22 (26)	16 (24)
Global region			
Europe	9 (13)	13 (15)	10 (15)
Africa	31(44)	35 (42)	31 (46)
Eastern Mediterranean	1 (1)	1 (1)	1 (1)
South Asia	10 (14)	11 (13)	7 (10)
Asia Pacific	6 (9)	6 (7)	6 (9)
North America	2 (3)	5 (6)	2 (3)
Caribbean			
South America	11 (16)	13 (16)	11 (16)
Health practitioner¥	**54 (77)**	**61 (73)**	**50 (74)**
Family doctor	52 (74)	57 (68)	46 (68)
Other doctor	1 (1)	3 (4)	3 (4)
Nurse	1 (1)	1 (1)	1 (1)
Years as health professional	54 (77)	61 (73)	50 (74)
<5	6 (9)	9 (11)	8 (12)
5-10	14 (20)	13 (15)	12 (18)
11-15	12 (17)	13 (15)	11 (16)
16-20	7 (10)	7 (8)	6 (9)
>20	15 (21)	19 (23)	13 (19)
Primary care academic¥	55 (79)	58 (69)	47 (69)
Junior academic role	24 (34)	37 (44)	20 (29)
Senior academic role	31 (44)	21 (25)	27 (40)
Years as academic	55 (79	58 (69)	47 (69)
<5	18 (26)	17 (20)	12 (18)
5-10	19 (27)	24 (29)	19 (28)
11-15	5 (7)	7 (8)	3 (4)

16-20	7 (10)	5 (6)	8 (12)
>20	6 (9)	5 (6)	5 (7)
Policy--maker¥	18 (26)	16 (19)	14 (21)
Years as policy-maker	18 (26)	16 (19)	14 (21)
<5	9 (13)	6 (7)	5 (7)
5-10	5 (7)	6 (7)	4 (6)
11-15	2 (3)	2 (2)	2 (3)
16-20	1 (1)	2 (2)	1 (1)
>20	1 (1)	0 (0)	2(3)

* WONCA global regions see http://www.globalfamilydoctor.com/AboutWonca/Regions.aspx

¥ Some panellists hold more than one role hence total >100%

Independent coding of the first 25 survey responses showed a high degree of consistency with a Cicchetti-Allison kappa co-efficient weight | =0·6106 (95% CI 0.0.3107 – 0.9105) p<0.0001 (substantial agreement). In the final LMIC dataset, 744 valid generated questions or responses were coded. Round 2 consisted of 31 questions on finance for rating.

Eighty-four (60%) of the enrolled participants completed Round 2 (see Table 2). The top 16 questions for each area when ratings were summed are shown in Table 3. Scores ranged from 1 = not important; 2 = of minor importance; 3 = important; to 4 = very important. The maximum score was 336 (if all panellists rated the question very important).

Table 3 Research questions for financing rated for importance

	Financing	Sum	Mean
1.	What are the barriers to implementing best practice in PHC?	285	3.52
2.	When resources are limited, where/how is it most cost-effective to use the available funds for the greatest health outcomes in PHC?	280	3.46
3.	What are the best practices in PHC and how can they be scaled up?	279	3.44
4.	What are the resources essential to deliver quality PHC services?	274	3.38
5.	What is the ideal proportion of the total health care budget that guarantees the development of quality PHC?	272	3.36
6.	What is the most appropriate payment system to increase access and availability of quality PHC?	270	3.33
7.	How much of the PHC budget should be allocated for preventable diseases (e.g. NCDs, vaccination, cancer screening)?	270	3.33
8.	Does everyone have access to quality PHC that he/she needs?	267	3.30
9.	What effective funding models exist for delivering universal PHC coverage in LMICs?	266	3.28
10.	What mechanisms have been found to be effective in persuading governments to invest in PHC?	263	3.25
11.	How do you maintain accountability for safety and/or quality in PHC while scaling up?	261	3.22
12.	Do accreditation systems (eg of vocational training, of practices) improve quality of patient care?	260	3.21
13.	How can the public and private sectors work more collaboratively to improve and integrate PHC coverage and prevent segmentation of the services?	258	3.19
14.	What percentage of public health care spending is dedicated to PHC in different LMIC countries?	258	3.19

15. What advances have been made in the last ten years to improve PHC and quality in the public and private sectors?	257	3.17
16. Does the government have policies/legal provisions to insure quality and safety of PHC?	257	3.17
17. Does the allocation of resources follow a defined pattern that considers social determinants in health in PHC?	256	3.16
18. What incentives and rewards are required to ensure that the PHC private sector contributes to successful comprehensive primary health care?	255	3.15
19. How do you communicate clearly the risks and benefits of PHC vs other high-cost subspecialty care?	252	3.11
20. Are quality measurements currently used to allocate resources in PHC?	247	3.05
21. How do PHC facilities clearly communicate their funding needs through a transparent, accountable system?	246	3.04
22. What are the appropriate outcomes to assess the effectiveness of different governance models for both the PHC public and private sectors?	244	3.01
23. Why, and when, should PHC services be contracted out by ministries of health and will this lead to improvements in quality of care and better management of scarce resources?	241	2.98
24. What are the similarities in PHC between the public and private networks in different HIC and LMIC countries?	236	2.91
25. What is the role of NGOs in the PHC system?	235	2.90
26. How do the PHC public and private sectors learn from each other to improve quality?	233	2.88
27. What is the role of the private sector in PHC services?	232	2.86
28. How does the quality and safety of the implementation of PHC affect having differences in the budget in the private and public sectors?	232	2.86
29. Is the PHC system well-funded through taxation (leading to subsidized payments) or via co-payments determined by insurance services?	230	2.84
30. How does regulation of the PHC private sector compare with public sector regulation by regulatory bodies?	225	2.78
31. Are taxes on products with harmful effects, such as alcohol and tobacco, used to try to increase health system funding?	216	2.67

Round 3, which ranked the questions in order of importance, was completed by 68 (48%) of enrolled participants. One of the top ranking questions in our parallel organisation of PHC project (‘How can the public and private sectors work more collaboratively to improve and integrate PHC coverage and prevent segmentation of the services?’) was clearly more relevant to PHC organisation than finance, hence we have moved it. The team subsequently discussed the general feasibility of the questions and moved some to higher priority.

The final top four ranked questions for the development of implementation plans are:

1. What is the most appropriate payment system to increase access and availability of quality PHC?
2. What mechanisms have been found to be effective in persuading governments to invest in PHC that might be implemented?
3. What is the ideal proportion of the total health care budget that guarantees the development of quality PHC?
4. What are the factors or incentives that can improve distribution of PHC workforce for equity of access of PHC services?

Literature review

The coding matrix is shown in Figure 3. One axis consists of components of service delivery (accessibility, continuity, comprehensiveness, coordination, person-centred care) and system outcomes (equity, efficiency, effectiveness), and the other axis is the domains of PHC finance (payments, public/private partnership, organisation, system, NGO, taxes, geography).

		PHC service delivery					System outcomes		
		Accessibility / coverage	**Continuity**	**Comprehensiveness**	**Coordination**	**Person-centred care**	**Equity**	**Efficiency**	**Effectiveness**
Payment	Compatibility of equity and user fees								
	Influence of payments								
Public/Private	Partnerships								
	Resources								
	Effect of private system (positive & negative)								
	Accountability								
Organisational	Monitoring & evaluation								
	Accountability								
	Data								
	Accreditation								
	Spending on prevention, care, etc								
	PHC budgets (N)								
System	Equity								
	Allocation								
	Quality								
	Scaling up								
NGO	Role of NGOs								
Taxes	Tax- based PHC scheme								

	Cost-effective								
Geography	Geography								

Figure 2 Coding matrix for PHC finance

The flowchart for total number of papers retrieved, excluded with reason, and final number included and coded is shown in Figure 3.

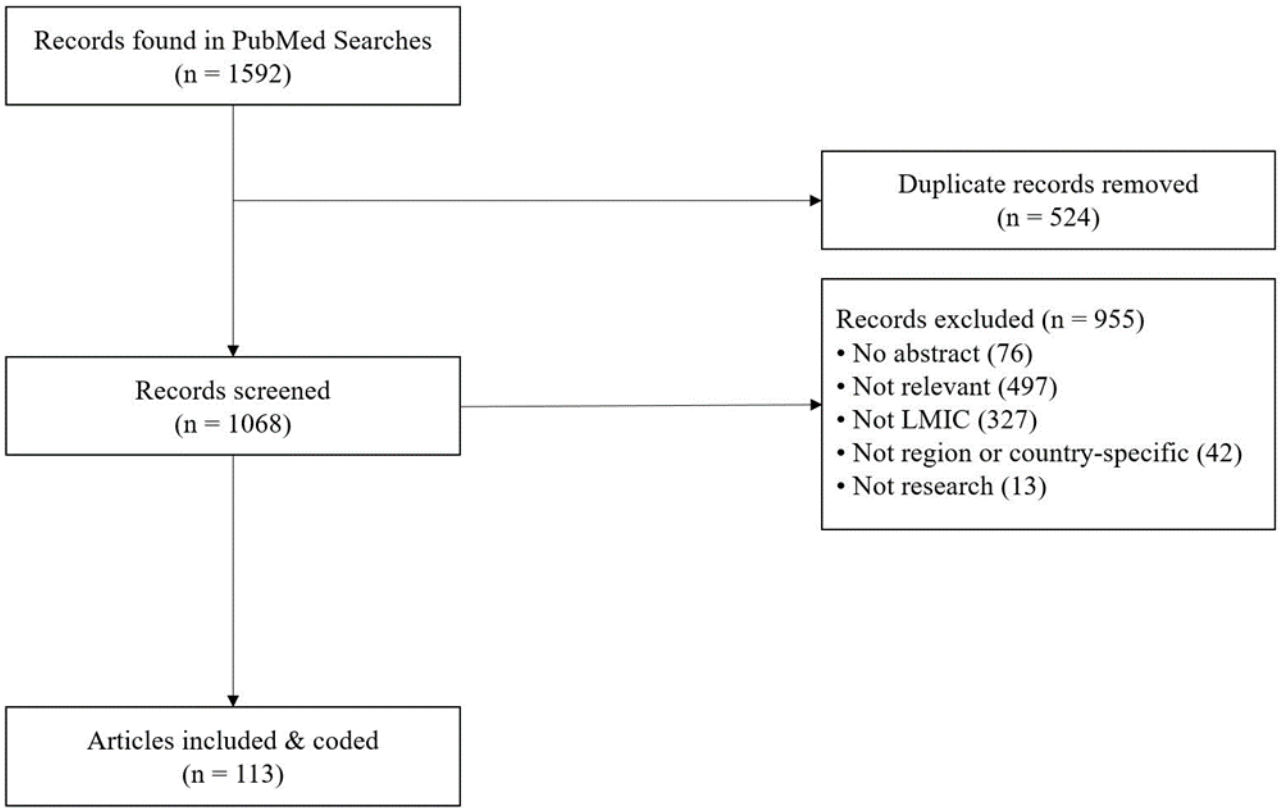

Figure 3 Flow chart for search on PHC finance

There were 113 articles included from the searches, coded according to the matrix for the two axes, and also coded for region and country.[29-141] All regions of the world were represented, with the most studies in Africa, followed by Latin America and the Caribbean (Table 4).

Table 4 Number of studies per global region

Global region	Number of studies
Africa	93
Latin America & Caribbean	60
Asia / Pacific	47
South Asia	32
Europe	18
Eastern Mediterranean	13

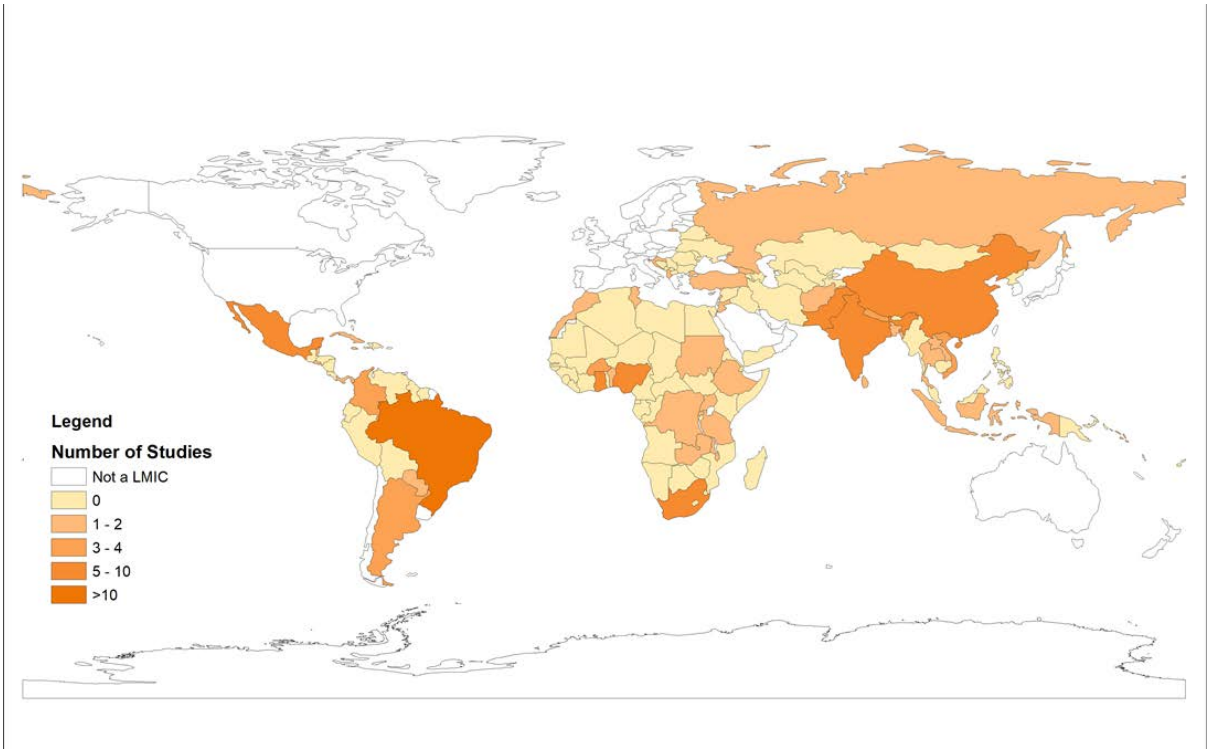

Figure 4 Number of studies from each LMIC

Gap map

The bubble gap map was generated through Eppi-Reviewer-4. A static version can be seen in Figure 5. For the interactive web-based map which presents both heat-map and bubble-map versions, includes filters for LMIC and for global regions, and enables viewing of all studies in a cell by clicking on the bubble. Click here to view interactive gap map:

PHC_Finance_GapMap_119_26062018.html

This map can be viewed in Google Chrome, Firefox or Microsoft Edge, but not Internet Explorer.

Figure 5 Static copy of gap map

Research implementation plans

The top-ranking questions were further considered and assessed as to their relevance to PHC financing. The final three questions relating to financing of PHC selected were then modified to relate specifically to the country or region for which the plan is developed. The final three questions are:

1. What is the most appropriate payment system to increase access and availability of quality primary health care in Croatia?
2. What mechanisms have been found to be effective in persuading governments to invest in primary health care that might be implemented in Kenya?
3. What is the ideal proportion of the total health care budget that guarantees the development of quality primary health care in Turkey?

Research Implementation Plan Kenya

What mechanisms have been found to be effective in persuading governments to invest in primary health care that might be implemented in Kenya?

Background and significance

Many governments in both high and low income countries remain heavily burdened with "fighting illness" at the expense of optimising health for the people they govern. This results in inadequate funding for health promotion and disease prevention resulting in increasing burden of illness in vulnerable groups.[142] In the low and middle income countries (LMICs) inadequate funding of health care and more so PHC has led to "out-of-pocket financing of healthcare" as the main funder for healthcare by families as they struggle with the double burden of both communicable and the rising non-communicable diseases.

A few examples of governments that have strong policy documents that guide investment include:

- Constitutional statements and direction that declare that provision of health was a human right and explicitly state and guide that governments are expected to provide universal primary health care funding. In Canada the CANADA HEALTH ACT obligates the government of the day to use funds collected through taxation of her citizens to fund primary health care. Guided by judicial interpretations of certain provisions of the Canadian constitution, there is clarity on the ambit of power between the federal and provincial governments over these essential health care matters.[143]
- In the United Kingdom (UK), the National Health Service (NHS) was established in 1948 in accordance with the National Health Service Act of 1946. It was founded on "the principle of collective responsibility by the state for a comprehensive health service, which was to be available to the entire population free at the point of use." This principle of the NHS has been preserved over the years despite multiple reforms by incoming governments and devolution to the constituent countries of the UK.[144]
- In the Nordic countries primary health care is financed and provided by the central governments through legislation.[145]

The Kenyan health funding is mainly out-of-pocket payment where the poor members of the population contribute a larger proportion of their income than the rich for what is a not necessarily optimal health service.[146] Available documents on health expenditure in Kenya are summarised in Table 1. It is unlikely that much has changed in the last five years.

Table 1: Shares of Total Health Expenditure (THE) in Kenya as at May 2016[147]

Key Indicators	
Population (2014)	44.9 million
Gross Domestic Product (GDP) per capita (2014, USD)	$1,420
Health Financing (2013)	
Total Health Expenditure (THE) per capita	$66.6
THE as % of GDP	6.8%
Government Health Expenditure (GHE) as % of THE	33.5%
GHE as % of General Government Expenditure (GGE)	6.1%
Out-off pocket (OOP) as % of THE	29%
Development Assistance for Health (DAH) as % of THE	26%
Pooled Private as % of THE	2%

What has worked in other countries?

Zhang et al, in their analysis of the Chinese government investment in primary healthcare institutions to promote equity reported deliberate government proactive increment in funding of these facilities from 2008 to 2011.[148] They documented this as resulting in promotion of equity to primary healthcare and universal coverage. Their article does not, however, analyse healthcare indicators of improvement.

Schneider et al documented five change factors that are requisite for facilitating implementation of primary health care reform in a South African province.[149] These factors do not consider financing challenges but can be used to promote and/or market effective primary health care reforms in Kenya where the government has relegated this function to poorly resourced and poorly supported community health facilities.

Primary health care services are mainly outpatient care for the unwell with huge components of enhanced community health promotion, disease prevention and early diagnosis of disease. Yuan et al carried out systematic reviews to assess the impact of different payments methods on the performance of the facilities that offered outpatient services. They compared intervention that augmented ongoing payments by "pay for performance" and "fee-for-service". Payment for the performance was directly linked to the performance of health care providers while payment for the service resulted in enhanced use of specific service items provided at the facility. Each of these approaches resulted in positive and not so positive health care outcomes.[150]

What has not worked in other countries

Wiysonge et al carried out systematic reviews on the effects financial arrangements for health systems in low and middle income countries (LMICs) and the effects these had on healthcare outcomes in these countries between 2010 and 2016.[151] Remarkable in their documented findings was the fact that most of the ongoing interventions that included enhancing salaries of health workers, cost sharing by patients and recipient incentives did not improve outcomes.

Panellists of stakeholders in health that included ministers for health and finance during a series of discussions that evaluated and upraised financing health systems towards universal health coverage in Africa highlighted both the bottle necks and ways of making meaningful changes to overcome the bottle necks.[152]

Specific Aims

1. To review grey literature in PHC investments to determine which countries have invested highly and those that have not, and to conduct key informant interviews with conveniently selected representatives from countries that have invested highly in PHC and those that have not.
2. Using these data to develop a tool to use in interviewing key stakeholders in health services management in Kenya.

Study Design

We will use a mixed method approach using both qualitative and quantitative data**.**

Methods We will review the grey literature on PHC investment globally and categorise them into two groups (those that have invested highly and those that have not). We will also review

and compare health care cost per capita and health indicators in the two categories. We will identify countries from which key informants will be conveniently selected for in-depth interviews on government investment in PHC. Questions mailed using the "Google forms" application and where possible video conferences will be set up. The WONCA secretariat and the research group leadership will be approached to assist us access these busy officials.

Findings of the literature search will be tabulated following the systematic review format. Qualitative and quantitative data collected from the key informants will be stored in appropriate databases and at the end of data collection be analysed using scientific software packages mutually agreed among team members.

The findings will guide the development of an interview guide to be used on conveniently selected key informant representatives of Kenyan health sector stakeholders among policy makers, economic experts, fiscal planning experts, health managers, health professional teachers and health workers in Kenyan national and regional governments. The interviews will include focus group discussion and in-depth interviews aimed at working towards implementing enhanced PHC funding in Kenya.

Inclusion and exclusion criteria for countries with high and low investment in PHC

1. Inclusion for countries with high investment in PHC
    a. Governments whose PHC funding component forms at least 15% of national health budget.
2. Inclusion criteria for countries with low investment in PHC.
    a. Governments whose PHC funding component forms less than 5% of national health budget.
3. Inclusion criteria for key stakeholders in health in Kenya.
    a. Consenting policy makers in health in national government.
        i. Cabinet secretary for health or an appointed representative,
        ii. Cabinet secretary for finance and fiscal planning or an appointed representative.
        iii. Head of the national PHC department.
    b. Consenting policy makers in health in randomly selected five county governments (10% of 47 regional governments).
    c. Consenting county health facility managers from five randomly selected county hospitals.
    d. Deans from the five Kenyan medical schools.
    e. Heads of departments of the five family medicine programs in Kenya.

Potential research team and partners

The team will include:

a. *Dr Patrick Chege*. Principal investigator. Department of Family Medicine Moi University Will play the overall role of coordinator of proposal writing, data collection, report writing and dissemination of results, and communication with WONCA. chege200851@yahoo.com
b. *Dr Joseph Thigiti*. Department of Family Medicine Kenyatta University. Will coordinate the selection of key informants in health care in Kenya and facilitate collection of data jthigiti@yahoo.co.uk
c. *Dr Ann Mwangi.* Research expert (PhD Biostatistics and an expert in research methodology) in the department of medical psychology. annwsum@gmail.com

d. *Dr Joy Mugambi.* Represents the Kenya Association of Family Physicians (KAFP) and the regional governments' family doctors. dr.mugambijoy@gmail.com
e. *Dr Bruce Dahlman.* One of the fathers of Family Medicine in Kenya and a close associate of the KAFP.bruce.dahlman@aimint.org
f. *Dr. Izaaq Odongo.* Senior deputy director of medical services in the national Ministry of Health and has been involved in national matters on family medicine in the past ten years izaqo@yahoo.com
g. *Dr. Jeremiah Laktabai* .Department of Family Medicine Moi University. To play the role of research methods coordination. idrlaktabai@yahoo.com
h. *Edith Kabure.* Administrator with the Institute of Family Medicine and can run the research secretariat as its administrator. edith@chak.or.ke

Overview work plan

1. Getting the research team together with membership determined by individual support and commitment to this task.
2. Set up a secretariat for the study and provide the necessary resources for effective operation
3. Agreeing and establishing the terms of reference and operation procedures with a log frame
4. Assigning tasks to sub groups and individuals within the team
5. Monitoring and evaluating progress through regular feedback by team members as data are collected and managed
6. Data collection and data management
7. Data analysis and report writing
8. Publication and dissemination of study findings through peer reviewed journals, workshops with different stakeholders, mass media and other locally convenient and acceptable methods of informing the communities
9. Lobby for the team to be part of the process of change in health system management.

Implementation of the study

- First quarter: work plan items 1 to 4
- Second quarter: work plan 5, 6 and 7
- Third quarter: work plan 7 and 8
- Quarter four: monitor and evaluate progress

Note that regular reports will be filed with the funders and the WONCA research working group

Barriers to implementation

Anticipated barriers to implementation include:

1. The Kenyan government focus on delivery universal health coverage (UHC) in the current five year plan is acknowledged and appreciated. This offers ground for lobbying for primary health care to play a central role in UHC. The policy makers seem to favour enhanced specialised health care services as drivers of health service enhancement at the expense of primary health care
2. Kenyan health budget on health remains below 10%. This presents severe completion for the limited funds in managing the health workers wage bill and the growing double burden of managing both communicable and non-communicable diseases at the expense of health promotion and disease prevention.
3. We anticipate slow response by the Kenyan political class and policy makers who already have plans that may not rank PHC very high among their priorities.

Dissemination of results
Publication and dissemination of study findings through peer reviewed journals, workshops with different stakeholders, mass media and other locally convenient and acceptable methods of informing communities.

High-level budget for implementation of research

ITEM	**Monthly cost (Kenya shillings)**	**Cost for 12 mths (KSH)**	**Cost for 12 mths (USD)**
Project coordinator/secretariat			
• Office space	150,000	1,800,000	5,7000
• Office furniture/computers/stationery	1,500,000	1,500,000	
• One administrator allowances	100,000	1,200,000	
• Two support staff	100,000	1,200,000	
	5,000,000	570,000	
Communications costs			
• Telephone	20,000	240,000	4,800
• Internet	20,000	240,000	
	40,000	480,000	
Local travel for researchers and study participants (as needed)			
• land	60,000	720,000	2,1600
• air	120,000	1,440,000	
	180,000	2,160,000	
Taping and transcribing interviews		5,000,000	5,000
Miscellaneous		1,400,000	1,4000
Total		**14,740,000**	**147,400**

Research Implementation Plan Croatia

What is the most appropriate payment system to increase access, availability, competency and outcome indicators of family medicine in Croatia?

Background and significance

Facts about Croatia, 2017[153]

Population, million	4.1
GDP, current US$ billion	54.9
GDP per capita, current US$	13,297
School Enrolment, primary (% gross)	98.0
Life Expectancy at Birth, years	78.1

Currently there are around 2300 family medicine doctors (GPs), 50% of whom have completed family medicine residency. They care for about 4 million citizens. Primary health care also includes paediatricians and gynaecologists. Family medicine doctors are not involved in care for the sexual health of women, nor provide antenatal care. In rural areas they do care for pre-school children, but not urban. About 75% work in private practice under the control of Croatian Health Insurance Fund (CHIF) (the only health insurance agency in Croatia). All others work for primary health care centres. In Croatia there are five Associations with family doctors as members, one foundation and four family medicine departments.

Croatia is the cradle of modern family medicine, with the first postgraduate course initiated by Dr Zivko Prebeg in 1951.[154] This was among the first courses of that type in the world. Prof Ante Vuletic devised and promoted the three-year training course for general practice which started in Zagreb in 1961, and this course influenced family medicine education in Great Britain.[155]

During the Communist era, primary health care (PHC) was within the state sector organised in a similar way to the Soviet Russia Semashko model.[153,154]

In 1952 the first primary health center was established in ex-Yugoslavia, in Zagreb, Croatia. During the late eighties of last century patients were given the right to choose their preferred doctor. Health insurance was granted to every citizen of Yugoslavia. Citizens were entitled to equal health insurance and the primary health network covered the whole country, which remains the case today in Croatia. At the time, cost-effectiveness of the primary health centre was not a priority, nor was the number of teams of GPs nor the quality of care provided. All costs were covered by the state. The numbers were not public knowledge. With changes of the social system and introduction of free market mechanism into the public sector, the primary health care system also changed. In 1997 it was decided to privatise primary health care. At first, primary care doctors were financially compensated according to number of patients seen, with little done to monitor the quality of health care services.[156] By this process, doctors were given independency, and team work was brought to a minimum.

From 2013 the financial structure was changed to a fixed income for running a practice, which made up 43% of total income (including salary for the nurse, minimal wages for the GP and other material expenses and variable income). The latter includes capitation fee (20%) and diagnostic and therapy procedures (DTP) (29%). DTP includes advisory work and extended medical examinations (treatment of patients with three or more diagnoses) and

intramuscular injections. In 2015 1,500,000 muscular injections were administered, mainly for pain treatment, whereas only 37,000 spirometry were administered.[157]

Four percent of medical practice revenue is generated by key indicators of success and work effectiveness: number of allowed sick days (by CHIF), prescribing antibiotics (according to quantity and price and not according to prescribing the antibiotics according to guidelines). Follow-up on patients with chronical non-communicable diseases (hypertension, COPD, diabetes mellitus type 2) through follow up of laboratory parameters, BMI, arterial blood pressure, life style check. There is no autonomous follow-up of patients referred to hospital. GPs who refer all their patients to hospital doctors may earn the same as those who provide all the treatment within their own practices, and hence many refer directly to the hospital, a fact to which the World bank drew attention.[158] Patients also provide pressure to be referred to hospital doctors.[159] Long waiting lists for certain specialists is a significant problem, plus the inability to make direct referral for services such as colonoscopy, gastroscopy, and MRI, which require mandatory recommendations from hospital specialists. This reduces accessibility to medical care and increases the coast of medical treatments for citizens for treatment in private clinics.

The common public perception of family doctors is that they serve to refer patients to hospital doctors, and provide therapies prescribed by hospital doctors. Local politicians rarely mention the need for strengthening the position of family medicine, and more often they mention the importance of easier access to hospital doctors.

Available data is an issue. For example, it is not possible to obtain the data about the numbers of asthma and COPD patients, as they fall within the same group of diagnosis according to Croatian Institute for Public Health, who collects the data. Therefore we cannot know how many family doctors autonomously treat this two conditions. On the other hand, according to OECD one of the indicators of quality of work of PHC is a number of patients needing to be hospitalised for these conditions.[8]

Currently there are discussions regarding anew law regulating health care in Croatia. It is proposed that all CPs should run private practices. It is not known how many doctors working for primary care centres are satisfied with this proposal, because this has not been researched. Views are being expressed by certain interest groups and patient associations. Some are motivated by sustainability of their positions (eg directors of primary medical centres), and others by fear of losing present public health benefits. Doctors working for primary health centres have lower income, are unable to choose medical equipment for their practices, and it is far more difficult for them to attend special education.

This study aims to determine the most appropriate payment system to increase access, availability, competency and outcome indicators of family medicine in Croatia.

Specific Aims:

1. To assess the attitude and knowledge of patients, doctors (family medicine, public health, hospital doctors), directors of primary care centres, insurance companies, local and state politicians, non-government associations about the role, involvement and placement of family medicine in the health system.
2. Develop proposed financing plan for general practitioners, based on results from the first aim.

Study Design

Targeted population (stakeholders)

1. Family doctors, other medical doctors in the health system
1. Patients
2. Local and state politicians
3. Directors of primary care medical centres and insurance representatives

Note: the Association of Employers in Healthcare operates in Croatia, as well as an Association of Mayors and the Croatian County Association are enabling quality data collection.

Methodology

Mixed method design

1. *Analysis of existing data and comparative analysis of different payment systems in the world* (literature review)[160]

2. *Questionnaires for target groups*[161]

3. *A self-administered questionnaire* will be designed and develop according to International Association for Medical Education (AMEE) Guide.[162] Following the literature review, the interviews with prospective family physicians will be performed to receive valuable expert input during design process. Questionnaire items will be written, but in order to improve the overall quality and representativeness of the questions, three methodology experts will be asked to systematically review the questionnaire's content.

4. *Focus groups for target groups* Consolidated criteria for conducting and reporting qualitative research (COREQ) will be used for conceptualising the study.[163] At the beginning of each focus group meeting, the topics to be discussed will be introduced. Discussions will be conducted in a closed-door room, around a circle seating conference table. A semi-structured question interview guide will be used in the study to elicit FPs' opinions, beliefs and attitudes. The discussion will commence by asking open-ended questions about the payment methods.

5. *Analysis of surveys and focus group data*

6. *Development of proposal for general practice financing*

Appropriate statistical methods will be used for all quantitative data sets. Ethical approval will be gained as relevant.

Potential research team

1. Tanja Pekez-Pavlisko – Project design and survey, PhD student, family physicians
2. Dinka Jurisic – dissemination, article design, PhD student, family physicians; dinka.jurisic@hotmail.com
3. Maja Racic – Study Design, methodology, PhD, Professor, former Vice Dean of Medical school East Sarajevo, Bosnia and Hercegovina; porodicnamedicina@gmail.com
4. Nemanja Rancic – Methodology, Statistics; Assistant Research Professor , MD, PhD, Faculty of Medicine of the Military Medical Academy, Belgrade, Serbia nece84@hotmail.com
5. All – survey and article preparation

The project implementation will be carried out by students of medicine, political science and economics.

Partners

Associations of Family Medicine doctors in Croatia, patients, Croatian Medical Chamber

Overview of the work plan

1. Survey design 1st and 2nd quarter
2. Survey distribution 1st and 2nd quarter
3. Survey analyses 3th and 4th quarter
4. Design of proposal for financing family medicine doctors, design of survey 5th quarter
5. Text design for policy makers and the public – 5th quarter
6. Publishing at conferences, journals 3-5th quarter

Barriers to implementation

1. Law rate of response to survey by various groups
2. Need to convince policy-makers on the significance of this project

Dissemination of results

1. Pamphlets and articles for policy makers
2. Articles in scientific journals
3. Collaboration with journalist and results announcements
4. Implementing project awareness through conferences

High-level budget for implementation of research

Rough estimate. Detailed budget will designed in accordance to rules for financing EU projects.

Item		**Cost in Euro**
Permanent employee – one year contract	1500 € per month	18 000 €
Phone and communication expense:	50 € per month	1200 €
Accessories and materials		1000 €
Team member fee	5000 € for one	20 000 €
Students fees	10 students, 100 work hours, 20 € per hour	20 000 €
Traveling expenses		6000 €
Attending international conferences	Fee, accommodation	15000 €
Payed ad sin Scientific Journals		4500 €
Unexpected expenses		3000 €
Total		**88700 € (103,805 USD)**

Research Implementation Plan Turkey

What is the ideal proportion of the total healthcare budget that guarantees the development of quality primary healthcare in Turkey?

Background and significance

Turkey has launched a reform package called Health Transformation Program in 2003. Since then, Turkey's healthcare system has been undergoing a significant transformation. Turkey's success at improving healthcare coverage and system performance has been impressive with significant improvements across indicators, such as maternal and infant mortality.[164,165] The primary care (PC) sector must now adopt quality as the focus of on-going reform. Now, Turkey's maturing healthcare system must anticipate the inevitable shifting of the national disease burden toward chronic morbidities associated with increasing age.[166] In the literature, the strength of Turkish PC is presented as weak to medium in comparison with other European countries.[167] Major areas needing improvement are integration of primary and secondary/tertiary care, coordination role of PC doctors, comprehensiveness and continuity of PC services, and strengthening PC teams.[168,169]

Primary health care (PHC) services are mainly financed through the general budget in Turkey; however, health expenditure statistics provided by government institutions do not include an expenditure item that could be attributed solely to PHC. According to the Organisation for Economic Co-operation and Development (OECD) Health Statistics 2017, with 53% Turkey has the highest hospital expenditure among the OECD countries. Only 13% of health expenditure of Turkey is attributed to ambulatory care. Turkey's health expenditure as a proportion of gross domestic product (GDP) is around 5.4% and has a steady state during recent years.[170] The latter figure is in compliance with World Health Organization (WHO) suggestion of 5% GDP for health, but there is no recommendation for the ideal proportion of the total healthcare budget that guarantees high quality PHC services for upper and middle-income countries.[171] In addition, the very recent challenge for Turkey is to guarantee high quality PHC services in the times of economic crisis. Turkey is facing global disadvantages of emerging markets nowadays, but also devaluation of Turkish currency of about 49% between June 2017 and June 2018 compels cost effective measures for quality improvement in PHC.[172]

Several factors play role on determining the right amount of spending on health care services, such as epidemiological conditions, social aspirations, the technical and allocated efficacy of health inputs and existing prices.[173,174] There are several approaches for calculating the costs of interventions at country level, such as peer pressure approach, the political economy approach, production function approach and the budget approach. According to WHO, the most complete approach, taking all factors mentioned above into consideration, is to identify the desired health status changes and determine what needs to be purchased in terms of health services or health service inputs in order to achieve those goals.[171]

The aim of this project is to determine the ideal proportion of the total health care budget that guarantees the development of quality primary health care in Turkey. In order to reach this aim, it is needed to set goals within the epidemiological context, estimate input requirements, survey prices and wages, and make arguments for health spending relative to other demands on the healthcare system on the basis of quality measures. Taking Turkey as an example, this task has to be achieved in times of economic crisis.

Specific Aims

The project will aim to answer the following specific questions:

1. How are the expenditure items, trend of expenses attributed to PHC and financial policies of Turkish health care budget differing from other countries having same GDP (upper middle-income countries)?
2. How is the quality of care provided in PHC in Turkey and what are financial barriers disabling, and also rational priorities that has potential to enable high quality PHC service provision?

Study Design

Targeted geographic region(s) and rationale for selection

There are 12 NUTS 1 (Nomenclature d'Unités Territoriales Statistiques) in Turkey and at least one province will be selected from each NUTS 1 in order to increase representativeness and also detect regional discrepancies.

Targeted population

PHC professionals, patients, academicians, policy makers and health directors.

Methodology

This research will be a mixed method research in five steps.

STEP 1: Analysis of current situation

The first step is an extensive document review to ascertain existing policy frameworks, strategic documents, meeting/workshop reports, medical news, statistical reports and research papers including grey literature. The researchers will choose these texts to encompass a variety of documents providing information about the financial policies and the health budget of Turkish healthcare system as well as other countries having the same GDP. Researchers will also aim to compare these documents to identify major themes, which exist in this area. National policy documents, strategies, action plans and also legislations will be analysed.

STEP 2: Cross-sectional survey

Quality of care will be assessed by questionnaires addressing PC patients and doctors. For the quality assessment the PHAMEU framework will be used as guide and questionnaires will be based on the surveys used in the QUALICOPC study.[175-178] In this way, we will be able to see the trends after implementation of Family Medicine Scheme throughout Turkey in 2010. QUALICOPC distinguishes three levels of care.[177] The first level is the system level of PC, encompassing features such as financing, governance and resources. The second level is the provision level, characterised as the delivery of care process at GP practice level. GPs can be seen as the core providers of PC. The third level are the users of PC services.

A minimum of 360 PC doctors and 3600 patients will be enrolled. Data collection will take place in 12 NUTS1 regions, each including one province, selected according to geographical distribution developmental status of the given provinces. At least 10% of the sample will be selected from family physicians with vocational training and their patients.

STEP 3: Participatory Action Research

This step will involve observations in several clinic settings. At least four to five PHC facilities will be selected for observations. A researcher will be present for a month in each facility to make active observations. This researcher will take notes of his/her observations and these notes will be analysed. The active observation process will focus on clinical

practice, management of the unit and attitudes of health care professionals. The action will be the actual experience in daily life in a PC centre. Financial barriers against provision of quality PC in real life situations will be identified. The results of the observations will be reported.

STEP 4: Qualitative research, Delphi panel and Discrete Choice Experiment
This step will involve in-depth interviews with key informants (experts including policy makers, economists, academics and health directors) to study their thoughts about financial policies for PHC. In total at least 15-18 key informants (policy makers from ministries, health directors and academics) will be selected in Turkey. Pre-prepared questions based on previous research data (Steps 2 and 3) will be posed to each interviewee and their answers will be audiotaped, analysed and reported. These questions will be related to quality assessment of PHC services and financial barriers disabling, and priorities enabling high quality PHC provision. Especially opinions on either redistribution of health budget or increasing PHC share will be explored during interviews.

A Delphi panel will be applied for reaching consensus about the priority areas that will guarantee high quality PHC services. Options for Delphi panel will be derived from both qualitative and quantitative data collected. The financial attributes and their levels for discrete choice experiment (DCE) will be determined by using information from the panel and qualitative research. DCE will enable us to analyse the simultaneous use of several criterion such as cost-effectiveness, equity (coverage of services), efficiency, burden of disease (Disability adjusted life years) during decision-making. The choices will include different options for primary healthcare care budget and participants will be able to trade on the choices. Academics, policy makers, health directors and clinicians working in the field of PHC will be enrolled. This method will give information about the importance of the attributes of participants during decision-making and how different options are traded off in the different circumstances. As a result, a framework for using evidence for rational priority setting will be provided (multi-criterion decision analysis - MCDA). Finally, relative importance of decision-making criterions will be estimated by using regression models. These data will help us select actions with the highest priorities, which can enable high quality PHC service provision in local settings.

STEP 5: Analysis for the estimation of percentage of the primary healthcare budget
In order to set the targets that will guarantee development of quality primary healthcare (scaling-up and/or reorganising health services where necessary and determining the resources needed), we will use the information gathered in Steps 1-4 (document review, cross-sectional survey, qualitative data and Delphi panels and DCE). These targets will be in compliance with national and international policy documents such as Millennium Development Goals, National Non-Communicable Disease Control Action Plan. Finally, an overall analysis will be performed to estimate the relative change in budget for achieving the targets defined and the ideal proportion of the total healthcare budget that guarantees the development of quality primary healthcare in Turkey.

Potential research team and partners
Research Team:

- Mehmet Akman, MD, MPH. Professor of Family Medicine, Marmara University School of Medicine, Istanbul, Turkey; Turkish Foundation of Family Medicine (TAHEV), general coordinator, makman4@gmail.com

- Sibel Sakarya, MD, PhD. Professor of Public Health, Marmara University School of Medicine, Istanbul, Turkey. Overall project design and implementation, skalaca@gmail.com
- Serap Çifçili, MD. Professor of Family Medicine, Marmara University School of Medicine, Istanbul, Turkey, Marmara Family Medicine Education, Research and Practice Center (MAR-AHEK-UYAM). Design and Implementation qualitative and cross-sectional research, serapcifcili@gmail.com
- Pemra Cöbek Ünalan, MD, PhD. Professor of Family Medicine, Marmara University School of Medicine, Istanbul, Turkey, Marmara Family Medicine Education, Research and Practice Center, Design and Implementation qualitative and cross-sectional research.
- Bulent Kılıç, MD. Professor of Public Health, Dokuz Eylül University School of Medicine, İzmir, Turkey. Overall project design and implementation, bulent.kilic@deu.edu.tr
- Hülya Akan, MD, PhD. Family Physician, retired academic, PhD in Anthropology
- Design and implementation of PAR, neseliha@gmail.com
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Coordinator institution:
TAHEV (Türkiye Aile Hekimliği Vakfı - Turkish Family Medicine Foundation)
Partners:
MAR-AHEK-UYAM, NIVEL, PCU, EFPC, Universities.

Overview work plan

Yr	Qtr*	Work Package	Outcome
1	1	Analysis of existing data/policies (statistics, reports, policy documents, legislations, articles)	Report on current finance and quality of PC in Turkey and similar middle-income countries
	2	Preparation* for cross-sectional surveys Preparation* for PAR	Field Surveys (doctor and patient experiences and values) Meeting schedule and observation
	3	Data collection: Cross-sectional surveys Implementation of PAR -Part I	Field data Initial observatory data
	4	Data analysis: cross-sectional surveys Implementation of PAR -Part II	Report/article/scientific presentation on cross-sectional data
2	1	Data analysis: PAR Preparations** for Qualitative R	Qualitative data
	2	Data analysis: PAR Dissemination of research results Data collection: Qualitative R***	Report/article/scientific presentation on PAR data
	3	Data analysis: Qualitative R	Report/article/scientific presentation on Qualitative data and Delphi panel
	4	Delphi Panel	
3	1	DCE	DCE data

	2	DCE analysis	Report/article/scientific presentation on DCE data
	3	Final overall data analysis Reporting: ideal proportion of PHC in total health budget	Final report
	4	Dissemination of results	Report/articles on whole project Meetings and documentation Media eg social media, handouts

*3 months each**preparing research documents, ethical approvals, team allocation and sample selection***Research

Barriers to implementation

Barriers	Strategy to overcome
Possible unwillingness of the potential participants	Budget allocation for incentives to promote participation
Reluctance of local /central health authorities about supporting the implementation of research	Having strategic partners who has experience in health research at national and international level and involvement of Ministry of Health in the research team at local and/or central level.

Dissemination of results

Publishing research results Articles, reports, highlights as hand-outs/posters, social media and health magazines.

Meetings with stakeholders to share study results

- Scientific meetings: Workshops, poster/oral presentations, symposium/conferences
- Ministry of Health: written documentation and/or face-to face meetings
- PC organisations: Family medicine associations and federation, family medicine specialists' association etc.
- Patient and volunteer organisations: eg patient rights association.

High-level budget for implementation of research

ITEM	ALLOCATED BUDGET (X1000 USD)
Personnel (2 research assistants)	52
Project coordination	36
Field work: cross-sectional survey	66
Field work: PAR	62
Field work: Qualitative research	15
Data Analysis: Qualitative + Quantitative	16
Travel + scientific meeting participation	34
Publishing and dissemination	35
Incentives	40
Meetings	19
Discrete Choice Experiment	10
Overall data analysis and consultancy	40
Miscellaneous	14
Total	***439***

Discussion

Summary of results

The volume and breadth of LMIC participants, and their response rates across three rounds of question generation, rating, and rankings was far beyond our expectations. The questions submitted by participants in the first round produced many common themes, and the rating and ranking stages produced four questions—two of which focused on payment and other incentives to provide equitable access to high-quality PHC; one about strategies to convince politicians to adequately support PHC; and a final question (which is similar to the foci of the WB, WHO, OECD, and the Gates Foundation) on ideal levels of PHC financing as a proportion of total health spending.[14] These questions, generated from LMIC participants, are we think also of interest to HIC.[179]

The literature review found the most studies addressed issues addressed accessibility and comprehensiveness. The relative weight of the studies being in these two areas makes sense for LMIC, because their financing efforts are most likely to be about increasing basic access and moving towards more horizontal rather than vertical care delivery programmes. The outcomes studies are more heavily focused on equity. Many LMIC have two-tiered systems, and a number of the studies speak to financing schemes aimed at reducing related disparities and changing provider behaviour (making them more amenable to seeing publicly insured patients or reducing out-of-pocket costs). There is a dearth of studies related to continuity or broadly scoped care, which would be much more common in developed countries. Perhaps this gap reflects a lower interest in, or lessened concern over, measuring what are intuitive functions of primary health care in LMIC relative to the concerns of deeply fragmented and sub-specialised OECD nations? Given the emphasis on 'people-centred' PHC by the WHO Astana draft statement,[180] the near complete void of evidence in this space is striking.

We acknowledge the limitations to this review and that there may well be relevant studies that we have missed. However clearly the evidence gap is very real, and there are no real answers currently available to our proposed priority questions.

Relationship to the literature

A number of themes in our models of care review related to optimal team-based care, access and geographic distribution, integration and coordination between primary and secondary care, and what PHC should incorporate. Two of the financing questions focused on related payments and other incentives to achieve adequate distribution and equitable access to high-quality PHC. This relationship between access and financing suggests to us that using a single process to generate questions allowed this relationship to emerge. The results also present degree of alignment with the Framework for Integrated People-Centered Health Services, which advocates that all people have access to health services that are coordinated around their needs, respects their preferences, and are safe, effective, timely, affordable, and acceptable.[181]

The research questions generated have a strong focus on the position of PHC in the health system, and the potential need to establish normative financing thresholds for primary care and the political strategies to make this possible. The Alma Ata Declaration called for increased technical and financial support of PHC, particularly in LMIC, and the 40th anniversary of the Declaration could use this research to support a more specific call for research on PHC financing and its relationship to outcomes. Furthermore it could further suggest how financing of how health services need to be organised to advance health equity and support PHC engagement in Community Oriented Primary Care.[31] All these questions can be informed, and perhaps structured for a further state of research, by framing them with the key financing options that create fiscal space for governments – taxation, different levels of insurance (national, social, employment, private), and personal payments. Issues such as workforce incentivisation and stabilisation (Q3) draw on a different literature that relates to the pipeline for training and then working conditions to attain and retain staff in PHC. The question of a minimum threshold has been hotly debated in various settings – and by diverse authors – because if the risk of a 'that's all we need to do' response – but without it there may be no allocation to PHC at all. The same question, we feel applies to the research budget – where must funders focus on basic science and potential new discoveries, whereas the most common and 'unfashionable' topics occur in the community – and get no funding at all.

A precursor to this work is a literature review conducted by the Primary Health Care Measurement and Implementation Research Consortium which established some broad areas of research priorities.[182] Furthermore, the Primary Health Care Performance Initiative (PHCPI) has introduced a framework to assess PHC performance in LMIC to help guide health reforms.[183] Many of the generated questions relate to required health system reform, and hence complement this work. The current research being done on PHC Financing by the WB, WHO, OECD, and Gates Foundation is also highly relevant to the questions generated by this study, offering guidance to their work as they move from methods to testing outcome associations and building politically palatable arguments.[14]

Strengths of the study

A strength of this research is the size and composition of our panel from LMIC. We recruited 141 panellists over two week period, with requests from people keen participate continuing after recruitment was closed. This demonstrates a hunger in the PHC sector for research into health service delivery and systems, to inform practice and policy. Access to, and knowledge of the local circumstances are vital for the success of PHC developments, where the general PHC principles need to be applied to local contexts. Having the voice of health care providers and academics enables traction at the community level. Bottom-up input is needed to counter the frequent top-down decisions made by policy-makers lacking in stakeholder engagement and therefore not being translated into effective change. Competing political and economic agendas in many LMIC, in addition to disproportionately high demand / supply ratios, means that what works and what does not fails to be evaluated.[184] This study therefore contributes to potential reforms on the most urgent needs in local contexts.

We chose to use the same panel for both organisation and financing because the development of effective PHC organisation and models of care cannot be isolated from mechanisms of funding, and these key areas go hand-in-hand. Evidence from our WONCA international comparative studies on primary health care policy implementation[184-187] highlights the need for an integrated coherent approach. We agreed that new research might be relevant in both domains, and that different questions might be generated. While we asked separately about organisation and financing of PHC, some questions in one area fitted better in the other. This emphasises the inter-relatedness of the topics.

The large number of research questions suggested shows a significant sense that evidence is lacking. Although we used a modified Delphi technique, our methods met the Delphi CREDES recommendations for selecting the panel, piloting the survey, conducting the rounds, maintaining anonymity and developing consensus.[188] We chose the bottom-up approach, recruiting predominantly PHC practitioners and academics, not exclusively policy-makers. Using only 'known' experts would have been too exclusive and unnecessarily narrow for a global perspective. We reasoned that even the most senior academics will be likely not to have knowledge of all the literature, nor a global perspective. Being linked with being an active member of a WONCA email group or another international organisation and accepting self-definition gave a strong likelihood of expertise.

This way it was possible to recruit within the short period that was available for this study, a large panel of professionals from LMIC, and retain them through three demanding rounds of the Delphi study. It also made it possible to recruit leaders for the development of follow-up implementation studies in concrete LMIC settings.

A further strength is our use of robust qualitative analysis methodology, which achieved a high degree of inter-rater coding reliability. Use of the Delphi approach facilitated consensus for prioritised research question.

We have consistently used a bottom-up approach. Our literature review was undertaken from the perspective of the stakeholders, searching for possible evidence already available for the prioritised questions that they had generated. We have used researchers in LMIC who know their own contexts to develop implementation plans relevant to their own country or region's needs and resources.

Being able to use our collective networks of global organisations benefitted the project in a number of ways. As well as enabling us to recruit a large representative panel, it allowed us to access researchers in LMIC interested in developing implementation plans specific to their local contexts. Furthermore we have been able to leverage of the WONCA Europe conference for important feedback, and to plan dissemination and follow-up action in the context of important conferences like the WONCA World conference in Seoul, Korea this October, and regional conferences in 2018 and the North American Primary Care research Group annual meeting in November 2018 in Chicago, as well as WONCA regional meetings in 2019.

Limits of the study

We had insufficient time and resources to use translation services for our Qualtric surveys. This meant that we required our panellists to be fluent in English, and hence limited potential participation. We note that the countries of enrolled African participants (Botswana, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Mali, Mozambique, Nigeria, Rwanda, South Africa, Uganda, Zambia, Sudan, Tanzania) are mostly Anglophone. Furthermore our literature searches were conducted using PubMed and restricted to English language publications. This was necessitated by the limited time period that was available for the study. Some important country- specific research or implementation experience may be published in the national language, as this is the most direct way to communicate to professionals in the field, and would therefore not be captured by our searches. Time and resources did not permit searching of the grey literature.

Most panellists were family physicians whose experience and issues of concern may differ from those of other PHC professionals such as nurses or community health workers. Time constraints limited our ability to disseminate our panel invitation through some networks. For example the International Council of nurses is a federation of more than 130 associations, and there were unable to communicate with many relevant organisations prior to our recruitment cut-off date. This meant that most practitioners were family physicians. It should be noted however that in Round 2, only two questions related specifically to family physicians, and only one of these made it to Round 3.

We were unable to conduct the literature reviews as robustly as we would have liked, given the time restraint. Studies were mostly screened on based on abstract, and those lacking an abstract were excluded. However the majority of these would have been commentaries and editorials rather than original research, as most journals do require structured abstracts for the latter. We also restricted our searches to PubMed, accepting that there may be a small number of additional research papers available in alternative databases. Examination of the grey literature may have revealed some unpublished studies.

Conclusion

Providing universal coverage is based on the premise that access to health care depends on need, not on the ability to pay. In the UK, the National Health Service (NHS) is funded by income tax, with the burden of taxation proportional to income.[189] Poorer people make more use of NHS services than richer people, and the overall pattern of costs and benefits is redistributive, which is an equitable system. The NHS is currently under-funded, with over-spending by some trusts and increasing difficulty in meeting performance targets, and is looking at ways to address the funding gap. While such a tax funding regime may appropriate for a HIC like the UK, although currently facing challenges, a scheme based solely on income tax may not be viable in a MIC, and certainly not in a LIC, with high levels of poverty and unemployment. Some form of international money is needed. The NGO sector must be an important player in these circumstances.

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Appendix 1 Priority and specific research areas & potential research questions

Identified during the Primary Health Care Measurement & Implementation Research Consortium July 2017 Priority Setting Meeting

Prioritized Research Areas	Specific Areas identified for Research	Potential Research Questions
1) Quality, Safety, and Performance Management	• Data use • Quality management • Learning systems	*Facility management* 1. What is the current "state" of facility management? 2. What are individual competencies at the individual, facility, and system levels for effective leadership/management at PHC facility levels? How do we measure these three levels? 3. How do we understand how context impacts how well good management can result in targeted outcomes including PHC functions? 4. How do you improve management? *Competence (technical and social)* *Assuming we know the areas of competency needed…* 1. What is the minimum skill set and competency with new delivery models/systems 2. How does a PHC systems ensure a growing "degree of fit" between need and competency required? 3. How can competent HCWs be recruited and retained? 4. What changes are needed to ensure newly graduated HCWs are competent
2) PHC Policies and Governance	• Community engagement • Social accountability	1. What are good models of mixed health systems for PHC? 2. How do we build governance models to support mixed health systems?

		3. What is the real situation with rural and urban workforce management? Is there a shortage of workforce in rural areas or an overflow in urban? 4. How can we assess social accountability? 5. How do we improve both internal and external accountability? 6. What tools are needed to effectively set priorities at the local level? 7. How are priorities being designed and executed? Can there be new ways of gaining resources while decreasing dependence on external aid? 8. How can we improve strategic purchasing at the local level? 9. What information is needed to address corruption at the local level?
3) Organization and models of care	• Workforce and team development • Scale • New models for management	1. What is the taxonomy of models of care across different settings? 2. Range of effective service delivery models in urban areas? 3. Use patterns in PHC for a set of functions/conditions? 4. Referrals/transitions of care? How do we measure these? 5. What does a PHC maturity model look like? 6. What is the taxonomy of PHC service delivery models? Setting, provider, user, integration 7. What are dynamic empanelment models? Insured; risk stratification linked with information systems 8. What are better team structures? How to help teams work together? How do they work together?
4) PHC Financing	• Market structure	*Private Sector*

	• Political economy • Uptake of evidence	1. How does the presence of private sector provider influence the quality of public sector providers (and visa versa)? 2. What are requirements for successful PPPs that allow scaling up of quality care in LMIC? Need implementation science. 3. What is role of private sector in scaling up quality in PHC in LMIC? 4. What do we know about best practices to level the playing field for quality and safety of PHC services between public and private sector? 5. Is there knowledge and evidence about how to mobilize private sector to reach "last mile populations?" 6. How do we make sure private sector is able to receive payment? 7. How to best improve managerial capacity in ministries of health for contract management? *Demand-Side Financing* 8. How do different UHC schemes affect health equity? 9. Does PHC need pooled funds against financial risk in LMICs? *Payment Systems* 10. What are appropriate payment systems for quality PHC depending on maturity model of PHC system and capacity to manage and implement payment systems with different levels of complexity? Relates to organization/models of care 11. How to develop provider payment mechanisms to promote vertical integration of care? *Supply-Side Financing*

		12. How do we make supply-side financing from governments more efficient? 13. What commodities can be deemed cost-efficient? *Political Economy* 14. Why do countries not scale/implement what they've identified as policy or best practices? *Financial Management* 15. Alignment of incentives at facility level. Should facilities have a bank account? Should they have the autonomy to use it? Linked to accountability agenda 16. What are the funding flows for PHC? How to ensure flow of funding to facilities are efficiently used? *PHC Spending* 17. Is there a minimum level of spending for PHC that should be an international benchmark?

Appendix 2 Collective networks of the research team

WONCA World Organization of Family Doctors

This project is sponsored by the World Organization of Family Doctors ('WONCA', see www.globalfamilydoctor.com), and the named investigators include the WONCA President, two Past Presidents, the Chair and two Members of the Working Party on Research. The WONCA Presidents for South Asia, Africa and South America (Iberoamericana) are included as advisors.

WONCA's mission is 'to improve the quality of life of the peoples of the world', by fostering high standards of care in general practice/family medicine. Founded in 1972, WONCA and its members are international leaders in informing, promoting, and impacting effective primary health care. WONCA has an extensive history of convening multinational stakeholders for review and prioritisation of Primary Health Care domains. Its 2004 Kingston Conference resulted in an extensive review of the priorities of primary health-care research and recommendations to build the research capacity to approach these priorities, and which has served as a template for WONCA and its member organizations in 131 nations to advocate for and support research in primary care in all regions of the world.[38] WONCA has its own Academic Membership category, and also supports the annual Brisbane Initiative for International Leadership, which fosters leadership and international collaboration in primary care research.[39]

WONCA at a global level has a regionalised structure, with Presidents for the 7 WHO regions, and the WONCA Executive (which includes Profs Howe as President and Kidd as Past Presidents) agreed that their leads and networks could be used for the research effort. We used the multinational networks of WONCA led through academics from its Working Party on Research and World Executive. WONCA has comparative panel data and member researchers from Ghana, Ethiopia, Malawi, Uganda, Sudan, Mali, Botswana, Zimbabwe, South Africa, Nigeria (Africa); Sri Lanka, South Africa, India, Nepal, Bangladesh, Pakistan (South Asia); Philippines, Taiwan, South Korea, Malaysia, Mongolia, Myanmar, Thailand, Vietnam, Hong Kong, Japan, China, Singapore, Taiwan, Australia, New Zealand (Asia Pacific); Brazil, Uruguay, Paraguay, Cuba, Peru, México, Rep. Dominicana, Argentina, Ecuador, Panamá (Iberoamericana-CIMF); Bahrain, Egypt, Lebanon, Qatar, Sudan, United Arab Emirates (Eastern Mediterranean); Spain, United Kingdom, Bosnia and Herzegovina, Netherlands, Turkey, Denmark, Ukraine, Romania, Macedonia, Finland (Europe), and Canada, USA (North America). We also called on the wider WONCA membership organisations, many of whom come from a wide range of LMICs.

WONCA Working Party on Research

WONCA's WP-R has longstanding relationships and experience with practice-based research networks around the world.[40] These are critical for fostering grass-roots curiosity and translating this into researchable questions. We used these networks both to test research gaps and to support the evolution of these questions into mature research projects. The capacity for

primary health care-based research is critical for front-line clinician engagement in LMIC, and should be an important component of effective PHC research programs in LMIC.

The WONCA Working Party on Research (WP-R) is more than a decade old and seeks to expand research in general practice/family medicine and welcomes interested family doctors from all countries. The 82 members of the WP-R meet regularly electronically and its executive committee includes representatives from Africa, Europe, North America, New Zealand, South Asia, Asia Pacific, Iberoamericana, and East Mediterranean who also have responsibilities for coordinating activities at regional meetings (http://www.globalfamilydoctor.com/groups/WorkingParties/Research.aspx). In 2013, the WP-R revised its objectives to the following:

1. To promote all university departments of family medicine / general practice / primary health care (FM / GP / PHC) or equivalent institutions globally in supporting and engaging in research to provide essential evidence for informed clinical and health policy decision making.
2. To promote all nations and funding bodies in prioritising FM / GP / PHC research and providing it with competitive but protected funding.
3. To support countries and regions in the promotion and nurturing of FM / GP / PHC research in their respective nations, and the timely translation of its results into everyday clinical service.

The WP-R provides an important infrastructure and international relationships to support this proposal. We engaged with the WP-R Executive member Regional Presidents who represent the seven world regions (with the exception of North America, already represented by our team and with no LMIC in this region) and who have connections with policymakers and other stakeholders in many countries within their respective continents.

Robert Graham Center and American Board of Family Medicine

The Robert Graham Center (RGC) and American Board of Family Medicine (ABFM) hosts international conferences including Starfield Summits which aim to advance the legacy of Barbara Starfield in the areas such as strengthening PHC towards health equity and social accountability. This will help inform this project. The RGC recently completed a study using national data from the U.S. to compare methods proposed by U.S. and other international efforts. Their networks enabled us to disseminate our call for LMIC panellists.

The Besrour Centre

The Besrour Centre fosters collaboration to advance family medicine around the world. It aims to achieve this mission through four strategic priorities:

1. Help establish family medicine as the foundation of health systems around the world
2. Increase the adoption of training standards and accreditation in family medicine
3. Advance faculty training in family medicine
4. Strengthen continuing professional development for generalist physicians and primary care teams.

The Besrour Centre has a network of scholars in LMIC who were approached to contribute to the panels.

Appendix 3 List of low and middle income countries

World Bank list of economies (June 2017)

Country	Region	Income
1. Korea, Dem. People's Rep.	East Asia & Pacific	Low income
2. Haiti	Latin America & Caribbean	Low income
3. Afghanistan	South Asia	Low income
4. Nepal	South Asia	Low income
5. Benin	Sub-Saharan Africa	Low income
6. Burkina Faso	Sub-Saharan Africa	Low income
7. Burundi	Sub-Saharan Africa	Low income
8. Central African Republic	Sub-Saharan Africa	Low income
9. Chad	Sub-Saharan Africa	Low income
10. Comoros	Sub-Saharan Africa	Low income
11. Congo, Dem. Rep.	Sub-Saharan Africa	Low income
12. Eritrea	Sub-Saharan Africa	Low income
13. Ethiopia	Sub-Saharan Africa	Low income
14. Gambia, The	Sub-Saharan Africa	Low income
15. Guinea	Sub-Saharan Africa	Low income
16. Guinea-Bissau	Sub-Saharan Africa	Low income
17. Liberia	Sub-Saharan Africa	Low income
18. Madagascar	Sub-Saharan Africa	Low income
19. Malawi	Sub-Saharan Africa	Low income
20. Mali	Sub-Saharan Africa	Low income
21. Mozambique	Sub-Saharan Africa	Low income
22. Niger	Sub-Saharan Africa	Low income
23. Rwanda	Sub-Saharan Africa	Low income
24. Senegal	Sub-Saharan Africa	Low income
25. Sierra Leone	Sub-Saharan Africa	Low income
26. Somalia	Sub-Saharan Africa	Low income
27. South Sudan	Sub-Saharan Africa	Low income
28. Tanzania	Sub-Saharan Africa	Low income
29. Togo	Sub-Saharan Africa	Low income
30. Uganda	Sub-Saharan Africa	Low income
31. Zimbabwe	Sub-Saharan Africa	Low income
32. Cambodia	East Asia & Pacific	Lower middle income
33. Indonesia	East Asia & Pacific	Lower middle income
34. Kiribati	East Asia & Pacific	Lower middle income
35. Lao PDR	East Asia & Pacific	Lower middle income
36. Micronesia, Fed. Sts.	East Asia & Pacific	Lower middle income
37. Mongolia	East Asia & Pacific	Lower middle income
38. Myanmar	East Asia & Pacific	Lower middle income
39. Papua New Guinea	East Asia & Pacific	Lower middle income
40. Philippines	East Asia & Pacific	Lower middle income

41. Solomon Islands	East Asia & Pacific	Lower middle income
42. Timor-Leste	East Asia & Pacific	Lower middle income
43. Vanuatu	East Asia & Pacific	Lower middle income
44. Vietnam	East Asia & Pacific	Lower middle income
45. Armenia	Europe & Central Asia	Lower middle income
46. Georgia	Europe & Central Asia	Lower middle income
47. Kosovo	Europe & Central Asia	Lower middle income
48. Kyrgyz Republic	Europe & Central Asia	Lower middle income
49. Moldova	Europe & Central Asia	Lower middle income
50. Tajikistan	Europe & Central Asia	Lower middle income
51. Ukraine	Europe & Central Asia	Lower middle income
52. Uzbekistan	Europe & Central Asia	Lower middle income
53. Bolivia	Latin America & Caribbean	Lower middle income
54. El Salvador	Latin America & Caribbean	Lower middle income
55. Guatemala	Latin America & Caribbean	Lower middle income
56. Honduras	Latin America & Caribbean	Lower middle income
57. Nicaragua	Latin America & Caribbean	Lower middle income
58. Djibouti	Middle East & North Africa	Lower middle income
59. Egypt, Arab Rep.	Middle East & North Africa	Lower middle income
60. Jordan	Middle East & North Africa	Lower middle income
61. Morocco	Middle East & North Africa	Lower middle income
62. Syrian Arab Republic	Middle East & North Africa	Lower middle income
63. Tunisia	Middle East & North Africa	Lower middle income
64. West Bank and Gaza	Middle East & North Africa	Lower middle income
65. Yemen, Rep.	Middle East & North Africa	Lower middle income
66. Bangladesh	South Asia	Lower middle income
67. Bhutan	South Asia	Lower middle income
68. India	South Asia	Lower middle income
69. Pakistan	South Asia	Lower middle income
70. Sri Lanka	South Asia	Lower middle income
71. Angola	Sub-Saharan Africa	Lower middle income
72. Cabo Verde	Sub-Saharan Africa	Lower middle income
73. Cameroon	Sub-Saharan Africa	Lower middle income
74. Congo, Rep.	Sub-Saharan Africa	Lower middle income
75. Côte d'Ivoire	Sub-Saharan Africa	Lower middle income
76. Ghana	Sub-Saharan Africa	Lower middle income
77. Kenya	Sub-Saharan Africa	Lower middle income
78. Lesotho	Sub-Saharan Africa	Lower middle income
79. Mauritania	Sub-Saharan Africa	Lower middle income
80. Nigeria	Sub-Saharan Africa	Lower middle income
81. São Tomé and Principe	Sub-Saharan Africa	Lower middle income
82. Sudan	Sub-Saharan Africa	Lower middle income
83. Swaziland	Sub-Saharan Africa	Lower middle income
84. Zambia	Sub-Saharan Africa	Lower middle income

85. American Samoa	East Asia & Pacific	Upper middle income
86. China	East Asia & Pacific	Upper middle income
87. Fiji	East Asia & Pacific	Upper middle income
88. Malaysia	East Asia & Pacific	Upper middle income
89. Marshall Islands	East Asia & Pacific	Upper middle income
90. Nauru	East Asia & Pacific	Upper middle income
91. Samoa	East Asia & Pacific	Upper middle income
92. Thailand	East Asia & Pacific	Upper middle income
93. Tonga	East Asia & Pacific	Upper middle income
94. Tuvalu	East Asia & Pacific	Upper middle income
95. Albania	Europe & Central Asia	Upper middle income
96. Azerbaijan	Europe & Central Asia	Upper middle income
97. larus	Europe & Central Asia	Upper middle income
98. Bosnia and Herzegovina	Europe & Central Asia	Upper middle income
99. Bulgaria	Europe & Central Asia	Upper middle income
100. Croatia	Europe & Central Asia	Upper middle income
101. Kazakhstan	Europe & Central Asia	Upper middle income
102. Macedonia, FYR	Europe & Central Asia	Upper middle income
103. Montenegro	Europe & Central Asia	Upper middle income
104. Romania	Europe & Central Asia	Upper middle income
105. Russian Federation	Europe & Central Asia	Upper middle income
106. Serbia	Europe & Central Asia	Upper middle income
107. Turkey	Europe & Central Asia	Upper middle income
108. Turkmenistan	Europe & Central Asia	Upper middle income
109. Argentina	Latin America & Caribbean	Upper middle income
110. Belize	Latin America & Caribbean	Upper middle income
111. Brazil	Latin America & Caribbean	Upper middle income
112. Colombia	Latin America & Caribbean	Upper middle income
113. Costa Rica	Latin America & Caribbean	Upper middle income
114. Cuba	Latin America & Caribbean	Upper middle income
115. Dominica	Latin America & Caribbean	Upper middle income
116. Dominican Republic	Latin America & Caribbean	Upper middle income
117. Ecuador	Latin America & Caribbean	Upper middle income
118. Grenada	Latin America & Caribbean	Upper middle income
119. Guyana	Latin America & Caribbean	Upper middle income
120. Jamaica	Latin America & Caribbean	Upper middle income
121. Mexico	Latin America & Caribbean	Upper middle income
122. Panama	Latin America & Caribbean	Upper middle income
123. Paraguay	Latin America & Caribbean	Upper middle income
124. Peru	Latin America & Caribbean	Upper middle income
125. St. Lucia	Latin America & Caribbean	Upper middle income
126. St. Vincent, Grenadines	Latin America & Caribbean	Upper middle income
127. Suriname	Latin America & Caribbean	Upper middle income
128. Venezuela, RB	Latin America & Caribbean	Upper middle income

129.	Algeria	Middle East & North Africa	Upper middle income
130.	Iran, Islamic Rep.	Middle East & North Africa	Upper middle income
131.	Iraq	Middle East & North Africa	Upper middle income
132.	Lebanon	Middle East & North Africa	Upper middle income
133.	Libya	Middle East & North Africa	Upper middle income
134.	Maldives	South Asia	Upper middle income
135.	Botswana	Sub-Saharan Africa	Upper middle income
136.	Equatorial Guinea	Sub-Saharan Africa	Upper middle income
137.	Gabon	Sub-Saharan Africa	Upper middle income
138.	Mauritius	Sub-Saharan Africa	Upper middle income
139.	Namibia	Sub-Saharan Africa	Upper middle income
140.	South Africa	Sub-Saharan Africa	Upper middle income

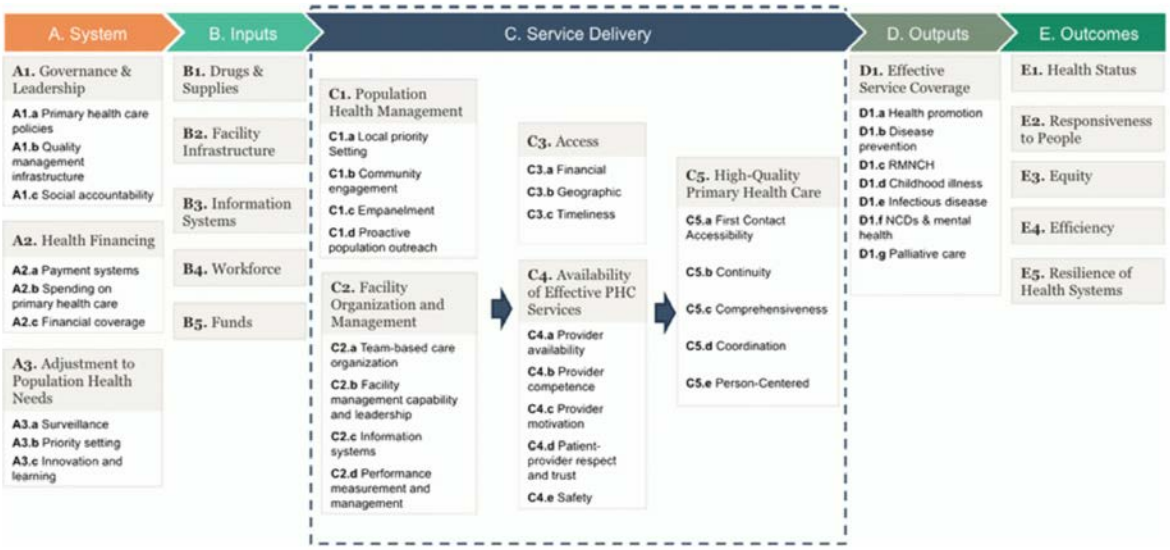
Appendix 4 Search terms string

The search consisted of terms for PHC and LMIC since 2003 (the last 15 years):
("Primary Health Care"[Mesh] OR "General Practice"[Mesh] OR "Family Practice"[MeSH]) AND ("lnternationality"[Mesh:NoExp] OR "Developing Countries"[Mesh] OR (developing countr*[tiab] OR under developed countr*[tiab] OR developing nation*[tiab] OR developing world[tiab] OR less developed world[tiab] OR lmic*[tiab] OR (less developed[tiab] OR low income[tiab] OR lower income[tiab] OR middle income[tiab] OR low middle income[tiab] OR resource poor[tiab] OR resource constrained[tiab] OR low resource[tiab] OR limited resource*[tiab] OR resource limited[tiab]) AND (country[tiab] OR countries[tiab] OR region[tiab] OR regions[tiab] OR settings[tiab] OR area[tiab] OR areas[tiab])) OR "Africa South of the Sahara"[Mesh] OR "Central America"[Mesh] OR "South America"[Mesh] OR "Latin America"[Mesh] OR "Caribbean Region"[Mesh] OR "Mexico"[Mesh] OR "Asia"[Mesh:NoExp] OR "Asia, Central"[Mesh] OR "Asia, Northern"[Mesh] OR "Asia, Southeastern"[Mesh] OR "Asia, Western"[Mesh] OR Afghanistan [tiab] OR Afghan [tiab] OR Albania* [tiab] OR Algeria* [tiab] OR American Samoa* [tiab] OR Angola* [tiab] OR Argentina [tiab] OR Argentinian [tiab] OR Armenia* [tiab] OR Azerbaijan* [tiab] OR Bangladesh* [tiab] OR Barbados [tiab] OR Barbadian [tiab] OR Belarus [tiab] OR Belorussian [tiab] OR Beliz* [tiab] OR Benin* [tiab] OR Bhutan* [tiab] OR Bolivia* [tiab] OR Bosnia [tiab] OR Bosnian* [tiab] OR Herzegovin* [tiab] OR Botswan* [tiab] OR Brazil [tiab] OR Brazilian [tiab] OR Bulgaria* [tiab] OR Burkina Faso [tiab] OR Burkinabe [tiab] OR Burmese [tiab] OR Burund* [tiab] OR Cambodia* [tiab] OR Cameroon* [tiab] OR Cape Verde [tiab] OR Cape Verdean [tiab] OR Central African Republic [tiab] OR Chad [tiab] OR Chadian [tiab] OR China [tiab] OR Chinese [tiab] OR Colombia [tiab] OR Colombian [tiab] OR Comoros [tiab] OR Comorian [tiab] OR Congo [tiab] OR Congolese [tiab] OR Costa Rica [tiab] OR Costa Rican [tiab] OR Cote d'Ivoire [tiab] OR Ivory Coast [tiab] OR Croatia* [tiab] OR Cuba [tiab] OR Cuban [tiab] OR Czech [tiab] OR Djibouti* [tiab] OR Dominica [tiab] OR Dominican [tiab] OR Ecuador* [tiab] OR Egypt [tiab] OR Egyptian [tiab] OR El Salvador [tiab] OR Salvadorian [tiab] OR Guinea [tiab] OR Guinean [tiab] OR Eritrea* [tiab] OR Estonia* [tiab] OR Ethiopia* [tiab] OR Fiji* [tiab] OR Gabon* [tiab] OR Gambia* [tiab] OR Gaza [tiab] OR Georgia [tiab] OR Georgian [tiab] OR Ghana [tiab] OR Ghanaian [tiab] OR Grenad* [tiab] OR Guatemala* [tiab] OR Guinea [tiab] OR Guinean [tiab] OR Guyan* [tiab] OR Haiti* [tiab] OR Hondura* [tiab] OR Hong Kong [tiab] OR Hungar* [tiab] OR India [tiab] OR Indian [tiab] OR Indonesia* [tiab] OR Iran [tiab] OR Iraq* [tiab] OR Jamaica* [tiab] OR Jordan [tiab] OR Jordanian [tiab] OR Kazakh* [tiab] OR Kenya [tiab] OR Kenyan [tiab] OR Kiribati [tiab] OR Korea* [tiab] OR Kyrgyz Republic [tiab] OR Kyrgyzstan [tiab] OR Laos [tiab] OR Laotian [tiab] OR Lebanon [tiab] OR Lebanese [tiab] OR Lesotho [tiab] OR Liberia* [tiab] OR Libya* [tiab] OR Macedonia* [tiab] OR Madagasca* [tiab] OR Malawi* [tiab] OR Malaysia* [tiab] OR Maldives [tiab] OR Maldivian [tiab] OR Mali [tiab] OR Malian [tiab] OR Marshall Islands [tiab] OR Mauritania* [tiab] OR Mauritius [tiab] OR Mauritian [tiab] OR Mayotte [tiab] OR Mexico [tiab] OR Mexican [tiab] OR Micronesia* [tiab] OR Moldov* [tiab] OR Mongolia* [tiab] OR Morocc* [tiab] OR Mozambique [tiab] OR Mozambican [tiab] OR Myanmar [tiab] OR Namibia* [tiab] OR Nepal* [tiab] OR Nicaragua* [tiab] OR Niger [tiab] OR Nigeria* [tiab] OR

Northern Mariana Islands [tiab] OR Oman* [tiab] OR Pakistan* [tiab] OR Palau* [tiab] OR Panama* [tiab] OR Papua New Guinea [tiab] OR Paraguay* [tiab] OR Peru* [tiab] OR Philippine* [tiab] OR Poland [tiab] OR Polish [tiab] OR Romania* [tiab] OR Rwanda* [tiab] OR Samoa* [tiab] OR Sao Tome [tiab] OR Senegal* [tiab] OR Serbia [tiab] OR Serbia* [tiab] OR Montenegr* [tiab] OR Seychell* [tiab] OR Sierra Leone [tiab] OR Slovak Republic [tiab] OR Slovakian [tiab] OR Solomon Islands [tiab] OR Somali* [tiab] OR South Africa [tiab] OR South African [tiab] OR Sri Lanka [tiab] OR Sri Lankan [tiab] OR Saint Kitts [tiab] OR Saint Lucia [tiab] OR Saint Vincent [tiab] OR Sudan* [tiab] OR Suriname* [tiab] OR Swaziland [tiab] OR Swazi [tiab] OR Syria [tiab] OR Syrian [tiab] OR Tajikistan [tiab] OR Tajik [tiab] OR Tanzania* [tiab] OR Thailand [tiab] OR Thai [tiab] OR Timor-Leste [tiab] OR Togo* [tiab] OR Tonga* [tiab] OR Trinidad and Tobago [tiab] OR Trinidadian [tiab] OR Tobagonian [tiab] OR Tunisia* [tiab] OR Turk* [tiab] OR Turkmenistan [tiab] OR Uganda* [tiab] OR Ukrain* [tiab] OR Uzbekistan [tiab] OR Uzbek [tiab] OR Vanuat* [tiab] OR Venezuela* [tiab] OR Vietnam* [tiab] OR West Bank [tiab] OR Yemen* [tiab] OR Zambia* [tiab] OR Zimbabwe*[tiab]) AND ("2003/01/01"[PDAT]: "3000/12/31"[PDAT])

Appendix 5 PHCPI conceptual framework[41]

https://phcperformanceinitiative.org/about-us/measuring-phc



Appendix 6 Number of studies per LMIC

LMIC Country	Number of studies	LMIC Country	Number of studies	LMIC Country	Number of studies
Brazil	42	Cameroon	1	Gabon	0
South Africa	26	Cuba	1	Grenada	0
China	21	Ecuador	1	Guinea	0
India	15	El Salvador	1	Guinea-Bissau	0
Tanzania	12	Eritrea	1	Guyana	0
Nigeria	11	Gambia, The	1	Honduras	0
Ethiopia	10	Guatemala	1	Iraq	0
Nepal	6	Kyrgyz Republic	1	Kazakhstan	0
Thailand	6	Lao PDR	1	Kiribati	0
Turkey	6	Malaysia	1	Korea, Dem. People's Rep.	0
Kenya	5	Mauritania	1	Kosovo	0
Malawi	5	Micronesia, Fed. Sts.	1	Lesotho	0
Mexico	5	Morocco	1	Libya	0
Pakistan	5	Mozambique	1	Macedonia, FYR	0
Vietnam	5	Myanmar	1	Madagascar	0
Zambia	5	Peru	1	Maldives	0
Afghanistan	4	Philippines	1	Marshall Islands	0
Botswana	4	Romania	1	Mauritius	0
Colombia	4	Solomon Islands	1	Moldova	0
Ghana	4	Sri Lanka	1	Mongolia	0
Iran, Islamic Rep.	4	St. Lucia	1	Montenegro	0
Burkina Faso	3	Sudan	1	Namibia	0
Haiti	3	Suriname	1	Nauru	0
Jordan	3	Tajikistan	1	Nicaragua	0
Mali	3	Ukraine	1	Niger	0
Uganda	3	Zimbabwe	1	Panama	0
American Samoa	2	Algeria	0	Papua New Guinea	0
Bangladesh	2	Angola	0	Paraguay	0
Bolivia	2	Azerbaijan	0	Russian Federation	0
Costa Rica	2	Belarus	0	Samoa	0
Croatia	2	Belize	0	São Tomé and Principe	0
Georgia	2	Bhutan	0	Senegal	0
Indonesia	2	Burundi	0	Serbia	0
Jamaica	2	Cabo Verde	0	Somalia	0
Lebanon	2	Cambodia	0	South Sudan	0
Liberia	2	Central African Republic	0	St. Vincent, Grenadines	0

Rwanda	2	Chad	0	Swaziland	0
Sierra Leone	2	Comoros	0	Syrian Arab Republic	0
Timor-Leste	2	Congo, Dem. Rep.	0	Togo	0
Tunisia	2	Congo, Rep.	0	Tonga	0
Albania	1	Côte d'Ivoire	0	Turkmenistan	0
Argentina	1	Djibouti	0	Tuvalu	0
Armenia	1	Dominica	0	Uzbekistan	0
Benin	1	Dominican Republic	0	Vanuatu	0
Bosnia and Herzegovina	1	Egypt, Arab Rep.	0	Venezuela, RB	0
Bulgaria	1	Equatorial Guinea	0	West Bank and Gaza	0
		Fiji	0	Yemen, Rep.	0