Identifying important research gaps in how primary health care is organised in low- and middle-income countries, and ways to address them

Felicity Goodyear-Smith on behalf of the WONCA team

Auckland, August 2018

Table of Contents

Table of Tables

Table of Figures

Research team

Principal Investigator

Professor Felicity Goodyear-Smith
Chair, WONCA Working Party on Research and Chair, International Committee of the North American Primary care research group. Academic head, Department of General Practice and Primary Health Care, School of Population Health, Tamaki Campus, 261 Morrin Road, Glen Innes Auckland 1072, New Zealand. Ph: +64 9 923 2357; f.goodyear-smith@auckland.ac.nz

Project manager

Mr Richard Fortier
Department of General Practice & Primary Health Care, University of Auckland.
Tel +64 9 923 7456 r.fortier@auckland.ac.nz

Co-investigators: (in alphabetical order)

Dr Andrew Bazemore
Member of the WONCA Working Party on Research, and of the US National Academy of Medicine Director of the Robert Graham Center Policy Studies in Family Medicine & Primary Care, Washington DC, USA. abazemore@aafp.org

Ms Megan Coffman
Robert Graham Center Policy Studies in Family Medicine & Primary Care, Washington DC, USA mcoffman@aafp.org

Prof Amanda Howe
President, World Organization of Family Doctors (WONCA); Professor of Primary Care, Norwich Medical School, Faculty of Medicine and Health Sciences, University of East Anglia, Norwich, UK. amanda.howe@wonca.net

Dr Hannah Jackson
Fellow, Robert Graham Center Policy Studies in Family Medicine & Primary Care, Washington DC, USA. HJackson@aafp.org

P*rof Michael Kidd*
Immediate past President of WONCA; Professor & Chair, Department of Family & Community Medicine, University of Toronto, Canada; Professorial Fellow, Murdoch Children's Research Institute, The Royal Children's Hospital Melbourne, Australia, and Honorary Professor of Global Primary Care, Southgate Institute for Health, Society and Equity, Flinders University, Australia michael.kidd@utoronto.ca

Prof Robert L Phillips
Member of the WONCA Working Party on Research; member of the US National Academy of Medicine. Vice President for Research and Policy of the American Board of Family Medicine, Lexington, KY, USA. Bphillips@theabfm.org

Assoc Prof Katherine Rouleau
Associate Professor at the Department of Family & Community Medicine, Dalla Lana School of Public Health, University of Toronto, and Director of the Besrour Centre, Canada. Katherine.Rouleau@utoronto.ca

Prof Chris van Weel
Past President of WONCA; Emeritus Professor of Family Medicine, Department of Primary and Community Care**,** Radboud Institute of Health Sciences, Nijmegen, The Netherlands and Honorary Professor of Primary Health Care Research, Department of Health Services Research and Policy, Australian National University, Canberra, Australia. chris.vanweel@radboudumc.nl

Lead authors of implementation plans

Dr Sandro Rodrigues Batista
Assistant Professor, Department of Community Medicine, Faculty of Medicine, Federal University of Goias, Goiânia, Brazil. sandrorbatista@gmail.com

Prof Shabir Moosa
Department of Family Medicine, University of the Witwatersrand, Johannesburg, South Africa. shabir@profmoosa.com

Prof Sherina Mohd-Sidik
Family Medicine, Faculty of Medicine and Health Sciences, Universiti Putra, Selangor, Malaysia. sherina@upm.edu.my

Dr Aboi Madaki
Associate Professor of Family Medicine and Deputy Director, Office of Research and Development, University of Jos, Jos, Nigeria. wankarani62@gmail.com

WONCA Regional President advisers

Prof Kanu Bala
WONCA South Asia President and Member of WONCA Executive; Professor of Family Medicine of the University of Science & Technology Chittagong, and the Medical Director of the Bangladesh Institute of Family Medicine & Research, University of Science & Technology Chittagong, Dhaka, Bangladesh. bala@agni.com

Dr Henry Lawson
WONCA Africa President and Member of WONCA Executive; family physician, Department of Community Health, School of Public Health, University of Ghana, Accra, Ghana. hjolaw@yahoo.com

Assoc Prof Maria Inez Padula Anderson
WONCA Iberoamericana-CIMF President and Member of WONCA Executive; Associate Professor, Department of Family and Community Medicine, Rio de Janeiro State University, Rio De Janeiro, Brazil. inezpadula@yahoo.com.br

Funding

This publication is based on research funded by Ariadne Labs through Brigham and Women's Hospital, who is the recipient of a Bill & Melinda Gates Foundation grant. The findings and conclusions contained within are those of the authors and do not necessarily reflect positions or policies of the Bill & Melinda Gates Foundation.

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 partnership
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

Introduction

Globally, it has long been recognised that timely access to affordable, acceptable health care from competent providers is crucial to achieving prevention, diagnosis, treatment and ongoing management of health problems.[1-5] A strong primary health care (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 addresses population health needs. Delivery of PHC requires a well-trained and well-resourced workforce which is adequate and appropriate for specific regional and national contexts. This may require capacity building of primary care physicians, to work in the context of interdisciplinary teams. PHC has to apply general principles under prevailing socio-economic cultural and health care conditions, with a focus on the priorities of the population under care. However, many countries are only just beginning to understand how to apply these principles, and have not yet evaluated the factors which could support effective PHC in their settings. This makes PHC research capacity in LMIC an essential feature of PHC development.

In 1978, the Declaration signed at Alma-Ata identified the importance of primary health care, and called for it to be strengthened, particularly in low and middle income countries (LMIC).[6] The initial response was the introduction of vertical programmes for specific populations and conditions,[7] but contemporarily PHC is now expected to give access to a range of services spanning health promotion, prevention, acute and chronic care management, palliative care and rehabilitation for the whole population using multidisciplinary teams.[8] These are people-focused and community-based horizontal services for both individuals and families.[9] The Declaration recognised that key factor in its effectiveness is individual and community engagement in PHC organisation.[6]

In order to enhance the quality and accessibility of PHC, and to integrate medical care across different illnesses and needs, changes in the workforce may be needed. The development of family physicians (a 'new' speciality to some countries, though long established in others) is linked with the need to develop a robust academic base for family medicine education, training and research. However, many countries face ongoing challenges both in resourcing and managing academic capacity development, against a picture of global inequity – for example, sub-Saharan Africa is frequently cited as having 24% of the global disease burden but only 3% of the world's health workers and less than 1% of the world's health expenditure.[10] Research has disproportionately occurred in high-income countries (HIC),[11 12] and when conducted in LMIC has often been led by international agencies and governments, with little evidence of subsequent implementation.[13]

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. There is a global move to measuring who is working in this sector, what they do, and what the outcomes are. There is also an expectation that accurate data can be provided to support both PHC workforce profiling and activity. However, much research in practice is conducted in hospital

settings, focusing on new diagnostic and treatment modalities. Even in developed countries, recommendations for practice often lack evidence from primary health care settings because research capacity and data from this sector is not prioritised.[14.] There is also the challenge of naturalistic change and variation in health systems as new models of care are implemented, often without concurrent systematic evaluation of the outcomes of such changes.

There is therefore a need to engage directly with the PHC sector to identify gaps in research, and to ensure that their views on the current models, key changes, and market factors are identified, and their ability to provide relevant data for future studies is tested. Research, plus knowledge from our collective work with primary care in LMICs, shows that different settings call for different models of care. For example, while patients in high income countries may all have their own primary care doctor, this goal may be unrealistic in the short term for areas of Africa with fewer resources - where a team-based approach led by family physicians may be a more sustainable model. The effectiveness of service delivery will depend on such elements as the composition of teams, their leadership structure, the degree they are horizontally integrated, and the ability of team members to share information. Adequate resourcing is required to establish and maintain an effective interdisciplinary PHC workforce of both family physicians and other interdisciplinary team members including nurses, midwives, mid-level care workers and community health workers. In many LMIC countries, data from the private as well as public health sectors are essential, as private health care may be a major provider; and this sector is the least regulated in terms of service design, quality, and equity of access. All of these factors must be considered, explored, and described when creating a research agenda for LMICs.

PHC delivery requires a community-based workforce, including medical practitioners. Family physicians (called general practitioners in some countries) are increasingly receiving postgraduate training to deliver first point of contact comprehensive generalist medical care for all.[15] They are frequently part of a multi-professional team which is also responsible for population-level services of health promotion and prevention, as well as acute and chronic care.[16] The scope of practice for family physicians varies with context and availability of other health professionals, and tends to be more extensive in rural and isolated areas. There has been task-shifting and other health practitioners such as nurses, nurse practitioners and community pharmacists are progressively taking on roles previously undertaken by family physicians, but family medicine training continues to be for generalist medical care which is comprehensive and with continuity over time.

A well-functioning health system requires vertical integration of PHC with secondary care services, and inter-sectoral integration across health and social services. An expanded chronic care model will incorporate population health promotion and disease prevention, and address social determinants of health and community partnerships. Identifying the contextual barriers and facilitators to integration of different systems in different contexts, ultimately informs policy, research, and implementation, and strategies to study and effectively scale up innovative interventions within and across countries. This adds another set of research dimensions. Finally, inn 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] 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). So workforce, service delivery models, and measurement, all may be areas where research is needed in LMICs.

Aims and Objectives

The aim of this study is to address the priority innovation area #3: Organization and models of care (workforce and team development, scale and new models for management).

Our aim is to identify and prioritise the knowledge needs of PHC practitioners and researchers 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 10-15 prioritised research questions.
2. Produce a gap map, including areas where there is evidence of what works to improve the gap, and where there are major gaps in evidence regarding how to measure and/or improve PHC organisation.
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; making efficient use of their 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 stakeholders, and 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 4).[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 networks listed above, augmented by 'snowballing' sampling techniques (allowing invitees to 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 organisation (the way services are delivered, with best practice care and services for an individual or a population throughout the stages of a condition or an injury). 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. 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 privacy 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 organisation (such as workforce, models of care, use of teams, scope of care, transitions of care, government policy). The text for Delphi Round 1 can be found in Appendix 4. 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 (see Appendix 5).[26] Two researchers independently coded the first 25 respondent replies and Cicchetti-Allison kappa co-efficients (a measure of rater agreement) were calculated to check for consistency in coding. Data were sorted by codes, collapsed, and synthesised to lists of questions for the key area. Where there were similar questions from a number of participants, these were combined into representative questions for Round 2.

In Round 2, all enrolled participants were invited to rate each question on a four-point Likert scale for level of importance 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 organisation, and these were removed. We were separately conducting the same exercise for PHC financing, and one of the top-ranking questions generated from that work fitted better into PHC organisation, so we included this. The four highest-ranking questions for PHC organisation 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 the research questions generated by the panel. A two-dimensional coding matrix was constructed based on the PHCPI conceptual framework and the dimensions of PHC organisation identified through coding the questions generated in Round 1 of the panel. The coding matrix was designed to search for specific answers to questions generated by 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. A selection of the searches were conducted by two researchers independently to avoid researcher bias and check for coding consistency.[27]

The search consisted of a string of terms for PHC and LMIC since 2003 (the last 15 years) – see Appendix 6. 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. Due to the tight timeframe imposed by the funders, the search did not extend to the grey literature.

The search was conducted in PubMed through Eppi-Reviewer 4 literature management software with shared review. A two-dimensional coding matrix was constructed based on the PHCPI conceptual framework and the dimensions of PHC organisation 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. 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 required 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 4: 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 36 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 for whom will benefit. Therefore once the top four questions were determined, we asked our panellists, members of the WONCA Working Party on Research and Besrour Fellows to indicate if they had a particular interest in one, and if so, what methods might they use, did they know 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 at the WONCA Europe conference in Krakow, Poland in late May 2018. During the workshop, small groups of participants critiqued the plans and provided feedback. These critiques were then sent back to those preparing the plans for their LMIC to help 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).

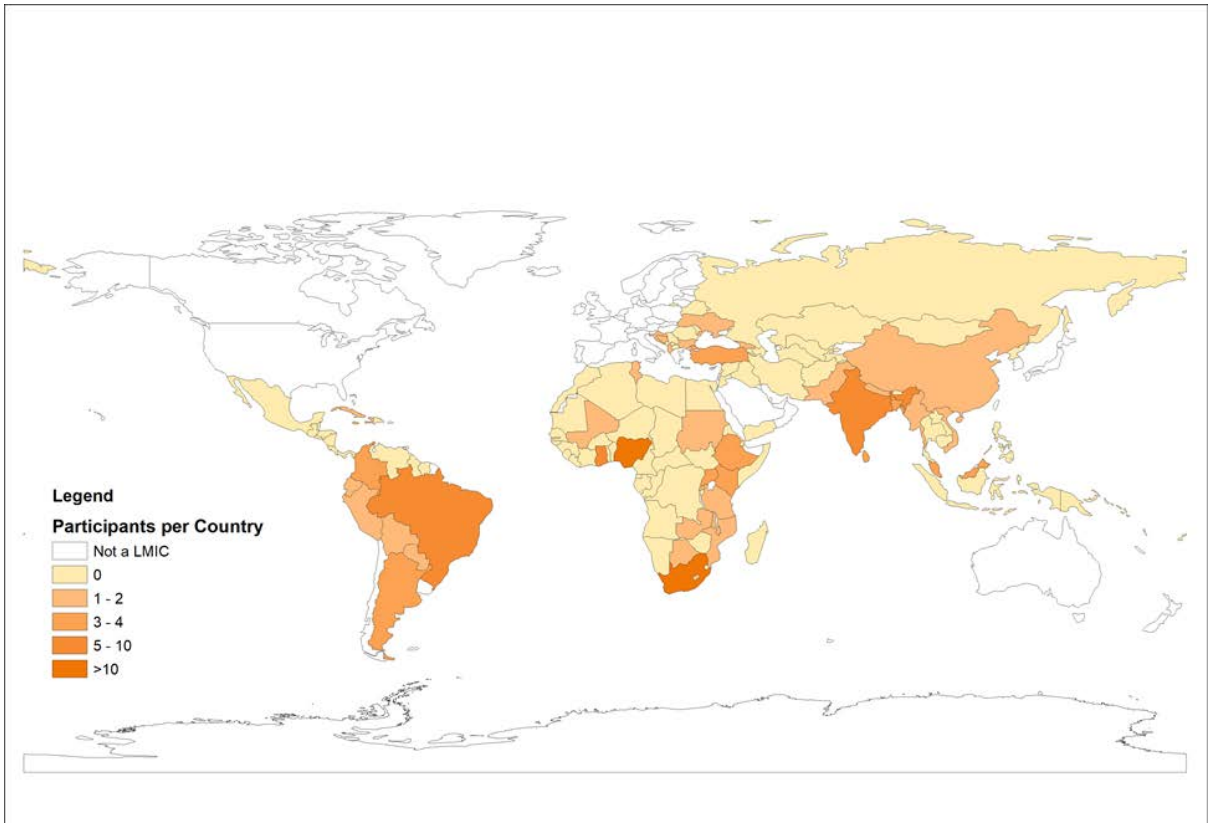


Figure 1 Countries of enrolled participants

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). A number hold dual roles as health practitioner and academic, and some also indicated that they have a policy-making role.

Table 2 Demographics of LMIC panel responders in each round

	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 | =0·879 (95% CI 0.7345–1.000) p<0.0001 (almost perfect agreement). In the final LMIC dataset, 744 valid generated questions or responses were coded. Round 2 consisted of 36 questions on organisation for rating.

Eighty-four (60%) of the enrolled participants completed Round 2 (see Table 2). Individual respondents in each round could not be identified in order to maintain confidentiality, and therefore it is unknown how many completed all three rounds. Table 3 shows the 36 questions rated for importance, with the top 16 questions indicated above the black bar.

Table 3 Research questions for PHC organisation rated for importance

Organisation / models of care	Sum	Mean
1. How can family physicians be supported to provide comprehensive community-based care instead of resources being directed into vertical programmes?	290	3.58
2. What are the drivers for PHC teams to deliver high quality services (intrinsic and extrinsic factors such as pay, status, career pathway/promotion etc)?	286	3.53
3. How can education and training support the PHC workforce to deliver the range of services that address priority health needs of the community?	284	3.51
4. How does PHC impact the health indicators of the countries? What are these indicators? How are they measured? How do they compare between countries?	284	3.51
5. What are the factors that facilitate recruitment and retention of a PHC workforce in underserved community settings?	280	3.46
6. What are the best strategies to implement and monitor best practice in PHC?	280	3.46
7. Are the services and scope of practice of PHC aligned with people's health needs, taking into account variations in population needs, resources and geography, and what is the evidence on which the range of services/scope of care provided should be decided?	279	3.44

8. What strategies can be undertaken to ensure quality in the delivery of PHC service to patients (e.g. training/research/quality control)?	279	3.44
9. What are the factors or incentives that can improve distribution of PHC workforce or equity of accessing PHC services?	277	3.42
10. How can different stakeholders (e.g. policymakers, health system managers, health workforce organisations, academic institutions and communities) support and assist the PHC workforce and successful team functioning?	277	3.42
11. How can PHC services be integrated with other community-based health and social services?	276	3.41
12. What are the factors to be considered and negotiated for successful referral from primary to secondary care and back?	275	3.40
13. What PHC models of care provision in resourced limited environments provide the highest impact?	274	3.38
14. How should care be horizontally integrated and coordinated among the multidisciplinary PHC team?	273	3.37
15. What factors should determine the composition of the PHC team and what professionals should the team include as a minimum?	270	3.33
16. What are the essential features to ensure adequate coordination and collaboration among PHC team members to address the priority health concerns of the population they serve?	270	3.33
17. What procedures and protocols are required to ensure seamless transitions and transfers occur when required to and from primary and secondary care? What role can IT play in this?	269	3.32
18. What is the best leadership model for PHC? Who should lead the PHC delivery team where there is no physician?	268	3.31
19. How can different stakeholders (e.g. health system managers, health workforce members, academic institutions and communities) advise policymakers on how to ensure that PHC services address population health needs?	268	3.31
20. What can be done to prioritise limited resources and what alternatives including telemedicine can assist in providing PHC to under-resourced areas?	264	3.26
21. What tools and processes are best for assessing the match between PHC team structure and function and patient/community needs?	263	3.25
22. What is the effective panel (patient population) size for provision of effective, comprehensive PHC? How does this differ depending on worker type, PHC team composition, and location (e.g. urban vs rural)?	259	3.20
23. How does a PHC team establish practice priorities, what essential services need to be provided and decide what is out of scope?	255	3.15
24. Are there differences in the ability to access PHC based on the region of the country, and between rural and urban?	254	3.14
25. What are the most useful ways of delineating PHC services and hospital services in a generalist district health system model?	253	3.12

26. What do patients consider should be the basic / essential scope of practice for PHC team?	252	3.11
27. What role is there for specialists to see patients in community settings and for PHC workers including family physicians to work in secondary and tertiary settings?	252	3.11
28. Why is there a significant number of the populace not able or willing to access services in PHC?	251	3.10
29. What role is there for community members guide the development and delivery of public and private community-based PHC services and to contribute to government policy which supports these services?	247	3.05
30. What are the most effective and efficient means of tracking of where PHC workers practice after completing training in LMICs?	243	3.00
31. How do government policies impact migration (import or export) of PHC physicians in LMICs?	242	2.99
32. How can traditional healers be accommodated within a PHC system?	238	2.94
33. What are the legal barriers & enablers that most inhibit and facilitate access to PHC services?	234	2.89
34. Is there a role for high school graduates to work in PHC teams as community workers if physicians and other trained clinicians are not available, particularly in rural areas, and what would a standardised skill set for these health workers be?	233	2.88
35. How do different PHC terminologies in LMIC and HIC countries influence comparative international research outcomes?	231	2.85
36. Do centres of excellence in key urban areas focus predominantly on secondary and tertiary services in your country? Are workers sent to rural and PHC settings as a form of disciplinary action?	223	2.75

* Maximum possible score = 336 (if all panellists rated the question very important)

Round 3 was completed by 68 (48%) of enrolled participants. One of our top ranking questions in our parallel PHC financing 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 it was moved here. Team discussions on the feasibility of answering some of the questions meant that we moved some up or down the list.

The final top four ranked questions are:

1 What are the factors to be considered and negotiated for successful referral from primary to secondary care and back?
2 How should care be horizontally integrated and coordinated among the multidisciplinary PHC team?
3 How can the public and private sectors work more collaboratively to improve and integrate PHC coverage and prevent segmentation of the services?

4 How can different stakeholders (eg policymakers, health system managers, health workforce organisations, academic institutions and communities) support and assist the primary health care workforce and successful team functioning?

Scoping literature review

Our coding matrix is shown in Figure 2. One axis consists of components of service delivery (accessibility, continuity, comprehensiveness, coordination, person-centred care) and system outcome (equity, efficiency, effectiveness) and the other access dimensions of PHC organisation (workforce, teams, scope of practice, integration). Development of this was informed by our coding of the original 36 questions, as well as the PHCPI conceptual framework and the coding matrix previously developed by the George Institute which also looked at the organisation of PHC and models of care.

The LMIC(s) in which the study was conducted, and the global region, were added as filters.

		PHC service delivery				System outcomes			
		Accessibility / coverage	Continuity	Comprehensiveness	Coordination	Person-centred care	Equity	Efficiency	Effectiveness
Workforce	Training								
	Recruitment & retention								
	Distribution								
	Staff well-being (eg remuneration, satisfaction)								
	Mentoring / supervision								
Team	Composition								
	Competencies / task shifting								
	Organisation								
	Leadership								
Scope of practice	Health promotion								
	Public health								
	Prevention / screening								
	Services for specific conditions								
	Government funded services								
	In different settings eg urban vs rural								
Service integration	With secondary care, transitions care, referrals								
	With social services, community outreach								
	Public private relationship / partnership								
	Between different health professionals								

Figure 2 Coding matrix for PHC organisation

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

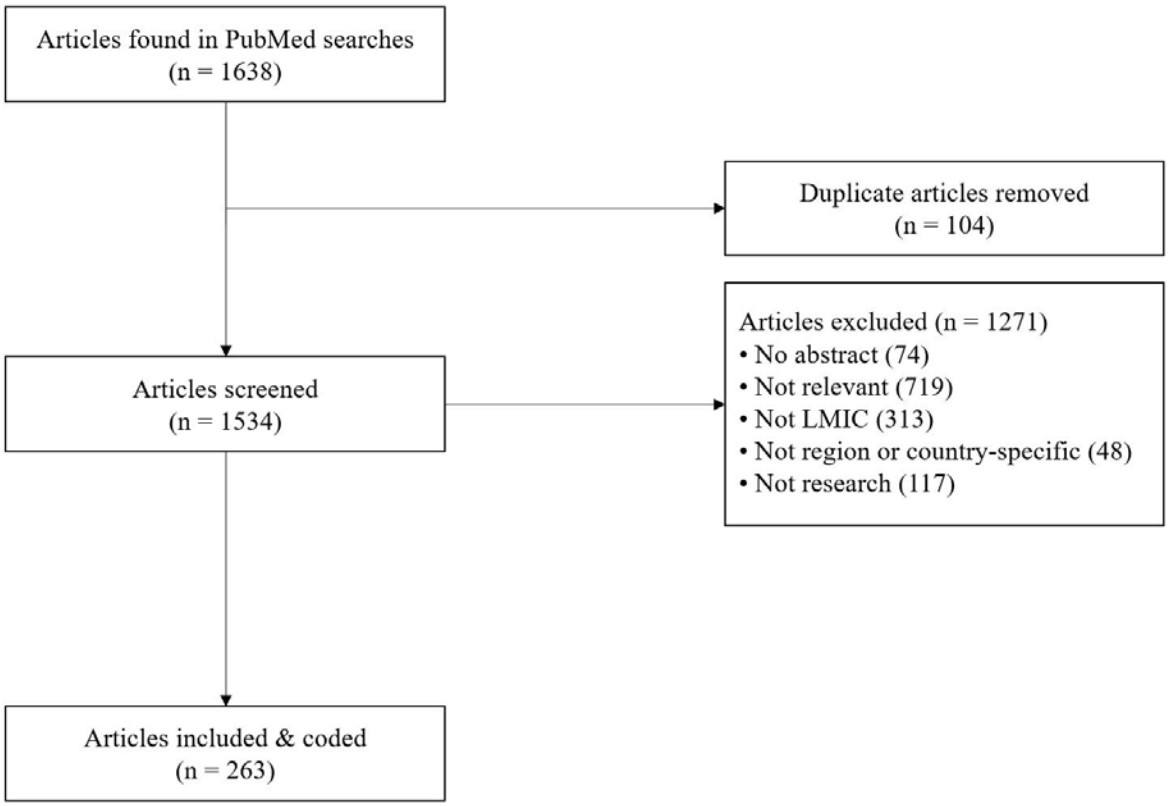


Figure 3 Flow chart for search on PHC organisation

There were 263 articles included from the searches, coded according to the matrix for the two axes, and also coded for region and country.[29-278, 259-291] 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

The number of studies for each LMIC is shown in Appendix 8. These are presented in a world map in Figure 4.

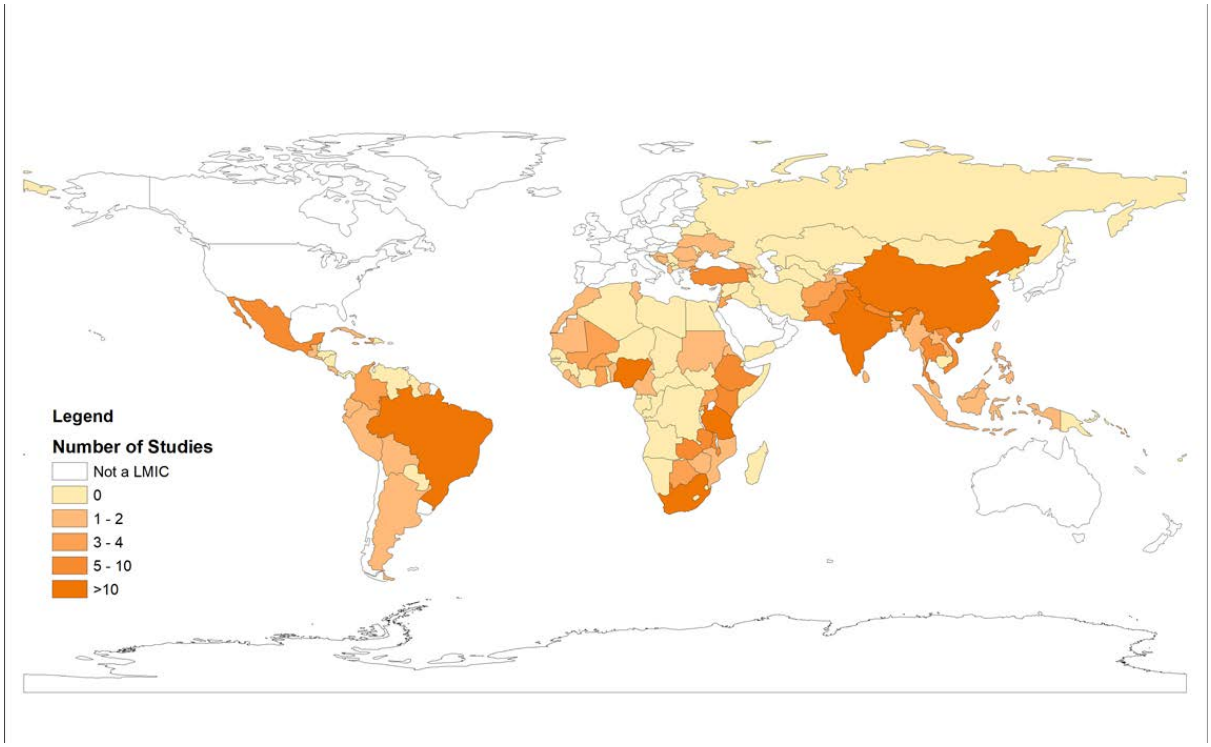


Figure 4 Number of studies from each LMIC

Gap map

The bubble gap map was generated through Eppi-Reviewer. 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 hovering over the bubble, click on:

PHC_MoC_GapMap_269_26062018.html

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

Figure 5 Gap map of studies

Research implementation plans

The top four questions relating to organisation of PHC were modified to relate specifically to the country or region for which the plan is developed. The final four questions are:

1. What are the factors to be considered and negotiated for successful referral from primary to secondary care and back in Brazil?
2. How should care be horizontally integrated and coordinated among the multidisciplinary primary health care team in South Africa?
3. How can the public and private sectors work more collaboratively to improve and integrate primary health care coverage and prevent segmentation of the services in Malaysia?
4. How can different stakeholders (eg policymakers, health system managers, health workforce organisations, academic institutions and communities) support and assist the primary health care workforce and successful team functioning in Nigeria?

The five-page proposals developed by PHC colleagues in these countries follow.

Research Implementation Plan Brazil

What are the factors to be considered and negotiated for successful referral from primary to secondary care and back in Brazil?

Background and significance

With the implementation of Brazilian Health System (SUS), institutionalized in Brazil by Laws 8080/90 and 8142/90, the development of primary health care (PHC) began to generate better health outcomes for Brazilian citizens. This level of care, recommended since the International Conference on Primary Health Care Alta-Ata,[292] as a driver of a broader view on health surveillance, population nutritional conditions and prevention, already a look beyond the individual, that is, for the family, environment and community.

The political agenda for strengthening PHC through the Family Health Strategy (ESF)[293] gradually consolidated in the country, and in 2006 became one of the priority dimensions of the Pact for Life. The ESF consolidation strengthened the Brazilian PHC, making it possible to extend coverage, provide integral care and develop health promotion. ESF became the main entrance of the SUS user, coordinating care and organising the Network Care Health (RAS, in Portuguese: Redes de Atenção à Saúde).

However, this broad mosaic of possibilities, which made it possible to expand health coverage in the Brazil, especially among the most vulnerable, left some gaps, especially in the communication between the primary and secondary levels of care, jeopardising WONCA core competencies such as primary care management (including care coordination, the so-called centrality of care carried out in the RAS) and the comprehensive approach.

Thus, considering these central aspects, we must investigate what factors should be considered - and negotiated - for effective referral between primary and secondary care in Brazil.

Specific Aims

1) To identify factors that influence referral between primary and secondary care in Brazilian context.
2) To test and develop strategies to improve communication between primary and secondary care within the main systems of referral in Brazil

Objectives

- To evaluate characteristics of the PHC task force that influence the attribute "care coordination" in the population of Brazilian physicians and nurses working in the PHC and also in secondary care.
- To explore and better detail the barriers and potentialities involved in referral between primary and secondary care.
- To construct and develop strategies to cope with the communication gap between primary and secondary care from tracer conditions (like depression, diabetes type 2 or cervical cancer but to be defined) (e.g., patient accompanied by different physicians and without medication conciliation; patients with multiple requests for the same laboratory or images studies by different physicians, disruption of the longitudinal care of the family doctor with his patient after referral, queuing and delay of care in specialised care).

Study design
Five health regions will be studied (or ten, depending on financing, preferential), representing the five Brazilian regions, according to the Brazilian Institute of Geography and Statistics:

- Midwest: Distrito Federal and Anápolis
- Southeast: Rio de Janeiro and Ribeirão Preto
- Northeast: Feira de Santana and Teresina
- South: Porto Alegre and Florianopolis
- North: to be determined

Rationale
Brazil is a continental country with extremely diverse regions (population, socioeconomics, politics and culture). The Brazilian Health System (SUS) was developed based on local policies; it is necessary to research the local influence in the referral process between primary and secondary care. The workplace of researchers will be considered.

Targeted population

- Family Physicians or General Practitioners (GP) and Nurse Practitioners (NP).
- Workers of primary health care (In Brazil, not all workers of PHC are specialised).
- Workers of Hospitals and Secondary Care Centers
- Municipal managers of selected regions (health secretaries and PHC coordinators, Secondary care coordinators and care regulation coordinators.

Methodology
PHASE 1: Application of online national questionnaire developed (or a questionnaire validated; Primary Care Assessment Tool is indicated) to evaluate the attribute "care coordination" and variables that may influence this variable. Semi-structured interviews (online mode is possible) with primary health care professionals, managers and professionals of medium complexity services of 10 cities in five regions of Brazil will be held to: 1) define how Health Systems are organized in each of them, and; 2) the main barriers and facilitators allowing comparison between these different system when it comes to successful referral of the conditions studied.

PHASE 2: Case studies in each of the selected regions will be selected to deepen the analysis of successful referral from primary to secondary care and back in each area, detecting which mechanisms have been established to improve the GAP of communication between PHC and secondary care, so that barriers and best practices already existing can be better understand. The conditions have been selected to be studied of a list and are conditions that depend mainly on PHC for a good standard of care, but where coordination of care by PHC and good quality of communication are essential for the good resolution of more severe cases. These conditions will involve different RAS (like as Psychosocial Network, Chronic Conditions and Women´s Health) in SUS allowing an opportunity to study the problems from a more complete perspective (e.g., patient accompanied by different physicians and without medication conciliation; patients with repeated requests for the same laboratory or repeated imaging exams by different physicians; disruption of the patient longitudinal care with the family physician/GP after referral; queuing and delay of care in specialized care).

PHASE 3: After the eight cities in four regions have been compared, the most frequent barriers and the best practices in each of them and in the national system will be identified,

providing a framework that can be used to improve communication and integration between these two levels in each studied case.

The next and final phase will be directed to motivate the development of successful strategies to improve PHC coordination and communication between primary and secondary care.

Participatory methodology will be used in the construction of intervention plans in each region, according to the selected marking condition. Assessment of indicators of structure, process and results

Considerations:

- It should be emphasised that according to the marked condition, patients or communication flows will be evaluated from the point of view of integral care. Collaborative / sharedcare is a form of integration and communication.[294]
- In phase two it will be used various methodologies for its implementation (therapeutic itinerary, questionnaires for the target population, focus groups).

Potential research team and partners

Sandro Rodrigues Batista
Assistant Professor, School of Medicine, Federal University of Goias, Brazil. PhD.
sandrorbatista@gmail.com
Sandra Fortes
Associate Professor, Rio de Janeiro State University. PhD. sandrafortes@gmail.com
Clara Aleida Prada Sanabria
Adjunt Professor, Feira de Santana State University. PhD. claricecapas@gmail.com
Rita De Cassia Nascimento
Assistant Professor, Feira de Santana State University. PhD. rnascimento@uefs.br
Fernanda K Melchior Silva Pinto
Preceptor and professor of Family Medicine, Instituto Unievangélico Anapolis, Brazil.
fernanda_melchior@hotmail.com
João Mazzoncini De Azevedo Marques
Professor, Social Medicine Department, Ribeirão Preto Medical School, University of São Paulo. jmaq@usp.br
Tiago Sarti
Professor, Social Medicine Department, Federal University of Espirito Santo. MD, PhD.
tdsarti@gmail.com
Leonardo Moscovici
Professor, Family and Community Health, Federal University of São Carlos. MD, PhD.
leoscovici@gmail.com

Overview work plan

	1 qr	**2 qr**	**3 qr**	**4 qr**
Year 1				
First researchers' meeting				
Data collection (online national questionnaire & semi-structured interviews)				
Phase 1 Data analysis				
Year 2				
Second researcher's meeting				
Case studies by region – data collection				

Case studies by region – data analyses				
Year 3				
Third researchers' meeting				
Communication strategies development				
Communication strategies implementation				
Final report – paper writing				

Barriers to implementation

- Difficulty of understanding GP and NP about their role as care coordinators;
- Difficulty of understanding AS physicians about their role as a support network for PHC and the role of GP and NP as care coordinators.
- Reference to incomplete and non-standardized information (reference and counter-reference).
- Absence of integrated electronic medical record.
- Almost complete absence of mechanisms of counter-referencing and the need for qualitative improvement of it in places where it already exists.
- Still deficient monitoring of GP and NP on their patients in other levels of attention (mainly in secondary care).
- Different health policies adopted by municipalities with regard to integration between PHC and secondary care.
- Poor structuring and regionalisation of the service network.
- National and local policies that influence behaviour of GPs and nurses

Dissemination of results

Plans for dissemination of the results to policymakers and communities, as well as next steps:

- Publication of partial and final project reports
- Seminars in the regions involved in the project (with professions, managers and researchers).
- Publication of articles in specialised journals.
- Presentation at forums in Family Medicine, PHC congresses, with municipal managers of selected regions (health secretaries and PHC coordinators, secondary & care regulation coordinators).
- Disseminate widely to people working on the ground.

High-level budget for implementation of research

Task	Total
3 researcher meetings	$17.000
8 researchers	$172.800
16 Graduate students – 36 months	$230.400
Quantitative and qualitative data analysis software	$18.000
Equipment	$12.000
Materials and supplies	$10.000
Printing	$1.000
Publication fees (mean of 4/5 articles)	$10.000
Total	**$471.200**

Research Implementation Plan South Africa

How should care be horizontally integrated and coordinated among the multidisciplinary primary health care team in South Africa?

Background and significance

The World Health Report 2008 on primary health care (PHC) stresses service delivery reform with a shift toward integrated people-centred primary care (focusing on population-based health needs and enduring personal relationships).[295] A review of African primary care shows the fallacy of disease-oriented approaches,[296 297] despite Africans wanting an integrated team-based approach.[298 299]

Task shifting is an effective strategy for addressing human resources for health in HIV/AIDS, non-communicable disease and mental illness, especially with in-depth training and on-going support.[300-302] The World Health Organization (WHO) asserts that primary care is dangerously oversimplified in resource-constrained circumstances, and stresses that primary care requires teams of professionals with specific and sophisticated biomedical and social skills.[295]

Integrated care is being prioritised in South Africa with PHC re-engineering (including PHC Outreach Teams since 2011) and Integrated Chronic Disease Management (ICDM) since 2014, within the context of National Health Insurance (NHI) proposals.[303] This includes re-organising the health system in a move away from current mainly curative services, towards promotive-preventive community outreach services to a defined population with the inclusion of community health care workers.[304 305] There has been little focus on the optimal staff and skill mix in a team around the patient and a defined population.[296]

Integration is a layered process (functional, clinical, informational, professional, administrative, financial, etc.) and should be an organisational strategy with the patients' perspective as the organizing principle of the PHC team.[306] There has been little attention in Africa to the role of family physicians in the primary health care team.[307] Stakeholders in South Africa showed appreciation for the strong role family physicians could play. They felt that primary health care teams needed to include family physicians, in time, with a new supervisory model with nurses / clinical officers practicing with the principles of family medicine under supervision and support of doctors and/or family physicians. Family physicians were urged to develop staffing norms by breaking down tasks and structuring relationships for optimal skills mix.[308]

Family medicine has been slowly accepted in South Africa[309] and incorporated into some Health Districts. However, their role has been limited to servicing district hospitals and managing doctors in a few community health centres, 'pushing the queues'.[310] Family physicians have been advocating for stronger community-oriented primary care. A systematic review showed that the only model that incorporated all elements of community-orientated primary care (COPC) was the original work by the Karks in the 1930s.[311] Countries that derive inspiration from the Karks, like Cuba and Brazil, have large populations of doctors.[312] A comprehensive model based strongly on the Karks work in Pholela and termed "Community Practice" has been developed in a small part of the Chiawelo Community Health Centre (CHC) in Soweto's public primary healthcare service. It is strongly based on four elements of what we define as a community practice: 1) community health workers as team members in the community; 2) team-based doctor-led practice that manages the

individual, family and community with strong problem-oriented record-keeping; 3) regular strong stakeholder engagement (including multi-disciplinary, intersectoral and community action); and 4) a strong focus on targeted health promotion (with innovative communication). This is modelled with the doctor as team leader, potentially enabling private general practitioner-led community practices to contract with the NHI for panels of 10 000 people. Family medicine departments are keen on up-skilling GPs using the Diploma in Family Medicine and expanding the pool of family doctors for such NHI contracting.[313]

Composition and processes of optimal teams

There are different ways to define the multidisciplinary health team. It can be narrowly clinical including doctors, nurses, physician assistants together with support staff like clerks and community health workers. It can be wide to include other members of primary health care including dentists, optometrists etc. The World Health Organization advocates the use of the Workload Indicators for Staffing Need (WISN) to explore staffing norms. The WISN method usually involves a national validation workshop, field verification, data collection, and feedback to policy-makers. It has been helpful in revising staffing norms; improving staff equity across facilities; ensuring appropriate skills mix and estimating workforce requirements for new cadres. Key assumptions in the WISN scenario are: the precise setting (CHC, clinic, health post or complex), the population covered (10 000 – 100 000), utilisation (2-5 visits per person per annum), list of team members possible (as a uniform staff category) and times of work (normal working hours vs. late hours and Sundays vs. all hours).[314-317] Whilst WISN is useful the process of understanding team composition it needs to account for shared activities, skills management, supervision and referral within a contracted panel.[318]

There has been little done on team composition and process – roles, competencies and relationships - for a primary health care system re-organised towards personalised team-based care for defined populations in South Africa. This is more so if it takes a whole system approach, including private providers.

Comparing outcomes for teams

Work done using Primary Care Assessment tool (PCAT) indicates poor user perceptions of person-centredness.[319] There has been little done in South Africa on assessment of all-cause mortality for small practice populations apart from demographic surveillance in the larger rural setting of Agincourt sub-district, Limpopo and the national Saving Mothers Reports.[320] [321] Preliminary work done in Chiawelo Community Practice (CCP) shows low utilisation rates, high population awareness, high patient satisfaction, short waiting times, high benefit and low costs (at 40% of the national non-hospital PHC expenditure).[322]

There has been little done on process-level outcomes, in relation to comprehensive and integrated primary health services in South Africa.

Specific Aims

1) Describe the multidisciplinary team composition for community practice in South Africa
2) Compare outcomes of care at the level of process in all sites of interest and related controls

Study design and target populations

The overall study design will be the development of Community Practices of 2000-10000 people within 4-6 Community Health Centres (CHCs) linked to different University Departments of Family Medicine. These Community Practices will use COPC principles: key stakeholders engaged, CHWs deployed into defined population served, practice orientation to

community, and targeted health promotion in 4-6 urban-rural sites identified by each Department of Family Medicine. The profiling of the community being served will be established in the process of COPC care. The patient base and a matched catchment community of the CHC (within which each Community Practice will be located) will serve as control. Each Community Practice will need a family physician able to direct a team led by a doctor and appropriate multidisciplinary team members who are able to set up a community practice within the public service and recruit a panel of 2000-10000 people. They will site these in low to middle income communities. The study designs of the various studies will vary as described below. The overall strategy will be reviewed by the national team of investigators. The question *"How should care be horizontally integrated and coordinated among the multidisciplinary primary health care team in South Africa?"* will guide the process.

Methodology

1 The research question is what the optimal team composition is – roles, competencies and relationships - for a family doctor led community practice of 10 000 people in South Africa. Our plans are to:

- To annually explore team composition (including activity standards, based on the Workload Indicators for Staffing Need (WISN) methodology) using a modified Nominal Group Technique (NGT). The networks of Departments of Family Medicine will purposively identify stakeholder experts from South Africa.(Hasson, Keeney and McKenna, 2000; Keeney, Hasson and McKenna, 2006) The national study meeting will discuss the overall research process, team approaches and engage in the NGT process (using rounds to seek consensus on team activity standards using WISN) (Day and Bobeva, 2005). Thereafter a focus group meeting will be held reflecting on the WISN tool and overall process.

2 The research hypothesis is that there is a quantitative difference in outcomes at the levels of process, patient, population and practice management between community practices and controls.

Our plans are to:

- Examine each site of care as case studies in Year 1 and Year 3 with key informant interviews, local data and observation to explore the processes of care (including changes from the previous study).
- Undertake annual open-ended focus discussion in Year 2 and Year 3 with key groups in each site of care (staff; CHWs; stakeholders groups; women; and youth) on the processes of care and its impact on them (including changes from the previous study).
- Undertake an annual staff performance review by all related staff using a 360-degree feedback tool that is anonymized and examined by staff type.
- Compare the quality of primary care in Year 2 and Year 3 with the primary care assessment tool (PCAT) for consumer-clients looking at some of the key groups in each site of care (stakeholders groups; women; and youth).

For the process-level outcomes, a diversity of participants of key groups will be practically drawn from the population or sampling framework of patients in each site. Snowball sampling may also be used to identify further participants from these critical cases. The researchers will collect qualitative data from focus group discussions, interviews and journals after member checking, verbatim transcriptions of all digital recordings, anonymisation and crosschecking-validation by the researchers.[323] The researchers will do individual and

collective content analysis of the transcripts as well as written evaluation using a framework approach. There will also be some discourse analysis.[324] Case study methodology will be used to write up the cases.[325]

Potential research team and partners
The project will be led by Prof Shabir Moosa from the Department of Family Medicine in the University of the Witwatersrand. The other eight Departments of Family Medicine in South Africa will be approached to join this project as partners.

Overview of work plan
Q1: Stakeholder engagement and practice setup of 4-6 sites
Q2: Deployment of CHWs into defined populations
Q3: Development of patient base / data
Q4: Development of health promotion
Q5: Testing of research process
Q6: Approval of research process
Q7-Q11: Collection of data
Q12: Finalisation of reports

Barriers to implementation
There may be difficulty with standardisation of the project and variables changing in sites. There may also be difficulty with buy-in from managers and the lack of involvement of staff at a local community practice level. The strategies to overcome this would be to have a national process in planning involving the national department of health and strong ongoing local stakeholder involvement in development of community practices.

Dissemination of results
The results will be disseminated with stakeholder engagement using regular reports and policy briefs. Results will also be disseminated using accessible peer-reviewed journals. There is opportunity to develop this as a practice-based research network than can scale to Southern Africa and research more complex issues in community practice. There are many possibilities, given additional funding:

- Undertake annual surveillance of all deaths by fieldworkers with interview of family regarding history and experience of all-cause mortality (and/or referrals in each site of care (as a beginning to collecting data on births, migrations and full demographic surveillance).
- Compare records and self-reported care for outcomes of common chronic patients in each site of care according to a modified standard of care based on the Integrated Chronic Disease Management (ICDM) manual.
- Compare the quality of primary care with the primary care assessment tool (PCAT) for consumer-clients.
- Compare each site of care for population health status and risk by examination and self-reported knowledge, attitude and practice based on SANHANES.
- Compare each site of care for practice-level differences by audit of practice and survey of patient and population.

High-level budget for implementation of research
The central activity would cost about R2.2m for three years. The six sites with a registered panel of 5000-10000 people each would cost ± R720 000 each site over three years, costing ±R4.3m for all six and ±R6.5m over three years for everything (±$500 000).

	Year 1	Year 2	Year 3	TOTAL
Central Admin	R50,000	R50,000	R50,000	
Central Finance	R90,000	R65,000	R65,000	
Meetings	R150,000	R150,000	R150,000	
Accommodation	R150,000	R150,000	R150,000	
Travel	R100,000	R100,000	R100,000	
Research Assistant	R200,000	R200,000	R200,000	
TOTAL	R740,000	R715,000	R715,000	R2,170,000
Per Site Cost				
Infrastructure support	R120,000			
Operational Support	R100,000	R100,000	R100,000	
Field Agents (2 CHWs/1 AN)	R100,000	R100,000	R100,000	
TOTAL	R320,000	R200,000	R200,000	R720,000
Overall Site Costs				
TOTAL	R1,920,000	R1,200,000	R1,200,000	R4,320,000
OVERALL TOTAL	R2,660,000	R1,915,000	R1,915,000	R6,490,000
Dollar Costs		USD: ZAR Rates	13	USD499,231

Research Implementation Plan Malaysia

How can the public and private sectors work more collaboratively to improve and integrate primary health care coverage and prevent segmentation of services in Malaysia?

Background and significance

The Malaysian primary health care is a two-tier system which consists of the public and private facilities. In 2017, the public primary health care clinics in Malaysia consist of the following; 1060 health clinics, 1803 community clinics and 357 Malaysia clinics.[326] In comparison, the number of registered private medical clinics is higher at 7335.[326] However, access and referrals between the public and private health care services are segmented. Though some may argue that this is good for patients' choice, it certainly does not do any good in terms of coordination and continuity of care which is much needed for chronic disease management. Access to private health services is limited to the richer society who can afford out-of-pocket payments of higher fees.[327]

Segmentation means division or separation into different parts. Segmentation of primary health care services is seen in terms of public and private sectors, in-patient and out-patient care, different in scopes of services, availability of diagnostic facilities and medications, and types of health care professionals.[328-332] Segmentation of the population into different groups of health care needs may result in better health care provision,[333] but segmentation of services is not generally perceived to contribute towards better health of the people, nor more effective and efficient care delivery.[334]

Segmentation may be compounded by different payment systems between the public and private sectors and their respective further clinical and medical care in the hospitals. The availability of health insurances can also influence whether patients choose to seek treatment at public or private sectors, and their according scope, timeliness and quality of medical care. Accessibility of the public or private primary care services could also influence segmentation based on the incidence and prevalence of certain health conditions at the community, or when the clinical situation of the person takes higher concern over affordability or health care cost.[335-338] The quality of service provided, including waiting-time, doctor-patient relationship and adherence to patients' expectations, may also influence patients' preferences.[339 340]

Segmentation and fragmentation of health services and facilities may exacerbate difficulties in access to comprehensive and quality services for the population at large,[328] and cause low response capacity towards certain health conditions at the first level of care by the health care providers.[341] This results in inefficiencies.[342] The rate of hospitalisation or referral for conditions that could be managed at a primary setting of a certain sector could be an indicator that reflects response capacity or presence of segmentation of services at the primary care level of that particular sector of services.[343]

A pharmacy practice reform that integrates pharmacists into primary health care clinics can be a potential initiative to promote quality use of medication. This model of care is a novel approach in Malaysia, and research in the local context is required, especially from the perspectives of pharmacists.[344] The Malaysian pharmacist board has recognised many issues that causes segmentation of services in Malaysia, such as control over the supply of medicines, quality of medicines (original or generic), national health care fund, even distribution of pharmacy services, self-regulation in pharmacy services and practice, education and research, national formulary and pharmacopoeia and pharmacy legislation.[345]

Owing to the scarcity of data on the segmentation of primary medical care services in the current literature in Malaysia,[346] this study aims to expand our understanding of existing primary health care systems and present segmentation of services so that we may improve on them.

Specific Aims

1. To determine the perception and experience of providing care in their own sector of public and private primary care practitioners, the constraints they identify, and the access to services in the other sector to which they would like to have access.
2. To determine the mechanisms used by people in the community to decide whether to access public or private primary care services when unwell.

Specific research questions:

a. Was a deciding factor the availability of specific services or personnel at the sector they chose?
b. Did they ever have a cross-sector referral?

Study Design

Targeted geographic region and rationale for selection

Public and private health clinics in urban, semi-urban and rural regions in Selangor will be studied. This state provides different regions of public and private primary health care services as mentioned. It is the most populated state in Malaysia including regions of high to low-income populations. It is also close to the researchers' institutions which increases feasibility.

Targeted population

The family medicine specialists (FMS), senior medical doctors (work experience of two or more years) and pharmacists at the public primary care clinics; and selected family physicians in the private primary care clinics will be invited in the Phase 1 study. Additionally, policy-makers at the districts, states and national levels including public health physicians, health directors and administrators will also be approached for focus group discussions or in-depth interviews about their perceptions and experience of possible segmentation of services in the Phase 1 until saturation of the themes occurs. In Phase 2, the similar groups of public healthcare professionals and private doctors throughout Malaysia will be invited via email. The contact information will be obtained from the Family Medicine Specialist Association for the public FMSs and Ministry of Health Malaysia for the public health physicians; and the Academy of Family Physicians Malaysia or Malaysian Medical Association will provide contact information for the private doctors.

The FMSs and senior medical doctors are identified as the targeted population in this research because they are important in identifying and highlighting areas for improvement and integration of primary care services; as well as in identifying areas to prevent segmentation. Involvement of the policymakers in this study increases importance and participation in this study, as well as drawing attention of and increasing the chance of implementation of the study findings by the health authorities at the higher levels. This issue is already being highlighted as an important area of concern by our current Minister of Health and medical health professionals would be interested in participating in this research.

Measures to be used to encourage the participation of family medicine specialists and doctors include educating them on the need for collaboration, and working out with them on the benefits of such a collaboration; such as reduction of the patient-load and workload in the public sectors and improvement of services in both the public and private sectors. In addition, there will be an increased income to the private sector, where patients who can afford private fees can also be referred from the public to private sectors. These measures will also improve continuous professional development between the two sectors.[347 348]

Methodology

Phase 1

A mixed qualitative and quantitative methods will be used. Firstly, there will be a qualitative study using purposive sampling. Study participants will be selected from public and private primary care practitioners. Their perception and experience of providing care in their own sector will be explored in detail. The primary care practitioners' constraints and access to services that they wish they could have to the other sector will be also explored in detail. Public health physicians and health directors as policymakers and experienced administrators will be approached in this study at their respective offices.

The purpose of the study will be clearly explained by the researcher and informed consent obtained from the study participants. We will also invite patients or general public to share their perceptions on segmentation of primary healthcare services. Patients visiting the clinics at selected public and private sectors will be approached and interviewed on their preferences of which health sector and for what reasons.

Public family medicine specialists, senior medical doctors, and pharmacists from different regions will be invited for in-depth interviews or focus-group discussion. Similarly, private family physicians or general practitioners will be visited at their respective clinics in the three different regions to record their perception and experience on the above matters. This is to ensure richness of the data and to influence data generation. Public health physicians and health directors will be engaged in personal interview sessions for their opinions on segmentation of primary care services, and on their opinions of the other respondents' perception collected earlier. This approach is intentionally arranged to increase this group of respondents' interest and participation in this study. The sample size of this study will be determined once data saturation is reached. We expect the sample size to be about 125 (25 per group of respondents from public FMSs, senior medical doctors, pharmacists, private family physicians, policymakers). Using semi structured interview protocols, the matters under study will be explored and discussed.

All interview sessions will be audio-recorded and video recorded. After each interview, audio recording will be transcribed. Transcripts will be examined against actual recording to ensure accuracy. Thematic analysis using NVivo 12 will be used to identify major themes. The coding of the identified themes will be cross - checked by other researchers in order to ensure the accuracy and reliability of the coding process.

Information will also be gathered from patients in selected public and private sectors on their preferences of which sector and for what reasons.

Phase 2

Following the Phase 1 qualitative analysis, all the possible issues of segmentation of services at both the public and private primary health care services will be enlisted. These issues will

be converted into items of a questionnaire on segmentation of services at primary care in Malaysia. Then, a nationwide survey of the public physicians, pharmacists, public health physicians and health directors, and private family physicians will be conducted to identify, confirm and estimate the degree of health care services segmentation in Malaysia. This will be conducted via emails and online survey. The estimated sample size for the nationwide FMSs is 350, senior medical officers 1500, pharmacists 600, private family physicians 1000 and policymakers 300. Supplementing the email invitation, personal approach to the identified respondents via telephone calls or visits maybe conducted.

A further survey will be conducted in Selangor with a sample of respondents' representative of the nationwide users of primary health care services on what factors determine their choice between the public and the private primary health sectors they attended when recently unwell, or should they become unwell in the future. This will be conducted by post to the Selangor population in random by stratification of the geographical regions and types of residential area. The estimated required sample size is 5000 with an estimated 50% non-response rate. Supplementing the postal invitation, personal approach to potential respondents at public and private health clinics, will be conducted to improve the recruitment of participants.

Potential research team and partners

1. Sherina Mohd Sidik (Professor Dr) (Universiti Putra Malaysia) – Principal investigator
2. Chew Boon How (Assoc Prof Dr) (Universiti Putra Malaysia)
3. Ambigga Devi Krishnapillai (Assoc Prof Dr) (Universiti Pertahanan Nasional Malaysia)
4. Aida Jaafar (Dr) (Universiti Pertahanan Nasional Malaysia)
5. Maizatullifah Miskan (Dr) (Universiti Pertahanan Nasional Malaysia)
6. Hasliza Abu Hassan (Datin Dr) (Universiti Pertahanan Nasional Malaysia)
7. Ng Kien Keat (Dr) (Universiti Pertahanan Nasional Malaysia)
8. Aznida Firzah Abdul Aziz (Assoc Prof Dr) (Universiti Kebangsaan Malaysia)
9. Noor Azimah Muhammad (Assoc Prof Dr) (Universiti Kebangsaan Malaysia)
10. Ummavathy Periasamy (Dr) (Ministry of Health Malaysia)
11. Muhambigai Perumal Samy (Ministry of Health Malaysia)
12. Vigneswary Perumal Samy (Ministry of Health Malaysia)

Overview work plan

The Phase 1 will begin in the last quarter of 2019 and be completed by the third quarter of 2020. Preparation for the Phase 2 will be done in the last quarter of 2020 and will begin in the first quarter of 2021. Completion of the Phase 2 with results for dissemination can be expected by the last quarter of 2021.

Barrier to implementation

Response rates to the online survey of the public and private doctors could be a challenge to achieve the desirable sample size. A letter or post card may be sent to the selected doctors before the arrival of the email and online survey. This is hoped to personalise the invitation and to better inform and prepare the potential respondents to the survey.

Similarly, the response rates of the general population to the postal survey may be too low or variable depending on region. Personal approach at the targeted regions and community may be considered to complement the shortcoming of the postal survey.

Dissemination of results

Results of the study will be disseminated to the relevant stakeholders / policy makers, medical and health professionals and also the public; via publications in journals (national journals and also international journals with impact factor 2.0 and above), presentations at national and international conferences and meetings. Two postgraduate students will be able to complete their PhDs under this project.

High-level budget for implementation of research

No.	Areas	2019-2020	2020-2021
1.	Personnel		
	• Post-graduate students	30,000 USD	30,000 USD
	• enumerators	10,000 USD	50,000 USD
2.	Fieldwork		
	• Hospitality during FGD/meetings with respondents	5,000 USD	5,000 USD
	• Tokens of appreciation	2,000 USD	10,000 USD
3.	Analytic work		
	• Transcription of qualitative data	10,000 USD	
	• Data entry and cleaning process		5,000 USD
	• Qualitative data-software (Nvivo 12 Pro- Academic) purchase & renewal for 4 investigators	4,000 USD	4,000 USD
	• Quantitative data-software (IBM SPSS Statistics Professional v25) purchase & renewal for 4 investigators	10,000 USD	10,000 USD
4.	Supplies		
	• Voice recorders	500 USD	
	• Laptops	1,500 USD	
	• Printers	500 USD	
	• Papers and stationery	2,000 USD	5,000 USD
	• Questionnaires printing	2,000 USD	5,000 USD
	• Postal and courier to-and-fro charges (for data collection in Phase 2)		25,000 USD
5.	Travel to:		
	• Sites of data collection	25,000 USD	50,000 USD
	• Meetings	2,500 USD	2,500 USD
	• Courses/scientific conferences	20,000 USD	30,000 USD
6.	Dissemination		
	• Editing and proof-reading services		20,000 USD
	• Articles processing charge		25,000 USD
	• Report to the policymakers		7,500 USD
	• Study close-out meeting/presentation of the findings to the policymakers		10,000 USD
7.	Others: insurance, taxes		20,000 USD
	TOTAL	125,000 USD	314,000 USD
GRAND TOTAL: USD 439,000			

Research Implementation Plan Nigeria

How can different stakeholders support and assist the primary health care workforce and successful team functioning in Nigeria?

Background and significance

Primary health care PHC) is the backbone of health systems, and its successful implementation is essential for improving health outcomes.[349] Since Alma Ata in 1978,[292] the implementation of PHC has improved health outcomes in developed, low- and middle-income countries (LMIC).[350-352] Effective PHC system is essential for achieving the Sustainable Development Goals (SDGs).[353 354]

1. PHC is the cornerstone of the Nigerian health policy and represents the system that provides first point of contact care to most Nigerians with the health system.[7 355]
2. Recent assessment of the Nigerian PHC using the World Bank supported primary health care performance indicators (PHCPI) conceptual framework revealed serious underperformance of the system including low output and comparatively higher morbidity and mortality.[356] Effective PHC performance is hindered by lack of financial access to services, segmented supply chains, weak infrastructure and poor health workers' performance. Poor health workers' performance include providers' incompetence in handling clinical problems, negative attitude to work and poor supervision.[357]

A scoping review of intervention designs and methods that addressed support and performance improvement for PHC workers in LMICs identified a number of approaches including supervision and supportive supervision; mentoring; use of tools and aids; quality improvement methods; and coaching as successful interventions that have improved team functioning and overall performance of the PHC workers and systems.[357] The use of these interventions can be facilitated by different PHC stakeholders including policy makers, health system managers, health workforce organisations, academic institutions and communities. Apart from poorly carried out supervision in the Nigerian PHC system, little is known about the use of such proven interventions, to support and assist PHC workforce and PHC team functioning in Nigeria. This knowledge to practice gap needs to be further explored in the Nigerian PHC system.

It is essential to first assess the views, perceptions and experiences of PHC stakeholders and PHC teams on these proven approaches so as to identify the gaps in knowledge to practice as well as possible barriers to their use. Secondly, evaluate the functional status of PHC teams. Thirdly, bring the information together to construct a common status of PHC stakeholders' perceptions, experiences and expectations with support and assistance to PHC workforce and team functioning in Nigeria. Finally, incorporate such information into a supportive supervisory module and deploy such module to improve the performance of the PHC system.

This research shall address the research question with the different PHC stakeholders being policy makers, Federal Ministry of Health, Parliamentary Health Committee, National Primary Health Care Development Agency; National Community Health Registration Board; the Nursing and Midwifery Council of Nigeria; State Primary Healthcare Boards; State Ministry of Health; Local Government Services Commissions; Local Government PHC management committees; Universities Community Health Officers' training programmes; and schools of health technology and communities.

This study is aimed at examining the perceptions and experiences as well as identifying knowledge to practice gaps of PHC stakeholders and PHC teams with the use of support and performance improvement of PHC workers' proven approaches in the Nigeria PHC system. The information generated from the perceptions and experiences, as well as the knowledge to practice gap, will be incorporated into a supportive supervisory module and tested to ascertain its effectiveness in improving PHC team functioning and performance. The final report of this study is expected to stimulate stakeholders' interest to use the research findings to provide support and assistance to PHC workforce and PHC team functioning in Nigeria and contribute to the Country's attainment of the SDGs.

Specific objectives

1. To assess perceptions, knowledge to practice gap and examine experiences of PHC stakeholders with the use of proven approaches for support and assistance for PHC workforce and PHC team functioning in Nigeria.
2. To incorporate the information generated from perceptions and knowledge to practice gap assessment into a Family Physician led Supportive Supervisory Module (FP-SSM) and test its effectiveness for supportive supervision in four PHC centres in four States in Nigeria.

Study Design

This study will use mixed research methodology. First will be the use of qualitative methods (expert interviews, focus group discussion, climate team inventory) to explore and examine experiences and interpret perceptions of PHC stakeholders with the use of proven approaches for support and assistance for PHC workforce and PHC team functioning in Nigeria. Secondly, it shall us a quasi-experimental design to test use of a family physician-led supportive supervision module and patient care support to improve PHC team functioning and Provider competency in clinical case management at the PHC centre level.

Targeted Region

The study will be conducted in Nigeria in West-Africa. Nigeria has 186 million people from 250 ethnic groups spread over 36 states and organized into six geopolitical zones.[358 359] A zone has an average of six states with a state having a population of about 2.5million people.[360] The study will take place in four states organised as one state per geopolitical zone in four zones. The states are Plateau (North-Central), Kano (North-West), Oyo (South-West) and Cross-River (South-South). The selection of states takes into consideration the diverse ethnic, cultural and economic characteristics seen in the zones which may have potential effects on PHC services and PHC team functioning.

Target population

This study will focus on public sector PHC stakeholders and workforce as its target populations. PHC stakeholders will be those whose mandate as prescribed by the Government of Nigeria includes making policies, regulations or training relating to the PHC system. These stakeholders will be grouped as top policy-making; training; regulation; service delivery and community level stakeholders, because the roles and experiences within such subgroups will be similar. The PHC workforce will be the health workforce as defined by the WHO, who are working in the PHC system in Nigeria.[361] PHC teams will be health workforce working in PHC centres and in teams as defined by the National Primary Health Care Development Agency.[353]

Methodology

Procedure

i. To address the first objective, two in-person interviews per each group category of stakeholders will be conducted in the policy-making, training, regulation and community level groups in each states. The most senior persons in rank in each group will be recruited as possible. There will be eight in-persons interviews per state, and 32 in the four states. There will be seven additional in-person interviews at the Federal Agencies situated at the Federal Capital Territory (FCT) to capture the views and experiences of top level policy stakeholders in the country. A focus group discussion (FGD) will be held with LGA-PHC supervisory team (nine persons/team) and a Team Climate Inventory (TCI) exercise administered on a PHC centre in three LGAs and three PHC centres teams (11 persons/team) in each of the four States. The three LGA-PHC supervisory teams and PHC centres shall be selected as one per each of the three senatorial districts in each of the four States. This gives a total of 12 FGDs in the Study. Also, three TCI exercises per State and 12 in the study will be conducted.

   An in-person interview guide (tool) will be developed and used to collect data. The guide will be structured to collect information on views, perceptions, barriers and experiences of the stakeholders with respect to common strategies/interventions for support of PHC workers identified in the scoping review.[11] The FGD guide (tool) will also address similar issues but tailored to the leadership at LGA/PHC supervisory level.

   These qualitative data will be analysed using the thematic analysis method. The responses from these tools will be transcribed verbatim. After familiarity with the data has been achieved, the responses will be coded to summarise the essential messages. Similar responses will be grouped to form themes, initially at the semantic level and subsequently at a latent level to identify and examine underlying ideas. The themes will be reviewed in the context of the objectives while ensuring overlap is avoided. The themes will be defined and a relationship between these will be sought to create a thematic map, leading to a discussion of the findings. The relevant findings will be incorporated into a supportive supervision module for supervision of PHC teams at PHC centres by Family Physicians to address the second objective. The findings will also be disseminated to advocate for support and assistance for PHC workforce.

ii. To address the second objective, the adapted module from Objective 1 will be pilot-tested and used for supportive supervision of PHC teams at PHC centres by family physicians. This is new because such a tool does not exit. Two PHC centres will be selected per state and randomly allocated into either intervention or control. A family medicine training institution shall be identified in each state and a family physician together with a trainee resident from the training centre will be selected to provide supportive supervision and patient care support using the Supportive Supervisory Module (SSM) to the intervention PHC centre. The second PHC centre shall serve as a control. The supportive supervisory visits shall be visited once every four weeks for 52 weeks and its effectiveness will be measured by change in team functioning as measured by TCI and providers' competence as measured by Health Sector Service Delivery Indicator module on assessment of providers' knowledge and ability. Information on team functioning and provider competence will be gathered at the two PHC centres at the beginning of the study, then at 27th week and at the end of the study at 52 weeks. The level of team functioning and the proportion of workers with diagnostic accuracy with an adult and childhood conditions

will be compared between the two types of facilities. The acceptability and feasibility of the supervisory tool will be assessed at an FGD session with the team at week 52.

Teams and Ethical consideration
The team leader with the three co-leads will constitute the Central Coordinating Team (CCT) and will be responsible for the overall implementation of the study. The CCT shall seek for ethical clearance for the study and obtains permission to carry out the study from respective agencies. Interviewees will grant an oral consent which will be taped-recorded together with the interview session. Participants for both TCI and FGDs will sign a written consent after perusing an informed consent.

Tentative research team members
This study will be carried out by four State teams consisting of eight researchers and four research assistants. There will be a 5th team of two researchers for the National level. Three will be a Central Coordinating team of four researchers comprising the Team Leader and three Co-leads as shown below.

1. Dr Aboi JK Madaki; MBBS; MA-HMPP; FWACP; University of Jos. Chair_SOFPON Practice Based Research Network. Team leader. Email: wankarani62@gmail.com.
2. Prof Udonwa Ndifreke_ MBBS; MPH; FMCGP; FWACP; Professor of Family Medicine. University of Calabar. Email: nudonwa@gmail.com.
3. Dr Akin Moses_MBBS; FMCGP; FWACP; Department of Family Medicine, National Hospital, Abuja. Email: lawakmoses@yahoo.com
4. Dr Irabor Achiaka _MBBS; MSc Devt Psych; FWACP; Family Physician trainer and researcher in Primary care. University College Hospital, Ibadan, Oyo State. Zonal Team Coordinator. achiaka@yahoo.com.

Overview of the work plan
First Year:
1st quarter Constitute the Study Coordinating Team, four State teams and 1 Federal Capital Territory (FCT) team. Identify and designate a Survey Coordinating Office. Notify study states, LGAs and PHC centres. Assemble survey tools and orientate the zonal teams on the use of survey instruments. Pilot test the instruments.
2nd quarter Secure National ethical clearance and permission from states selected for the study. Carry out pre-study visitation to selected sites to assess readiness to participate in the study. Produce and deploy survey instruments. Produce a study sites visitation schedule.
3rd – 4th quarters_ Mobilise study teams to sites and conduct first phase of the study.

Second Year:
1st quarter Analyse results of first objectives and produce reports targeting different levels of stakeholders. Also incorporate relevant finding into a supportive supervision module.
2nd quarter Disseminate research findings through workshops at the National Level and through appropriate Zonal level fora. Produce a manuscript for publications at a peer-reviewed journal. Pilot-test the use of supportive supervisory module.

Third Year:
2rd quarter Second Year **to** **2rd** ***quarter Third year***. Commence and complete intervention study using the adapted supportive supervisory module to conduct visits to PHC centres.
3rd ***-4th quarters*** analyse and disseminate results through a National Workshop to stakeholders. Mount advocacy to relevant agencies (NPHCDA; SPHCBs; FMOH; Faculties of Family Medicine) for the incorporation of the strategy into the PHC system.

Barriers to implementation

1. *Security challenges* Addressing insecurity in States with frequent episodes of farmers-herdsmen clashes, kidnapping and Boko Haram attacks is essential for the success of the study. Caution be exercise and high risk LGAs will be avoided at the selection level.
2. *Absenteeism* Absence from work by LGA workers is high and may affect the schedule of research activities. However, the teams shall start scheduling of visits early enough to secure timely appointments and keep the study on track.
3. *Lack of essential supplies* such as drugs and basic clinic equipment will affect improvement in providers' clinical competence. Selection of PHC centres will also consider availability of basic clinic equipment and availability of drugs.
4. *Lack of cooperation from PHC clinic staff* may impede the realisation of the objectives of the interventional arm of the study. Efforts will be made to educate all parties on the potential of this supervisory strategy and carry everybody along.

Dissemination of results

Results addressing the first objective of the study shall be disseminated in the first quarter of second year to stakeholders at a National Workshop at Country's Federal Capital city. This workshop will seek to educate policy makers on the finding of study and advocate for the implementation of the recommendations of the study. Reports will be prepared in an easy to digest form and distributed to stakeholders. Results addressing the second objective will be disseminated in the 3rd – 4th quarters of the 3rd year at a National Workshop. High level advocacy visits to the National Primary Health Care Development Agency (NPHCDA); Federal Ministry of Health and Faculties of Family Medicine of the two post-graduate colleges will be carried out to advocate for funding for the implementation of the results. The ultimate will be to get Family Medicine training centre based Family Physicians to lead supervision of PHC teams at the PHC centre level with funding from the government for such integration.

High-Level budget for implementation of research

Approximate resource allocation:

ITEM	**ALLOCATED BUDGET in USD**
Personnel	$86,502
Field and analytic work	$91,014
Supplies	$8,457
Travel	$49,959
Dissemination	$34,157
Miscellaneous	$14,518
Total over 3 years	***$284,607.00***

Budget justification

The outline of the budget above reflects the expected contribution of key personnel making the team and the desired activities to be implemented in three years. This team has already started making such contributions by putting up this draft proposal together. In building up the budget, we kept to our team principles of engagement: respect, equity, integrity and commitment to excellence. We are keeping the expected personnel cost very low as a mark of our willingness to make contribution to strengthening the PHC system in Nigeria. The personnel cost includes provision for a visit to Nigeria by a Besrour mentor as a way of strengthening our continuous and cherished collaboration which has brought great value to our work here in Nigeria.

Discussion

Summary of results and relationship to existing literature

This is the first global study to ask primary health care practitioners and researchers based in LMICs to identify their research priorities on the organisation and models of primary health care. The leading priority areas identified have focused on several key elements necessary for the strengthening of primary health care systems, including referral between primary and secondary care, integration and coordination of PHC, collaboration between the private and public primary health care sectors, the composition of primary health care teams, and the role of key stakeholders in supporting the PHC workforce.

A number of themes related to optimal team-based care, access and geographic distribution, integration and coordination between primary and secondary care, and what PHC should incorporate. The results also show a considerable 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.[362] Many of the generated questions relate to required health system reform, and hence complement the aforementioned work of the Primary Health Care Measurement and Implementation Research Consortium, which established some broad areas of research priorities.[18]

The research questions generated have a strong focus on the position of PHC in the health system, and its relation to hospitals and secondary care specialists. This may signal the challenges of PHC in stabilising its position as the integrator of first-point patient care in health systems that have traditionally been centred on hospital care. It is important to acknowledge this prioritisation, but at the same time keep track of the importance of horizontal links of PHC to other community-based sectors that impact on population health,[11] [363] and of the invitation of the 40th anniversary of the Alma Ata Declaration to move beyond how health services have been structured, to how health services need to be organised to advance health equity and support people to actively participate in the maintenance of their health status.[364]

An interesting absentee in the generated questions is the importance of studying the distribution of the health problems in the population under care, whereas a WONCA conference on the role of PHC research had this as one of its main recommendations.[365] This may be because the original framing question about models of care does not draw attention to epidemiological issues. However, insight into the most important health problems in the population under care will inform the development of PHC. Such insight would be relevant for a number of the research questions that were generated, for example in relation to practice priorities, the interface of PHC and hospital care, or teaching and training. Often, exploring health problems in the PHC setting has been the first step to successful PHC research.[366]

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.[18] Furthermore, the Primary Health Care Performance Initiative (PHCPI) has introduced a framework to assess PHC performance in LMIC to help guide health reforms.[367] Many of the generated questions relate to required health system reform, and hence complement this work.

The prevalence of questions related to the health work force among the top 16 research questions is not surprising. The delivery of health services within the primary health care framework is deeply (and some would say primarily) relational. Even as the world evolves to consider how technology, system planning, financing and improved management systems might support better primary health care, the crux of primary health care remains the interface between the provider (or providers) and the user or patient. The health work force, how it is selected, trained, deployed, coordinated into effective multidisciplinary teams, rewarded and recognised is bound to remain one of the most potent determinant of our collective success in ensuring access to quality PHC for the world's populations. In fact, many of the proposed questions related to team-based care hint to enumerable additional questions related to that subject, a subject we are only now beginning to explore and understand. The ways in which culture, for example, is bound to affect how teams form and perform will be a likely object of research for some years to come.

There is a recurring debate about the definition of primary health care, and similarly what research relates to it. In Labonte's review,[11] they included research addressing projects that were intersectoral and engaged communities, as well as clinical health care, but omitted projects which might affect health but did not involve actors from the health sector. Our literature review was informed by professionals from LMIC and in that way focussed on the specific LMIC context. Within the time frame of the project we were able to identify the available studies. From this we were able to corroborate the Delphi study findings and then to identify research gaps for LMIC. This enabled us to solicit context-specific implementation plans from colleagues in LMIC.

Strengths of our 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.[368] 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[368-371298-301] 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.[372] 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.

Limitations

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.

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.

Implications going forward

The Primary Health Care Performance Initiative (PHCPI) has introduced a framework to assess PHC performance in LMIC to help guide health reforms.[367296] This work can be used to complement/ moderate their intended programme of work. The work is being disseminated through academic presentation and publication, and will raise the whole agenda around the need to develop research capacity and conduct health services research in LMICs. Hopefully this will lead into new funding for these settings, and also a next phase of work to fill in the gaps identified.

Finally we hope it will also guide policy and implementation of appropriate models of care for PHC in LMICs. 2018 is the fortieth anniversary of the Alma Ata declaration, and a global discussion is being led by WHO about strengthening primary health care for universal health coverage. It is hard to evaluate impact where these services do not exist, and there is already pressing evidence of need to invest in the PHC workforce and deliver evidence based care in

this sector. The four priority questions are all clearly key issues for effective health systems. We do not want this report to be read as ‘we cannot do this because the evidence is not there’ but as ‘we need to make changes in our system and evaluate early pilots and outcomes’. The implementation of a referral system is a complex intervention, but this kind of research is really important and assists change management and staff engagement.[373] We hope that our community and professional networks can make a further contribution to the next phase.

References

1. Commonwealth Fund. Primary Care: Our First Line of Defense. New York: Commonwealth Fund, 2013.
2. European Forum for Primary Care. EFPC at a glance Utrecht: EFPC; 2017 [Available from: http://www.euprimarycare.org/about/efpc-glance.
3. Goodwin N, Dixon A, Poole T, et al. Improving the quality of care in general practice Report of an independent inquiry commissioned by The King's Fund. London: The King's fund, 2011:169.
4. Starfield B. Measuring the uniqueness of primary care. *J Ambulatory Care Manage* 1979;2(3):91-9.
5. World Health Organization. The World Health Report 2008: Primary Health Care - Now More Than Ever. Geneva: World Health Organization, 2008.
6. International Conference on Primary Health Care. Declaration of Alma-Ata. Alma-Ata, USSR: WHO, 1978.
7. Tarimo E, Webster E, World Health Organization. Primary health care concepts and challenges in a changing world : Alma-Ata revisited. Geneva: WHO 1994.
8. World Health Assembly. Primary health care, including health system strengthening WHA6212 Geneva: 22nd World Health Assembly, WHO, 2009:3.
9. Labonte R, Sanders D, Baum F, et al. Implementation, effectiveness and political context of comprehensive primary health care: preliminary findings of a global literature review. *Aust J Prim Health* 2008;14(3):58-67.
10. Anyangwe SC, Mtonga C. Inequities in the global health workforce: the greatest impediment to health in sub-Saharan Africa. *Int J Environ Res Public Health* 2007;4(2):93-100.
11. Labonte R, Spiegel J. Setting global health research priorities. 2003
12. Yoshida S. Approaches, tools and methods used for setting priorities in health research in the 21(st) century. *Journal of Global Health* 2016;6(1):010507. doi: doi: 10.7189/jogh.06.010507
13. McGregor S, Henderson KJ, Kaldor JM. How are health research priorities set in low and middle income countries? A systematic review of published reports. *PLoS ONE [Electronic Resource]* 2014;9(9):e108787. doi: https://dx.doi.org/10.1371/journal.pone.0108787
14. Steel N, Abdelhamid A, Stokes T, et al. A review of clinical practice guidelines found that they were often based on evidence of uncertain relevance to primary care patients. *Journal of Clinical Epidemiology* 2014;67(11):1251-7. doi: https://dx.doi.org/10.1016/j.jclinepi.2014.05.020
15. Goodyear-Smith F. The History of Primary Care Research. In: Goodyear-Smith F & Mash B, ed. International Perspectives on Primary Care Research. London: CRC Press, Taylor & Francis Group 2016:5-10.
16. Phillips RL, Jr., Brundgardt S, Lesko SE, et al. The future role of the family physician in the United States: a rigorous exercise in definition.[Erratum appears in Ann Fam Med. 2015 Jul-Aug;13(4):311; PMID: 26195673]. *Ann Fam Med* 2014;12(3):250-5. doi: https://dx.doi.org/10.1370/afm.1651
17. Bitton A, Ratcliffe HL, Veillard JH, et al. Primary Health Care as a Foundation for Strengthening Health Systems in Low- and Middle-Income Countries. *J Gen Int Med* 2017;32(5):566-71. doi: https://dx.doi.org/10.1007/s11606-016-3898-5
18. Primary Health Care Measurement & Implementation Research Consortium. Priority Setting Meeting Report. Boston, USA, 2017:19.
19. Tindana PO, Singh JA, Tracy CS, et al. Grand challenges in global health: community engagement in research in developing countries. *PLoS Med* 2007;4(9):e273.
20. Whyte W. Participatory action research. Thousand Oaks, CA: Sage Publications 1991.
21. Sinha IP, Smyth RL, Williamson PR. Using the Delphi technique to determine which outcomes to measure in clinical trials: recommendations for the future based on a systematic review of

existing studies. *PLoS Med* 2011;8(1):e1000393. doi: https://dx.doi.org/10.1371/journal.pmed.1000393
22. World Bank Group. List of economies Washington DC, USA2017 [Available from: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups accessed 18 Mar 2018.
23. Sadler GR, Lee HC, Lim RS, et al. Recruitment of hard-to-reach population subgroups via adaptations of the snowball sampling strategy. *Nurs Health Sci* 2010;12(3):369-74. doi: https://dx.doi.org/10.1111/j.1442-2018.2010.00541.x
24. Carey T, Yon A, Beadles C, et al. Prioritizing Future Research through Examination of Research Gaps in Systematic Reviews Cecil G Sheps Center for Health Services Research: University of North Carolina, 2012:44.
25. Hsu C, Sandford B. Minimizing Non-Response in The Delphi Process: How to Respond to Non-Response. *PARE Online* 2007;12(17)
26. Thomas D. A general Inductive approach for analyzing qualitative evaluation data. *Am J Med Eval* 2006;27(2):237-46 doi: doi: 10.1177/1098214005283748
27. Higgins J, Lasserson T, Chandler J, et al. Methodological Expectations of Cochrane Intervention Reviews (MECIR): Standards for the conduct and reporting of new Cochrane Intervention Reviews, reporting of protocols and the planning, conduct and reporting of updates. Version 105: Cochrane, 2018.
28. Snilstveit B, Vojtkova M, Bhavsar A, et al. Evidence Gap Maps: A Tool for Promoting Evidence-Informed Policy and Prioritizing Future Research. Policy Research working Paper 6725. Washington DC: Independent Evaluation Group, Public Sector Evaluation Department, The World Bank, 2013:pp34.
29. Aantjes C, Quinlan T, Bunders J. Integration of community home based care programmes within national primary health care revitalisation strategies in Ethiopia, Malawi, South-Africa and Zambia: a comparative assessment. *Globalization and health* 2014;10:85. doi: 10.1186/s12992-014-0085-5
30. Abate B, Enquselassie F. Information use in patients' referral system at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia. *Ethiopian medical journal* 2010;48(2):123-35.
31. Abimbola S, Olanipekun T, Igbokwe U, et al. How decentralisation influences the retention of primary health care workers in rural Nigeria. *Global health action* 2015;8:26616. doi: 10.3402/gha.v8.26616
32. Acharya B, Tenpa J, Thapa P, et al. Recommendations from primary care providers for integrating mental health in a primary care system in rural Nepal. *BMC health services research* 2016;16:492. doi: 10.1186/s12913-016-1768-9
33. Acosta Ramirez N, Giovanella L, Vega Romero R, et al. Mapping primary health care renewal in South America. *Family practice* 2016;33(3):261-7. doi: 10.1093/fampra/cmw013
34. Aksoy H, Kahveci R, Doner P, et al. Physicians' attitudes toward home healthcare services in Turkey: A qualitative study. *The European journal of general practice* 2015;21(4):246-52. doi: 10.3109/13814788.2015.1096339
35. Alameddine M, Khodr H, Mourad Y, et al. Upscaling the recruitment and retention of human resources for health at primary healthcare centres in Lebanon: a qualitative study. *Health & social care in the community* 2016;24(3):353-62. doi: 10.1111/hsc.12210
36. Alameddine M, Saleh S, El-Jardali F, et al. The retention of health human resources in primary healthcare centers in Lebanon: a national survey. *BMC health services research* 2012;12:419. doi: 10.1186/1472-6963-12-419

37. Alberti H, Boudriga N, Nabli M. Primary care management of diabetes in a low/middle income country: a multi-method, qualitative study of barriers and facilitators to care. *BMC family practice* 2007;8:63. doi: 10.1186/1471-2296-8-63
38. Almeida PF, Santos AM. Primary Health Care: care coordinator in regionalized networks? *Revista de saude publica* 2016;50:80. doi: 10.1590/S1518-8787.2016050006602
39. Andersen KL, Basnett I, Shrestha DR, et al. Expansion of Safe Abortion Services in Nepal Through Auxiliary Nurse-Midwife Provision of Medical Abortion, 2011-2013. *Journal of midwifery & women's health* 2016;61(2):177-84. doi: 10.1111/jmwh.12419
40. Ariff KM, Beng KS. Cultural health beliefs in a rural family practice: a Malaysian perspective. *The Australian journal of rural health* 2006;14(1):2-8. doi: 10.1111/j.1440-1584.2006.00747.x
41. Athie K, Menezes AL, da Silva AM, et al. Perceptions of health managers and professionals about mental health and primary care integration in Rio de Janeiro: a mixed methods study. *BMC health services research* 2016;16(1):532. doi: 10.1186/s12913-016-1740-8
42. Balakrishnan R, Gopichandran V, Chaturvedi S, et al. Continuum of Care Services for Maternal and Child Health using mobile technology - a health system strengthening strategy in low and middle income countries. *BMC medical informatics and decision making* 2016;16:84. doi: 10.1186/s12911-016-0326-z
43. Baldani MH, Mendes YB, Lawder JA, et al. Inequalities in dental services utilization among Brazilian low-income children: the role of individual determinants. *Journal of public health dentistry* 2011;71(1):46-53.
44. Bauer AM, Fielke K, Brayley J, et al. Tackling the global mental health challenge: a psychosomatic medicine/consultation-liaison psychiatry perspective. *Psychosomatics* 2010;51(3):185-93. doi: 10.1176/appi.psy.51.3.185
45. Bauhoff S, Rabinovich L, Mayer LA. Developing citizen report cards for primary health care in low and middle-income countries: Results from cognitive interviews in rural Tajikistan. *PloS one* 2017;12(10):e0186745. doi: 10.1371/journal.pone.0186745
46. Baynes C, Semu H, Baraka J, et al. An exploration of the feasibility, acceptability, and effectiveness of professional, multitasked community health workers in Tanzania. *Global public health* 2017;12(8):1018-32. doi: 10.1080/17441692.2015.1080750
47. Ben Romdhane H, Tlili F, Skhiri A, et al. Health system challenges of NCDs in Tunisia. *International journal of public health* 2015;60 Suppl 1:S39-46. doi: 10.1007/s00038-014-0616-0
48. Berhanu S, Alemu S, Prevett M, et al. Primary care treatment of epilepsy in rural Ethiopia: causes of default from follow-up. *Seizure* 2009;18(2):100-3. doi: 10.1016/j.seizure.2008.07.002
49. Biswas KK, Pearson E, Shahidullah SM, et al. Integrating postabortion care, menstrual regulation and family planning services in Bangladesh: a pre-post evaluation. *Reproductive health* 2017;14(1):37. doi: 10.1186/s12978-017-0298-1
50. Biswas R, Joshi A, Joshi R, et al. Revitalizing primary health care and family medicine/primary care in India--disruptive innovation? *Journal of evaluation in clinical practice* 2009;15(5):873-80. doi: 10.1111/j.1365-2753.2009.01271.x
51. Boccolini CS, de Souza Junior PR. Inequities in Healthcare utilization: results of the Brazilian National Health Survey, 2013. *International journal for equity in health* 2016;15(1):150. doi: 10.1186/s12939-016-0444-3
52. Bodur S, Filiz E. A survey on patient safety culture in primary healthcare services in Turkey. *International journal for quality in health care : journal of the International Society for Quality in Health Care* 2009;21(5):348-55. doi: 10.1093/intqhc/mzp035
53. Bousquat A, Giovanella L, Campos EMS, et al. Primary health care and the coordination of care in health regions: managers' and users' perspective. *Ciencia & saude coletiva* 2017;22(4):1141-54. doi: 10.1590/1413-81232017224.28632016

54. Boutayeb W, Lamlili M, Maamri A, et al. Actions on social determinants and interventions in primary health to improve mother and child health and health equity in Morocco. *International journal for equity in health* 2016;15:19. doi: 10.1186/s12939-016-0309-9
55. Bradley H, Lehmann U, Butler N. Emerging roles and competencies of district and sub-district pharmacists: a case study from Cape Town. *Human resources for health* 2015;13:88. doi: 10.1186/s12960-015-0081-8
56. Bradley S, Kamwendo F, Masanja H, et al. District health managers' perceptions of supervision in Malawi and Tanzania. *Human resources for health* 2013;11:43. doi: 10.1186/1478-4491-11-43
57. Brazier E, Andrzejewski C, Perkins ME, et al. Improving poor women's access to maternity care: Findings from a primary care intervention in Burkina Faso. *Social science & medicine (1982)* 2009;69(5):682-90. doi: 10.1016/j.socscimed.2009.06.023
58. Breen A, Swartz L, Flisher AJ, et al. Experience of mental disorder in the context of basic service reforms: the impact on caregiving environments in South Africa. *International journal of environmental health research* 2007;17(5):327-34. doi: 10.1080/09603120701628388
59. Brock D, Bolon S, Wick K, et al. The military veteran to physician assistant pathway: building the primary care workforce. *Academic medicine : journal of the Association of American Medical Colleges* 2013;88(12):1890-4. doi: 10.1097/ACM.0000000000000011
60. Brown L, Lee TH, De Allegri M, et al. Applying stated-preference methods to improve health systems in sub-Saharan Africa: a systematic review. *Expert review of pharmacoeconomics & outcomes research* 2017;17(5):441-58. doi: 10.1080/14737167.2017.1375854
61. Cacapava JR, Colvero Lde A. [Mental health care strategies in primary health care units]. *Revista gaucha de enfermagem* 2008;29(4):573-80.
62. Casotti E, Monteiro AB, Castro Filho EL, et al. [Organization of public oral health services for early diagnosis of potentially malignant disorders in the state of Rio de Janeiro, Brazil]. *Ciencia & saude coletiva* 2016;21(5):1573-82. doi: 10.1590/1413-81232015215.10742
63. Cecilio LC, Andreazza R, Carapinheiro G, et al. [Primary healthcare and the construction of thematic health networks: what role can they play?]. *Ciencia & saude coletiva* 2012;17(11):2893-902.
64. Chang SM, Grantham-McGregor SM, Powell CA, et al. Integrating a Parenting Intervention With Routine Primary Health Care: A Cluster Randomized Trial. *Pediatrics* 2015;136(2):272-80. doi: 10.1542/peds.2015-0119
65. Chazard E, Marcolino MS, Dumesnil C, et al. One Million Electrocardiograms of Primary Care Patients: A Descriptive Analysis. *Studies in health technology and informatics* 2015;216:69-73.
66. Chitama D, Baltussen R, Ketting E, et al. From papers to practices: district level priority setting processes and criteria for family planning, maternal, newborn and child health interventions in Tanzania. *BMC women's health* 2011;11:46. doi: 10.1186/1472-6874-11-46
67. Chukwuani CM, Olugboji A, Akuto EE, et al. A baseline survey of the Primary Healthcare system in south eastern Nigeria. *Health policy (Amsterdam, Netherlands)* 2006;77(2):182-201. doi: 10.1016/j.healthpol.2005.07.006
68. Chukwuneke FN, Ezeonu CT, Onyire BN, et al. Culture and biomedical care in Africa: the influence of culture on biomedical care in a traditional African society, Nigeria, West Africa. *Nigerian journal of medicine : journal of the National Association of Resident Doctors of Nigeria* 2012;21(3):331-3.
69. Chung V, Yip BH, Griffiths SM, et al. Patients' experience of Chinese Medicine Primary Care Services: Implications on Improving Coordination and Continuity of Care. *Scientific reports* 2015;5:18853. doi: 10.1038/srep18853
70. Colvin M, Gumede L, Grimwade K, et al. Contribution of traditional healers to a rural tuberculosis control programme in Hlabisa, South Africa. *The international journal of*

tuberculosis and lung disease : the official journal of the International Union against Tuberculosis and Lung Disease 2003;7(9 Suppl 1):S86-91.
71. Condo J, Mugeni C, Naughton B, et al. Rwanda's evolving community health worker system: a qualitative assessment of client and provider perspectives. *Human resources for health* 2014;12:71. doi: 10.1186/1478-4491-12-71
72. Costa GD, Cotta RM, Reis JR, et al. [Evaluating child healthcare in the context of Family Healthcare in the city of Teixeiras, Minas Gerais (MG, Brazil)]. *Ciencia & saude coletiva* 2011;16(7):3229-40.
73. Costa JM, Silva MR, Carvalho EF. [The implementation analysis of the arterial hypertension care by the Family Health teams in Recife city (Pernambuco, Brazil)]. *Ciencia & saude coletiva* 2011;16(2):623-33.
74. Courtright P, Seneadza A, Mathenge W, et al. Primary eye care in sub-Saharan African: do we have the evidence needed to scale up training and service delivery? *Annals of tropical medicine and parasitology* 2010;104(5):361-7. doi: 10.1179/136485910X12743554760225
75. Cox AT, Linton T, Lentaigne J, et al. A review of the documentation in the British Armed Forces electronic patient record following discharge from the Role 3 Hospital in Camp Bastion. *Journal of the Royal Army Medical Corps* 2015;161(2):132-4. doi: 10.1136/jramc-2014-000337
76. da Fonseca DA, Mialhe FL, Ambrosano GM, et al. [Influence of the organization of primary care and the socio-demographic characteristics of the population on the demand for municipal emergency dental care]. *Ciencia & saude coletiva* 2014;19(1):269-77. doi: 10.1590/1413-81232014191.2048
77. da Silva SA, Fracolli LA. Evaluating child care in the Family Health Strategy. *Revista brasileira de enfermagem* 2016;69(1):47-53. doi: 10.1590/0034-7167.2016690107i
78. Dagdeviren N, Akturk Z. An evaluation of patient satisfaction in Turkey with the EUROPEP instrument. *Yonsei medical journal* 2004;45(1):23-8. doi: 10.3349/ymj.2004.45.1.23
79. De Kock JH, Pillay BJ. Mental health nurses in South Africa's public rural primary care settings: a human resource crisis. *Rural and remote health* 2016;16(3):3865.
80. De Vos P, Barroso I, Rodriguez A, et al. The functioning of the Cuban home hospitalization programme: a descriptive analysis. *BMC health services research* 2007;7:76. doi: 10.1186/1472-6963-7-76
81. Deen J, Matos Lda C, Temple B, et al. Identifying national health research priorities in Timor-Leste through a scoping review of existing health data. *Health research policy and systems* 2013;11(1):8. doi: 10.1186/1478-4505-11-8
82. de-Graft Aikins A. Healer shopping in Africa: new evidence from rural-urban qualitative study of Ghanaian diabetes experiences. *BMJ (Clinical research ed)* 2005;331(7519):737. doi: 10.1136/bmj.331.7519.737
83. Delobelle P, Rawlinson JL, Ntuli S, et al. Job satisfaction and turnover intent of primary healthcare nurses in rural South Africa: a questionnaire survey. *Journal of advanced nursing* 2011;67(2):371-83. doi: 10.1111/j.1365-2648.2010.05496.x
84. DePue JD, Dunsiger S, Seiden AD, et al. Nurse-community health worker team improves diabetes care in American Samoa: results of a randomized controlled trial. *Diabetes care* 2013;36(7):1947-53. doi: 10.2337/dc12-1969
85. Derbew M, Animut N, Talib ZM, et al. Ethiopian medical schools' rapid scale-up to support the government's goal of universal coverage. *Academic medicine : journal of the Association of American Medical Colleges* 2014;89(8 Suppl):S40-4. doi: 10.1097/ACM.0000000000000326
86. Deressa W, Azazh A. Attitudes of undergraduate medical students of Addis Ababa University towards medical practice and migration, Ethiopia. *BMC medical education* 2012;12:68. doi: 10.1186/1472-6920-12-68

87. Dhillon RS, Bonds MH, Fraden M, et al. The impact of reducing financial barriers on utilisation of a primary health care facility in Rwanda. *Global public health* 2012;7(1):71-86. doi: 10.1080/17441692.2011.593536
88. Doubova SV, Guanais FC, Perez-Cuevas R, et al. Attributes of patient-centered primary care associated with the public perception of good healthcare quality in Brazil, Colombia, Mexico and El Salvador. *Health policy and planning* 2016;31(7):834-43. doi: 10.1093/heapol/czv139
89. du Toit R, Faal HB, Etya'ale D, et al. Evidence for integrating eye health into primary health care in Africa: a health systems strengthening approach. *BMC health services research* 2013;13:102. doi: 10.1186/1472-6963-13-102
90. Duma OO, Rosu ST, Manole M, et al. Disparities in the access to primary healthcare in rural areas from the county of Iasi - Romania. *Revista medico-chirurgicala a Societatii de Medici si Naturalisti din Iasi* 2014;118(3):743-8.
91. Duong DV, Binns CW, Lee AH. Utilization of delivery services at the primary health care level in rural Vietnam. *Social science & medicine (1982)* 2004;59(12):2585-95. doi: 10.1016/j.socscimed.2004.04.007
92. Ebuehi OM, Campbell PC. Attraction and retention of qualified health workers to rural areas in Nigeria: a case study of four LGAs in Ogun State, Nigeria. *Rural and remote health* 2011;11(1):1515.
93. Edward A, Branchini C, Aitken I, et al. Toward universal coverage in Afghanistan: A multi-stakeholder assessment of capacity investments in the community health worker system. *Social science & medicine (1982)* 2015;145:173-83. doi: 10.1016/j.socscimed.2015.06.011
94. Edward A, Osei-Bonsu K, Branchini C, et al. Enhancing governance and health system accountability for people centered healthcare: an exploratory study of community scorecards in Afghanistan. *BMC health services research* 2015;15:299. doi: 10.1186/s12913-015-0946-5
95. Exley J, Pitchforth E, Okeke E, et al. Persistent barriers to care; a qualitative study to understand women's experiences in areas served by the midwives service scheme in Nigeria. *BMC pregnancy and childbirth* 2016;16:232. doi: 10.1186/s12884-016-1026-5
96. Fairall LR, Folb N, Timmerman V, et al. Educational Outreach with an Integrated Clinical Tool for Nurse-Led Non-communicable Chronic Disease Management in Primary Care in South Africa: A Pragmatic Cluster Randomised Controlled Trial. *PLoS medicine* 2016;13(11):e1002178. doi: 10.1371/journal.pmed.1002178
97. Feng S, Shi L, Zeng J, et al. Comparison of Primary Care Experiences in Village Clinics with Different Ownership Models in Guangdong Province, China. *PloS one* 2017;12(1):e0169241. doi: 10.1371/journal.pone.0169241
98. Ferreira AC, Suarez-Mutis MC, Campos MR, et al. Primary health care in municipalities at high risk for malaria. *Revista latino-americana de enfermagem* 2011;19(6):1281-8.
99. Fetene N, Linnander E, Fekadu B, et al. The Ethiopian Health Extension Program and Variation in Health Systems Performance: What Matters? *PloS one* 2016;11(5):e0156438. doi: 10.1371/journal.pone.0156438
100. Franco LM, Diop FP, Burgert CR, et al. Effects of mutual health organizations on use of priority health-care services in urban and rural Mali: a case-control study. *Bulletin of the World Health Organization* 2008;86(11):830-8.
101. Friend-du Preez N, Cameron N, Griffiths P. Stuips, spuits and prophet ropes: the treatment of abantu childhood illnesses in urban South Africa. *Social science & medicine (1982)* 2009;68(2):343-51. doi: 10.1016/j.socscimed.2008.10.027
102. Giovanella L, de Mendonca MH, de Almeida PF, et al. Family health: limits and possibilities for an integral primary care approach to health care in Brazil. *Ciencia & saude coletiva* 2009;14(3):783-94.

103. Girao AL, Freitas CH. Hypertensive patients in primary health care: access, connection and care involved in spontaneous demands. *Revista gaucha de enfermagem* 2016;37(2):e60015. doi: 10.1590/1983-1447.2016.02.60015
104. Girot EA, Enders BC, Wright J. Transforming the obstetric nursing workforce in NE Brazil through international collaboration. *Journal of advanced nursing* 2005;50(6):651-60. doi: 10.1111/j.1365-2648.2005.03450.x
105. Gnyawali S, Bhattarai D, Upadhyay MP. Utilization of primary eye health services by people from a rural community of Nepal. *Nepalese journal of ophthalmology : a biannual peer-reviewed academic journal of the Nepal Ophthalmic Society : NEPJOPH* 2012;4(1):96-101. doi: 10.3126/nepjoph.v4i1.5859
106. Gomes FM, Silva MG. [Family health program as a strategy of primary attention: a reality at Juazeiro do Norte]. *Ciencia & saude coletiva* 2011;16 Suppl 1:893-902.
107. Goncalves DA, Fortes S, Campos M, et al. Evaluation of a mental health training intervention for multidisciplinary teams in primary care in Brazil: a pre- and posttest study. *General hospital psychiatry* 2013;35(3):304-8. doi: 10.1016/j.genhosppsych.2013.01.003
108. Goudge J, Gilson L, Russell S, et al. The household costs of health care in rural South Africa with free public primary care and hospital exemptions for the poor. *Tropical medicine & international health : TM & IH* 2009;14(4):458-67. doi: 10.1111/j.1365-3156.2009.02256.x
109. Graz B, Falquet J, Morency P. Rapid assessment of alternative medicine through a comparison of the expected and observed progress of patients: a feasibility study of the prognosis/follow-up method. *Journal of alternative and complementary medicine (New York, NY)* 2003;9(5):755-61. doi: 10.1089/107555303322524607
110. Gregorio G, Tomlinson M, Gerolin J, et al. Setting priorities for mental health research in Brazil. *Revista brasileira de psiquiatria (Sao Paulo, Brazil : 1999)* 2012;34(4):434-9.
111. Guerra AF, Goncalves DU, Werneck Cortes Mda C, et al. [Pediatric Otolaryngology at the Public Health System of a city in Southeastern Brazil]. *Revista de saude publica* 2007;41(5):719-25.
112. Gureje O, Abdulmalik J, Kola L, et al. Integrating mental health into primary care in Nigeria: report of a demonstration project using the mental health gap action programme intervention guide. *BMC health services research* 2015;15:242. doi: 10.1186/s12913-015-0911-3
113. Gwaikolo WS, Kohrt BA, Cooper JL. Health system preparedness for integration of mental health services in rural Liberia. *BMC health services research* 2017;17(1):508. doi: 10.1186/s12913-017-2447-1
114. Habtom GK. Integrating traditional medical practice with primary healthcare system in Eritrea. *Journal of complementary & integrative medicine* 2015;12(1):71-87. doi: 10.1515/jcim-2014-0020
115. Hafeez A, Mohamud BK, Shiekh MR, et al. Lady health workers programme in Pakistan: challenges, achievements and the way forward. *JPMA The Journal of the Pakistan Medical Association* 2011;61(3):210-5.
116. Hailemariam M, Fekadu A, Selamu M, et al. Equitable access to integrated primary mental healthcare for people with severe mental disorders in Ethiopia: a formative study. *International journal for equity in health* 2016;15(1):121. doi: 10.1186/s12939-016-0410-0
117. Hamid S, Dunsiger S, Seiden A, et al. Impact of a diabetes control and management intervention on health care utilization in American Samoa. *Chronic illness* 2014;10(2):122-34. doi: 10.1177/1742395313502367
118. Han Y, Wei J, Song X, et al. Accessibility of primary health care workforce in rural China. *Asia-Pacific journal of public health* 2012;24(5):833-47. doi: 10.1177/1010539511403801

119. Hansen PM, Peters DH, Edward A, et al. Determinants of primary care service quality in Afghanistan. *International journal for quality in health care : journal of the International Society for Quality in Health Care* 2008;20(6):375-83. doi: 10.1093/intqhc/mzn039
120. Hardison C, Fonken P, Chew T, et al. The emergence of family medicine in Kyrgyzstan. *Family medicine* 2007;39(9):627-33.
121. Harris JB, Hatwiinda SM, Randels KM, et al. Early lessons from the integration of tuberculosis and HIV services in primary care centers in Lusaka, Zambia. *The international journal of tuberculosis and lung disease : the official journal of the International Union against Tuberculosis and Lung Disease* 2008;12(7):773-9.
122. Harzheim E, Duncan BB, Stein AT, et al. Quality and effectiveness of different approaches to primary care delivery in Brazil. *BMC health services research* 2006;6:156. doi: 10.1186/1472-6963-6-156
123. Harzheim E, Goncalves MR, Umpierre RN, et al. Telehealth in Rio Grande do Sul, Brazil: Bridging the Gaps. *Telemedicine journal and e-health : the official journal of the American Telemedicine Association* 2016;22(11):938-44. doi: 10.1089/tmj.2015.0210
124. Hasna FS. Utilization of family planning services in the Governorate of Zarqa, Jordan. *Journal of transcultural nursing : official journal of the Transcultural Nursing Society* 2006;17(4):365-74. doi: 10.1177/1043659606291547
125. Heard A, Nath DK, Loevinsohn B. Contracting urban primary healthcare services in Bangladesh - effect on use, efficiency, equity and quality of care. *Tropical medicine & international health : TM & IH* 2013;18(7):861-70. doi: 10.1111/tmi.12113
126. Heimann LS, Ibanhes LC, Boaretto RC, et al. [Primary healthcare: a multidimensional study on challenges and potential in the Sao Paulo Metropolitan Region (SP, Brazil)]. *Ciencia & saude coletiva* 2011;16(6):2877-87.
127. Hickling FW, Robertson-Hickling H, Paisley V. Deinstitutionalization and attitudes toward mental illness in Jamaica: a qualitative study. *Revista panamericana de salud publica = Pan American journal of public health* 2011;29(3):169-76.
128. Hlahane MS, Greeff M, du Plessis E. Professional nurses' perceptions of the skills required to render comprehensive primary health care services. *Curationis* 2006;29(4):82-94.
129. Hou J, Xu M, Kolars JC, et al. Career preferences of graduating medical students in China: a nationwide cross-sectional study. *BMC medical education* 2016;16:136. doi: 10.1186/s12909-016-0658-5
130. Hughes D, Leethongdee S, Osiri S. Using economic levers to change behaviour: the case of Thailand's universal coverage health care reforms. *Social science & medicine (1982)* 2010;70(3):447-54. doi: 10.1016/j.socscimed.2009.10.031
131. Hung LM, Shi L, Wang H, et al. Chinese primary care providers and motivating factors on performance. *Family practice* 2013;30(5):576-86. doi: 10.1093/fampra/cmt026
132. Ichiho HM, Shomour M, Marar J, et al. An assessment of non-communicable diseases, diabetes, and related risk factors in the Federated States of Micronesia, State of Chuuk: a systems perspective. *Hawai'i journal of medicine & public health : a journal of Asia Pacific Medicine & Public Health* 2013;72(5 Suppl 1):30-8.
133. Iorio S. [AN ETHNOGRAPHIC STUDY OF MEDICAL PRACTICES AND KNOWELEDGE IN THE NAHUA CONTEST (NAUPAN, PUEBLA, MEXICO)]. *Medicina nei secoli* 2014;26(3):793-820.
134. Ireland M, Cavalini L, Girardi S, et al. Expanding the primary health care workforce through contracting with nongovernmental entities: the cases of Bahia and Rio de Janeiro. *Human resources for health* 2016;14:6. doi: 10.1186/s12960-016-0101-3

135. Iyer V. Female health workers in Gujarat: Examining human resource actions and workforce objectives-an exploratory mixed methods study. *The National medical journal of India* 2013;26(5):273-8.
136. Javoric H, Topolovec-Nizetic V, Pavlekovic G. Home visits in Croatian family practice: a longitudinal study: 1995-2012. *Collegium antropologicum* 2014;38 Suppl 2:55-9.
137. Jegede AS, Adejumo P, Ushie BA. Factors influencing motivation and retention of primary healthcare workers in the rural areas of Oyo State, Nigeria. *World health & population* 2013;14(4):23-36.
138. Jerome G, Ivers LC. Community health workers in health systems strengthening: a qualitative evaluation from rural Haiti. *AIDS (London, England)* 2010;24 Suppl 1:S67-72. doi: 10.1097/01.aids.0000366084.75945.c9
139. Jimoh BM, Anthonia OC, Chinwe I, et al. Prospective evaluation of cases of discharge against medical advice in Abuja, Nigeria. *TheScientificWorldJournal* 2015;2015:314817. doi: 10.1155/2015/314817
140. Johns B, Doroshenko O, Tarantino L, et al. The Cost-Effectiveness of Integrating HIV Counseling and Testing into Primary Health Care in the Ukraine. *AIDS and behavior* 2017;21(3):655-64. doi: 10.1007/s10461-016-1554-z
141. Kahabuka C, Kvale G, Moland KM, et al. Why caretakers bypass Primary Health Care facilities for child care - a case from rural Tanzania. *BMC health services research* 2011;11:315. doi: 10.1186/1472-6963-11-315
142. Kamalakannan S, Gudlavalleti Venkata M, Prost A, et al. Rehabilitation Needs of Stroke Survivors After Discharge From Hospital in India. *Archives of physical medicine and rehabilitation* 2016;97(9):1526-32.e9. doi: 10.1016/j.apmr.2016.02.008
143. Kamatenesi MM, Acipa A, Oryem-Origa H. Medicinal plants of Otwal and Ngai Sub Counties in Oyam district, Northern Uganda. *Journal of ethnobiology and ethnomedicine* 2011;7:7. doi: 10.1186/1746-4269-7-7
144. Kaufman A, Derksen D, Alfero C, et al. The Health Commons and care of New Mexico's uninsured. *Annals of family medicine* 2006;4 Suppl 1:S22-7; discussion S58. doi: 10.1370/afm.539
145. Kauye F, Udedi M, Mafuta C. Pathway to care for psychiatric patients in a developing country: Malawi. *The International journal of social psychiatry* 2015;61(2):121-8. doi: 10.1177/0020764014537235
146. Kentoffio K, Kraemer JD, Griffiths T, et al. Charting health system reconstruction in post-war Liberia: a comparison of rural vs. remote healthcare utilization. *BMC health services research* 2016;16:478. doi: 10.1186/s12913-016-1709-7
147. Khuzwayo LS, Moshabela M. The perceived role of ward-based primary healthcare outreach teams in rural KwaZulu-Natal, South Africa. *African journal of primary health care & family medicine* 2017;9(1):e1-e5. doi: 10.4102/phcfm.v9i1.1388
148. Kilic B, Kalaca S, Unal B, et al. Health policy analysis for prevention and control of cardiovascular diseases and diabetes mellitus in Turkey. *International journal of public health* 2015;60 Suppl 1:S47-53. doi: 10.1007/s00038-014-0557-7
149. Kovai V, Rao GN, Holden B, et al. An estimate of patient costs and benefits of the new primary eye care model utilization through vision centers in Andhra Pradesh, India. *Asia-Pacific journal of public health* 2010;22(4):426-35. doi: 10.1177/1010539510370779
150. Kringos DS, Boerma WG, Spaan E, et al. A snapshot of the organization and provision of primary care in Turkey. *BMC health services research* 2011;11:90. doi: 10.1186/1472-6963-11-90

151. Krumholz AR, Stone AE, Dalaba MA, et al. Factors facilitating and constraining the scaling up of an evidence-based strategy of community-based primary care: management perspectives from northern Ghana. *Global public health* 2015;10(3):366-78. doi: 10.1080/17441692.2014.981831
152. Kuang L, Liang Y, Mei J, et al. Family practice and the quality of primary care: a study of Chinese patients in Guangdong Province. *Family practice* 2015;32(5):557-63. doi: 10.1093/fampra/cmv064
153. Lakra GJ, Kadam S, Hussain MA, et al. Motivation and job satisfaction among multipurpose health workers in hilly and non-hilly areas of Jashpur District, Chhattisgarh: an exploratory study. *The Southeast Asian journal of tropical medicine and public health* 2012;43(5):1262-72.
154. Lawan UM, Amole GT, Khayi JH. Rural posting experience, requests for transfer, and perspectives about critical factors for staff retention among primary health care workers in urban Kano, Nigeria. *Nigerian journal of clinical practice* 2017;20(1):25-30. doi: 10.4103/1119-3077.178946
155. Le LT, Partridge JC, Tran BH, et al. Care practices and traditional beliefs related to neonatal jaundice in northern Vietnam: a population-based, cross-sectional descriptive study. *BMC pediatrics* 2014;14:264. doi: 10.1186/1471-2431-14-264
156. Li H, Sun Y, Qian D. Can integrated health services delivery have an impact on hypertension management? A cross-sectional study in two cities of China. *International journal for equity in health* 2016;15(1):193. doi: 10.1186/s12939-016-0485-7
157. Lin A, Zhang G, Liu Z, et al. Community-based lifestyle intervention for reducing blood pressure and glucose among middle-aged and older adults in China: a pilot study. *International journal of environmental research and public health* 2014;11(11):11645-63. doi: 10.3390/ijerph111111645
158. Lorenzo T, van Pletzen E, Booyens M. Determining the competences of community based workers for disability-inclusive development in rural areas of South Africa, Botswana and Malawi. *Rural and remote health* 2015;15(2):2919.
159. Low S, Tun KT, Mhote NP, et al. Human resources for health: task shifting to promote basic health service delivery among internally displaced people in ethnic health program service areas in eastern Burma/Myanmar. *Global health action* 2014;7:24937. doi: 10.3402/gha.v7.24937
160. Luna I, da Silva MT. Service intangibility and its implications for the work coordination of primary healthcare multi-professional teams in Brazil. *Work (Reading, Mass)* 2015;52(3):617-26. doi: 10.3233/WOR-152195
161. Macintyre K, Lochigan M, Letipila F. Understanding referral from primary care clinics in rural Kenya: using health information systems to prioritize health services. *The International journal of health planning and management* 2003;18(1):23-39. doi: 10.1002/hpm.689
162. Mahmood MA, Raulli A, Yan W, et al. Cooperative medical insurance and the cost of care in Shandong, PR China: perspectives of patients and community members. *Asia-Pacific journal of public health* 2015;27(2):NP897-902. doi: 10.1177/1010539510376664
163. Majrooh MA, Hasnain S, Akram J, et al. Accessibility of antenatal services at primary healthcare facilities in Punjab, Pakistan. *JPMA The Journal of the Pakistan Medical Association* 2013;63(4 Suppl 3):S60-6.
164. Mann V, Eble A, Frost C, et al. Retrospective comparative evaluation of the lasting impact of a community-based primary health care programme on under-5 mortality in villages around Jamkhed, India. *Bulletin of the World Health Organization* 2010;88(10):727-36. doi: 10.2471/BLT.09.064469
165. Martins SM, Salibe-Filho W, Tonioli LP, et al. Implementation of 'matrix support' (collaborative care) to reduce asthma and COPD referrals and improve primary care management in Brazil: a

pilot observational study. *NPJ primary care respiratory medicine* 2016;26:16047. doi: 10.1038/npjpcrm.2016.47
166. Mash BJ, Mayers P, Conradie H, et al. How to manage organisational change and create practice teams: experiences of a South African primary care health centre. *Education for health (Abingdon, England)* 2008;21(2):132.
167. Maulik PK, Kallakuri S, Devarapalli S, et al. Increasing use of mental health services in remote areas using mobile technology: a pre-post evaluation of the SMART Mental Health project in rural India. *Journal of global health* 2017;7(1):010408. doi: 10.7189/jogh.07.010408
168. Mayta-Tristan P, Pereyra-Elias R, Montenegro-Idrogo JJ, et al. Profile and professional expectations of medical students from 11 Latin American countries: the Red-LIRHUS project. *BMC research notes* 2017;10(1):159. doi: 10.1186/s13104-017-2479-y
169. Mbaruku GM, Larson E, Kimweri A, et al. What elements of the work environment are most responsible for health worker dissatisfaction in rural primary care clinics in Tanzania? *Human resources for health* 2014;12:38. doi: 10.1186/1478-4491-12-38
170. Mboineki JF, Zhang W. Healthcare Provider Views on Transitioning From Task Shifting to Advanced Practice Nursing in Tanzania. *Nursing research* 2018;67(1):49-54. doi: 10.1097/NNR.0000000000000259
171. McCollum R, Chen L, ChenXiang T, et al. Experiences with primary healthcare in Fuzhou, urban China, in the context of health sector reform: a mixed methods study. *The International journal of health planning and management* 2014;29(2):e107-26. doi: 10.1002/hpm.2165
172. Melo DO, Castro LL. Pharmacist's contribution to the promotion of access and rational use of essential medicines in SUS. *Ciencia & saude coletiva* 2017;22(1):235-44. doi: 10.1590/1413-81232017221.16202015
173. Mignone J, Bartlett J, O'Neil J, et al. Best practices in intercultural health: five case studies in Latin America. *Journal of ethnobiology and ethnomedicine* 2007;3:31. doi: 10.1186/1746-4269-3-31
174. Mirzikashvili N, Baramidze L. THE ROLE OF PRIMARY HEALTH CARE IN ASSESSING AND PREVENTING HEALTH RISK FACTORS OF ADOLESCENTS IN GEORGIA. *Georgian medical news* 2017(264):53-57.
175. Mishra A. 'Trust and teamwork matter': community health workers' experiences in integrated service delivery in India. *Global public health* 2014;9(8):960-74. doi: 10.1080/17441692.2014.934877
176. Mishra AK, Bhattarai S, Bhurtel P, et al. Need for improvement of medical records. *JNMA; journal of the Nepal Medical Association* 2009;48(174):103-6.
177. Molapo ST, Maja TM, Wright SC. Guidelines to reduce sexually transmitted infections at primary health care centres--part 2. *Curationis* 2007;30(4):31-7.
178. Moosa S, Derese A, Peersman W. Insights of health district managers on the implementation of primary health care outreach teams in Johannesburg, South Africa: a descriptive study with focus group discussions. *Human resources for health* 2017;15(1):7. doi: 10.1186/s12960-017-0183-6
179. Moosa S, Downing R, Essuman A, et al. African leaders' views on critical human resource issues for the implementation of family medicine in Africa. *Human resources for health* 2014;12:2. doi: 10.1186/1478-4491-12-2
180. Mostert-Phipps N, Pottas D, Korpela M. A socio-technical approach to continuity of care and electronic records in the South African context. *Studies in health technology and informatics* 2010;160(Pt 1):406-10.
181. Mubyazi GM, Mushi A, Kamugisha M, et al. Community views on health sector reform and their participation in health priority setting: case of Lushoto and Muheza districts, Tanzania. *Journal of public health (Oxford, England)* 2007;29(2):147-56. doi: 10.1093/pubmed/fdm016

182. Munyewende PO, Rispel LC, Chirwa T. Positive practice environments influence job satisfaction of primary health care clinic nursing managers in two South African provinces. *Human resources for health* 2014;12:27. doi: 10.1186/1478-4491-12-27
183. Narahari SR, Ryan TJ, Bose KS, et al. Integrating modern dermatology and Ayurveda in the treatment of vitiligo and lymphedema in India. *International journal of dermatology* 2011;50(3):310-34. doi: 10.1111/j.1365-4632.2010.04744.x
184. Negin J, Martiniuk AL, Farrell P, et al. Frequency, cost and impact of inter-island referrals in the Solomon Islands. *Rural and remote health* 2012;12:2096.
185. Nemutandani SM, Hendricks SJ, Mulaudzi MF. Perceptions and experiences of allopathic health practitioners on collaboration with traditional health practitioners in post-apartheid South Africa. *African journal of primary health care & family medicine* 2016;8(2):e1-8. doi: 10.4102/phcfm.v8i2.1007
186. Ngoma MC, Prince M, Mann A. Common mental disorders among those attending primary health clinics and traditional healers in urban Tanzania. *The British journal of psychiatry : the journal of mental science* 2003;183:349-55.
187. Nguyen P, Bich Hanh D, Lavergne MR, et al. The effect of a poverty reduction policy and service quality standards on commune-level primary health care utilization in Thai Nguyen Province, Vietnam. *Health policy and planning* 2010;25(4):262-71. doi: 10.1093/heapol/czp064
188. Nkomazana O, Mash R, Phaladze N. Understanding the organisational culture of district health services: Mahalapye and Ngamiland health districts of Botswana. *African journal of primary health care & family medicine* 2015;7(1):907. doi: 10.4102/phcfm.v7i1.907
189. Nkomazana O, Mash R, Wojczewski S, et al. How to create more supportive supervision for primary healthcare: lessons from Ngamiland district of Botswana: co-operative inquiry group. *Global health action* 2016;9:31263. doi: 10.3402/gha.v9.31263
190. Ocek ZA, Ciceklioglu M, Yucel U, et al. Family medicine model in Turkey: a qualitative assessment from the perspectives of primary care workers. *BMC family practice* 2014;15:38. doi: 10.1186/1471-2296-15-38
191. Ojakaa D, Olango S, Jarvis J. Factors affecting motivation and retention of primary health care workers in three disparate regions in Kenya. *Human resources for health* 2014;12:33. doi: 10.1186/1478-4491-12-33
192. Okoronkwo IL, Onwujekwe OE, Ani FO. The long walk to universal health coverage: patterns of inequities in the use of primary healthcare services in Enugu, Southeast Nigeria. *BMC health services research* 2014;14:132. doi: 10.1186/1472-6963-14-132
193. Okyere E, Mwanri L, Ward P. Is task-shifting a solution to the health workers' shortage in Northern Ghana? *PloS one* 2017;12(3):e0174631. doi: 10.1371/journal.pone.0174631
194. Oliveira APC, Gabriel M, Poz MRD, et al. Challenges for ensuring availability and accessibility toin health care services under Brazil's Unified Health System (SUS). *Ciencia & saude coletiva* 2017;22(4):1165-80. doi: 10.1590/1413-81232017224.31382016
195. Oliver M, Geniets A, Winters N, et al. What do community health workers have to say about their work, and how can this inform improved programme design? A case study with CHWs within Kenya. *Global health action* 2015;8:27168. doi: 10.3402/gha.v8.27168
196. Onocko-Campos RT, Campos GW, Ferrer AL, et al. Evaluation of innovative strategies in the organization of Primary Health Care. *Revista de saude publica* 2012;46(1):43-50.
197. Onwujekwe O, Uzochukwu B. Socio-economic and geographic differentials in costs and payment strategies for primary healthcare services in Southeast Nigeria. *Health policy (Amsterdam, Netherlands)* 2005;71(3):383-97. doi: 10.1016/j.healthpol.2004.06.006

198. Opina-Tan LA. A pilot implementation of interprofessional education in a community-academe partnership in the Philippines. *Education for health (Abingdon, England)* 2013;26(3):164-71. doi: 10.4103/1357-6283.125992
199. Paudel R, Upadhyaya T, Pahari DP. People's perspective on access to health care services in a rural district of Nepal. *JNMA; journal of the Nepal Medical Association* 2012;52(185):20-4.
200. Peck R, Fitzgerald DW, Liautaud B, et al. The feasibility, demand, and effect of integrating primary care services with HIV voluntary counseling and testing: evaluation of a 15-year experience in Haiti, 1985-2000. *Journal of acquired immune deficiency syndromes (1999)* 2003;33(4):470-5.
201. Peck R, Mghamba J, Vanobberghen F, et al. Preparedness of Tanzanian health facilities for outpatient primary care of hypertension and diabetes: a cross-sectional survey. *The Lancet Global health* 2014;2(5):e285-92. doi: 10.1016/S2214-109X(14)70033-6
202. Pei L, Wang D, Ren L, et al. Evaluation of the Rural Primary Health Care project on undernutrition equity among children in rural Western China. *Health policy and planning* 2013;28(4):429-34. doi: 10.1093/heapol/czs074
203. Perry H, Berggren W, Berggren G, et al. Long-term reductions in mortality among children under age 5 in rural Haiti: effects of a comprehensive health system in an impoverished setting. *American journal of public health* 2007;97(2):240-6. doi: 10.2105/AJPH.2006.088732
204. Persson LA, Nga NT, Malqvist M, et al. Effect of Facilitation of Local Maternal-and-Newborn Stakeholder Groups on Neonatal Mortality: Cluster-Randomized Controlled Trial. *PLoS medicine* 2013;10(5):e1001445. doi: 10.1371/journal.pmed.1001445
205. Pesec M, Ratcliffe HL, Karlage A, et al. Primary Health Care That Works: The Costa Rican Experience. *Health affairs (Project Hope)* 2017;36(3):531-38. doi: 10.1377/hlthaff.2016.1319
206. Petersen I, Fairall L, Egbe CO, et al. Optimizing lay counsellor services for chronic care in South Africa: a qualitative systematic review. *Patient education and counseling* 2014;95(2):201-10. doi: 10.1016/j.pec.2014.02.001
207. Petersen I, Lund C, Bhana A, et al. A task shifting approach to primary mental health care for adults in South Africa: human resource requirements and costs for rural settings. *Health policy and planning* 2012;27(1):42-51. doi: 10.1093/heapol/czr012
208. Phafoli SH, Christensen-Majid A, Skolnik L, et al. Student and preceptor perceptions of primary health care clinical placements during pre-service education: Qualitative results from a quasi-experimental study. *Nurse education in practice* 2018;28:224-30. doi: 10.1016/j.nepr.2017.10.012
209. Phaswana-Mafuya N, Petros G, Peltzer K, et al. Primary health care service delivery in South Africa. *International journal of health care quality assurance* 2008;21(6):611-24. doi: 10.1108/09526860810900745
210. Phiri SC, Prust ML, Chibawe CP, et al. An exploration of facilitators and challenges in the scale-up of a national, public sector community health worker cadre in Zambia: a qualitative study. *Human resources for health* 2017;15(1):40. doi: 10.1186/s12960-017-0214-3
211. Pineda-Reyes R, Llanos-Cuentas A, Dancuart M. [Traditional treatments in an endemic area of american cutaneous Leishmaniasis in Peru]. *Revista peruana de medicina experimental y salud publica* 2015;32(4):761-5.
212. Pinto LF, Soranz D, Scardua MT, et al. Ambulatory municipal regulation of the Unified Health System services in Rio de Janeiro: advances, limitations and challenges. *Ciencia & saude coletiva* 2017;22(4):1257-67. doi: 10.1590/1413-81232017224.26422016
213. Pires MR, Gottems LB, Vasconcelos Filho JE, et al. The Care management Information system for the home Care Network (SI GESCAD): support for care coordination and continuity of care

in the Brazilian Unified health system (SUS). *Ciencia & saude coletiva* 2015;20(6):1805-14. doi: 10.1590/1413-81232015206.00152014
214. Poudyal AK, Jimba M, Poudyal BK, et al. Traditional healers' roles on eye care services in Nepal. *The British journal of ophthalmology* 2005;89(10):1250-3. doi: 10.1136/bjo.2004.065060
215. Powell DL, Price AJ, Burns FA, et al. Pillars for the care of older persons in the Caribbean. *Public health nursing (Boston, Mass)* 2012;29(1):80-90. doi: 10.1111/j.1525-1446.2011.00963.x
216. Prasetiyawan, Viora E, Maramis A, et al. Mental health model of care programmes after the tsunami in Aceh, Indonesia. *International review of psychiatry (Abingdon, England)* 2006;18(6):559-62. doi: 10.1080/09540260601039959
217. Price JA, Soares AI, Asante AD, et al. "I go I die, I stay I die, better to stay and die in my house": understanding the barriers to accessing health care in Timor-Leste. *BMC health services research* 2016;16(1):535. doi: 10.1186/s12913-016-1762-2
218. Prytherch H, Kagone M, Aninanya GA, et al. Motivation and incentives of rural maternal and neonatal health care providers: a comparison of qualitative findings from Burkina Faso, Ghana and Tanzania. *BMC health services research* 2013;13:149. doi: 10.1186/1472-6963-13-149
219. Qian Y, Yan F, Wang W, et al. Challenges for strengthening the health workforce in the Lao People's Democratic Republic: perspectives from key stakeholders. *Human resources for health* 2016;14(1):72. doi: 10.1186/s12960-016-0167-y
220. Qidwai W, Alim SR, Dhanani RH, et al. Use of folk remedies among patients in Karachi Pakistan. *Journal of Ayub Medical College, Abbottabad : JAMC* 2003;15(2):31-3.
221. Radovcic Z, Nola IA. [Integration of complementary and alternative medicine with primary health care in Croatia - opinions of primary health care physicians]. *Acta medica Croatica : casopis Hravatske akademije medicinskih znanosti* 2015;69(5):451-8.
222. Rafiei M, Ezzatian R, Farshad A, et al. Occupational Health Services Integrated in Primary Health Care in Iran. *Annals of global health* 2015;81(4):561-7. doi: 10.1016/j.aogh.2015.08.020
223. Rashidian A, Joudaki H, Khodayari-Moez E, et al. The impact of rural health system reform on hospitalization rates in the Islamic Republic of Iran: an interrupted time series. *Bulletin of the World Health Organization* 2013;91(12):942-9. doi: 10.2471/BLT.12.111708
224. Rathish D, Premarathna I, Jayathilake T, et al. Availability of essential medicines in selected public, primary and secondary health care institutions of a rural Sri Lankan district: a spot survey. *BMC health services research* 2017;17(1):11. doi: 10.1186/s12913-016-1969-2
225. Rechel B, Spencer N, Blackburn C, et al. Impact of health reforms on child health services in Europe: the case of Bulgaria. *European journal of public health* 2009;19(3):326-30. doi: 10.1093/eurpub/ckp027
226. Rees CP, Hawkesworth S, Moore SE, et al. Factors Affecting Access to Healthcare: An Observational Study of Children under 5 Years of Age Presenting to a Rural Gambian Primary Healthcare Centre. *PloS one* 2016;11(6):e0157790. doi: 10.1371/journal.pone.0157790
227. Renner A, Kirigia JM, Zere EA, et al. Technical efficiency of peripheral health units in Pujehun district of Sierra Leone: a DEA application. *BMC health services research* 2005;5:77. doi: 10.1186/1472-6963-5-77
228. Richardson E. Armenia: health system review. *Health systems in transition* 2013;15(4):1-99.
229. Ruas SS, Assuncao AA. Teleconsultations by primary care physicians of Belo Horizonte: challenges in the diffusion of innovation. *Telemedicine journal and e-health : the official journal of the American Telemedicine Association* 2013;19(5):409-14. doi: 10.1089/tmj.2012.0095
230. Ruiz-Rodriguez M, Rodriguez-Villamizar LA, Heredia-Pi I. Technical efficiency of women's health prevention programs in Bucaramanga, Colombia: a four-stage analysis. *BMC health services research* 2016;16(1):576. doi: 10.1186/s12913-016-1837-0

231. Rust G, Baltrus P, Ye J, et al. Presence of a community health center and uninsured emergency department visit rates in rural counties. *The Journal of rural health : official journal of the American Rural Health Association and the National Rural Health Care Association* 2009;25(1):8-16. doi: 10.1111/j.1748-0361.2009.00193.x
232. Saprii L, Richards E, Kokho P, et al. Community health workers in rural India: analysing the opportunities and challenges Accredited Social Health Activists (ASHAs) face in realising their multiple roles. *Human resources for health* 2015;13:95. doi: 10.1186/s12960-015-0094-3
233. Saswata B, Omar F, Aubery RJ, et al. Bridging the health gap in Uganda: the surgical role of the clinical officer. *African health sciences* 2005;5(1):86-9.
234. Sato M, Maufi D, Mwingira UJ, et al. Measuring three aspects of motivation among health workers at primary level health facilities in rural Tanzania. *PloS one* 2017;12(5):e0176973. doi: 10.1371/journal.pone.0176973
235. Schneider H, Schaay N, Dudley L, et al. The challenges of reshaping disease specific and care oriented community based services towards comprehensive goals: a situation appraisal in the Western Cape Province, South Africa. *BMC health services research* 2015;15:436. doi: 10.1186/s12913-015-1109-4
236. Schnippel K, Lince-Deroche N, van den Handel T, et al. Cost evaluation of reproductive and primary health care mobile service delivery for women in two rural districts in South Africa. *PloS one* 2015;10(3):e0119236. doi: 10.1371/journal.pone.0119236
237. Schuttner L, Sindano N, Theis M, et al. A mobile phone-based, community health worker program for referral, follow-up, and service outreach in rural Zambia: outcomes and overview. *Telemedicine journal and e-health : the official journal of the American Telemedicine Association* 2014;20(8):721-8. doi: 10.1089/tmj.2013.0240
238. Scott K, McMahon S, Yumkella F, et al. Navigating multiple options and social relationships in plural health systems: a qualitative study exploring healthcare seeking for sick children in Sierra Leone. *Health policy and planning* 2014;29(3):292-301. doi: 10.1093/heapol/czt016
239. Shaban I, Barclay L, Lock L, et al. Barriers to developing midwifery as a primary health-care strategy: a Jordanian study. *Midwifery* 2012;28(1):106-11. doi: 10.1016/j.midw.2010.11.012
240. Shah SM, Zaidi S, Ahmed J, et al. Motivation and Retention of Physicians in Primary Healthcare Facilities: A Qualitative Study From Abbottabad, Pakistan. *International journal of health policy and management* 2016;5(8):467-75. doi: 10.15171/ijhpm.2016.38
241. Shi L, Lee DC, Liang H, et al. Community health centers and primary care access and quality for chronically-ill patients - a case-comparison study of urban Guangdong Province, China. *International journal for equity in health* 2015;14:90. doi: 10.1186/s12939-015-0222-7
242. Shi L, Song K, Rane S, et al. Factors associated with job satisfaction by Chinese primary care providers. *Primary health care research & development* 2014;15(1):46-57. doi: 10.1017/S1463423612000692
243. Shivalli S, Majra JP, Akshaya KM, et al. Family centered approach in primary health care: experience from an urban area of Mangalore, India. *TheScientificWorldJournal* 2015;2015:419192. doi: 10.1155/2015/419192
244. Silva MI, Sousa FC, Gondim AP. Herbal therapy in primary health care in Maracanau, Ceara, Brazil. *The Annals of pharmacotherapy* 2005;39(7-8):1336-41. doi: 10.1345/aph.1E178
245. Simino GP, dos Santos CB, Mishima SM. Follow-up of cancer patients by family health workers. *Revista latino-americana de enfermagem* 2010;18(5):856-63.
246. Sindhu S, Pholpet C, Puttapitukpol S. Meeting the challenges of chronic illness: a nurse-led collaborative community care program in Thailand. *Collegian (Royal College of Nursing, Australia)* 2010;17(2):93-9.

247. Soares FF, Chaves SC, Cangussu MC. [Local government and public dental health services: an analysis of inequality in use]. *Cadernos de saude publica* 2015;31(3):586-96.
248. Song K, Scott A, Sivey P, et al. Improving Chinese primary care providers' recruitment and retention: a discrete choice experiment. *Health policy and planning* 2015;30(1):68-77. doi: 10.1093/heapol/czt098
249. Souza MF, Santos AFD, Reis IA, et al. Care coordination in PMAQ-AB: an Item Response Theory-based analysis. *Revista de saude publica* 2017;51:87. doi: 10.11606/S1518-8787.2017051007024
250. Suwankhong D, Liamputtong P, Rumbold B. Seeking help chaow baan ways in southern Thailand. *Australian journal of primary health* 2012;18(2):105-11. doi: 10.1071/PY11015
251. Syah NA, Roberts C, Jones A, et al. Perceptions of Indonesian general practitioners in maintaining standards of medical practice at a time of health reform. *Family practice* 2015;32(5):584-90. doi: 10.1093/fampra/cmv057
252. Tahaineh L, Albsoul-Younes A, Al-Ashqar E, et al. The role of clinical pharmacist on lipid control in dyslipidemic patients in North of Jordan. *International journal of clinical pharmacy* 2011;33(2):229-36. doi: 10.1007/s11096-011-9479-0
253. Takarinda KC, Harries AD, Mutasa-Apollo T, et al. Characteristics and treatment outcomes of tuberculosis patients who "transfer-in" to health facilities in Harare City, Zimbabwe: a descriptive cross-sectional study. *BMC public health* 2012;12:981. doi: 10.1186/1471-2458-12-981
254. Takemura T, Kielmann K, Blaauw D. Job preferences among clinical officers in public sector facilities in rural Kenya: a discrete choice experiment. *Human resources for health* 2016;14:1. doi: 10.1186/s12960-015-0097-0
255. Takian A, Doshmangir L, Rashidian A. Implementing family physician programme in rural Iran: exploring the role of an existing primary health care network. *Family practice* 2013;30(5):551-9. doi: 10.1093/fampra/cmt025
256. Takian A, Rashidian A, Kabir MJ. Expediency and coincidence in re-engineering a health system: an interpretive approach to formation of family medicine in Iran. *Health policy and planning* 2011;26(2):163-73. doi: 10.1093/heapol/czq036
257. Talbot Y, Takeda S, Riutort M, et al. Capacity-building in family health: innovative in-service training program for teams in Latin America. *Canadian family physician Medecin de famille canadien* 2009;55(6):613-3.e1.
258. Tanser F, Gijsbertsen B, Herbst K. Modelling and understanding primary health care accessibility and utilization in rural South Africa: an exploration using a geographical information system. *Social science & medicine (1982)* 2006;63(3):691-705. doi: 10.1016/j.socscimed.2006.01.015
259. Tejativaddhana P, Briggs D, Fraser J, et al. Identifying challenges and barriers in the delivery of primary healthcare at the district level: a study in one Thai province. *The International journal of health planning and management* 2013;28(1):16-34. doi: 10.1002/hpm.2118
260. Theodorakis PN, Mantzavinis GD. Inequalities in the distribution of rural primary care physicians in two remote neighboring prefectures of Greece and Albania. *Rural and remote health* 2005;5(3):457.
261. Topp SM, Chipukuma JM, Chiko MM, et al. Integrating HIV treatment with primary care outpatient services: opportunities and challenges from a scaled-up model in Zambia. *Health policy and planning* 2013;28(4):347-57. doi: 10.1093/heapol/czs065
262. Trad LA, Castellanos ME, Guimaraes MC. [Accessibility to primary health care by black families in a poor neighborhood of Salvador, Northeastern Brazil]. *Revista de saude publica* 2012;46(6):1007-13.

263. Triyana M. The effects of Indonesia's 'Midwife in the Village' programme 10 years post-launch. *Population studies* 2016;70(3):365-76. doi: 10.1080/00324728.2016.1145728
264. Urassa JA. Equity in access to health care provision under the medicare security for small scale entrepreneurs in Dar es Salaam. *East African journal of public health* 2012;9(1):1-6.
265. Van Belle SB, Marchal B, Dubourg D, et al. How to develop a theory-driven evaluation design? Lessons learned from an adolescent sexual and reproductive health programme in West Africa. *BMC public health* 2010;10:741. doi: 10.1186/1471-2458-10-741
266. Van Wieren A, Palazuelos L, Elliott PF, et al. Service, training, mentorship: first report of an innovative education-support program to revitalize primary care social service in Chiapas, Mexico. *Global health action* 2014;7:25139. doi: 10.3402/gha.v7.25139
267. Vandebroek I, Calewaert JB, De jonckheere S, et al. Use of medicinal plants and pharmaceuticals by indigenous communities in the Bolivian Andes and Amazon. *Bulletin of the World Health Organization* 2004;82(4):243-50.
268. Vandebroek I, Thomas E, Sanca S, et al. Comparison of health conditions treated with traditional and biomedical health care in a Quechua community in rural Bolivia. *Journal of ethnobiology and ethnomedicine* 2008;4:1. doi: 10.1186/1746-4269-4-1
269. Vazquez ML, Vargas I, Garcia-Subirats I, et al. Doctors' experience of coordination across care levels and associated factors. A cross-sectional study in public healthcare networks of six Latin American countries. *Social science & medicine (1982)* 2017;182:10-19. doi: 10.1016/j.socscimed.2017.04.001
270. Vellakkal S, Gupta A, Khan Z, et al. Has India's national rural health mission reduced inequities in maternal health services? A pre-post repeated cross-sectional study. *Health policy and planning* 2017;32(1):79-90. doi: 10.1093/heapol/czw100
271. Verma H, Aggarwal AK, Rattan V, et al. Access to public dental care facilities in Chandigarh. *Indian journal of dental research : official publication of Indian Society for Dental Research* 2012;23(1):121. doi: 10.4103/0970-9290.99057
272. Vichayanrat T, Steckler A, Tanasugarn C. Barriers and facilitating factors among lay health workers and primary care providers to promote children's oral health in Chon Buri Province, Thailand. *The Southeast Asian journal of tropical medicine and public health* 2013;44(2):332-43.
273. Wagenaar BH, Cumbe V, Raunig-Berho M, et al. Health facility determinants and trends of ICD-10 outpatient psychiatric consultations across Sofala, Mozambique: time-series analyses from 2012 to 2014. *BMC psychiatry* 2015;15:227. doi: 10.1186/s12888-015-0609-4
274. Wang HH, Wong SY, Wong MC, et al. Patients' experiences in different models of community health centers in southern China. *Annals of family medicine* 2013;11(6):517-26. doi: 10.1370/afm.1545
275. Wanzala P, Hassanali J, Kibet P, et al. Perceptions of primary health care with regard to corresponding knowledge, attitude and practices amongst the Kenyan Maasai. *East African medical journal* 2005;82(1):24-7.
276. Wasserman S, de Villiers L, Bryer A. Community-based care of stroke patients in a rural African setting. *South African medical journal = Suid-Afrikaanse tydskrif vir geneeskunde* 2009;99(8):579-83.
277. Wazir MS, Shaikh BT, Ahmed A. National program for family planning and primary health care Pakistan: a SWOT analysis. *Reproductive health* 2013;10(1):60. doi: 10.1186/1742-4755-10-60
278. Wei X, Yin J, Wong SY, et al. Private ownership of primary care providers associated with patient perceived quality of care: A comparative cross-sectional survey in three big Chinese cities. *Medicine* 2017;96(1):e5755. doi: 10.1097/MD.0000000000005755

279. Willcox ML, Peersman W, Daou P, et al. Human resources for primary health care in sub-Saharan Africa: progress or stagnation? *Human resources for health* 2015;13:76. doi: 10.1186/s12960-015-0073-8
280. Wong ST, Yin D, Bhattacharyya O, et al. Developing a performance measurement framework and indicators for community health service facilities in urban China. *BMC Family Practice* 2010;11:91. doi: 10.1186/1471-2296-11-91
281. Xavier T, Robin M, Agrawal D. Using a Call Centre for Data Mining and Data Capturing - Pilot Study Using Glasgow Coma Outcome Scale in Head Injured Patients. *Studies in health technology and informatics* 2016;225:866-7.
282. Yaya S, Nouatin GS, Singbo SJ. [Pre-financing community healthcare: the willingness of households to pay for primary health care in Benin]. *Sante publique (Vandoeuvre-les-Nancy, France)* 2013;25(4):527-33.
283. Yingtaweesak T, Yoshida Y, Hemhongsa P, et al. Accessibility of health care service in Thasongyang, Tak Province, Thailand. *Nagoya journal of medical science* 2013;75(3-4):243-50.
284. Yitayal M, Berhane Y, Worku A, et al. Health extension program factors, frequency of household visits and being model households, improved utilization of basic health services in Ethiopia. *BMC health services research* 2014;14:156. doi: 10.1186/1472-6963-14-156
285. Zeng J, Shi L, Zou X, et al. Rural-to-Urban Migrants' Experiences with Primary Care under Different Types of Medical Institutions in Guangzhou, China. *PloS one* 2015;10(10):e0140922. doi: 10.1371/journal.pone.0140922
286. Zeni ALB, Parisotto AV, Mattos G, et al. [Use of medicinal plants as home remedies in Primary Health Care in Blumenau - State of Santa Catarina, Brazil]. *Ciencia & saude coletiva* 2017;22(8):2703-12. doi: 10.1590/1413-81232017228.18892015
287. Zere E, Moeti M, Kirigia J, et al. Equity in health and healthcare in Malawi: analysis of trends. *BMC public health* 2007;7:78. doi: 10.1186/1471-2458-7-78
288. Zhang M, Yang R, Wang W, et al. Job satisfaction of urban community health workers after the 2009 healthcare reform in China: a systematic review. *International journal for quality in health care : journal of the International Society for Quality in Health Care* 2016;28(1):14-21. doi: 10.1093/intqhc/mzv111
289. Zhang T, Xu Y, Ren J, et al. Inequality in the distribution of health resources and health services in China: hospitals versus primary care institutions. *International journal for equity in health* 2017;16(1):42. doi: 10.1186/s12939-017-0543-9
290. Zou Y, Zhang X, Hao Y, et al. General practitioners versus other physicians in the quality of primary care: a cross-sectional study in Guangdong Province, China. *BMC family practice* 2015;16:134. doi: 10.1186/s12875-015-0349-z
291. Zulu JM, Kinsman J, Michelo C, et al. Hope and despair: community health assistants' experiences of working in a rural district in Zambia. *Human resources for health* 2014;12:30. doi: 10.1186/1478-4491-12-30
292. World Health Organization. Declaration of Alma-Ata. International Conference on Primary Health Care. Alma-Ata, USSR: WHO, 1978.
293. Trevisol DJ, Traebert J, Schuelter-Trevisol F. Brazil's Family Health Strategy. *N Engl J Med* 2015;373(13):1277. doi: https://dx.doi.org/10.1056/NEJMc1509056
294. Ivbijaro GO, Enum Y, Khan AA, et al. Collaborative care: models for treatment of patients with complex medical-psychiatric conditions. *Curr Psychiatry Rep* 2014;16(11):506. doi: https://dx.doi.org/10.1007/s11920-014-0506-4
295. World Health Organization. The World Health Report 2008: Primary Health Care (Now More Than Ever). Geneva: WHO, 2008:109.

296. Starfield B. Primary care: an incresingly important contributor to effectiveness, equity, and efficiency of health services. SESPAS report 2012. *Gaceta Sanitaria* 2012;26(5):25--31.
297. Starfield B, Shi L, Macinko J. Contribution of primary care to health systems and health. *Milbank Quarterly* 2005;83(3):457--502. doi: 10.1111/j.1468-0009.2005.00409.x
298. Member States of the African Region of World Health Organisation. The Ouagadougou declaration on primary health care and health systems in Africa: achieving better health for Africa in the new millennium. Ouagadougou: WHO regional Office for Africa, 2008:18.
299. Africa Union. Africa Health Strategy: 2007 - 2015. Johannesburg, South Africa, 2007:30.
300. Callaghan M, Ford N, Schneider H. A systematic review of task- shifting for HIV treatment and care in Africa. *Human Resources for Health* 2010;8:8. doi: 10.1186/1478-4491-8-8
301. Fulton BD, Scheffler RM, Sparkes SP, et al. Health workforce skill mix and task shifting in low income countries: a review of recent evidence. *Human resources for health* 2011;9(1):1. doi: 10.1186/1478-4491-9-1
302. Rabkin M, El-Sadr WM. Why reinvent the wheel? Leveraging the lessons of HIV scale-up to confront non-communicable diseases. *Global Public health* 2011;6(3):247--56. doi: 10.1080/17441692.2011.552068
303. National Department of Health. National Health Insurance in South Africa. *BMJ* 1929;2:359. doi: 10.1136/bmj.2.3581.359
304. Department of Health. Provincial Guidelines for the implementation of the three Streams of PHC Re-engineering. Pretoria: Republic of South Africa, 2012:67.
305. Minister of Health. Strategic Plan for the Prevention and Control of Non-Communicable Diseases 2013-17. Pretoria, South Africa, 2013:80.
306. Shaw S, Rosen R, Rumbold B. What is integrated care? 2011(June):166--91.
307. World Health Organization. Sixty-second World Health Assembly: Primary health care, including health system strengthening. Geneva: World Health Assembly, 2009:114.
308. Moosa S, Mash B, Derese A, et al. The views of key leaders in South Africa on implementation of family medicine: critical role in the district health system. *BMC family practice* 2014;15(1):125. doi: 10.1186/1471-2296-15-125
309. Health Professions Council of South Africa. Regulations Relating To The Registration Of Specialities And Subspecialities In Medicine And Dentistry. Health Professions Amendment Act 29 of 2007. Pretoria: Republic of South Africa, 2007.
310. Moosa S, Gibbs A. A focus group study of primary health care in Johannesburg Health District, South Africa:'we are just pushing numbers'. *S Afr Fam Pract* 2013;56(2):147--52.
311. Gavagan T. A Systematic Review of COPC: Evidence for Effectiveness. *Journal of health care for the poor and underserved* 2008;19(3):963--80.
312. Macinko J, Dourado I, Aquino R, et al. Major expansion of primary care in Brazil linked to decline in unnecessary hospitalization. *Health Affairs (Project Hope)* 2010;29(12):2149--60. doi: 10.1377/hlthaff.2010.0251
313. Mash R, Malan Z, von Pressentin K, et al. Strengthening primary health care through primary care doctors: the design of a new national Postgraduate Diploma in Family Medicine. *South African Family Practice* 2015;6190(September):1--5. doi: 10.1080/20786190.2015.1083719
314. Daviaud E, Chopra M. How much is not enough? Human resources requirements for primary health care: a case study from South Africa. *Bulletin of the World Health Organization* 2008;86(1):46--51.
315. McQuide Pa, Kolehmainen-Aitken R-L, Forster N. Applying the workload indicators of staffing need (WISN) method in Namibia: challenges and implications for human resources for health policy. *Human Resources for Health* 2013;11(64):64. doi: 10.1186/1478-4491-11-64

316. Musau P, Nyongesa P, Shikhule A, et al. Workload Indicators of Staffing Need method in determining optimal staffing levels at Moi Teaching and Referral Hospital. *East African medical journal* 2008;85(5):232--9.
317. Shipp PJ. Workload indicators of staffing need (WISN): a manual for implementation: World Health Organization, 1998.
318. Dubois C-A, Singh D. From staff-mix to skill-mix and beyond: towards a systemic approach to health workforce management. *Human resources for health* 2009;7:87. doi: 10.1186/1478-4491-7-87
319. Bresick GF, Sayed A-Ra. Western Cape Primary Care Assessment Tool (PCAT) study: Measuring primary care organisation and performance in the Western Cape Province, South Africa (2013). *African Journal of Primary Health Care \& Family Medicine* 2016;8(1):1--12. doi: 10.4102/phcfm.v8i1.1057
320. Mayosi BM, Flisher AJ, Lalloo UG, et al. The burden of non-communicable diseases in South Africa. *Lancet* 2009;374(9693):934--47. doi: 10.1016/S0140-6736(09)61087-4
321. Tollman SM, Kahn K, Sartorius B. Implications of mortality transition for primary health care in rural South Africa: a population-based surveillance study. *The Lancet* 2008;372(9642):893--901. doi: 10.1016/S0140
322. Davn J, Day C, Blecher M, et al. Finance. 2017:1--23.
323. Keeney S, Hasson F, McKenna H. Consulting the oracle: ten lessons from using the Delphi technique in nursing research. *Journal of advanced nursing* 2006;53(2):205--12. doi: 10.1111/j.1365-2648.2006.03716.x
324. Guba EG, Lincoln YS. Competing paradigms in qualitative research. 1994;2:105--17.
325. Yin RK. Analyzing case study evidence. 1994
326. Malaysia MoH. Health Facts 2017: Planning Division, Ministry of Health Malaysia, 2017.
327. Thomas S, Beh L, Nordin RB. Health care delivery in Malaysia: changes, challenges and champions. *Journal of public health in Africa* 2011;2(2):e23. doi: 10.4081/jphia.2011.e23 [published Online First: 2011/09/05]
328. Lim HM, Sivasampu S, Khoo EM, et al. Chasm in primary care provision in a universal health system: Findings from a nationally representative survey of health facilities in Malaysia. *PLoS One* 2017;12(2):e0172229. doi: 10.1371/journal.pone.0172229 [published Online First: 2017/02/15]
329. Sahoo D, Ghosh T. Healthscape role towards customer satisfaction in private healthcare. *Int J Health Care Qual Assur* 2016;29(6):600-13. doi: 10.1108/ijhcqa-05-2015-0068 [published Online First: 2016/06/15]
330. Toth F. Classification of healthcare systems: Can we go further? *Health Policy* 2016;120(5):535-43. doi: 10.1016/j.healthpol.2016.03.011 [published Online First: 2016/04/05]
331. Strum DP, Vargas LG. An outpatient segmentation model: estimation of stakeholder costs. *Clinical and investigative medicine Medecine clinique et experimentale* 2005;28(6):364-7. [published Online First: 2006/02/03]
332. Kumar R, Hassali MA, Saleem F, et al. Knowledge and perceptions of physicians from private medical centres towards generic medicines: a nationwide survey from Malaysia. *Journal of pharmaceutical policy and practice* 2015;8(1):11. doi: 10.1186/s40545-015-0031-9 [published Online First: 2015/04/11]
333. Lynn J, Straube BM, Bell KM, et al. Using population segmentation to provide better health care for all: the "Bridges to Health" model. *The Milbank quarterly* 2007;85(2):185-208; discussion 09-12. doi: 10.1111/j.1468-0009.2007.00483.x [published Online First: 2007/05/23]

334. Sollazzo A, Berterretche R. [The Integrated National Healthcare System in Uruguay and the challenges for Primary Healthcare]. *Cien Saude Colet* 2011;16(6):2829-40. [published Online First: 2011/06/29]
335. Risso-Gill I, Balabanova D, Majid F, et al. Understanding the modifiable health systems barriers to hypertension management in Malaysia: a multi-method health systems appraisal approach. *BMC Health Serv Res* 2015;15:254. doi: 10.1186/s12913-015-0916-y [published Online First: 2015/07/03]
336. Omar M, Tong SF, Saleh N, et al. A comparison of morbidity patterns in public and private primary care clinics in Malaysia. *Malaysian Family Physician* 2011;6(1):19-25.
337. Ibrahim WN, Aljunid S, Ismail A. Cost of Type 2 Diabetes Mellitus in Selected Developing Countries. *Malaysian Journal of Public Health Medicine* 2010;10(2):68-71.
338. Feisul IM, Azmi S, Mohd Rizal AM, et al. What are the direct medical costs of managing Type 2 Diabetes Mellitus in Malaysia? *Med J Malaysia* 2017;72(5):271-77. [published Online First: 2017/12/05]
339. Morrison M, Murphy T, Nalder C. Consumer preferences for general practitioner services. *Health marketing quarterly* 2003;20(3):3-19. [published Online First: 2004/03/17]
340. Victoor A, Delnoij DM, Friele RD, et al. Determinants of patient choice of healthcare providers: a scoping review. *BMC Health Serv Res* 2012;12:272. doi: 10.1186/1472-6963-12-272 [published Online First: 2012/08/24]
341. Organization PAH. Access to comprehensive, equitable, and quality health services: Regional Office for the Americas of the World Health Organization; 2015 [Available from: https://www.paho.org/salud-en-las-americas-2017/?tag=segmentation-of-health-services accessed 21 May 2018.
342. Stange KC. The problem of fragmentation and the need for integrative solutions. *Ann Fam Med* 2009;7(2):100-3. doi: 10.1370/afm.971
343. Harirchi I, Karbakhsh M, Hadi F, et al. Patient Delay, Diagnosis Delay and Treatment Delay for Breast Cancer: Comparison of the Pattern between Patients in Public and Private Health Sectors. *Arch Breast Cancer* 2015;2(2):52-57. doi: 10.19187/abc.20152252-57
344. Chua SS, Lim KP, Lee HG. Utilisation of community pharmacists by the general public in Malaysia. *Int J Pharm Pract* 2013;21(1):66-9. doi: 10.1111/j.2042-7174.2012.00219.x [published Online First: 2013/01/11]
345. Wong SS. Pharmacy practice in Malaysia. *Malaysian Journal of Pharmacy* 2001;1(1):2-8.
346. Montagu D, Goodman C. Prohibit, constrain, encourage, or purchase: how should we engage with the private health-care sector? *Lancet* 2016;388(10044):613-21. doi: 10.1016/s0140-6736(16)30242-2 [published Online First: 2016/07/01]
347. Thadani KB. Public Private Partnership in the Health Sector: Boon or Bane. *Procedia - Social and Behavioral Sciences* 2014;157:307-16. doi: https://doi.org/10.1016/j.sbspro.2014.11.033
348. Kula N, Fryatt RJ. Public-private interactions on health in South Africa: opportunities for scaling up. *Health Policy Plan* 2014;29(5):560-9. doi: 10.1093/heapol/czt042 [published Online First: 2013/08/22]
349. Friedberg MW, Hussey PS, Schneider EC. Primary care: a critical review of the evidence on quality and costs of health care. *Health Affairs* 2010;29(5):766-72.
350. Kruk ME, Porignon D, Rockers PC, et al. The contribution of primary care to health and health systems in low-and middle-income countries: a critical review of major primary care initiatives. *Social Science & Medicine* 2010;70(6):904-11.
351. Macinko J, Starfield B, Erinosho T. The impact of primary healthcare on population health in low-and middle-income countries. *Journal of Ambulatory Care Management* 2009;32(2):150-71.

352. Macinko J, Starfield B, Shi L. The contribution of primary care systems to health outcomes within Organization for Economic Cooperation and Development (OECD) countries, 1970–1998. *Health Services Research* 2003;38(3):831-65.
353. Balabanova D, Mills A, Conteh L, et al. Good Health at Low Cost 25 years on: lessons for the future of health systems strengthening. *The Lancet* 2013;381(9883):2118-33.
354. Pettigrew LM, De Maeseneer J, Anderson M-IP, et al. Primary health care and the Sustainable Development Goals. *The Lancet* 2015;386(10009):2119-21.
355. Federal Government of Nigeria. Minimum Standards for Primary Health Care in Nigeria. In: Agency NPHCD, ed., 2015:71.
356. Primary Health Care Performance Initiative. Spurring Improvements in Primary Health Care USA2017 [Available from: http://phcperformanceinitiative.org/ accessed 9 May 2018.
357. Kress DH, Su Y, Wang H. Assessment of Primary Health Care System Performance in Nigeria: Using the Primary Health Care Performance Indicator Conceptual Framework. *Health Systems & Reform* 2016;2(4):302-18.
358. Adogu P, Egenti B, Ubajaka C, et al. Utilization of maternal health services in urban and rural communities of Anambra State, Nigeria. *Nigerian Journal of Medicine* 2014;23(1):61-69.
359. Vasan A, Mabey DC, Chaudhri S, et al. Support and performance improvement for primary health care workers in low-and middle-income countries: a scoping review of intervention design and methods. *Health Policy and Planning* 2016;32(3):437-52.
360. Nigeria National Population Commission. National Demographic and Household Survey Lagos2004 [Available from: https://www.prb.org>thenewsthenigeria/ accessed 11 May 2018.
361. World Population Review. Nigeria Population 2018 2018 [Available from: http://worldpopulationreview.com/countries/nigeria-population/ accessed 10 May 2018.
362. World Health organization. Framework on integrated people-centred health services. Geneva: WHO, 2018.
363. Labonte R, Spiegel J. Setting global health research priorities. *Br Med J* 2003;326(7392):722-3.
364. The Lancet. The NHS at 70 and Alma-Ata at 40. *The Lancet* 2018;391(10115):1. doi: https://doi.org/10.1016/S0140-6736(18)30003-5
365. van Weel C, Rosser WW. Improving health care globally: a critical review of the necessity of family medicine research and recommendations to build research capacity. *Ann Fam Med* 2004;2 Suppl 2:S5-16.
366. van Weel C. Research and clinical practice: How to better answer the needs of patient care. *Journal of Clinical Epidemiology* 2015;68:1244-6.
367. Veillard J, Cowling K, Bitton A, et al. Better Measurement for Performance Improvement in Low- and Middle-Income Countries: The Primary Health Care Performance Initiative (PHCPI) Experience of Conceptual Framework Development and Indicator Selection. *Milbank Q* 2017;95(4):836-83. doi: https://doi.org/10.1111/1468-0009.12301
368. van Weel C, Kassai R. Expanding primary care in South and East Asia. *Br Med J* 2017;356:j634. doi: https://dx.doi.org/10.1136/bmj.j634
369. van Weel C, Kassai R, Qidwai W, et al. Primary healthcare policy implementation in South Asia. *BMJ Glob Health* 2016;1(2):e000057. doi: https://dx.doi.org/10.1136/bmjgh-2016-000057
370. van Weel C, Kassai R, Tsoi GW, et al. Evolving health policy for primary care in the Asia Pacific region. *Br J Gen Pract* 2016;66(647):e451-3. doi: http://dx.doi.org/10.3399/bjgp16X685513
371. van Weel C, Turnbull D, Ramirez J, et al. Supporting Health Reform in Mexico: Experiences and Suggestions from an International Primary Health Care Conference. *Ann Fam Med* 2016;14(3):279-80. doi: http://dx.doi.org/10.1370/afm.1942

372. Junger S, Payne SA, Brine J, et al. Guidance on Conducting and REporting DElphi Studies (CREDES) in palliative care: Recommendations based on a methodological systematic review. *Palliative Medicine* 2017;31(8):684-706. doi: https://dx.doi.org/10.1177/0269216317690685
373. May C. Agency and implementation: understanding the embedding of healthcare innovations in practice. *Social Science & Medicine* 2013;78:26-33. doi: https://dx.doi.org/10.1016/j.socscimed.2012.11.021

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 • Political economy • Uptake of evidence	*Private Sector* 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? 19 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.[303] 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.[304]

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.[305] 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. Belarus	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 Text for Round 1 Delphi panel for Qualtrics

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

Thank you for your interest in our expert Delphi panel. You are eligible to join the panel if you are a health professional, academic or policy maker from a low or middle income country working in primary health care (PHC) and sufficiently fluent in English. We apologise that time and resources do not allow us to offer translated versions.

This project aims to identify priority research questions in the areas of primary health care (1) organisation or models of care, and (2) financing. The participant information sheet can be found here. We want to identify knowledge gaps and determine the most important areas where research is needed. We would like you to tell us based on your knowledge of the literature and as an expert in primary health care in your country.

In the second round, we will combine all panellist responses into two sets of questions and ask you to rate the degree of importance of each question. This will help us achieve consensus of what should be researched first.

In the brief third round, we will ask you to rank in order our final lists for primary health care organisation and financing.

1 First, a little information about yourself
What country do you reside in? (drop down box)
What is your age? (20-29; 30-39; 40-49; 50-59; 60+ years)
What is your gender? (male; female; other)
Are you a health practitioner / primary care academic / policy-maker? Tick/check all that apply
(only available if yes to health practitioner) What is your clinical / health practitioner role? (family doctor / general practitioner; other doctor [specify]; nurse [specify]; Other [specify])
How long have you been working in this capacity? Less than 5 years / 5 to 10 years / 11 to 15 years / 16 to 20 years / greater than 20 years
(only available if yes to academic) What is your academic role? Professor / Associate Professor / Senior Lecturer / Lecturer / Other [specify]
How long have you been working in this capacity? Less than 5 years / 5 to 10 years / 11 to 15 years / 16 to 20 years / greater than 20 years
(only available if yes to policy-maker) What is your role as a policy-maker? [specify]
How long have you been working in this capacity? Less than 5 years / 5 to 10 years / 11 to 15 years / 16 to 20 years / greater than 20 years

2 ***Models of primary health care organisation***
This first section is about the organisation of primary health care and models of care in your country. A model of care is the way health services are delivered. It outlines best practice

care and services for an individual or a population throughout the stages of a condition or an injury. Based on your experience and understanding of the literature, what are the current **gaps in knowledge**? Short answers or bullet points of your ideas are fine, or questions you would like answered. You do not need to write something for every category, and please note that this is about research needs not about resolution of problems in the service per se.

Under each research question there is a sample research question just to give you some idea and get you started, but please generate your own.

Primary health care workforce (workforce is people involved in providing the services)
Eg What are the issues facing primary health care workforce?

Models of primary health care
Eg What models of care exist across different settings?

Primary health care team structures and functions (a team is a group of people working together)
Eg Who should lead the team and who should it include?

Services and scope of practice of primary health care
Eg What are the range of services/scope of care provided by primary health care?

Referrals and transitions of care between primary and secondary care
Eg What conditions are seen to be "primary health care" versus requiring specialty or hospital care?

Public and private primary health care
Eg What is the role of private practice? What is the governance of private practice: integrated with or separated from the public sector?

Government policy on primary health care
Eg How is primary health care delivery driven by government policy? Are professionals restricted in how they practice in the community and provide access to first line services?

If there are other areas of research into primary health care organisation you consider important for your setting that do not fit these categories, please add here.

3 Financing

This second section is about the financing of primary health care in your country. Financing means how the funds are provided and services paid for. Based on your experience and your understanding of the literature, please suggest as many areas as possible where you think there is **a gap in our knowledge** that research might help fill, in each of the categories listed. Short answers or bullet points of your ideas are fine, or questions you would like answered.

You do not need to write something for every category, and please note that this is about research needs not about resolution of problems in the service per se.

Under each research question there is a sample research question just to give you some idea and get you started, but please generate your own.

Equity of primary health care system
Eg Do differences in payment lead to variation nationally/regionally in which services are covered or in the availability of services?

Quality and safety of primary health care services in the public and private sectors
Eg What role does the private sector have in partnering with public? In improving access?

Contract management capacity in ministries of health
Eg What is the best way for contracts for services managed and decided?

Appropriate payment systems for quality primary health care
Eg What is overall health spending and is there protected money for primary health care?

Scaling up / implementing best practice
Eg Does the private sector have a responsibility in improving quality?

Defining essential and cost-efficient commodities
Eg How do we decide what services should be considered essential to provide universally?

Pooled funds against financial and technical risks
Eg Is there a policy to achieve universal health coverage? And if so: is primary health care an integrated part of this policy?

Efficient funding for primary health care and flow to facilities
Eg What is the best mechanism to enable community-based services to be adequately and reliably funded?

Payment mechanisms to promote vertical integration of care
Eg Are there payment incentives for PHC for the management of chronic health problems/care for the elderly?

If there are other areas of research into primary health care financing you consider important for your setting that do not fit into any of these categories, please add here.

Thank you very much for your participation. We are very grateful for your contribution. Please submit your responses. You will be asked to complete Round 2 in the middle of March and Round 3 (ranking the questions) in early April.

Appendix 5 Codes for organisation / models of care

Domain	Code
(1) Workforce	A- Workforce Training
	B- Workload & Working Conditions, capacity, recruitment & retention (J)
	C- Workforce Distribution
	J- Workforce Satisfaction
	K- Recognition & status of FM & PHC professionals
	M- Assessing outcomes related to workforce
	X- Role of PHC professionals including FPs in developing government policy
(2) Team	D- Interactions with other sectors
	F- Team composition
	G- Role & value of FP
	K- Recognition & status of FM
(3) Policy	V- Government & PHC & Public Health
	W- Relationship between PHC, PC & public health
	T- Measuring effectiveness
	Y- Inequalities in PHC funding
	BB- PHC Innovations
	Z- Measuring PHC delivery
(4) System	H- Resources & Infrastructure
	I -Service quality
	Q- Barriers to care
	P- Transitions of care
(5)Public/Private	R- Private practice in universal health coverage
(6) Scope of practice	N- Determine SOP
	P -Who decides SOP
(7)Geography	DD-
(8) Misc	XX
Null response	ZZ

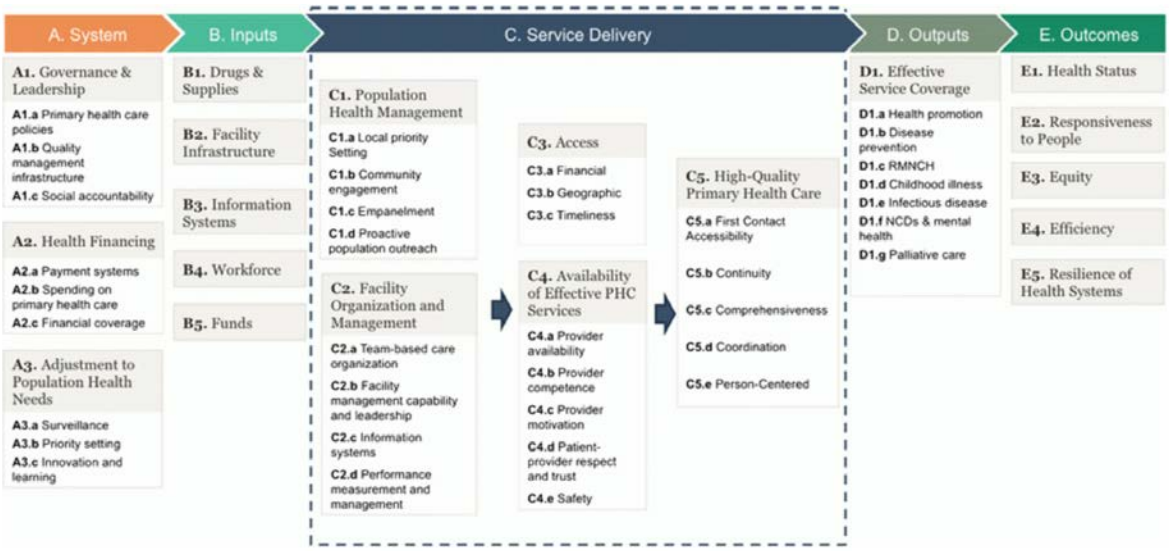
Appendix 6 Search terms for PHC and LMIC since 2003

("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 7 PHCPI conceptual framework

https://phcperformanceinitiative.org/about-us/measuring-phc[280]



Appendix 8 Number of studies per LMIC country

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

Indonesia	2	Cabo Verde	0	Somalia	0
Jamaica	2	Cambodia	0	South Sudan	0
Lebanon	2	Central African Republic	0	St. Vincent, Grenadines	0
Liberia	2	Chad	0	Swaziland	0
Rwanda	2	Comoros	0	Syrian Arab Republic	0
Sierra Leone	2	Congo, Dem. Rep.	0	Togo	0
Timor-Leste	2	Congo, Rep.	0	Tonga	0
Tunisia	2	Côte d'Ivoire	0	Turkmenistan	0
Albania	1	Djibouti	0	Tuvalu	0
Argentina	1	Dominica	0	Uzbekistan	0
Armenia	1	Dominican Republic	0	Vanuatu	0
Benin	1	Egypt, Arab Rep.	0	Venezuela, RB	0
Bosnia and Herzegovina	1	Equatorial Guinea	0	West Bank and Gaza	0
Bulgaria	1	Fiji	0	Yemen, Rep.	0
Cameroon	1	Gabon	0		