

**FACTORS THAT AFFECT UPTAKE OF COMMUNITY-BASED
HEALTH INSURANCE IN LOW AND MIDDLE-INCOME
COUNTRIES: A SYSTEMATIC REVIEW**

A mini-dissertation submitted to the University of Cape Town in partial fulfillment of the requirements for the award of the degree of Master of Public Health (Health Systems)

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Part 0: Preamble

Declaration

I, Esther Adebayo, hereby declare that the work on which this dissertation is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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Dedication

I dedicate this work to God Almighty for his faithfulness, love and mercy; and to my Dad who passed on to glory during this research, for his constant encouragement and for being my hero.

Thesis abstract

The systematic review undertaken for this MPH assesses the existing evidence for factors that affect uptake of community-based health insurance in low and middle-income countries.

Part A is the review protocol which outlines the background, problem statement and process of the review. Search strategies combined related terms for uptake, enrollment and health insurance. Inclusion criteria were expanded enough to include a broad range of study designs, given the heterogeneity of outcomes and the absence of randomized control trials (RCTs). Search records were screened by two researchers, as were selected full articles. These were evaluated using the STROBE checklist, a quantitative study assessment tool for observational studies.

Part B provides details on the background of the systematic review by exploring the existing theoretical and empirical literature around the topic. It describes community financing and health care financing in low and middle-income countries and the future of community-based health insurance. It also explores community-based insurance and social capital, socio-demographic factors and health related variables and how it affects enrollment, a generic conceptual framework of analysis was also given. Community-based health insurance and equity was also described, effectiveness and limitation of the scheme were studied and then an overview of a selected number of community-based health insurance schemes in Asia and Africa was presented.

Part C presents the full systematic review in a format appropriate for journal submission. The background and method of the review is summarized and the results are presented and discussed

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Part A: Study Protocol

Protocol Abstract

Introduction: Many people residing in low and middle-income countries (LMIC) are regularly exposed to catastrophic healthcare expenditure. It is therefore pertinent that LMICs should finance their health systems in ways that ensure their citizens can use needed healthcare services and are protected from potential impoverishment arising from having to pay for the services. Ways of financing health systems include government funding, health insurance schemes and out-of-pocket payment. A health insurance scheme refers to pooling of prepaid funds in a way that allows for risks to be shared. The health insurance scheme particularly suitable for the rural poor and the informal sector in LMICs is community-based health insurance (CBHI) i.e. insurance schemes operated by organizations other than governments or private for-profit companies. We plan to search for and summarize currently available evidence on factors associated with the uptake of CBHI, as we are not aware of previous systematic reviews that have looked at this important topic.

Methods: This is a protocol for a systematic review of the literature. We will include both quantitative and qualitative studies in this review. Eligible quantitative studies include both intervention and observational studies. Qualitative studies to be included are focus group discussions, direct observations, interviews, case studies and ethnography. We will search Embase, PubMed, Scopus, ERIC, PsychInfo, Africa-Wide Information, Academic Search Premier, Business Source Premier, WHOLIS, CINAHL and the Cochrane Library for eligible studies available by 31 October 2013; regardless of publication status or language of publication. We will also check reference lists of included studies, proceedings of relevant conferences and contact researchers for eligible studies

Two authors will independently screen the search output, select studies and extract data; resolving discrepancies by consensus and discussion. Qualitative data will be extracted using standardized data extraction tools adapted from the Critical Appraisal Skills Program (CASP) qualitative appraisal checklist and put together in a thematic analysis where applicable. We will statistically pool data from quantitative studies in a meta-analysis; but if included quantitative studies differ significantly in study settings, design and/or outcome measures, we will present the findings in a narrative synthesis.

Dissemination: Recommendations will be made to health policy makers, managers and researchers in LMICs to help inform them on ways to strengthen and increase uptake of community-based health insurance.

Ethics: Ethics approval is not required.

Key words: Health insurance, Community-based health insurance, Low and middle-income countries, Access, Uptake, Informal sector

1.0 Background

The health sector of Low and Middle Income Countries (LMICs) has a huge financing gap to fill. This is as a result of the wide difference between revenue raised by taxation in LMICs and high income countries, which are 14% of gross national product (GNP) for the former and 31% for the latter (1). It was as a result of this gap in financing that, user fees was introduced which led to increased out-of- pocket (OOP) expenditure. These out of pocket led to increased household exposure to financial risk and also intensified inequity in access to health care. User fees have been unable to improve efficiency or raise considerable added revenue and it encourages corruption, perverse incentives and bureaucracy (2-4). (2-4). Due to this crisis, over the past two decades many LMICs have found it progressively difficult to maintain sufficient financing for health care. As a result, OOP payments remain high creating more constraints to utilizing essential health services (5). Out-of-pocket (OOP) payment for health care is a major cause of poverty, hence strengthening the financial protection to reduce catastrophic expenditure is seen as pivotal to poverty reduction strategies (6-8).

In recent years, prepayment health care financing¹ have proven to provide greater financial protection to individuals and households than have a preference to OOP (23). Hence, health insurance is set up to provide financial risk protection and to mobilize resources to avert impoverishments that may arise from paying OOP for health care. This is because a system financed through taxation and mandatory health insurance can achieve high degree of risk pooling and provide universal coverage. Health insurance has also the potential to increase utilization and affordability of health care especially among the poor and vulnerable population.

¹ Prepayment health care financing is a process whereby individuals or households contribute regularly to the cost of health care via tax payments and/or health insurance

Through health insurance, risks are shared and financial inputs pooled by way of contributions, e.g. from salaries or taxation (9). However establishing such mechanisms in low and middle income settings has proven difficult as the poor in these settings are largely excluded. This is further compounded by the large share of informal sector workers and rural populace in these countries (9, 10). Therefore community based health insurance began to spread in response to the crisis in the health care financing sector and more specifically due to introduction of user fees at public health facilities and rise of alternative private source of quality health care provision (11).

Due to the recent call for countries to ensure universal coverage of the population (12); the need arose to provide insurance coverage for the large informal sector in LMICs. Increasing access to affordable health is essential for achieving universal coverage and in turn to eradicate poverty. One of the ways to providing health insurance² coverage for informal sector and the rural populace is through Community-Based Health Insurance (CBHI). Community-based health insurance (a) operates by risk-pooling, (b) is financed through regular premiums and (c) tailored to poor people who would otherwise not be able to take out large scale insurance (13). CBHI, though with problems relating to the extent of resource pooling, has however been shown to facilitate and improve access to health care services especially among children and pregnant women (14, 15). CBHI addresses health care challenges faced specifically by the rural poor and informal sector workers (16).

In addition, some authors have agreed that CBHI should be considered as an intermediate stage towards universal risk protection via some mix tax-based and social health insurance (17). Historic examples of this have been set by countries like Germany, Korea and Japan where

² There are three main categories of health insurance namely the mandatory (often called national or social) health insurance, private voluntary insurance and community based (pre-payment) health insurance (27)

community financing was scaled up and incorporated into national or social health insurance (18, 19, 19, 20).

1.1 Problem statement

One of the key objectives of universal coverage is ‘universal financial protection’. This is because health financing through general taxation or social health insurance are known to reduce household out-of-pocket expenditures; and hence is able to achieve sufficient financial protection for all health care costs (21). However most LMIC still find it hard to achieve this, because only a certain proportion of the population can be reached and the health services benefitted by this proportion in return is inadequate. More so, because the health financing is heavily dependent on government funding³, it is difficult to expand the capacity taxes in most countries, as it relies on compliance amongst income earners, acceptance and ability to pay (22). In addition, management of Social Health Insurance (SHI) or National Health Insurance (NHI) which includes collection, organization and monitoring of health and financial information which most LMIC government lack hampers the SHI scheme (21).

In addition, in most LMICs, the health system is not equitable in terms of distribution of public health resources in urban and rural areas. Often times, health care services made available to citizens in urban areas, usually in hospitals, claims a huge part of public health budget. However, the majority of the low and middle income country’s population resides in rural area and may get little or no share of public funds (23).

³ Government funding are generally derived from direct taxes (charged on company and personal tax) and indirect tax (includes custom duties and value added tax).

Furthermore, one of the major challenges faced by most LMIC is the provision of health care for the 1.3 billion poor people who work in the informal sector or reside in the rural areas (21). These groups of people are heterogeneous; they consist of taxi drivers, farmers, laborers, shop owners, traders, market women and self employed professionals. However they all share similar lack of access to health care services, which is majorly as a result of insufficient health care financing (24). A general picture of LMICs is such that the rural populace is served via operations in public health care facilities in rural area. These facilities may not get qualified health care practitioners and those who take up such positions often work at irregular intervals, hence provide services that are of poor quality. The health care facilities are short of drugs and medical supplies, therefore when people are ill; they are often forced to depend on self-treatment first with home remedies provided by pharmacists and some traditional healers (21). In some instance, individuals pay informal charges and formal co-payment when treated in the public sector; hence, individuals have to choose between purchasing the treatment and bankrupting their families (22). More so studies have shown that households still pay a significant part of their income in informal charges, even when government provides nearly free or free services. About 80% of total health care expenditure in most LMIC comes from OOP by individuals (25). Huge medical expenditure such as expensive out-patient drugs and inpatient care is a major source of poverty (24).

It is important to note that the economic context of most LMIC is such that the governments do not spend enough money on health care and increasing government spending on health may not be feasible (22). Firstly, this is because most LMIC have small tax base and inefficient tax collection systems, therefore amount gathered together via tax is not sufficient. There is also demand from other sectors for the limited government resources, which ends up leaving just

small government funding for the rural and informal populace (22). The national or social health insurance in most LMIC have low coverage, private health insurance is expensive and user fees are inequitable, all these creates a very huge barrier to accessing health care by those in the informal sector (26, 27). Secondly, money spent by household is regressive and not channeled in the right collective arrangements; also providers take advantage of the small population size and absence of multiple providers by giving above market price to the individual at the point of care (22). Thirdly, in most LMICs, the government fund is used to pay the salaries of health care workers (irrespective of whether they are delivering the care or not) and also for the purchase of drugs and medical supplies, which is mostly inadequate (21). Therefore, the aim of the government which is free-services is defeated as patient pay for drugs and other forms of medical consumables OOP. In most cases, this pushes individual in the informal sector or rural areas to seek care from the private health sector using their little income (21).

In light of these, CBHI have been used to address the above mentioned issues, and to also mobilize resources to deliver health care for the poor in urban and rural settings. While some CBHI have achieved the above mentioned issues, other has been used as a primary means of generating income for providers (21).

1.2 Description of the condition

Over 50% of the LMICs' population experiences financial constraints as a main barrier to access health care (25, 28, 29). CBHI are intended for those employed outside the formal sector, this is because a higher percentage of the populace are in the informal sector as compared with the formal sector. Furthermore, the World Bank and World Health Organization (WHO) have urged countries to curb OOP expenditures for health care at the point of use via pre-payment schemes

or mechanisms. This is a significant step towards preventing the financial hardship associated with payment of health care services (9). More so, currently CBHI covers 2million people in Africa out of an estimated 900million. This amounts to just 0.2% of the catchment population (5).

In an era when universal coverage is more relevant than ever before, it is important to understand the reasons for low enrolment into health insurance schemes in Africa as well as other low and middle-income regions of the world. Therefore, not only is it important to assess the impact of health insurance schemes for the informal sector as most existing literature have done but also factors that affect take up of voluntary and CBHI in LMIC (30).

1.3 How the intervention might work

Just handfuls LMIC currently provides protection against cost for health care for all or most of the population. This has resulted in great financial burden for those using the health services, mostly those working in the informal sector. Those in the formal employment are more secure financially and also more easily drafted into health insurance scheme. This is because their income is known and can be taxed at source (24). However those in informal employment are a small minority, also, most governments in LMIC have insufficient means to finance and manage the health sector, and this has resulted in new forms of health care finance and different types of health insurance scheme. Therefore, steps taken by government and international agencies and NGOs to protect those in the informal sector against health care cost at the point of use are increasing the uptake of community financing. A well designed and managed CBHI for those outside formal employment may be a potential means of improving health care services (24). Allowing communities to give to health care and the extent of their contribution between sick

and healthy people, resources for health care delivery can be mobilized. This can be used to increase financial risk protection, improve quality of health care and increase accessibility.

1.4 The importance of conducting this review

The final goals of the health system as a whole as considered by World Health Organization (WHO) are health equality, health status, responsiveness of health system to individual's non-medical expectation and fairness in financial contribution (23). Fairness in financial contribution for health occurs when healthcare expenditures of households are distributed in accordance to the ability to pay rather than the cost incurred as a result of illness. Therefore, a national health system should raise funds for health care in ways that ensure people can use needed healthcare services and are protected from impoverishment arising from having to pay for such services (23).

However, a systematic review published in 2012 found that the uptake of health insurance is less than expected in Africa (30). Based on this study, a few insurance schemes accorded significant protection from high levels of OOP payments to members. In light of this more information is need to understand the reasons for low enrolment. To the best of our knowledge, no systematic reviews have been specifically designed to summarize factors associated with enrolment of CBHI.

Researchers studying German experience with health insurance from the country's early phase of development of a health insurance system have recommended that "small, informal, voluntary health insurance schemes may serve as learning models for fund administration and solidarity,

both of which will make introduction of larger, more formal, compulsory schemes an easier task” (18).

In addition, there are many studies, conducted in different settings to evaluate the factors that determine enrolment into CBHI or people’s willingness to pay for CBHI. Several factors have been found to influence CBHI enrolment, including age, income, education and distance to health facility (31, 32). The association between age and Willingness to Pay (WTP) has been mixed in the literature. Respondent’s age is found to have a positive effect on WTP in some studies; such that older participants were more willing to pay for health insurance, while in others it is the opposite (33). Likewise, distance to the nearest health facility has been found to have a positive effect on WTP in some cases, in the sense that, short distance increased likelihood of WTP (31, 32). While in others it has had a negative effect (33). Many studies have shown that household wealth index or income has a positive effect on WTP (34, 35). However, there are some exceptions (31). Other factors that have been found to significantly influence WTP for CBHI programmes include education, household size, level of trust that households have in the management of the insurance programme, sex, knowledge of the CBHI programme and place of residence (urban versus rural) (34, 36).

In light of this, various in-country primary studies have been conducted to determine the factors that affect uptake; therefore there is great need for current best evidence on these factors amongst LMICs to improve quality and access to health care services. There is great need for a rigorous synthesis of current best evidence on factors that determine enrolment and willingness to pay for CBHI programmes in LMICs. We therefore conceived this review to summarize all the currently available evidence around factors affecting uptake of CBHI in LMICs. Such evidence would

inform health policy makers and managers seeking to improve quality and access to healthcare services in such resource-constrained settings.

1.5 Objectives

The following are the specific objectives of this study

1. To systematically assess the factors that affect enrolment for CBHI schemes
2. To understand the reason for low enrolment into CBHI schemes
3. To describe the scope and quality of existing literature
4. To reflect on the generalizability, context and feasibility of the included studies

1.6 Methods

1.6.1 Types of studies

Both quantitative and qualitative studies will be included in the review. Quantitative studies to be included are randomized control trials (RCTs), controlled before-and-after studies (CBAs), interrupted time series designs (ITS), cohort studies, case-control studies, household surveys, contingent valuation studies, and cross-sectional surveys. Qualitative studies to be included are those that used known qualitative methods of data collection such as focus group discussions, interviews, direct observation, case studies, ethnography and action research; and known methods of qualitative analysis such as thematic analysis, grounded theory, coding and discourse analysis. This mixed-method approach offers an opportunity for complementary answers to research questions that cannot be answered completely by either the qualitative or quantitative method. This will help in making the review more relevant and robust, by maximizing the

findings and the ability of these findings to inform policy and practice. Thus, the fusion of both qualitative and quantitative evidence in this review will enhance its impact and effectiveness. Inclusion of both components would help identify priority research gaps and boost the relevance of the review for decision makers. The mixed-methods facilitate the incorporation of qualitative understanding from people's lives and robust quantitative estimates of benefits and harms.

1.6.2 Participants and Interventions

We will include studies conducted in low and middle-income countries (as defined by the World Bank) on all types of health services that involve community-based health insurance, community financing, mutual health organizations, community health funds, micro insurance, or rural health insurance managed and operated by organizations other than governments or private for-profit companies.

1.6.3 Types of outcome measures

Primary outcomes: The primary outcomes of interest for this review are uptake of, or willingness to pay for, community-based insurance schemes (as defined by the authors of the primary studies).

Secondary outcomes: The secondary outcomes include acceptability of insurance schemes, availability of health services, ability to pay, financial protection, fairness in financial contribution, and utilization of health services.

1.6.4 Search methods for identification of studies

A comprehensive search will be performed and extensive search of peer-reviewed and grey literature with the help of an information specialist, to identify all appropriate studies available

by 31 October regardless of publication status (published and unpublished) with no language restriction.

1.6.5 Inclusion criteria

This review will consider both quantitative and qualitative studies that: (i) examined the factors associated with or that affect the uptake or willingness to pay for community based health insurance; (ii) explored the reason for low enrolment to CBHI

1.6.6 Electronic searches

We will search the following electronic databases for primary studies:

- Cumulative Index to Nursing and Allied Health Literature (CINAHL)
- PubMed
- Soc Index
- Scopus
- Web of Science
- Education Resources Information Centre (ERIC)
- EconLit
- Academic Search
- PsycINFO
- Humanities international
- Sociological abstracts
- Social care online
- Cochrane (Trials and economic evaluation)

- African Index Medicus
- Latin American and Caribbean Health Sciences Literature (LILACS)
- IndMed
- Academic One file
- Africa Wide
- Business source premier
- Journal storage (JSTOR)

We will develop a comprehensive search strategy for each database or platform, consisting of both medical subject headings and free-text words (as appropriate), for example determinants, factors, enrolment, uptake, willingness to pay, community based insurance, community health insurance, voluntary health insurance, community health plan, mutual health organization, mutual health insurance, community based health financing, rural health insurance and micro health insurance. In Appendices 1 and 2 we provide the comprehensive search strategies and output for all databases.

1.6.7 Searching other resources

We will search other related reviews in the Campbell collaboration library of systematic reviews, Cochrane Database of Systematic Reviews (CDSR). The following websites will also be searched World Health Organization (WHO), National Bureau of Economic Research, Institute of Development Studies, International Health Economics Association, and EconPapers.

1.6.8 Reference lists

Reference lists of relevant studies identified will be obtained, and the full text articles reviewed for inclusion in the review will be checked for additional information.

1.6.9 Data collection and analysis

Internationally recognized methodology for data collection and analysis will be used based on the guidance of the Cochrane Handbook of Systematic Reviews for Interventions (37)

1.7 Selection of studies

We will develop and pilot a study selection guide using the inclusion criteria described above to make sure that the criteria are clear and can be applied consistently by all review authors. Two authors will independently screen the titles and abstracts obtained from the search and retrieve the full text of records deemed potentially eligible by at least one of the two authors.

Two authors will independently screen the titles and abstracts of the records obtained from the search, compare their results, and obtain the full text of any study deemed potentially eligible by at least one of them. The two authors will then independently review the full text of each potentially eligible study, compare their results, and resolve any discrepancy by discussion and consensus. If a decision is not reached, a third review author will be consulted.

1.8 Data extraction and management

Two authors will independently extract data from included studies using standardized forms. For each study, we will extract the following information: citation, study design and methodology, geographic setting, nature of CBHI, outcomes, types of analysis performed, and findings. The

two authors will compare the extracted data and resolve discrepancies by discussion and consensus; failing which a third author will arbitrate.

1.9 Assessment of studies

We will assess the methodological quality of all included studies in duplicate using the appropriate quality assessment tool; for example, the Newcastle-Ottawa Scale for non-randomized studies and the Cochrane risk of bias tools for RCTs. We will provide a thorough description of missing data and dropouts for each included study, and the extent to which these missing data could have influenced the results of the study. The authors will compare their results and resolve any differences by discussion and consensus; failing which a third author will arbitrate. Also the use of critical appraisal skills programme (CASP⁴) will be used to assess the methodological quality of the qualitative studies included.

1.9.1 Dealing with missing data

Where required corresponding authors of included studies will be contacted to supply any unreported data. If within one week of request, the corresponding author does not respond, other authors will be contacted. More so, if additional information is required for further analysis, authors will be asked. Thorough description of missing data and dropouts for each included study; and the extent to which the missing data could alter our results of the study will be discussed.

⁴ <http://www.sph.nhs.uk/sph-files/casp-appraisal-tools/Qualitative%20Tool.pdf>

1.9.2 Data synthesis

We will present a table of included studies (clearly describing the methods, participants, type of CBHI, outcome measures and other relevant notes) and another table of studies that were considered potentially eligible but which ended up being excluded; with reasons for exclusion. If relevant quantitative studies that report similar outcomes are included, we will perform a random-effects meta-analysis by statistically pooling quantitative data from the studies. We will then assess statistical heterogeneity between study results using the Chi^2 test of homogeneity (with significance defined at the 10% alpha-level) and quantify any between-study heterogeneity using the I^2 statistic (38). If the included studies differ significantly in design, settings, outcome measures or otherwise, we will summarize the findings in a narrative format. For qualitative studies, designs such as phenomenology, grounded theory and ethnography will be considered. For the latter, data will be extracted using standardized data extraction tools adapted from the Critical Appraisal Skills Program (CASP) qualitative appraisal checklist and put together in a thematic analysis (39). This will involve the synthesis of findings using three steps: (i) assembling the findings according to their quality; (ii) categorizing these findings on the basis of similarity in meaning; and (iii) subjecting these categories to produce a single comprehensive set of synthesized findings.

We will report the methods, findings and implications of the findings of this review according to the PRISMA guidelines, including the extended guidance on reporting equity-focused systematic reviews (40, 41).

2.0 Expected significance of the review

The findings of this systematic review will have policy, practice and research implications for low and middle-income countries. Our results will present evidence of factors that influence the uptake of community-based health insurance schemes amongst the poor in the urban and rural populace. Such information will be useful to decision makers, programme managers and implementers alike. In addition to providing policy and programmatic insights, the review will also provide a management and organizational framework of community financing.

2.1 Ethics

Since systematic review draws on data publicly available, it therefore does not require formal ethical review.

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APPENDIX 1: PUBMED

	Query	Output
#10	#3 AND #9	968
#9	#4 OR #5 OR #6 OR #7 OR #8	2334216
#8	developing countries[MeSH Terms]	60258
#7	(Low income country OR lower income country OR third world country OR middle income country)	100779
#6	(Angola OR Republic of Angola OR Albania OR Republic of Albania OR Algeria OR The People's Democratic Republic of Algeria OR American Samoa OR Argentina OR Azerbaijan OR Belarus OR Belize OR Bosnia and Herzegovina OR Bosnia-Herzegovina OR Bosnia OR Botswana OR Brazil OR Federative Republic of Brazil OR Bulgaria OR China OR People's Republic of China OR Colombia OR Costa Rica OR Fiji OR Gabon OR Gabonese Republic OR Grenada OR Hungary OR Islamic Republic of Iran OR Persia OR Iran OR Iraq OR Jamaica OR Jordan OR Hashemite Kingdom of Jordan OR Kazakhstan OR Lebanon OR Lebanese Republic OR Libya OR State of Libya OR Macedonia OR Republic of Macedonia OR Malaysia OR Maldives OR Republic of the Maldives OR Maldive Islands OR Marshall Islands OR Republic of the Marshall Islands OR Palau OR Republic of Palau OR Panama OR Republic of Panama OR Peru OR Romania OR Serbia, OR the Republic of Serbia OR Seychelles OR the Republic of Seychelles OR South Africa OR Saint Lucia OR Saint Vincent and the Grenadines OR Suriname OR Thailand OR Kingdom of Thailand OR Tonga OR Kingdom of Tonga OR Tunisia OR Turkey OR Turkmenistan OR Turkmenia OR Cuba OR Dominica OR Commonwealth of Dominica OR The Dominican Republic OR Ecuador OR Mauritius OR Mexico OR United Mexican States OR Montenegro OR Namibia OR Tuvalu OR Ellice Islands OR Venezuela OR the Bolivarian Republic of Venezuela)	1505863
#5	(Armenia OR armenia OR Bhutan OR Kingdom of Bhutan OR Bolivia OR Plurinational State of Bolivia OR Cameroon OR Republic of Cameroon OR Republic of Cameroun OR Cape Verde OR Republic of Cape Verde OR Cote D'ivoire OR Ivory Coast OR Republic of Cote D'ivoire OR Djibouti OR Republic of Djibouti OR Arab Republic of Egypt OR Egypt OR El Salvador OR Georgia OR Ghana OR Republic of Ghana OR Guatemala OR Republic of Guatemala OR Guyana OR Co-operative Republic of Guyana OR Honduras OR Republic of Honduras OR Spanish Honduras OR Republic of Indonesia OR Indonesia OR India OR Republic of India OR Kiribati OR Republic of Kiribati OR Kosovo OR Kosovo and Metohija OR Laos OR Lao Lao People's Democratic Republic OR Lesotho OR Kingdom of Lesotho OR Mauritania OR Islamic Republic of Mauritania OR Micronesia, Fed. Sts. OR Federated States of Micronesia OR FSM OR Moldova OR Republic of Moldova OR Mongolia OR Morocco OR Kingdom of Morocco OR Nicaragua OR Republic of Nicaragua OR Nigeria OR Federal	594912

	Republic of Nigeria OR Pakistan OR Islamic Republic of Pakistan OR Papua New Guinea OR Independent State of Papua New Guinea OR Paraguay OR Republic of Paraguay OR Philippines OR Republic of the Philippines OR Samoa OR Independent State of Samoa OR Sao Tome and Principe OR Democratic Republic of Sao Tome and Principe OR Senegal OR Republic of Senegal OR Solomon Islands OR Sri Lanka OR Democratic Socialist Republic of Sri Lanka OR Sudan OR Republic of the Sudan OR North Sudan OR Swaziland OR Kingdom of Swaziland OR Ngwane OR Yuwatini OR Syrian Arab Republic OR Syria OR East Timor OR Timor-leste OR Democratic Republic of Timor-leste OR Ukraine OR Uzbekistan OR Republic of Uzbekistan OR Vanuatu OR Republic of Vanuatu OR Vietnam OR the Socialist Republic of Vietnam OR West bank and Gaza OR Yemen OR Yemeni Republic OR Zambia OR Republic of Zambia.)	
#4	(Afghanistan OR Islamic Republic of Afghanistan OR Bangladesh OR People's Republic of Bangladesh OR Benin OR Dahomey OR Republic of Benin OR Burkina Faso OR Burkina OR Republic of Upper Volta OR Burundi OR Republic of Burundi OR Cambodia OR Kingdom of Cambodia OR Central African Republic OR Chad OR Republic of Chad OR Comoros OR Union of the Comoros OR Democratic Republic of the Congo OR DR Congo OR Congo-Kinshasa OR DRC OR Zaire OR Eritrea OR State of Eritrea OR Ethiopia OR Federal Democratic Republic of Ethiopia OR The Gambia OR Republic of the Gambia OR Guinea OR Republic of Guinea OR Guinea-Conakry OR Guinea-Bissau OR Republic of Guinea-Bissau OR Haiti OR Republic of Haiti OR Kenya OR Republic of Kenya OR North Korea OR Democratic People's Republic of Korea OR Kyrgyz Republic OR Kyrgyzstan OR Liberia OR Republic of Liberia OR Madagascar OR Republic of Madagascar OR Malawi OR Republic of Malawi OR The Warm Heart of Africa OR Mali OR Republic of Mali OR Mozambique OR Republic of Mozambique OR Myanmar OR Burma OR Republic of the Union of Myanmar OR Nepal OR Democratic Republic of Nepal OR Niger OR Republic of Niger OR Rwanda OR Republic of Rwanda OR Sierra Leone OR Republic of Sierra Leone OR Somalia OR Federal Republic of Somalia OR South Sudan OR Republic of South Sudan OR Tajikistan OR Republic of Tajikistan OR Tanzania OR United Republic of Tanzania OR Republic of Tanganyika and Zanzibar OR Togo OR Togolese Republic OR Uganda OR Republic of Uganda OR Zimbabwe OR Republic of Zimbabwe OR Rhodesia)	278419
#3	#1 AND #2	17449
#2	"community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group"	2396128
#1	"health insurance"[MeSH Terms]	118850

APPENDIX 2: Other electronic databases
Academic Search Premier via EBSCO

	Query	Field	Output
#3	#1 AND #2		2979
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	abstract or author-supplied abstract	1489644
#1	("health insurance")	Subject terms	29615

Africa-Wide Information via EBSCO

	Query	Field	Output
#3	#1 AND #2		126
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstracts	194489
#1	("health insurance")	Title	616

Business Source Premier via EBSCO

	Query	Field	Output
#3	#1 AND #2		4235
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstract or author-supplied abstract	852150
#1	("health insurance")	Subject terms	42943

Sociological abstracts

	Query	Field	Output
#3	#1 AND #2		239
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstract	164451
#1	("health insurance")	Subject heading	1184

CINAHL

	Query	Field	Output
#3	#1 AND #2		227
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstract	225594
#1	("health insurance")	Title	2064

EconLit via EBSCO

	Query	Field	Output
#3	#1 AND #2		286
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstract	56051
#1	("health insurance")	Subject	2126

ERIC via EBSCO

	Query	Field	Output
#3	#1 AND #2		419
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstract	254733
#1	("health insurance")	Descriptor exact	1598

Humanities

	Query	Field	Output
#3	#1 AND #2		42
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstracts	81236
#1	("health insurance")	Subject terms	499

PsycInfo via EBSCO

	Query	Field	Output
#3	#1 AND #2		764
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstract	555743
#1	("health insurance")	Subjects	3406

SocIndex via EBSCO

	Query	Field	Output
#3	#1 AND #2		600
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstract	286421
#1	("health insurance")	Subject terms	4396

Scopus

	Query	Field	Output
#3	#1 AND #2		4428
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstracts	5136251
#1	("health insurance")	Article, title and abstract	111038

Africa Index Medicus

	Query	Field	Output
#1	("health insurance")	Title and Keyword	35

Cochrane (Trials and economic evaluation)

	Query	Field	Output
#1	"health insurance"	Title, abstracts, keywords	438

LILACS

	Query	Field	Output
#1	("health insurance") AND ("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Title, abstracts, subject	272

IndMED

	Query	Field	Output
#1	("health insurance")	Basic search	2

Social care online

	Query	Field	Output
#1	("health insurance")	Basic search	165

Web of Science

	Query	Field	Output
#3	#1 AND #2		812
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Title	500794
#1	("health insurance")	Topic	17417

Academic onefile

	Query	Field	Output
#3	#1 AND #2		523
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstracts	725135
#1	("health insurance")	Subject	19796

JSTOR

	Query	Field	Output
#3	#1 AND #2		139
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstracts	141391
#1	("health insurance")	Title	1800

Part B: Literature Review

2.0 Introduction

This section starts by giving the various definitions and overview of community financing and community based health insurance (CBHI) schemes. This is then followed by an overview of health care financing in low and middle income countries (LMIC) including the major mechanisms for health care financing and the emergence of CBHI. The links between CBHI, social capital and social protection program; the future of CBHI is also considered. The various factors that influence uptake of the scheme were explored and a framework for analysis presented. CBHI is viewed with the equity lens considering its effectiveness and drawbacks. The review also presents an overview of some selected schemes in Asia and Africa.

2.1 Overview of community financing

The word community as defined by Oxford English dictionary comprises a group of people who share the same religion, race and job. Hence community goes beyond its common use to denote a geographical entity as referred for administration and political purposes (1)

Health financing is a process whereby contribution is made to improve health condition by ensuring adequate resources are made available to fund the health system. Health financing focuses on how financial resources are generated, allocated and used in a health system (2).

Health insurance can be defined as a type of insurance⁵ coverage that pays for medical and surgical expenses that are incurred by the insured (3).

Community financing is any arrangement or scheme that has three basic features: voluntary membership, community control and prepayment for health care by the members of the

⁵ Insurance is the means through which financial impact of a risk occurring is reduced

community (4). Community financing covers a wide variety of health-financing arrangement. Different authors use the term community financing in different ways. This includes community health funds, micro-insurance, mutual health organizations, revolving drug fund, community based health insurance, rural health insurance and community involvement in user fee management. However, they may differ in terms of objectives, management, policies, institutional and organizational characteristics and possess various strength and weakness (5).

Chawala and Berman described community financing as a scheme established by the common will of the people rather than the market forces. The program permits a variety of resource such as payment in cash or kind, payment in part or full, payment in the form of labor contribution, idle lands etc (6). A more comprehensive and elaborate way of defining community financing for health is a mechanism whereby different households in a community (the population in a district, village, rural settlement, geographical area, ethnic or socio-economic population group) finance or co-finance the present and/or principal costs related with a set of health services; and involved in the organization of various health services and management of the community financing scheme (7-9).

A community based health insurance (CBHI) scheme can be defined also as a means of providing financial protection against the cost of ill health. This increases access to quality health services for individuals/households who are excluded from the formal/social health insurance (10).

Classification of community based health insurance can be done in several ways in accordance to the kind of benefits provided, circumstances of their creation, level of risk pooling, fund management and ownership. It also depends if the scheme focuses on low cost, high frequency

events or high cost low frequency events. Irrespective of their class, they all possess some level of similarities such as voluntary membership, prepayment of contribution and entitlement to specific benefits. Non-profit character is a key role in the design and running of the scheme (11, 12). CBHI schemes are noted for the principal role of a community's involvement in raising⁶, pooling⁷, allocating⁸, purchasing⁹ and supervision of the health care financing arrangement. Also, some schemes cover similar geographical entities, professional affiliations and some other joint activity. In addition, beneficiaries of these schemes are individuals who have no form of financial protection or access to cover the cost of health care; and the scheme is voluntary in nature (4).

In summary and for the purpose of this review, CBHI is understood as the application of the principles of insurance by a defined community bearing in mind the community's social context, which is directed by their choices and based on their arrangement and structures. Mutual health organizations¹⁰, community health funds, rural health insurance, micro insurance¹¹, revolving drug funds and community based prepayment scheme will all be considered as synonyms.

⁶ Raising funds also called revenue collection involves the source of funds and the means through which they are collected. The population is the primary source of all funds apart from external donors (14, 90).

⁷ "Pooling refers to the accrual of prepaid health care funds on behalf of a population" (90)

⁸ Allocation of funds occurs from the collecting agency (central pools) to designated or geographically based pooling organisations (90).

⁹ Purchasing involves transfer of pooled resources to health service providers for the population which the funds were pooled (14, 90).

¹⁰ These schemes originated on the basis of an ethnic mutual aid, collective pooling of health risks and solidarity in which members participate efficiently in its functioning and management. It is a voluntary, autonomous, non-profit organization. Payments are collected by community in advance of treatment and this is managed in paying for providers (75)

2.2 Health care financing in low and middle-income countries

More broadly health care financing covers three major areas: the mobilization of funds, pooling of these funds and a mechanism for paying for health care. In light of this, health care financing is major on the global health policy agenda, due to its key importance. It determines the availability and access to health care and the degree to which financial protection is offered against catastrophic costs of illness (13, 14).

An enormous health financing gap has been highlighted in low and middle income countries¹² (LMICs). This gap amongst other things is as a result of the wide disparity between the burdens of diseases as compared with the global health spending percentage. The LMICs contribute 90% to the global burden of disease, but account for 12% of global health spending as compared with 9.7% and 88% respectively for high income countries. Also, governments in LMICs have increasing debts, burdens of AIDS, tuberculosis and malaria epidemic results in declining government expenditure. This further widens the health financing gap in these countries (15). For better clarity, it is important to understand the various mechanism of health care financing.

2.2.1 Major mechanism for health care financing.

There at least three major ways through which health care is financed. The first way is via government funding, which is derived from general tax revenues. LMICs depend heavily on general tax to fund the health care system. However, their tax bases are small and they possess little or no capacity to collect tax. The average national income obtained as tax revenue for

¹¹ Is a voluntary, self-help scheme for social health insurance, it covers populations excluded by the government/national health insurance (91)

¹² Countries in the world are classified into income group according to gross national income (GNI) per capita using the World Bank Atlas method.

LMICs and high income countries are 18% and 48% respectively (13, 16). The difference may be attributed to the difficulty in tax administration and compliance.

Secondly, health insurance is another means of health care financing. There are several types of health insurance. Mandatory is often called national or social health insurance, which may be used interchangeably, is a compulsory type of health insurance. This type of insurance requires by law that certain groups or the entire population is covered. National health insurance is a form of mandatory health insurance that covers the whole population including those who have not contributed to the scheme. Social health insurance on the other hand is for specific group of people lawfully permitted to become members or strictly those who make contribution to the scheme are entitled to coverage (14).

Voluntary health insurance is another type of health insurance. As the name implies, it is voluntary in nature. It exists in two forms: private for profit health insurance and private not-for-profit health insurance (e.g. community-based health insurance). The former is often times employment based and is reserved for the high-income groups (6). The latter as defined explicitly earlier is based on three principles, which are self reliance, prepayment and community cooperation (4).

Lastly, out-of-pocket (OOP) payment is another means of health care financing, where payments are made directly by patient to health care provider at the time services are offered. These payments include user fees¹³, co-payments¹⁴ and payments made to private health facilities. This

¹³ User fees are payment made to public health facilities

¹⁴ Co-payments are partial payment made by a member of health insurance for health care service used in addition to the amount paid by the insurance. Sometimes the aim is to place members on some cost burden thereby discouraging them from excessive use of health care service

is a highly regressive way of financing health and results in impoverishment (14). OOP is the dominant health funding mechanism in most low and middle income countries. In more than 40% of African countries over half of all health care expenditure is funded via this mechanism (15).

In order to prevent households and individuals from catastrophic health expenditure, prepayment health care financing¹⁵ is highly recommended. Nearly 25% of those hospitalized in LMICs are pushed below the poverty line by catastrophic impact of OOP health care expenditure; this shows that there is need for risk pooling¹⁶. Prepayment health care financing offers greater financial protection to households and is preferable to OOP (17).

2.3 The emergence of community-based health insurance

Most population in LMICs strives to tackle the problem of widespread poverty. However, the issue of health care payments for the poor remains a large problem in most of these countries (18). This amongst others drives the goal of achieving universal coverage in LMICs. One of the key objectives of universal coverage is ‘universal financial protection’ (14).

It is known that health care financed through general taxation or social health insurance reduces household out-of-pocket expenditures; and hence is able to achieve sufficient financial protection for all health care costs (5). However, most LMIC find it hard to achieve wide coverage through these means of health care financing. Social health insurance in most of these countries covers

¹⁵ Prepayment health care financing comprises tax payments and/or health insurance contributions

¹⁶ This is a process whereby risk is shared across a group of people or an entire population, so that unexpected health care expenditure does not fall solely on an individual or household, hence preventing them from catastrophic expenditure.

individuals in the formal employment sector. This is because the ratio of population in the rural areas and informal employment is higher than those in urban and formal employment in LMIC.

Hence risk pooling, amongst healthy to sick people and from formal to informal employment is absent, these result in financial hardship when these people fall ill (19). More so, in most cases where pooling occurs it is in bits and pieces amongst different income groups, therefore preventing cross-subsidy; this leads to a situation whereby, the rich benefit more than the poor from public expenditure and subsidies in LMICs (19). Therefore, health services benefitted by those informally employed and rural areas are inadequate (20, 21).

In addition, health care financing in LMICs is heavily dependent on government funding¹⁷, and it is difficult to expand the capacity of taxes in most countries, as it relies on compliance amongst income earners, acceptance and ability to pay (14). Also, management of social health insurance (SHI) or national health insurance (NHI) which includes collection, organization and monitoring of health and financial information which most LMIC governments lack also hampers the SHI scheme (5).

It is also pertinent to note that the economic context of most LMIC is such that the government does not spend enough money on health care and increasing government spending on health may not be feasible (14). Therefore, waiting for the effects of economic growth to filter down to tax revenue is considered a passive approach (14).

In an effort to provide answer to these difficulties, CBHIs have become wide spread in Africa and Asia over the last decade. The main goal of the schemes is to improve access to health care.

¹⁷ Government funding are generally derived from direct taxes (charged on company and personal tax) and indirect tax (includes custom duties and value added tax).

It also serves as a substitute for those who do not benefit from any form of social protection. Due to the discouragement faced by the excluded populace and the urgent need for additional health care resources in most LMICs, an alternative means is via CBHI. The schemes exist within localized communities in mostly rural areas. Members make pre-payment to the schemes and the schemes cover the fees charged by local health services.

2.4 Community based health insurance and social capital

Social capital can be defined as the “norms and networks that enable individuals to act collectively”, also it could be simply referred to as the existence of a set of certain informal values or norms shared among the members of a group that allows cooperation amongst them (22, 23). It also implies trust, social-life, networks and norms that cause households to act together more efficiently to pursue shared goals (10). Social capital has been considered by the World Bank and other international organizations to be a useful in achieving the objectives of development actors in developing and developed countries (24).

Social capital has four aspects which include: community links such as those between extended families, clubs, local organizations, and associations – individuals in small communities assisting each other; network links between different communities (vertical), and network links between similar communities (horizontal); institutional links such as those about between communities, legal, political and cultural environment; and societal links between government and their citizens. Table 1 gives a summary of the various aspect of social capital (25, 26).

Table 1: Social capital and network links

SOCIAL CAPITAL	1. Network Links
	Between different communities (vertical) and similar communities (horizontal)
	2. Community Links
	Between extended families clubs, local organizations, civic groups and association
	3. Societal links
	Between government and citizens via community participation and public-private partnerships
	4. Institutional Links
	To communities, legal, political and cultural environments

Source: Preker et al 2002

Due to the nature of CBHI schemes, their success therefore depends largely on the existence and survival of social capital in the community. CBHI can therefore attain sustainability, effectiveness and be long-lasting with the help of social capital in a community; because social capital has a positive influence on the community demand for insurance (10).

More so, evidence has shown that social capital¹⁸ acts positively on the value people attach to their health. Weak level of social capital amongst members of a group results in an increasing risk of experiencing self-centered behavior at its peak of anti-selection and moral risk (27). On the other hand, high level of social capital affects households' decision on health insurance which in turn increases the demand for CBHI (10).

¹⁸ There are two types of social capital: weak ties (bridging social capital) and strong ties (bonding social capital). A strong tie is the close relationship between an individual and his family, ethnic group and friends. It is the interaction between existing groups (family and friends). Strong ties also correspond to intra-community social capital and it implies a high level of harmony between members of the group. A weak tie is an individual's contacts outside family or ethnic group (other ethnic groups, other entrepreneurs, banks). It is the interactions across multitude groups, has less harmony and it corresponds to extra-community social capital (23).

The drawbacks of social capital occur when communities and networks become parochial or isolated or work at opposite direction to societal collective needs (for example gangs, ghettos, cartels). These could impact on CBHI adversely.

- CBHI that remains secluded and small deprive their members of the benefits of risk spread across a broader population.
- CBHI that share risk only among poor will deny its members the needed cross-subsidies from higher income group
- CBHI that is not linked to the broader referral health networks and systems deny its members of the comprehensive range of health care service.

New areas of thinking in terms of CBHI policies are needed in terms of focus on values, goals and power relations. With the emergence of social capital theories it could contribute to why CBHI schemes do not appear to develop and experience wide coverage in a sustainable pattern (27).

2.5 Community-based health insurance scheme and social protection programmes

Social protection programmes (SPP) are defined as public interventions that help provide support to the poor and help households and communities to better manage risks (28). There are numerous of such schemes that enable the poor to access health services and reduce barriers to the uptake of current services or that provide incentives for their uptake. In Asia and Africa, vouchers are used to encourage the uptake of services by the poor, in a way that they can enjoy subsidized or free identified services at designated providers (29, 30). In Latin America, conditional cash transfers are made available to the poor. A situation whereby households are provided with the cash if they comply with selective services such as school attendance and/or preventive health services (31). In Africa, a range of community safety nets- in absence or in addition to public interventions exist (32). Also in some South East Asian countries, a single-

purpose social assistance set up, this occurs when a third party pays the health care providers for services delivered to eligible poor. This process is called health equity funds (33, 34).

Hypothesis proposed by Jacobs et al is that bridging community based health insurance and SPP can result in economies of scale and a reduction in high administrative overheads that both SPP and CBHI experience (29). This could bring about increasing the purchasing power on the demand side leading to enhancement in the quality of health care, which may in turn attract more poor people to afford the premium leading in a virtuous cycle (29). In this hypothesis, it was proposed that SPP (community safety nets) would financially support-partly or fully – the premium¹⁹ for community based health insurance scheme for households that are experiencing main problems in paying these contributions. These may result to synergetic effects boosting the coverage of social protection for health care. This hypothesis further stressed that a merger scenario has key intrinsic merits: It contributes to larger pooling arrangement and it contradicts the fragmentation of funds (28, 29).

The preferred cross-subsidy in this scenario is from international fund to local indigenous community based health insurance fund, not from poor to less poor. It can be done efficiently, well-targeted investment with a clear and sustainable objective of donor funding. Expecting the international community to continuously fund SPP may not be sustainable. The process may encourage and eventually mandate better-off households to cross – subsidize health care for the poorer ones, a similarity with most social health insurance systems in developed or high income countries (35).

¹⁹ The premium is bought with social protection programme aided by external funds for pre-identified households, while community based health insurance pays providers for delivering the same services for all insured individuals. This includes those who paid the premium themselves and those for whom the SPP paid premium

2.6 The future of community based health insurance

Researchers studying German experience with health insurance from the country's early phase of development of a health insurance system have recommended that "small, informal, voluntary health insurance schemes may serve as learning models for fund administration and solidarity, both of which will make introduction of larger, more formal, compulsory schemes an easier task" (36).

Community-based health insurance scheme is continuously gaining ground, as their number seems to be ever growing; an inventory carried out in 2003 listed about 622 organizations in eleven countries of Central and West Africa. Although most of these schemes do not go beyond the experimental stage, they are also faced with huge obstacles to their development.

However, a systematic review published in 2012 found that the uptake of health insurance is less than expected in Africa (37). Currently, CBHI covers 2 million people in Africa out of an estimated 900 million. This amounts to just 0.2% of the population. While CBHI is not expected to cover the entire population in Africa, this low coverage affects the sustainability of the scheme.

Based on this study, among the many challenges the schemes encounter, the question of enrolment appears as one of the most essential. Therefore more information is needed to understand the reasons for low enrolment.

2.7 Community-based health insurance and factors that influence its uptake

Due to the voluntary nature of the schemes, enrolment involves four processes. Firstly, the will to insure against catastrophic expenditure, secondly, the will to become a member of a scheme, thirdly, accepting the principles of risk pooling and lastly, up-to-date payment of premium (38).

In theory, there are several indicators used to monitor the enrolment rate of CBHI schemes.

These indicators include the coverage rates, which refers to the percentage of individual who become members among the targeted population; the renewal rate, which is the percentage of enrollees renewing their enrolment; the gross growth rate, which assesses the progress of the number of enrollees and beneficiaries (38).

The issue of enrolment can also be assessed from the individual's willingness to pay (WTP) for the scheme, this indicator helps to determine the maximum amount of money an individual or household is willing to contribute. Willingness to pay comprises an indicator of utility of a scheme for individual or their level of satisfaction (39)

It is also pertinent to provide empirical facts relating to factors influencing uptake of CBHI. There are a number of empirical studies conducted in different settings to evaluate the factors that determine enrolment into CBHI or people's willingness to pay for CBHI. Several factors have been found to influence CBHI enrolment. These include age, income, education, distance to health facility, and quality of health service provided. A detailed systematic review of these factors is contained in part C.

2.7.1 Socio-demographic characteristics

In this sub-section, factors that influence the decision to enroll which are linked to the characteristics of individuals/households are discussed. Studies have found age, education, household size, sex and place of residence (urban versus rural) as some factors that influence CBHI enrolment (40, 41). The association between age and willingness to pay (WTP) has been mixed in the literature. Respondent's age is found to have a positive effect on WTP in some studies; such that older household heads were more willing to pay for health insurance (42), while in others it is the opposite (43).

In addition, some studies have reported higher enrolment rates amongst some ethnic groups. A study carried out in Burkina Faso shows a positive association between enrolment into a CBHI scheme and Bwaba ethnicity (majority of members of the scheme are of Bwaba ethnic group). This ethnic group according to the study is the minority in the targeted region, they are said to be open towards innovations, hold risk perception for diseases that differ from that of other ethnic groups and interconnected in matters of health (44).

Furthermore, previous involvement in association (membership of an association) also makes enrolment easier as members of the communities are already used to risk sharing. Although as considered in the section below, previous negative experience can hamper community's trust and serves as a hindrance to enrolment in a scheme (45).

2.7.2 Economic characteristics

Household income level is an important parameter of enrolment, lack of financial resources is one of the major reasons first mentioned in CBHI enrolment. Many studies have shown that

household wealth index or income has a positive effect on WTP (20, 46), however, there are some exceptions (40). Some studies have also shown that the socio-economic level of enrollees is higher than that of non-enrollees (44).

Distance to the nearest health facility has been found to have a positive effect on WTP in some cases, in the sense that, short distance increased likelihood of WTP, while in others it has had a negative effect (40, 41), (43).

2.7.3 Health related variables

The quality of health care motivates individual to enroll or not to enroll in a health risk sharing scheme. Another study showed that individuals are generally not satisfied with the quality of health care in public health facilities, and another reported that poor perceived quality of care has a positive impact on drop-out, in other words increase probability of the household not renewing the membership in CBHI. Some studies showed that the health status of an individual or members of a household does not affect the decision to enroll (46-48).

2.7.4 Other significant characteristics

Level of trust that households have in the management of the insurance programme is also vital and determines the level of enrolment (20, 49).

2.8 Framework for analysis

From the literature (empirical and theoretical) reviewed briefly above, it is important to note that not only are the socio-demographic (age, sex, geographic location, education, marital status, head of household, household size, employment status, wealth quintile and membership of an

association distance to health facilities), health related (illness experience, state of health, utilization of health facilities, quality of health services, availability of drugs and medical supplies, health care workforce) and other factors (trusts and relationship) linked to the enrolment of CBHI scheme. There are some other areas that also enhance active participation and uptake by households or individuals, such as the link between social capital, social protection programmes and CBHI. These are further fortified by trust.

In addition, the role of the government in terms of subsidy towards the social protection programmes is also vital, as it will assist households that are experiencing problems in paying their contributions (35).

Furthermore, the different characteristics of CBHI also play a crucial role in the uptake of the scheme. The characteristics include technical, management and institutional characteristics. The technical characteristics can be viewed from the lens of health care financing function, which are revenue collection, pooling and purchasing. Revenue collection mechanism of technical designs considers the level to which contributions are voluntary as to compulsory, degree of prepayment compared with direct out of pocket spending. Pooling revenue and risk sharing consider number and size of the pool, redistribution from healthy to sick, rich to poor and gainfully employed to economically inactive, while resource allocation and purchasing looks at demand, supply, prices and incentive regimes (5). With the various characteristics in place, intermediate performance and final outcome indicators can be used to measure the impact of the scheme in relation to the broader health care finance.

Hence, from the previous sub-sections a framework of analysis could be derived as seen in Figure 1. The fundamental factors evolving around uptake of CBHI is also surrounded by layers

of other issues which ought to be studied in unraveling low enrolment. In other words, the framework reveals how each layer is related to one another and how each layer should not be considered in isolation to the others, as they all depend on each other. The socio-demographic factors cannot be considered in isolation in determining the reason for low enrolment, in as much as they are important they also depend on the trust and relationship individual/households have with the scheme and health facility staff respectively. In other words, favorable socio-demographic factors cannot take the place of trust and relationship as they are also vital. Also, a scheme that does not possess effective managerial, technical or institutional characteristics in place may also hamper its sustainability. Hence a scheme that does not last long due to these core characteristics will in turn lose trust from individuals/households.

Due to the nature of CBHI the need for social capital in order for it to succeed cannot be overemphasized. This is because the scheme depends largely on the existence and survival of social capital in the community. CBHI scheme is mainly for the poor, it therefore means that social protection programmes is important, as it will enable the target population to enjoy subsidized or free identified services at specific providers. The social protection programmes can be successful in a community that has strong values, norms and cooperation amongst each other. Therefore these entire layers link to each other and it better helps for a holistic consideration of the subject under review.

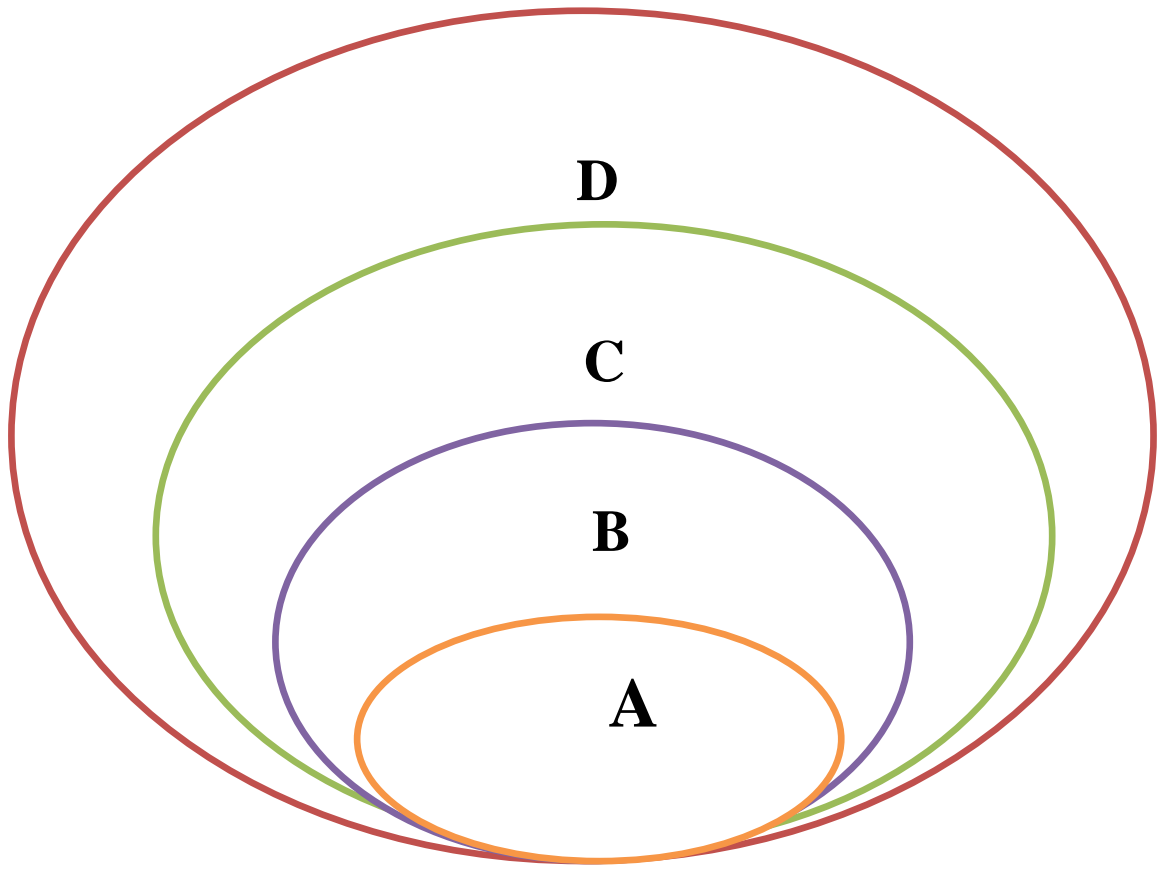


Figure 1: Generic conceptual framework for analyzing uptake of CBHIs

Key to framework

A – Fundamental factors evolving around uptake of community based health insurance

Socio-demographic factors: age, sex, geographic location, education, marital status, head of household, household size, employment status, wealth quintile and membership of an association.

Health related factors: illness experience, state of health, utilization of health facilities, quality of health services, availability of drugs and medical supplies and health care workforce

Other factors: Trust, relationship and distance to health facilities

B – Characteristics of the scheme (managerial, technical, institutional)

Dimensions of scheme (political, economic, managerial and social)

C - Role of government (subsidies, policy framework and implementation, technical support)

Role of community (ownership and support)

D - Social protection programmes

Social capital

2.9 Community-based health insurance and equity

It is necessary to view CBHI from the equity lens. Equity in health care financing means contributing according to ability to pay while equity in health care provision means use of health services (or service benefits) according to need (50). Equity here anchors on a strong element of cross-subsidy. This is because everyone, whether poor or rich, should get the health services

they require without financial hardship, which is also the core of achieving universal health coverage (UHC) (13).

The level of cross-subsidy is determined by focusing on the horizontal or vertical equity component of financing and provision. In terms of provisions, vertical equity approach leads to uneven efforts to ensure that those with the greatest needs are able to utilize health services when needed whereas horizontal equity would ensure that those in equal need have equal use of health services (51). In terms of financing, vertical equity requires those with greater ability to pay to make higher contributions, while horizontal equity is ensuring that those with equal ability to pay do make equal health care financing contributions (13).

As earlier stated, the most regressive way of financing health services is via out-of-pocket payments. This is because those with the lowest income levels tend to bear the greatest burden of ill health, hence bear the greatest financing burden as payment is directly linked to use of health services. This means of financing health services will remain regressive unless the low income individuals do not use health services when needed (14).

A study that reviewed the literature found that even though the poorest and socially excluded individuals are not automatically reached, CBHI is effective in reaching some low income group of people (12, 19, 52, 53). This exclusion effect has been observed in Senegal and India in some selected CBHI scheme (54-57). On the other hand, strong evidence of equity in successful large CBHI in Oxfam's CBHI programs in Armenia and large CBHI program in Nigeria was reported (58, 59). In a qualitative study of demand for health insurance in rural West Africa, the authors recommended that the equity aspect of a CBHI program largely depends on its technical design (60).

The main significant reasons for inequity are poor accessibility to hospitals providing services under this scheme and inability to afford the premiums (12, 35). CBHI scheme inequity may also be attributed to implementation strategies, lack of trust in the program or voluntary membership strategy, and inadequate community involvement in program planning. On the other hand, high administrative charge and moral hazard are essential factors which inflate the cost and in return discourage the poorest from enrolling (61). In the literature survey carried out by Preker et al, they concluded that competent and trained management with strong ownership and involvement contribute to the objective of inclusion (19). Also, an empirical study on equity achievement through CBHI in India finds enrolment and renewal of enrolment to be inequitable in economic term (enrolment is disproportionately higher in favor of the wealthier class) (62).

In light of this, the equity effects of CBHI program are expected to differ across countries. Although there has been no systematic study on the progressivity²⁰ of CBHI, it can arguably be more progressive (or less regressive) than user fees (63, 64).

Table 2: Characteristics and the key areas of consideration of CBHI

Core characteristics	Key areas of consideration
Technical design characteristics	<p>Revenue collection mechanism Risk sharing and prepayment as to point-of-service payment Flat rate premium The payment contribution gives room for household/individuals employed in informal and agricultural sector (often non cash and irregular) Some pro-poor orientation through exemptions of subsidies and premiums despite flat-rate contribution</p> <p>Arrangement for pooling revenues and risk sharing Risk transfers from gainfully employed to inactive, healthy to sick and rich to poor via risk sharing and pooling of revenues within community groups</p>

²⁰ A progressive funding mechanism is one whereby high-income groups contribute a higher percentage of their income than do low-income groups.

	<p>Resource allocation and purchasing</p> <p>Benefit package to be covered is defined by many community schemes in advance.</p> <p>Almost all community schemes give a collective decision about who to cover via the scheme, which is based on direct family kinship and association.</p> <p>Some other community schemes are involved in communal negotiations about payment and price mechanisms.</p>
Management characteristics	<p>The management culture of most community schemes tends to be consensual, showing high level of democratic participation.</p> <p>Many schemes are managed by community leaders; the involvement of community allows social controls over behavior of providers and members that reduces adverse selection, moral hazard and induced demand.</p>
Organizational characteristics	<p>Most community schemes are circulated organizational configurations that reach deep into the informal and rural sectors.</p> <p>Incentive rules include: (a) ability to gather limited reserves if successful but unsuccessful schemes often seek government assistance (b) extensive decision right (c) majorly factor-market exposure as few schemes compete with each other in the market (d) High internal accountability agreement to parent or membership community organization (e) limited coverage of poor population through government or community subsidies.</p> <p>Some better organized schemes uses vertical links to formal sector and horizontal referral networks</p>
Institutional characteristics	<p>Governance and ownership arrangement are most times directly linked to parent community schemes; stand alone health insurance schemes are uncommon.</p> <p>Stewardship function is not controlled by national health insurance system or central government but mostly by local community which is apt to make schemes receptive to local contexts.</p> <p>Competition is restricted in factor market and via consumer choice.</p> <p>There is little or no competition in the product market.</p>



Intermediate performance indicators: Level of mobilized resources, sustainability of resources mobilized, level of health care utilization, financial access and barriers, successful risk management, equity, efficiency and quality.



Final outcome indicator: Health Protection against impoverishment Social inclusion

Source: Preker et al 2002

3.0 Effectiveness of community-based health insurance

It is no doubt that CBHI reaches groups of population that national, government, social or market insurance financing arrangements do not. These groups of people are those with low income who operate in the informal (both rural and urban) sector and those excluded due to physical or cultural characteristics. They are either sidelined due to these reasons or not able to take advantage of the government health financing plan. The scheme provides them with some level of financial protection (12) .

It has shown that use of health services increases amongst member as compared with non-member. According to Soucat et al 1997, utilization of health services increased after the introduction of Bamako Initiatives in Benin and Guinea, this was attributed to availability of drugs and improvement in quality of health services brought by community involvement (65). Self-employed women’s association (SEWA) scheme in India also reported results, as cost of seeking care was significantly higher for non-members compared with insured member (56).

As one of the health systems building blocks²¹, the health financing function is to ensure that adequate financial resources are available for people to access quality health care services. There are three sub-functions of health financing; hence the assessment of CBHI can be looked at within each of them as shown in table 3.

²¹ The health systems building blocks according to the WHO framework include service delivery, health workforce, health information, medical technologies, leadership/governance and health financing (92)

3.0.1 Revenue collection and community based health insurance

Enrolment in community based health insurance is on voluntary basis, comparing the percentage covered and the target population is a pointer of the general outlook of scheme.

On one hand high prepayment contributions may protect households from catastrophic expenditure and on another hand the contributions could be expensive for poor households (66). However prepayment does not depend on households' contributions solely, other sources of contributions may be local government, national or international non-governmental organization (NGOs), and bilateral donors as clearly shown in table 3. What is very essential in relation to revenue is the aggregate ratio of prepaid contributions (this includes grants or subsidies) to health care expenditure. This is a pointer to the accessibility at the point of need and of the level of financial protection that the scheme can offer (67).

The scheme arrangements contribute greatly to the resources available for local health services e.g. primary care, hospital care and drugs (68).

3.0.2 Pooling and community-based health insurance

There is need for prepayment and membership to be harmonized with 'risk pooling'. Risk pooling is very beneficial because it allows resources to be shared between the healthy and the sick (69). As important as risk pooling is, due to the voluntary membership of community based health insurance it is not fully realized. This may occur as a result of adverse selection with inadequate risk pooling (70). Also high contributions to the scheme can serve as a barrier to enrolment (71).

In addition, voluntary schemes could be fragmented with different funds covering different classes of people. Some schemes with better benefit packages could cater for the rich while others with less generous benefit packages for the poor. Therefore, in order to ensure that funds collected allow for adequate financial protection for households there is a need to avoid fragmentation and for risk pooling that ensures the subsidization of the poor by the rich and high-risk members by low-risk members (69, 71).

3.0.3 Community-based health insurance and purchasing

Strategic purchasing²² is a pointer of access to cost-effective and rational health care and access to adequate health services. It requires that members take ownership of the scheme, not only by enrolling, but also members may constitute as part of management board (72). The CBHI may receive the mandate amongst others to: a) determine the set of insured health services or benefit package; b) establish the list of health care provider payments mechanism; c) to set quality standard of care.

The benefit package is very vital in community based health insurance, when the package includes inpatient services such as hospital admissions, catastrophic health spending can be avoided and risk of impoverishment drastically reduced. In low and middle income countries (LMICs), access to inpatient facilities and the cost of transportation greatly impede the use of inpatient care (68). Therefore, transportation as a benefit is worth considering, which could be done via the incorporation of effective ambulatory care.

²² Strategic purchasing is the process of active search for the best contracting arrangement and payment methods

In terms of financial protection, the scheme reduces out of pocket spending of its members at the point of receiving health care. It is also efficient in reaching a significant number of low-income populations, who do not have financial protection against the cost of illness. In addition, it is a potential mechanism of protection from the impoverishing effects of health expenditures for rural and informal population. The scheme has also proven to be effective in reaching a large number of low-income people who would otherwise have no financial protection against cost of being ill (73).

Table 3: Overview of factors influencing the effectiveness of community based health insurance within the health financing sub functions

Health financing sub functions	Factors influencing effectiveness of community based health insurance
Revenue Collection	Enrolment: <ul style="list-style-type: none"> • Distance to health facility • Affordability of contributions • Time of collection • Trust • Quality of care Prepayment Ratio: <ul style="list-style-type: none"> • Mix of contributions by households, local government, donors. • Mechanisms of enhanced risk pooling • Trust • Provider payment mechanism • Contracting • Waiting period • Referrals
Pooling of resources	<ul style="list-style-type: none"> • Mechanisms of enhanced risk pooling • Trust • Size of catchment area • Enrolment rate • Mix of enrolees
Purchasing of services	<ul style="list-style-type: none"> • Provider payment mechanism • Contracting • Waiting period • Referrals

Adapted from Carrin et al 2005

3.1 Drawbacks of community-based health insurance

Community-based health insurance contributes considerably to the resources available for local health care such as drugs, primary and hospital care. This does not imply that the excluded groups are automatically represented, because interest and willingness is needed to be part of it (21).

Membership to the scheme is voluntary and it involves people residing in the same geographical location (town or district), members of a micro-finance groups and work cooperative (56). However, some studies have shown that contributions to CBHI could be regressive because a flat premium rate is charged usually as stated in table 4 (63, 74). More so, the advantage that comes with cross-subsidies (transfer of resources from wealthier to poorer members) is limited because of small membership.

Since the insurance scheme is not enforced, it requires people's ability and willingness to pay, for its sustainability as clearly depicted in table 4 (75). Some factors that may affect people's demand for CBHI includes health care needs, expected impact of the scheme on health care access perceived quality of health care facilities. Most community based financing schemes provides a uniform benefit package²³ for the whole community like a 'one size fits all'. This does not account for the different needs of the community (15). Another major challenge with CBHI is that they only pool risk between individuals with similar characteristics and conditions (e.g. only the poor) as stated in Table 4.

²³ which in most cases is the primary health care services

However if the government subsidize the services under the scheme, two levels of risk pooling occur concurrently – one between members of the scheme and the other via the subsidy generated across the population (76). Therefore the establishment, effectiveness and sustenance of community based health insurance schemes require both financial and organizational support from the government (77). Some other weaknesses attributed to the scheme are low degree of revenue mobilization, low capital base, small size of risk pool, constant exclusion of the poorest of the poor, isolation from more comprehensive benefits and limited management capacity (78).

Table 4: Limitations of community based health insurance scheme within the sub functions of health financing.

Health financing sub-functions	Some limitations of community based health insurance scheme
Revenue collection	Resource mobilization may be limited for everyone who is poor in the pool, without subsidies Financial barrier is created for the poor by regressive flat-rate contributions and by lack of premium exemptions and subsidies, hence pro-poor orientation is undermined. A large of the proportion does not enroll if they cannot afford premiums. Only a handful of schemes have reinsurance ²⁴ or other means to buffer against huge external shocks
Pooling of revenue and risk sharing	Transfer scopes within very small pools is limited Voluntary prepayment community based health insurance is prone to adverse selection
Resource allocation and purchasing	The poorest are often left out without subsidies. Most times providers exert monopoly power during payment and price negotiations. Benefit package is often limited.

Adapted from Bennett et al (1998) and Carrin (2001)

²⁴ Reinsurance is the transfer of liability from one community-based health insurance scheme serving as the primary insurer to another scheme or insurance company (the reinsurer). The transfer of this risk is known as cession. The activity of reinsurance offers five major activities which includes capacity, financing, catastrophe protection and underwriting and managerial assistance (93, 94).

3.2 Community-based health insurance in Asia and Africa

In order to highlight the existence of CBHIS in Africa and Asia, a few randomly selected CBHI across different countries are studied under the following areas which include, country, name of scheme, structure and nature of scheme, service provided, government subsidy, external donors and number or percentage enrolled. These are contained in Table 5.

These selected areas are amongst others key areas used in giving an overview of the scheme, it also highlight some contextual difference across the various scheme. The structural framework of schemes varies across countries and continents. However they may have similar underlying goals to increase access to health services and reduce catastrophic payment. Some countries have country-wide singular community financing scheme while some have different schemes targeted at different population.

In some schemes where government subsidy is present, coverage is wide (China and Rwanda), while in others despite the government subsidy, coverage is still low (Burkina Faso). This does not imply that the presence or absence of government subsidy translates into low uptake, but how the contextual difference of various schemes and country needs to be taken into account.

For instance as seen in the Table 5, the community based health insurance in Rwanda experienced well over a 200 percent increase between 2006 (35%) and 2008 (85%). This scheme has been given a central place by policy makers, and it is an integral part of the country's health program. The scheme enjoys strong administrative and political support for their effect on functioning and expansion. The Rwandan CBHI scheme revealed that CBHIs had a potential of increasing health care utilization by 15 percent following an episode of illness (79).

Table 5: An overview of a selected community-based health insurance in Asia and Africa

Continent	Country	Name of scheme	Structure and nature of the scheme	Services provided	Government subsidy	External agents donors	Number or percentage enrolled	Source
sssssAsia	China	Cooperative Medical Systems	Health services are financed through prepayment plans. Most of the villages funded the scheme from three sources: compulsory prepayment by residents, village contributions and government subsidies	Basic preventive care (e.g. prenatal consultation, immunization) and some curative services such as treating common injuries and illnesses	Present	None	90 percent of the rural population was covered by its schemes	(4)
Asia	Indonesia	Dana Sehat (The village health fund)	Voluntary community-based, prepaid health care program. Contributions come from local economic activities; funds are generated through co-ops of handicrafts or crops, while others are paid in cash. Every household is compelled to pay the premium either in-kind or in cash to the bank or the committee of the Dana Sehat	Package of basic outpatient and curative care, combined with free preventive services	Through technical support by providing guidance and tool monitoring and supervisory procedures. The government is responsible for facilitating the process like planning meetings between health providers, religious organization and local authorities	None	11 percent of the population (about 23 million people) in 2000	(80)

Asia	Thailand	Indonesia Health Card	Voluntary scheme, primarily to promote maternal and child health	The enrollees have unlimited access to free services at the public facilities	Present - 100% financial subsidy	None	3 million people	(4)
Asia	Guatemala	The Association por Salud de Barilas (ASSABA)	NA*	Primary health centre, hospital outpatient, prescribed drugs, inpatient care and other services provided in the health posts, health centers and health promoters in the village.	Relative	Present	11,000 people out of 65,000 target	(81)
Asia	India	Self Employed Women Association (SEWA)	It provides a comprehensive insurance package – including asset, life and medical insurance – on a voluntary basis, for its members and their spouses	Primary and secondary care. Co-payment at the time of admission, however insurance company re-imburses patients through NGO	Not explicit	Present	101,809 (10% of target population) men and women enrolled for the health insurance option out of 500,000 SEWA members	(82)
Asia	Philippines	The ORT health plus scheme (OHPS)	NA*	Inpatient and ambulatory care, basic ancillary services and prescribed drugs.	None	Present	230 families out of 3,000 target	(81)
Africa	Senegal	Thies region	Membership is on individual basis. organization of the scheme is done by a mutual health organization	Antenatal care, post natal treatments, antiretroviral and tuberculosis drugs and vulnerable population groups, for example the elderly	None	Not indicated	30,000 persons are covered on average, with each scheme having an average of 500 persons	(83)
Africa	Burkina Faso	Nouna health districts	Is managed by the community via elected representatives. The management unit is	First and second line medicals are accessed at point of service with no copayment.	Present	Present	4% of the target population of 60,000	(84)

			appointed directly by the community. Enrolment fee paid by adult differs from children. A 3-month window period before accessing services is observed by members upon enrolment.					
Africa	Ghana	Nkoranza health insurance	It is a provider insurance model, in which health care and management are provided by hospital personnel. The administration is done at 3 tiers: insurance management team in the hospital, insurance advisory board made up of political, traditional and religious leaders in the community, field workers and zonal coordinators.	Free hospital admission in the medical, maternity and surgical wards. Insured person can also claim refunds when referred to other health institution	Present	Present	48% of target population	(85)
Africa	Tanzania	Is voluntary and membership is on a family basis.	Preventive and outpatient service at a dispensary and a referral hospital to which the scheme is linked. Essential drug supply and basic laboratory service	The package covers both inpatient and outpatient care but excludes antiretroviral (ARVs). However, opportunistic infections are treated.	Only supports district based schemes	Initiated by donors and receives continuous technical assistance	NA*	(86, 87)
Africa	Uganda	Ishaka scheme	It is a church-owned facility, provider driven and involved in health promotion. The scheme measures against adverse selection	The package covers both inpatient and outpatient care. Opportunistic infections are treated; diagnostic tests and	Supports monitoring and enrolment to scheme	Initiated by external donors	950 (2%) people out of 50,000 target population	(87, 88)

			(waiting period of two weeks) and group-based enrolment is ensured.	drugs are included in the package. It excludes dental care, optic care and chronic diseases. Referral to a higher level of care is not included in the benefit package				
Africa	Rwanda	Micro-health insurance	Individuals or family can only enroll after one-month waiting period	Basic health care package which covers all drugs and services provided in their choice health centre, which also includes ambulance transfer to a church-owned or district public hospital where package is limited	Present	Present	85% of the target population	(79)
Africa	Democratic Republic of Congo	Bwamanda hospital insurance	Scheme is managed by the district executive team. Payment is flat rate and same for all regardless of sex, age, state of health and residential area. Payment of annual subscription is done when peasants are selling their farm produce. Decentralized collection of premiums at each health centre by health centre team. Family is considered as a subscription unit with payment of individual premiums	A co-payment of 20% of the fee if enrollees are hospitalized, coverage of risks is limited to hospital care	Present	Present	60-70% of the target population. About 160,000 people in 1994	(89)

3.3 Discussion

Community based health insurance is aimed at extenuating some of the worst equity effects of out of pocket payments through risk sharing of contributions between the healthy and the sick. It gives room for individuals to spread their contributions over time in an orderly manner, rather than paying for health care when ill (76).

In the midst of general censure of levying user charges, failure of the markets to reach the poor and cutting down government budgets, the schemes have been viewed as a means of financing health care costs. The advantage of such a scheme is that it is able to reach poor and low-income individuals in rural areas who are hard to reach using social health insurance (78). In order for the poor to benefit more, a sliding scale may be introduced for contributions and hospital care included in the benefit package as most schemes use flat rate as stated in Table 2.

The success of this scheme is not without the role and involvement of key groups. The involvement of the community is the first major step towards improved access to priority health services and improved financial protection against the cost of illness. The role of the government is to contribute to the sustainability and effectiveness of community health financing schemes for informal sector, poor and rural population. This can be via well-targeted subsidies boosting the health insurance contributions; prevention of expenditure fluctuation; reinsurance to enlarge the size of small risks pools and cover catastrophic event. More so, there is a need for government to play an overseeing role in terms of ensuring an equity focus of the schemes. This could be achieved by a strong government regulatory framework for schemes such as in Thailand (37, 76).

There is also evidence of geographical inequities under community based health insurance; those living closer to health facilities utilize health care service more than those living in the remote rural areas (76). Therefore the establishment or presence of the scheme does not assume the role of ensuring availability of health facilities. Efforts are required to ensure equitable distribution of facilities in the various geographical areas.

There are few studies examining the patterns of uptake of community based health insurance especially among the poor (36, 40, 88). However many studies have looked at the impact and effectiveness, advantages and disadvantages, strength and weakness of this scheme (8, 11, 12, 19, 21, 37, 52, 86). Therefore there is need for more research to be carried out in examining the pattern of uptake and factors attributed to it in a systematic fashion.

It is also pertinent that schemes be developed with knowledge of both technical concerns and local contexts. Therefore it is vital to understand the factors underlying how each scheme is run in different countries as a result of contextual difference.

Studies have shown that the CBHI is limited in scope and quality and it still remains unclear if the scheme is sustainable in the long run (13, 14, 14). The sustainability could be linked to low uptake or enrolment by users; this could be further linked to its voluntary nature and the government not getting involved. Hence, the assumption that CBHI would transit to form national health financing may not be appropriate, this is because among other things the contextual difference in the various LMIC. Most of the schemes in the LMIC cover for high-cost, low-frequency (Type I²⁵) or low-cost, high frequency (Type II²⁶). The former occurs in

²⁵ In type I, people are more concerned in purchasing insurance primarily for its benefits of risk sharing while type II is focused on improving the availability and quality of health care and improved access to pharmaceuticals.

Ghana, Kenya, Taiwan, while the latter occurs in Indonesia and Nepal. Therefore differentiating between schemes with respect to their levels of risk pooling is important. In other words understanding the burden of disease in the community or at population level is imperative (63).

3.4 Conclusion

Among the challenges that CBHIs are facing, the issue of enrolment is the most important. Although more schemes are being developed in LMICs, enrolment rates remain relatively low, sometimes hampering the sustainability of the scheme. Several surveys have tried to unravel the reasons for low enrolment and weak participation of populations, but these studies are different in terms of their approach and have produced contradictory results in some cases. Therefore systematically providing a comparative summary of these studies is likely to highlight the most important factors influencing the decision to enroll. This further fortifies the need for this study; the review is explicitly carried out in part C of this research.

It is also pertinent to know that the analysis of the factors affecting uptake of CBHI only represents one layer amongst others to examine this complex issue as depicted in the framework of analysis (Figure 1). The relationship between CBHI schemes and the overall environment such as state, regional or national political context, the role of public health system and NGOs promoting these schemes are taken into account to a limited extent. All these dimensions need to be explored thoroughly.

²⁶ Type I sets wide geographical boundary and it is mostly hospital owned or based. It is sometimes committed to meeting certain selected costs and its premium is calculated using variable cost or actuarial basis. On the other hand, Type II is mostly based at the village and is community owned. Some are just concerned with payment and availability of drugs or to raising extra income for service and premium is set majorly in terms of ability to pay.

Finally, the combination of CBHI schemes with other key parties such as the micro-finance institutions could also be studied in terms of reinforcing mutualist organization.

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Part C: Journal Manuscript

Proposed Journal: BMC Medicine²⁷

²⁷ Instructions for authors in appendix 8, tables and figures have been inserted in the main text of the manuscript to improve readability. Authors' contribution and information are also excluded. For the purpose of this thesis, the student is the sole and first author of the work.

Factors That Affect Uptake of Community-Based Health Insurance in Low and Middle-Income Countries: A Systematic Review

Abstract

Background: Most low and middle-income countries (LMICs) have been unable to achieve the key objective of universal coverage which is ‘universal financial protection’ and access to needed health services. A promising avenue to provide health insurance for the informal sector and the rural populace in LMICs is community-based health insurance (CBHI). The aim of this article is to assess and synthesize factors associated with CBHI enrolment in LMICs.

Methods: PubMed, Scopus, ERIC, PsychInfo, Africa-Wide Information, Academic Search Premier, Business Source Premier, WHOLIS, CINAHL, Cochrane Library, conference proceedings, and reference lists were searched for eligible studies available by 31 October 2013; regardless of publication status or language of publication. Both quantitative and qualitative studies were included. Eligible quantitative studies include both intervention and observational studies. Eligible qualitative studies included focus group discussions, direct observations, interviews, case studies and ethnography. Included studies differed significantly in study settings, design, and outcome measures, so the findings are presented in a narrative synthesis.

Results: Both quantitative and qualitative studies showed low levels of income and lack of financial resources as major factors affecting enrolment. Also, poor healthcare quality (including drug and medical supply stock-outs, poor healthcare worker attitudes, and long waiting times) leads to low coverage. Trust in both the scheme and caregivers also affect enrolment. In addition,

more educated people, men, young people, and larger households were more willing to pay higher for CBHI enrolment.

Conclusions: Lack of funds, poor quality of care, and lack of trust are major reasons for the low CBHI coverage in LMICs; and need to be considered when such schemes are set up to ensure financial protection is achieved.

Key words: Health insurance, Community-based health insurance, Low and middle-income countries, Access, Uptake, Informal sector

3.0 Introduction

An enormous health financing gap has been highlighted in low and middle-income countries²⁸ (LMICs). This gap is, amongst other factors, a result of the wide disparity between the burden of disease and health spending. LMICs contribute 90% to the global burden of disease, but account for only 12% of global health spending as compared with 9.7% and 88% respectively for high-income countries (1).

Although current government spending on health is so low in LMICs, the economic context of most of these countries is such that increasing existing government spending on health may not be feasible (2). Most LMIC governments have growing debts and high disease burdens, resulting in a declining ability for government expenditure. This further widens the health financing gap in these countries (1).

Apart from out-of-pocket payments, LMICs' health financing is heavily dependent on government funding²⁹ and it has been difficult to expand the tax capacity in these countries, as it relies on compliance amongst income earners, acceptance and ability to pay (2). Therefore, waiting for the effects of economic growth to filter down to tax revenue is considered a passive approach (2).

Among other factors, national or social health insurance is set up in some LMICs to provide financial risk protection and to mobilize resources to avert impoverishments that may arise from paying out-of-pocket (OOP) for health care. National health insurance also has the potential to

²⁸ Countries in the world are classified into income groups according to gross national income (GNI) per capita using the World Bank Atlas method.

²⁹ Government funding is generally derived from direct taxes (charged on company and personal tax) and indirect tax (includes custom duties and value added tax).

increase utilization and affordability of health care, especially among the poor and vulnerable population (3). Through national health insurance, risks are shared and financial inputs pooled by way of contributions, for example from salaries or taxation (3). This type of health insurance coverage still remains very low in many LMICs, a situation which is compounded by the large informal sector workforce and rural populace (4). Therefore, one of the major challenges faced by most LMICs is the provision of health care for poor people who work in the informal sector or reside in rural areas.

These groups of people are heterogeneous and include taxi drivers, peasant farmers, laborers, small scale traders, market women and self-employed professionals in rural areas. However, they all share a similar lack of access to healthcare services, which is predominantly a result of insufficient health care financing (5).

CBHI schemes are noted for the principal role of a community's involvement in raising³⁰, pooling³¹, allocating³², purchasing³³ and supervision of the health care financing arrangement. Also, some schemes cover similar geographical entities, professional affiliations and some other joint activity. In addition, beneficiaries of these schemes are individuals who have no form of financial protection or access to cover the cost of health care; and the scheme is voluntary in nature (6).

³⁰ Raising funds also called revenue collection involves the source of funds and the means through which they are collected. The population is the primary source of all funds apart from external donors (2, 41).

³¹ "Pooling refers to the accrual of prepaid health care funds on behalf of a population" (41)

³² Allocation of funds occurs from the collecting agency (central pools) to designated or geographically based pooling organisations (41).

³³ Purchasing involves transfer of pooled resources to health service providers for the population which the funds were pooled (2, 41).

Therefore, a promising avenue to provide health insurance for the informal sector and the rural populace is through community-based health insurance (CBHI).

CBHI, despite its problems relating to the extent of resource pooling, has been shown to facilitate and improve access to health care services, especially among children and pregnant women (7, 8). Moreover, CBHI also addresses health care challenges faced specifically by the rural poor and informal sector workers. However, enrolment to CBHI scheme remains a challenge (9).

Currently CBHI covers 2 million people in Africa out of an estimated 900 million. This amounts to just 0.2% of the catchment population (10). In an era when universal health coverage is more relevant than ever before, it is important to understand the reasons for low enrolment in health insurance schemes in Africa as well as other low- and middle-income regions of the world (11).

There is a paucity of research which systematically explores the reasons for poor enrolment. Therefore; the use of a systematic review was intended to generate answers to this question in order to guide policy and decision making. This paper aims to contribute to the knowledge gap around enrolment to CBHI schemes using a mixed method systematic review. The objective of the study includes systematically accessing factors that affects enrollment for CBHI schemes, describing the scope and quality of existing literature and to reflect on the generalizability, context and feasibility of the included studies. To the best of our knowledge, no previous systematic reviews have been specifically designed to summarize factors associated with uptake of CBHI. We therefore systematically reviewed the factors that affect enrolment into CBHI schemes, described the quality of existing literature and discussed the policy implication of available evidence.

3.1 Framework of analysis

For this study we hypothesize based on both empirical and theoretical literature, that not only are the socio-demographic (age, sex, geographic location, education, marital status, head of household, household size, employment status, wealth quintile and association membership), health related (illness experience, state of health, utilization of health facilities, distance to health facilities, quality of health services, availability of drugs and medical supplies, health care workforce) and other factors (trusts and relationship) are linked to the enrolment of CBHI scheme. There are some other areas that also enhance active participation and uptake by households or individual, such as the link between social capital, social protection programmes and CBHI, which are further fortified with trust.

In addition, the role of the government in terms of subsidy towards the social protection programmes is also vital, as it will assist households that are experiencing main problems in paying their contributions.

Furthermore, the different characteristics of CBHI also play a crucial role in the uptake of the scheme. The characteristics include technical, management and institutional characteristics. The technical characteristics can be viewed from the lens of health care financing function, which are revenue collection, pooling and purchasing. Revenue collection mechanism of technical designs considers the level to which contributions are voluntary as to compulsory, degree of prepayment compared with direct out of pocket spending and extent to which contributions are progressive subsidies for the poor and leverage against external shocks. Pooling revenue and risk sharing considers number and size of the pool, redistribution from healthy to sick, rich to poor and gainfully employed to economically active, while resource allocation and purchasing looks at

demand, supply, prices and incentive regime. With the various characteristics in place, intermediate performance and final outcome indicators can be used to measure the impact of the scheme in relation to the broader health care finance.

Hence, from the framework of analysis below, the fundamental factors evolving around uptake of CBHI is also surrounded by layers of other issues which ought to be studied in unraveling low enrolment. In other words, the socio-demographic factors amongst other factors should not be considered in isolation but to be linked to these other vital areas.

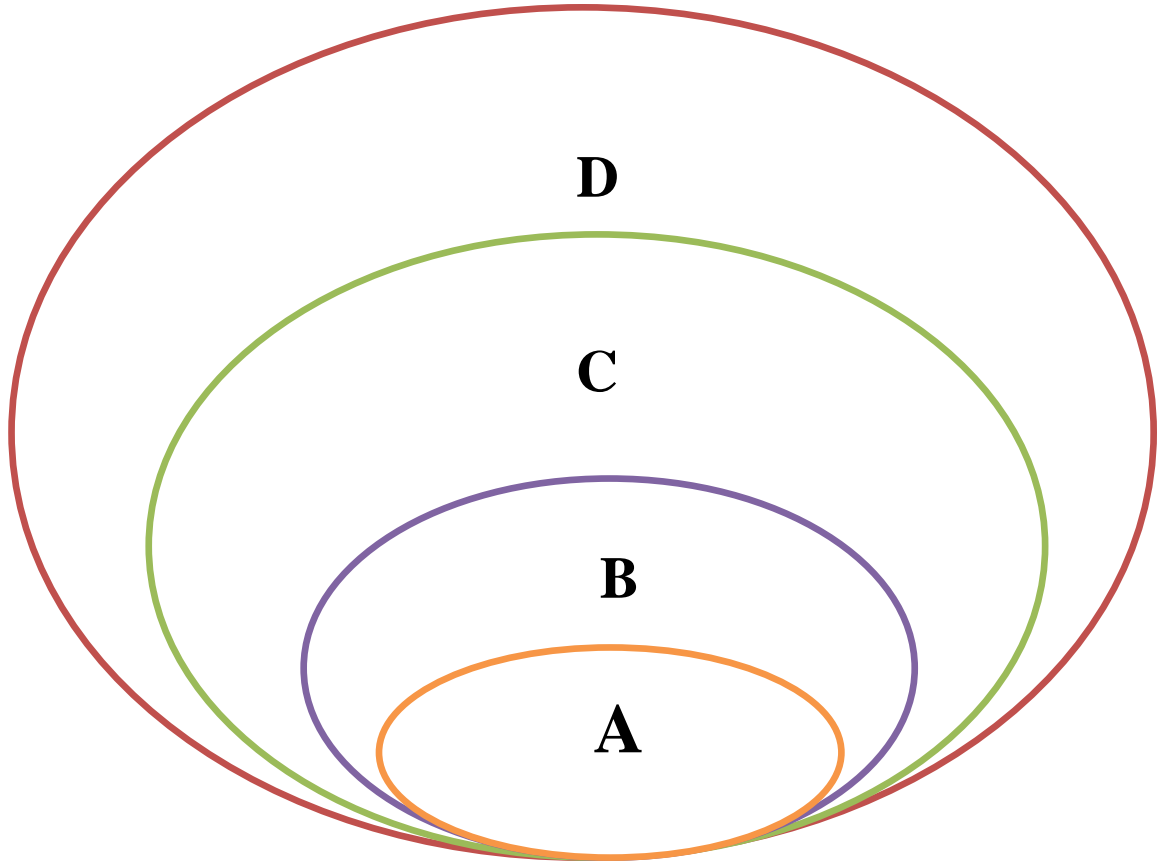


Figure 1: Generic conceptual framework for analyzing uptake of CBHIs

Key to framework

A – Fundamental factors evolving around uptake of community based health insurance

Socio-demographic factors: age, sex, geographic location, education, marital status, head of household, household size, employment status, wealth quintile and membership of an association.

Health related factors: illness experience, state of health, utilization of health facilities, quality of health services, availability of drugs and medical supplies and health care workforce

Other factors: Trust, relationship and distance to health facilities

B – Characteristics of the scheme (managerial, technical, institutional)

Dimensions of scheme (political, economic, managerial and social)

C - Role of government (subsidies, policy framework and implementation, technical support)

Role of community (ownership and support)

D - Social protection programmes

Social capital

3.2 METHODS

3.2.1 Inclusion criteria

Type of studies

Both quantitative and qualitative studies were included in this review. The following quantitative studies were searched for: randomized control trials (RCTs), controlled before-and-after studies (CBAs), interrupted time series designs (ITS), cohort studies, case-control studies, household surveys, contingent valuation studies, and cross-sectional surveys. Although randomized controlled trials are regarded as the gold standard for evidence, no RCT was found for this review. Most of the quantitative studies found were high quality household surveys, which assesses uptake or enrolment into the scheme. Qualitative studies included are those that used known qualitative methods of data collection such as focus group discussions, semi-structured interviews and exit interviews.

The mixed-method approach offered the opportunity for complementary answers to the research questions that cannot be answered completely by either the qualitative or quantitative method. It also helped in making the review more relevant and robust, by maximizing the findings and the ability of these findings to inform policy and practice. Thus, the fusion of both qualitative and quantitative evidence in this review enhanced its impact and effectiveness. Inclusion of both components also helped identify priority research gaps and boost the relevance of the review for decision makers. The mixed-methods also facilitated the incorporation of qualitative understanding from people's lives and robust quantitative estimates of benefits and harms.

Participants

We included studies conducted in low and middle-income countries as defined by the World Bank

Definition and description of the intervention

There are various definitions and terminologies for community based health insurance, but for the purpose of this review, CBHI is defined as the application of the principles of insurance by a defined community bearing in mind the communities' social context, which is directed by their choices and based on their arrangement and structures. Mutual health organizations³⁴, community health funds, rural health insurance, micro insurance³⁵, revolving drug funds and community based prepayment scheme will all be considered as synonyms.

Dates

A comprehensive and extensive search was done to identify all relevant studies available by 31 October 2013.

³⁴ These schemes originated on the basis of an ethnic mutual aid, collective pooling of health risks and solidarity in which members participate efficiently in its functioning and management. It is a voluntary, autonomous, non-profit organization. Payments are collected by community in advance of treatment and this is managed in paying for providers (42)

³⁵ Is a voluntary, self-help scheme for social health insurance, it covers populations excluded by the government/national health insurance (43)

Outcome measures

Primary outcomes: The primary outcomes of interest for this review are uptake of, or willingness to pay for, community-based insurance schemes (as defined by the authors of the primary studies).

Secondary outcomes: The secondary outcomes included acceptability of insurance schemes, availability of health services, ability to pay, financial protection, fairness in financial contribution, and utilization of health services.

3.2.2 Search methods for identification of studies

An exhaustive and comprehensive search was performed by EA with the help of an information specialist, to help recognize all relevant studies available regardless publication (published, unpublished, in progress or in press) or language status. We searched both grey literature (non-published/internal or non-reviewed reports and papers) and peer-reviewed journal articles

3.2.3 Database

We searched the following electronic databases: PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Scopus, Web of Science, Education Resources Information Centre (ERIC), PsycINFO, Humanities international, International Bibliography of the Social Sciences (IBSS), Sociological abstracts, Social online, Cochrane Database of Systematic Reviews (CDSR), WHO library databases (WHOLIS), Africa Index Medicus, Latin American and Caribbean Health Sciences Literature (LILACS), IndMed, Academic One file, Africa Wide, Business source premier and Journal storage (JSTOR). We used both text words and medical

subject heading (MeSH). Appendix 1 and 2 shows the detailed information on the search for each database.

3.2.4 Searching other sources

We searched other the following websites National Bureau of Economic Research, Institute of Development Studies, International Health Economics Association, Canadian Institute of health Information, and EconPapers.

3.2.5 Reference lists

We checked the reference lists of all full text articles assessed for inclusion in the review.

3.2.6 Search Strategy

Although the main language of many of the databases is English, studies were excluded based on language. Search strategies combined associated terms for community-based health insurance. A broad combination of terms was used for the intervention. The full list of search terms and output for all databases can be found in Appendix 1 and 2. The list of websites and approaches to each website are also detailed in Appendix 3.

3.2.7 Data collection and analysis

Only English language documents were considered for review. Disagreement amongst the reviewers were resolved by consensus and discussion based on full text. The full texts of eligible studies were then retrieved and reviewed to validate their suitability, using the strict inclusion criteria outlined above. The search results are documented in figure 2. It is important to note that,

studies that considered rural households' willingness to pay for health insurance, without explicitly stating which type of health insurance³⁶ were excluded. Also studies that considered the feasibility of community-based health insurance and willingness for rural households and informal sector to pay for social or national health insurance were excluded. The analysis for this review was done based on the proposed framework of analysis (as seen in figure 1), and from individual or household willingness to pay. Both quantitative and qualitative analysis was done separately.

3.3 Selection of studies

A screening guide was developed and piloted to ensure that the inclusion criteria were strictly adhered to and consistently applied by review authors. Two review authors working independently screened the titles and abstracts of all studies identified through the literature searches for eligibility. The two authors independently assessed the full text of each article for eligibility; compared their results and resolved discrepancies by discussion and consensus. For all studies excluded by the assessors, we described the reasons for exclusion below.

3.4 Data extraction and management

References were managed using RefWorks, all search outputs and results were imported to RefWorks and duplicates were deleted. Two authors' independently extracted data for each included article using a standardized data collection form. For each study, we extracted the following information: citation, study design and methodology, geographic setting, nature of

³⁶ There are two major types of health insurance: mandatory health insurance (which could be national or social health insurance) and voluntary health insurance (which comprise of private and community-based health insurance)
(2)

CBHI, outcomes, types of analysis performed, and findings. The two authors compared the extracted data and resolve discrepancies by discussion and consensus; failing which a third author arbitrated.

3.5 Assessing the risk of bias

To assess the risk of bias for studies included a tool was modified from the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines. The risk of bias was assessed by scoring low risk = 2, moderate risk = 1, unclear = 0, high risk = minus 2.

The total score was used as the summary assessment for the risk of bias. The evaluation for each study was assessed by two independent reviewers (EA and KL). In the case of any discrepancy in the assessment of a study between the reviewers, final decision was taken by consensus.

3.6 Dealing with missing data

In cases of missing or incomplete information presented in included studies, we attempted to contact authors for further information.

3.7 Presenting and reporting of results

Findings in our review were presented in various ways. Flow diagrams were used to study selection process (Figure 2). A narrative report of both quantitative and qualitative studies was stated separately followed by a table of characteristics of included studies for both quantitative and qualitative data were reported differently. We also provided a list of excluded studies with reasons for exclusion.

3.8 Results

The process and results of study identification are outlined in a flow diagram (figure 1). Almost all of the search records were immediately imported to RefWorks; however those that had to be manually entered from websites were excluded if they were clearly irrelevant. A total of 14,506 records were identified through a comprehensive search of the electronic databases and 1743 from other sources; giving a total 16,249 records of which 2,920 were duplicates. The remaining 13,329 studies (after removing the duplicates) titles and abstract were screened; we excluded 13,285 clearly irrelevant records. The 36 remaining studies were reviewed for eligibility by two independent researchers. The full texts of these articles were retrieved and independently assessed for eligibility by the two researchers; who resolved disagreements in study eligibility by discussion and consensus. Twenty five of the studies were found to meet the eligibility criteria and have been included in the review. All included studies except one were cross sectional studies specifically household surveys (Tables 1 and 2). One of the included studies used a mixed method; this was presented as separate entries in both qualitative and quantitative studies.

3.8.1 Excluded studies

We obtained the full text of 36 potentially eligible articles, from which 11 articles were excluded after duplicate critical appraisal, discussion and consensus. We provided reasons for excluding each publication in Table 3

3.8.2 Summary of findings

A total of 25 studies were included, 18 quantitative studies, 6 with a qualitative and one with a mixed method design. Tables 1 and 2 below give a detailed summary of interventions and study

results. The mixed method is presented as separate entries in both qualitative and quantitative study.

The analysis for this review was done based on the proposed framework of analysis (as seen in Figure 1), and from individual or household willingness to pay. Both quantitative and qualitative analysis was done separately.

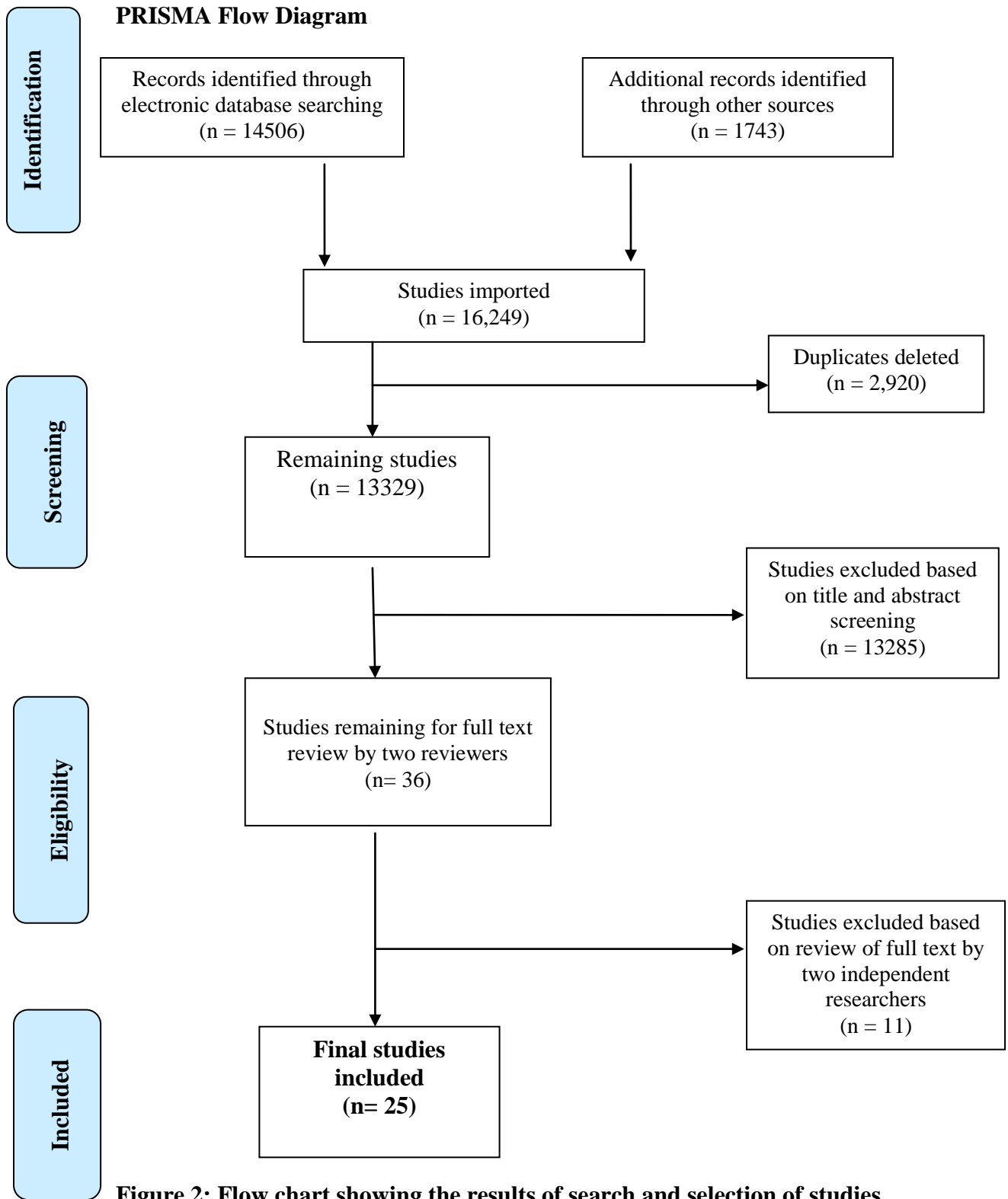


Figure 2: Flow chart showing the results of search and selection of studies

3.8.3 Quantitative studies

Socio-demographic factors influencing the uptake of CBHI

In this section we analyzed the factors affecting uptake of CBHI schemes, which are linked to individual characteristics and to the socio-economic features of individuals and households.

Age is statistically significant to uptake of the scheme, and various studies have revealed that young individuals were more willing to pay (12-21) as compared to the old. At the household level, older age of household head is positively associated with enrolment (14). In terms of gender, male headed households in Burkina Faso and Nigeria were found to be more likely to enroll as compared to female headed households(17, 22, 23) and at the individual level, men were found to be willing to pay more than women(17, 18, 21, 22). This differs from the results of studies conducted in Ghana, Mali and Senegal(14), which revealed that female-headed households were more likely to enroll in CBHI schemes.

Geographic location also affects enrolment; this is based on rural or urban location of individuals or households. The included studies results varied. In some studies, urban dwellers were willing to pay less as compared with rural dwellers (18, 19, 21) while the opposite was recorded in another study (24). Education also plays a key role in uptake of CBHI, as all studies that reported this variable found that the less educated were willing to pay less compared to the highly educated(12, 14, 17-20, 22, 24-26) at both household and individual level. The studies measured willingness to pay and not ability to pay, although the former can be used as proxy to measure the latter.




More so, the wealthier households and individuals are likely to be more willing and able to pay more than the less wealthy for health insurance (15, 18, 19, 21)(22, 25-29). However one study reported differently in terms of wealth quintile and enrolment, in that the high income are less likely to pay than those with lower income, that is a negative association between income level and willingness to pay (30).

In addition, household size is another key factor that was found to affect uptake of the CBHI scheme. Some studies found that households with a large size were willing to pay higher amounts than relatively smaller households (21, 27, 30). This differs from what was reported in some other studies (18, 19, 24). Where larger households drop out of the scheme this was likely a result of the huge financial burden faced by households when they seek health care. Some studies associated marital status to the uptake of the scheme. As reported by this study, single individuals were more willing to pay than married couples (12, 26). In terms of being members of an already existing association in the community, households that are members of an association already were more willing to enroll into the scheme (16, 29), which reveals the role of solidarity and social cohesion to willingness to pay for the scheme.

Table 1: Summary results for socio-demographic factors

Study ID/date	Age	Gender	Location	Education	Income	Household size	Marital status	Membership association
Ataguba 2008(28)				+	+			
Ataguba 2008(27)		+			+	+		
Banwat(12)	+			+			+	
Binnendijk 2013(13)	+							
Chankova 2008(14)	+	-		+				
Donfouet 2011(15)	+				+			

Donfouet 2011(16)	+							+
Dong 2002(17)	+	+		+				
Dong 2004(18)	+	+	+	+	+	-		
Dong 2009(24)			-	+		-		
Dror 2007(19)	+		+	+	+	-		
Dong 2003(20)				+				
Mathiyazhagan 1998(21)	+	+	+		+	+		
Onwujekwe 2009(22)		+		+	+			
Oriakhi 2012(30)					-	+		
Allegrri 2006(25)				+	+			
Shafie 2013(26)				+	+		+	
Ozawa 2009(31)								
Binam 2004(29)					+			+

 Positive association;
  Negative association;
  not statistically significant

3.8.4 Health related factors influencing uptake of CBHI

The quality of health care is another key factor that influences the uptake of the scheme. Individuals or households that perceive quality of care as good are more willing to pay than those who perceive the quality with less admiration (24, 28). One study linked the quality of health care and distance together in the sense that, households that perceive quality of health care centers close to them as poor are willing to enroll into the scheme and are willing to pay higher (27). This would enable them have access to other facilities that are far away but with good quality.

In addition, household illness experiences also determine enrolment, and the results of some included studies shows that households that have recorded sick members are less willing to pay than their counterparts (28). It is cognizance to note that no particular illness was stated in any of the studies. Another empirical study reported that household with more sick members were

willing to pay more (21) which supports the notion that families with high illness rates or more prone to be ill, have a greater tendency to participate or to be members of the health prepayment scheme. On the other hand, lower number of illness episodes in a specified period of time had a positive effect on drop-out of the scheme (19, 24). The health status as recorded in the following empirical studies also determined enrolment (19, 28, 29) as individuals with better health status were willing to pay lesser amounts for health insurance compared with individuals with poorer health status (15).

The use of conventional medicine is also an important factor for enrolling into CBHI since the scheme requires the regular use of conventional means of treatment; hence those who use conventional medicine have been found to be willing to pay than those who use other means of treatment (15, 16, 30, 32). Trust in CBHI was also reported to affect WTP, as household heads that have greater trust in the scheme were willing to pay higher amounts than their counterparts (27, 31).

One other factor that affects enrolment is households that travel long distances to access health care were found to be more willing to pay for CBHI than those that needed to travel less distance, (25, 27, 28) in other words more people enrolled. This result diverges from some other studies that reported the opposite association between distances required to access healthcare and willingness to pay, that is less people enrolled (18, 19, 21). However long distance to health facilities was not explicitly defined in these studies; hence a general pattern was not defined across the studies.

3.8.5 Qualitative studies

This reiterated some crucial factors already highlighted in the quantitative studies and also pointed out some variables not measurable using quantitative methods.

From the framework of analysis, wealth quintile is stated as a socio-demographic factor revolving around the uptake of the scheme, and as shown by quantitative studies, affordability is a key factor affecting enrolment. Non-enrolled individuals collectively identified lack of means as the primary reason for not enrolling (33-35).

In terms of health related factors, perception of the quality of health care also affects enrolments. Respondents criticized excessive prescribing, long waiting times, differential treatment, health provider's attitude and technical incompetence amongst providers, irrespective of enrolment status (33)(36-38) as issues that affect uptake of scheme.

From the framework of analysis, "software" characteristics, one of which is trust, was stressed in almost all studies included (31, 33-35). Poor knowledge of the benefit package and poor understanding of the notion of the scheme was also found to affect enrolment (33-35). Institutional rigidities in payment modality and timing of the enrolment campaign in relation to seasonal revenue fluctuations (36), as shown in the framework for analysis, were also found to contribute to uptake of CBHI. Low-level community participation and involvement in the decision-making process (34, 35) and lack of solidarity acts in a community hampers enrolment (38). Solidarity acts in community involves support from the community and social capital. Such factors reflect the importance of social capital as shown in the framework (figure 1). One other outcome affecting uptake revealed by an included study was the cultural belief that setting money aside for health care could attract disease (33).

Table 2: Summary results for health-related and other factors

Study ID/date	Quality of health care	Household illness experience	Use of conventional medicine	Long distance travel to health facility	Trust	Lack of means	Knowledge of benefit package	Health status
Ataguba 2008(28)	+	-		+				-
Ataguba 2008(27)	+			+	+			
Donfouet 2011(15)			+					+
Donfouet 2011(16)			+					
Dong 2004(18)				-				
Dong 2009(24)	+	-						
Dror 2007(19)		-		-				-
Mathiyazhagan 1998(21)		+		-				
Oriakhi 2012(30)			+					
Allegri 2006(25)			+	+				
Ozawa 2009(31)					+			
Binam 2004(29)								-
De Allegri 2006(33)					+	+		
Basaza 2007(34)					+	+		
Allegri 2005(39)						+		
Basaza 2008(35)					+			
Schneider 2005(38)					+			




 Positive association;
  Negative association;
  not statistically significant

Table 3: Characteristics of quantitative studies that met inclusion criteria

Study ID (Year)	Study design	Study setting	Study outcome	Funding source
Ataguba 2008(28)	Cross-sectional study	Nigeria Rural setting	Willingness to pay	AusAID, IDRC, CIDA, SIDA.
Ataguba 2008(27)	Cross-sectional study	Nigeria Rural setting	Willingness to pay	AusAID, IDRC, CIDA), SIDA.
Banwat(12)	Cross-sectional study	Nigeria Rural setting	Willingness to pay	Not reported
Binnendijk 2013(13)	Cross-sectional study 2009-2010	India	Willingness to pay	NOW and German Federal Ministry for Economic Cooperation and Development.
Chankova 2008(14)	Cross-country study 2004	Ghana (rural district), Mali (both rural and urban district) and Senegal (rural)	Uptake of community based health insurance	USAID
Donfouet 2011(15)	Cross-sectional study November 2009	Cameroon Rural	Willingness to pay	ILO, African Doctoral Dissertation Research Fellowship offered by the APHRC in partnership with the IDRC
Donfouet 2011(16)	Cross-sectional study (household survey)	Cameroon Rural	Willingness to pay	ILO, African Doctoral Dissertation Research Fellowship offered by the APHRC in partnership with the IDRC
Dong 2002(17)	Cross-sectional study (household survey)	Burkina Faso Rural	Willingness to pay	Germany Research Foundation
Dong 2004 (18)	Cross-sectional study (household survey)	Burkina Faso	Willingness to pay	Germany Research Foundation
Dong 2009(24)	Cross-sectional study	Burkina Faso Rural	Willingness to pay	German Research Society

	May 2006			
Dror 2007(19)	Cross-sectional study (household survey)	India Rural	Willingness to pay	ECCP and GTZ
Dong 2003(20)	Cross-sectional study (household survey)	Burkina Faso Rural	Willingness to pay	German Research Society
Mathiyazhagan 1998(21)	Survey research and heuristic/ documentary research	India Rural setting	Willingness to pay	Not reported
Onwujekwe 2009(22)	Cross-sectional study (household survey)	Nigeria Urban, semi-urban and rural area.	Willingness to pay	AFRO, Brazzaville
Oriakhi 2012(30)	Cross-sectional study (household survey)	Nigeria Rural	Willingness to pay	Not reported
Allegri 2006(25)	Population-based case-control study 2004	Burkina Faso	Uptake of CBHI	German Research Society
Shafie 2013(26)	Cross-sectional study 2009	Malaysia	Willingness to pay	Universiti Sains Malaysia Short Term Grant
Ozawa 2009(31)	Mixed method	Cambodia	Uptake of CBHI	Not reported
Binam 2004 (29)	Cross-sectional	Cameroon	Willingness to pay	Not reported

Key

NOW: Netherlands Organization for Scientific Research

USAID: United States Agency for International Development

APHRC: African Population and Health Research Center

ILO: International Labor Organization

ECCP: European Union within the EU-India Economic Cross Cultural Programme

GTZ: Deutsche Gesellschaft für Technische Zusammenarbeit

AFRO: African Regional Office of the World Health Organization

IDRC: International Development Research Centre

AusAID: Australian Agency for International Development

IDRC: International Development Research Centre

CIDA: Canadian International Development Agency

SIDA: Swedish International Cooperation and Development Agency

Table 4: Characteristics of qualitative studies that met inclusion criteria

Study ID	Methodology	Study setting	Study outcome	Funding source
De Allegri 2006(33)	Semi-structured interview May–June 2004	Burkina Faso Rural	Uptake of scheme	German Research Society
Basaza 2007(34)	Case study evaluation (semi-structure interview) November 2004–December 2005	Uganda Rural	Uptake of scheme	Ministry of Health Uganda, the DGIC Belgium and Institute of Tropical Medicine in Antwerp
Allegri 2005(39)	In-depth interviews and semi-structured interviews May–June 2004	Rural and urban	Uptake of scheme	German Research Society
Basaza 2008(35)	Focus group discussion	Uganda Rural	Uptake of scheme	Not reported

	October 2005– March 2006			
Criel 2007(40)	Focus group March 2000	Guinea-Conakry Rural	Uptake of scheme	German bilateral co-operation and the Institute of Tropical Medicine in Antwerp
Ozawa 2009(31)	Focus group	Cambodia Rural	Uptake of scheme	UK Department for International Development
Schneider 2005(38)	Focus group August 2000	Rwanda Rural	Uptake of scheme	Not reported.

Table 5: Findings of quantitative studies

Study ID	Findings
Ataguba 2008(28)	<p>Male-headed households are more willing to pay than female-headed households; wealthy households are also more willing to pay than less wealthy households.</p> <p>Household heads that are less educated are willing to pay lesser amounts than those who are highly educated. This bears correlation with the level of income because the non-poor are more likely to be more educated than the poor.</p> <p>Households that have to travel long distances to access health care are more willing to pay than households that have to travel less distances.</p> <p>Households that perceive the quality of health centre services as good are more willing to pay than those that perceive the quality as lesser.</p> <p>Households that have recorded a household member sick are less willing to pay than their other counterparts</p> <p>Respondents with better health status are willing to pay lesser amounts when compared with respondents with poorer health status.</p>
Ataguba 2008(27)	<p>Wealthier households are willing to pay higher amounts than households that are less wealthy.</p> <p>Male headed households are willing to pay higher amounts than female headed households.</p> <p>Households with larger sizes are also willing to pay higher amounts than households with relatively smaller size.</p> <p>Household that perceives the quality of health care centers nearest to them as poor are willing to pay more than households that perceive the quality to be good. Household heads that have greater trust and confidence in the proposed scheme are more willing to pay higher amounts than those that have low confidence in the scheme.</p> <p>Households that have to travel long distances to access health care are willing to pay higher amounts than their counterparts that live close to health care centers.</p>
Banwat(12)	Age was statistically significant with willingness to pay.

	<p>Willingness to pay was highest amongst the tertiary level education</p> <p>Statistically significant association was reported between marital status and willingness to pay</p>
Binnendijk 2013(13)	<p>Average willingness to pay for health insurance varies greatly across the locations.</p> <p>Willingness to pay increases as the income of the household increases and there is also great variation of willingness to pay across income groups within the locations.</p>
Chankova 2008(14)	<p>Female household heads are more likely to join mutual health organization (MHO)</p> <p>Education of head of household is also positively associated with MHO enrolment in all three settings</p> <p>Older age of the household head is significantly associated with enrolment only in Ghana and Senegal.</p> <p>Household economic status indicates that individuals from the richest quintile are more likely to be enrolled compared with those from poorest quintile.</p> <p>Availability of a health facility in the community is associated with higher likelihood of enrolment in Mali and Senegal.</p>
Donfouet 2011(15)	<p>Age is statistically significant, younger individuals are more willing to pay than older ones</p> <p>Farmers are less willing to pay than those who are self employed or private/public sector</p> <p>Income has a positive significant impact on willingness to pay. Health status does not affect the decision of the respondents to pay for community prepayment scheme.</p> <p>Catholic household heads are more willing to pay than those from other religion</p> <p>Households more knowledgeable about CBHI tend to be more willing to pay</p> <p>Those who seek orthodox medicine are more willing to pay than those who use other means</p>
Donfouet 2011(16)	<p>Household heads who have been more involved in associations are more willing to pay for CBHI.</p> <p>Household from catholic religion has a higher willingness to pay than those practicing other religions, or not practicing any religion.</p> <p>Household heads that regularly use clinics/hospitals when sick are more willing to pay than those who use traditional healers and herbalists.</p>
Dong 2002(17)	<p>The aged are more willing to pay less than the young</p> <p>Married men are more willingness to pay more than married women</p> <p>Education influenced male willingness to pay not female</p> <p>Male heads of household were willing to pay more than female heads; other males were willing to pay more than other females also.</p> <p>Distance to health facility significantly influence both male and female willingness to pay</p>
Dong 2004(18)	<p>Household heads residing in Nouna town were willing to pay relatively less for themselves and more for other household members than those in rural areas. As the household size increases the willingness to pay difference increases.</p> <p>Greater distance to the health facility had the expected negative association, reducing individual willingness to pay.</p> <p>The old have a lower willingness to pay than the young, females have lower willingness to pay than males, the poor have a lower willingness to pay than the rich, and those with less schooling have a lower willingness to pay than those with more years of schooling.</p>
Dong 2009(24)	<p>The following factors all had a positive effect on drop-out, meaning that they increased the probability</p>

	that a household did not renew its membership in CBI: female household head, higher household head's age, lower household head's education, larger household size, living in rural area, lower number of illness episodes in the past three months, fewer children or elderly in a household, poor perceived quality of care, less health care seeking in the month prior to the survey.
Dror 2007(19)	High significant positive association between willingness to pay and household size Significant association between education of the household head and willingness to pay. Marginally significant association between age of household head and willingness to pay. A significantly high and strong positive association with household income. There is a marginally significant negative correlation between distance to hospital and willingness to pay. Households who experienced hospitalization in the last 2 years were willing to pay more
Dong 2003(20)	Living in Nouna town reduce the value of willingness to pay. However age, sex, education, monogamy, traditional religion increases the value of willingness to pay.
Mathiyazhagan 1998(21)	Family size of households strongly influenced willingness to pay for rural health insurance. There is a negative relationship between age and willingness to pay for the scheme. Higher income level households have a higher chance of willingness to pay for the proposed scheme. The higher the number of days lost to ill-health, the more likely someone is to pay for the scheme. Distance, travel and waiting time to obtain health care were used as proxies for the physical accessibility of the respondents. The estimated coefficients of physical accessibility are significantly positive in all cases except one variable (i.e. waiting time).
Onwujekwe 2009(22)	Willingness to pay was positively related to socio-economic status for both respondents and other household members. Conversely, willingness to pay was negatively related to geographic location, showing that residence in rural areas led to decreased willingness to pay. Positive relationship of gender with willingness to pay, implying higher willingness to pay amongst males compared with females. Additionally, the higher the number of years of education, the higher were the amounts of elicited willingness to pay.
Oriakhi 2012(30)	Household with more members are more likely to participate in the scheme Respondents with high income are less likely to participate Households with higher medical expenses and medical credit are more likely to enrol
Allegri 2006(25)	In comparison with controls, cases were more likely to belong to the Bwaba ethnic group, employed outside the farming sector, and were more likely to fall into the wealthier categories. Positive association between enrolment in CHI and higher education, higher socioeconomic status, a negative perception of the adequacy of traditional care, a higher proportion of children living within the household, an increased distance to the health facility, and a lower level of socioeconomic inequality within the community. Cases also differed from controls in that they were more likely to have rated traditional care as “mediocre/inadequate”, to have used curative health services, to live far from the health facility, and to live in communities with low levels of socioeconomic inequality.

Shafie 2013 (26)	<p>Ethnicity, marital status and higher education attainment showed significant association for willingness to pay</p> <p>Uptake is positively affected by a higher income</p> <p>Chinese ethnic group are more willing to enroll in the scheme.</p> <p>Willingness to pay is higher for those that have current health insurance, higher incomes and people of Chinese ethnicity but decreases for those who are married</p>
Ozawa 2009 (31)	<p>Villagers who renewed insurance (RRR = 1.15) scheme were found to have statistically significantly higher trust levels compared to those who are new to the scheme (RRR = 1.08) and those who dropped out (RRR = 1.06)</p>
Binam 2004 (29)	<p>Household revenue level, gender, constant visit to the health center, household association experience and the household health status affect significantly the willingness to prepay value.</p> <p>A positive and significant membership to a community club or association increases willingness to prepay for the scheme.</p> <p>Positive and statistically robust relationship between the family health status and enrolment.</p> <p>Respondent's monthly revenue and frequent use of health facility have a positive and statistically significance with the willingness to pay</p>

Table 6: Findings of qualitative studies

Study ID	Findings
De Allegri 2006 (33)	<p>Non-enrolled individuals unanimously identified lack of means as the primary reason for not joining the scheme.</p> <p>Once probed, respondents expressed dissatisfaction with the quality of care. Respondents, irrespective of enrolment status, criticized the quality of care. Criticisms always focused on three aspects: long waiting times, excessive prescribing, and differential treatment depending on the patient's socio-economic status.</p> <p>Interviewees were reluctant to justify low enrolment in relation to cultural beliefs and practices. All interviewees acknowledged the fact that setting money aside for health care may be perceived as attracting diseases, but they always attributed this belief to others in their community.</p> <p>All enrolled individuals constructed a link between their choice to enroll and the trust they have in the CBI management.</p> <p>Interviewees explained skepticism in relation to three factors: lack of adequate knowledge and understanding, health providers' resistance towards the new initiative, and previous bad experiences with collective arrangements.</p>
Basaza 2007 (34)	<p>Incapability to raise the contributions</p> <p>Lack of trust in local financial organizations after previous depressing experiences with similar institutions</p> <p>Low level of community involvement in the management of hospital-based CHI schemes</p>

	Lack of information on and poor understanding of the notion of community health insurance
Allegri 2005 (39)	<p>Institutional rigidity in payment modality was identified to be a greater barrier to enrolment.</p> <p>Respondents also asked that the timing of the enrolment campaign be changed to better match seasonal revenue fluctuations.</p> <p>Knowledge of the benefit package was very poor among most respondents in rural as well as in urban settings.</p> <p>Most interviewees, regardless of socio-economic and insurance status, could not recall the specific elements of the package</p> <p>Respondent's defined poor quality of care exclusively in terms of health providers' attitudes, what they expect from the scheme is not to seek an alternative contracting partner, but rather to invest in changing providers' attitudes and induce the quality improvements.</p>
Basaza 2008 (35)	<p>There is mixed understanding of pooling of contributions in the scheme.</p> <p>The level of trust in financial organizations stands out clearly as a key factor affecting enrolment in the scheme.</p> <p>Inability to pay for membership was pointed out as the foremost reason for not joining the schemes.</p> <p>The desire to have members more closely involved in the decision-making process on the scheme; and the wish to include chronic diseases in the package of benefits.</p>
Criel 2007 (40)	Quality of care is perceived as unsatisfactory; hence people are not motivated to join the scheme.
Ozawa 2009 (31)	The need for health insurance organization to build trust via having interpersonal relationships with villagers.
Schneider 2005 (38)	<p>People's mistrust in provider is the main reason for low enrolment.</p> <p>Technical incompetence amongst provider is also reason for low enrolment.</p> <p>In areas where there are some solidarity acts, high enrolment occurred there.</p>

3.9 Discussion

The use of a mixed-method approach offered the opportunity for complementary answers to the research questions that could not be holistically answered by either qualitative or quantitative methods. This also generated a more relevant and robust review by maximizing the findings and the ability of these findings to inform policy and practice. Inclusion of both components (qualitative and quantitative) also helped identify priority research gaps and boost the relevance of the review for decision makers. The mixed-methods also facilitated the incorporation of understanding people's diverse and contextual experiences from a qualitative perspective and robust quantitative estimates of benefits and harms.

The included studies were carried out by various disciplines such as sociology, economics and public health. Divergence among the included studies lies in the methodology used. While some studies were based on a qualitative approach, others used quantitative methods analysis. Moreover, the qualitative and quantitative analysis measured different variables and were done in different countries, which resulted in contextual difference and variation.

Results shows that the wealthier households and individuals are likely to be more willing and able to pay more than the less wealthy for health insurance (15, 18, 19, 21)(22, 25-29). This suggests that income is very crucial in determining the demand behavior for any good. Education and wealth quintiles could be linked as the richest quintile are more likely to be educated than those from the poor quintile.

In terms of being members of an already existing association in the community, households that are members of an association already were more willing to enroll into the scheme (16, 29) which reveals the role of solidarity and social cohesion to willingness to pay for the scheme.

One study linked the quality of health care and distance together in the sense that, households that perceive quality of health care centers close to them as poor are willing to enroll into the scheme and are willing to pay higher (27). This would enable them have access to other facilities that are far away but with good quality.

In addition, household illness experiences also determine enrolment, although no particular illness was stated in any of the studies. Another empirical study reported that household with more sick members were willing to pay more (21) which supports the notion that families with high illness rates or more prone to be ill, have a greater tendency to participate or to be members of the health prepayment scheme. The qualitative studies reiterated some crucial factors already highlighted in the quantitative studies and also pointed out some variables not measureable using quantitative methods.

Wealth quintile is stated as a socio-demographic factor revolving around the uptake of the scheme, and as shown by quantitative studies, affordability is a key factor affecting enrolment. Non-enrolled individuals collectively identified lack of means as the primary reason for not enrolling (33-35).

In terms of health related factors, perception of the quality of health care also affects enrolments. Respondents criticized excessive prescribing, long waiting times, differential treatment, health provider's attitude and technical incompetence amongst providers, irrespective of enrolment status (33)(36-38)

In order to summarize the above-mentioned results, the main variables that were measured by most studies and reiterated in both quantitative and qualitative studies as affecting enrolment included low levels of income and lack of financial resources. Another predominant reason for low uptake was poor quality of health care services in terms of drug availability and medical supply, attitude of health care workers, patient waiting time and efficiency of treatment.

Furthermore, one impact variable common in both types of studies (although reported by almost all qualitative study) was the importance of trust in both the scheme and caregivers. This is because the nature of the CBHI scheme is voluntary; therefore level of trust is needed as it involves financial contribution of the respondents. Low levels of trust in the insurance scheme can also be a result of previous negative experiences with insurance schemes. Some socio-demographic factors that were linked to enrolment included education level, sex, age and household size.

It is also pertinent to note that although we did not restrict this study selection to a particular period, all studies included were done from 1990 onward. It could be inferred from the fact that community-based health insurance was not widely available before 1990 and the published literature only gained ground from this period onwards.

4.0 Limitations

For some variables or characteristics, variations were reported in the different countries. Some variables were positively significant while others are negatively significant, although this could be linked to contextual differences between countries. However, it makes reaching a conclusion with regards to that variable difficult. As stated above, most included quantitative studies were cross-sectional studies; although these are good quality studies, such study design is limiting. This study design has basic limitation in assessing the direction of causality between the outcomes and exposure and in generalization of findings beyond the population. Cross-sectional studies have the possibility of bias if there are differential investigations of individuals with the interested outcome.

Another limitation of this review is that only studies conducted in English were included. Some other studies that may meet the inclusion criteria but written in other languages were thus excluded.

4.1 Conclusion

Increasing enrolment is one of the most important challenges facing CBHI. Although schemes keep spreading in low- and middle-income countries, rates of enrolment remains low, this in turn affects the sustainability of the scheme.

This review has attempted to provide a comprehensive summary of the empirical evidence available, highlighting the most significant factors affecting uptake.

The studies included a focus on a range of factors including socio-demographic factors, health-related factors, software issues and social capital. These factors had different kind of effects and association

which point to the importance of considering a wide range of factors through various kinds of studies in order to understand and address their impact on uptake. There is paucity of evidence around CBHI schemes including their characteristics, benefit package, provider payment mechanisms, dimension of the scheme, and the role of government and community

However, based on the available evidence, lack of funds is still a major reason for the low uptake, hence it could be inferred that the reason for setting up CBHI schemes, may not be achieved, as the target population is still not benefiting from the scheme. Also, the role of non-governmental organizations and the public health system were not considered as none of the included studies considered this key area. There is a huge knowledge gap in this area, which requires further and thorough analysis in the context of CBHI uptake so that reasons for poor enrolment can be more adequately addressed.

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APPENDIX 1: PUBMED

	Query	Output
#10	#3 AND #9	968
#9	#4 OR #5 OR #6 OR #7 OR #8	2 334 216
#8	developing countries[MeSH Terms]	60 258
#7	(Low-income country OR lower-income country OR third-world country OR middle-income country)	100 779
#6	(Angola OR Republic of Angola OR Albania OR Republic of Albania OR Algeria OR The People's Democratic Republic of Algeria OR American Samoa OR Argentina OR Azerbaijan OR Belarus OR Belize OR Bosnia and Herzegovina OR Bosnia-Herzegovina OR Bosnia OR Botswana OR Brazil OR Federative Republic of Brazil OR Bulgaria OR China OR People's Republic of China OR Colombia OR Costa Rica OR Fiji OR Gabon OR Gabonese Republic OR Grenada OR Hungary OR Islamic Republic of Iran OR Persia OR Iran OR Iraq OR Jamaica OR Jordan OR Hashemite Kingdom of Jordan OR Kazakhstan OR Lebanon OR Lebanese Republic OR Libya OR State of Libya OR Macedonia OR Republic of Macedonia OR Malaysia OR Maldives OR Republic of the Maldives OR Maldive Islands OR Marshall Islands OR Republic of the Marshall Islands OR Palau OR Republic of Palau OR Panama OR Republic of Panama OR Peru OR Romania OR Serbia, OR the Republic of Serbia OR Seychelles OR the Republic of Seychelles OR South Africa OR Saint Lucia OR Saint Vincent and the Grenadines OR Suriname OR Thailand OR Kingdom of Thailand OR Tonga OR Kingdom of Tonga OR Tunisia OR Turkey OR Turkmenistan OR Turkmenia OR Cuba OR Dominica OR Commonwealth of Dominica OR The Dominican Republic OR Ecuador OR Mauritius OR Mexico OR United Mexican States OR Montenegro OR Namibia OR Tuvalu OR Ellice Islands OR Venezuela OR the Bolivarian Republic of Venezuela)	1 505 863
#5	(Armenia OR armenia OR Bhutan OR Kingdom of Bhutan OR Bolivia OR Plurinational State of Bolivia OR Cameroon OR Republic of Cameroon OR Republic of Cameroun OR Cape Verde OR Republic of Cape Verde OR Cote D'ivoire OR Ivory Coast OR Republic of Cote D'ivoire OR Djibouti OR Republic of Djibouti OR Arab Republic of Egypt OR Egypt OR El Salvador OR Georgia OR Ghana OR Republic of Ghana OR Guatemala OR Republic of Guatemala OR Guyana OR Co-operative Republic of Guyana OR Honduras OR Republic of Honduras OR Spanish Honduras OR Republic of Indonesia OR Indonesia OR India OR Republic of India OR Kiribati OR Republic of Kiribati OR Kosovo OR Kosovo and Metohija OR Laos OR Lao Lao People's Democratic Republic OR Lesotho OR Kingdom of Lesotho OR Mauritania OR Islamic Republic of Mauritania OR Micronesia, Fed. Sts. OR Federated States of Micronesia OR FSM OR Moldova OR Republic of Moldova OR Mongolia OR Morocco OR Kingdom of Morocco OR Nicaragua OR Republic of Nicaragua OR Nigeria OR Federal Republic of Nigeria OR Pakistan OR Islamic Republic of Pakistan OR Papua New Guinea OR Independent State of Papua New Guinea OR Paraguay OR Republic of Paraguay OR Philippines OR Republic of the Philippines OR Samoa OR Independent State of Samoa OR Sao Tome and Principe OR Democratic Republic of Sao Tome and Principe OR Senegal OR Republic of Senegal OR Solomon Islands OR Sri Lanka OR Democratic Socialist Republic of Sri Lanka OR Sudan OR Republic of the Sudan OR North Sudan OR Swaziland OR Kingdom of Swaziland OR Ngwane OR Yuwatini OR Syrian Arab Republic OR Syria OR East Timor OR Timor-leste OR Democratic Republic of Timor-leste OR Ukraine OR Uzbekistan OR Republic of Uzbekistan OR Vanuatu OR	594 912

	Republic of Vanuatu OR Vietnam OR the Socialist Republic of Vietnam OR West Bank and Gaza OR Yemen OR Yemeni Republic OR Zambia OR Republic of Zambia.)	
#4	(Afghanistan OR Islamic Republic of Afghanistan OR Bangladesh OR People's Republic of Bangladesh OR Benin OR Dahomey OR Republic of Benin OR Burkina Faso OR Burkina OR Republic of Upper Volta OR Burundi OR Republic of Burundi OR Cambodia OR Kingdom of Cambodia OR Central African Republic OR Chad OR Republic of Chad OR Comoros OR Union of the Comoros OR Democratic Republic of the Congo OR DR Congo OR Congo-Kinshasa OR DRC OR Zaire OR Eritrea OR State of Eritrea OR Ethiopia OR Federal Democratic Republic of Ethiopia OR The Gambia OR Republic of the Gambia OR Guinea OR Republic of Guinea OR Guinea-Conakry OR Guinea-Bissau OR Republic of Guinea-Bissau OR Haiti OR Republic of Haiti OR Kenya OR Republic of Kenya OR North Korea OR Democratic People's Republic of Korea OR Kyrgyz Republic OR Kyrgyzstan OR Liberia OR Republic of Liberia OR Madagascar OR Republic of Madagascar OR Malawi OR Republic of Malawi OR The Warm Heart of Africa OR Mali OR Republic of Mali OR Mozambique OR Republic of Mozambique OR Myanmar OR Burma OR Republic of the Union of Myanmar OR Nepal OR Democratic Republic of Nepal OR Niger OR Republic of Niger OR Rwanda OR Republic of Rwanda OR Sierra Leone OR Republic of Sierra Leone OR Somalia OR Federal Republic of Somalia OR South Sudan OR Republic of South Sudan OR Tajikistan OR Republic of Tajikistan OR Tanzania OR United Republic of Tanzania OR Republic of Tanganyika and Zanzibar OR Togo OR Togolese Republic OR Uganda OR Republic of Uganda OR Zimbabwe OR Republic of Zimbabwe OR Rhodesia)	278 419
#3	#1 AND #2	17 449
#2	"community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group"	2 396 128
#1	"health insurance"[MeSH Terms]	118 850

APPENDIX 2: Other electronic databases

Academic Search Premier via EBSCO

	Query	Field	Output
#3	#1 AND #2		2 979
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	abstract or author-supplied abstract	1 489 644
#1	("health insurance")	Subject terms	29 615

Africa-wide Information via EBSCO

	Query	Field	Output
#3	#1 AND #2		126
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstracts	194 489
#1	("health insurance")	Title	616

Business Source Premier via EBSCO

	Query	Field	Output
#3	#1 AND #2		4 235
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstract or author-supplied abstract	852 150
#1	("health insurance")	Subject terms	42 943

Sociological abstracts

	Query	Field	Output
#3	#1 AND #2		239
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstract	164 451
#1	("health insurance")	Subject heading	1 184

CINAHL

	Query	Field	Output
#3	#1 AND #2		227

#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstract	225 594
#1	("health insurance")	Title	2 064

EconLit via EBSCO

	Query	Field	Output
#3	#1 AND #2		286
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstract	56 051
#1	("health insurance")	Subject	2 126

ERIC via EBSCO

	Query	Field	Output
#3	#1 AND #2		419
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstract	254 733
#1	("health insurance")	Descriptor exact	1 598

Humanities

	Query	Field	Output
#3	#1 AND #2		42
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstracts	81 236
#1	("health insurance")	Subject terms	499

PsycInfo via EBSCO

	Query	Field	Output
#3	#1 AND #2		764
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstract	555 743
#1	("health insurance")	Subjects	3 406

SocIndex via EBSCO

	Query	Field	Output
#3	#1 AND #2		600
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstract	286 421
#1	("health insurance")	Subject terms	4 396

Scopus

	Query	Field	Output
#3	#1 AND #2		4 428
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstracts	5 136 251
#1	("health insurance")	Article, title and abstract	111 038

Africa Index Medicus

	Query	Field	Output
#1	("health insurance")	Title and Keyword	35

Cochrane (Trials and economic evaluation)

	Query	Field	Output
#1	"health insurance"	Title, abstracts, keywords	438

LILACS

	Query	Field	Output
#1	("health insurance") AND ("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Title, abstracts, subject	272

IndMED

	Query	Field	Output
#1	("health insurance")	Basic search	2

Social care online

	Query	Field	Output
#1	("health insurance")	Basic search	165

Web of Science

	Query	Field	Output
#3	#1 AND #2		812
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Title	500 794
#1	("health insurance")	Topic	17 417

Academic onefile

	Query	Field	Output
#3	#1 AND #2		523
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstracts	725 135
#1	("health insurance")	Subject	19 796

JSTOR

	Query	Field	Output
#3	#1 AND #2		139
#2	("community based" OR "rural" OR "mutual" OR "micro" OR "community" OR "group")	Abstracts	141 391
#1	("health insurance")	Title	1 800

Appendix 3: Excluded studies and reason for exclusion

Author	Year	Country	Reason for Exclusion
Asgary et al. (127)	2004	Iran	This study focused on health insurance (which could be any type of health insurance) not community-based health insurance specifically
Eckhardt et al. (128)	2011	Ecuador	This is a feasibility study and also identifying people's understanding and attitudes toward the presented CBHI model.
Dong et al. (129)	2004	Burkina Faso	This is also a feasibility study and willingness to pay was considered in terms of amount willing to pay and not factors that affect the willingness to pay
Criel et al. (111)	1998	Democratic Republic of Congo	The paper investigates social perceptions of the Bwamanda health insurance scheme, hence factors affecting enrolment is implicit in the study.
Barnighausen et al. (130)	2007	China	Considers informal sector workers' willingness to pay for social health insurance.
Tsutomu (131)	1999	Tokyo	Study was conducted in Tokyo, a high-income country.
Lofgren	2008	Vietnam	The study explored both mandatory and voluntary insurance broadly whereby voluntary insurance could be private health insurance or community-based health insurance, not specified.
Taylor et al. (132)	2006	America	The study looked at community-based programmes in the United States a high income country.
Dong et al.	2003	Burkina Faso	A comparison of the reliability of the take-it-or-leave-it and the bidding game approach to determine willingness to pay is the focus of this study. The study assessed the agreement between test and retest.
Walraven (133)	1996	Tanzania	Willingness to pay for district hospital services in a rural area, which is out-of-pocket payment at the point of health care.
Vellakkal (134)	2013	India	Determinant of enrolment in voluntary health insurance was considered not community-based health insurance specifically.

Appendix 4: Data Extraction Form

Section 1: Details of Reviewer

	Description	Comments
Name of reviewer		
Date reviewed (dd/mm/yyyy)		

Section 2: General information

Description of the study	Enter as appearing in the publication	Reference page/table or figure in the study
Study ID based on surname of first author and year (e.g. Ataguba 2008)		
Study reference		
Correspondence author and the contact details:		
Publication type	<input type="checkbox"/> Full text <input type="checkbox"/> Abstract <input type="checkbox"/> Governmental or governmental reports <input type="checkbox"/> Book chapter non-governmental reports <input type="checkbox"/> Other (specify)	
Informed consent obtained for study <i>(if applicable)</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear	
Ethical approval obtained for study <i>(if applicable)</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear	
Funding of study		
Notes/Comments		

Section 3: Study Eligibility Assessment

Characteristics	Tick or describe as appropriate	Reference page/table or figure in article
Primary study	<input type="checkbox"/> Yes (Primary) <input type="checkbox"/> No	
Type of study design		
Study conducted in LMIC (study setting)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Name of country		
Specify country income level	<input type="checkbox"/> Low-income country <input type="checkbox"/> Lower middle-income country <input type="checkbox"/> Upper middle-income country	Specify country income level
Study on CBHI or community health funds or micro-insurance or mutual health organizations or revolving drug fund or community-based health insurance or rural health insurance	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Final decision on study eligibility	<input type="checkbox"/> Yes <input type="checkbox"/> No (Include) (Exclude)	
Reason(s) for exclusion		

NB: Do not proceed to the next step if the study is excluded from the review

Section 4: Quantitative study characteristics

Characteristics	Measures	Description	Reference page/table or figure in the study
Socio-demographic characteristics	Sex		
	Age		
	Geographic location (urban or rural)		
	Education		
	Marital status		
	Employment status (include nature of employment)		
	Household size		
	Wealth quintile/class/income/expenditure/socio-economic status		
	Association Membership		
Benefit package (coverage)	Primary care		
	Secondary care		
	Tertiary care		
Health-related variables	Public health care facilities (utilization)		
	Private health care facilities (utilization)		
	Distance to health facility		
	Illness experience		
	State of health		
Mode of reimbursement	Lump sum		
	Third party		

	Incurred expenditure claim		
Mode of contribution	Flat rate		
	Income-rated		
	Risk-rated		
'Software' characteristic	Trust in fund administrators		
	Trust in insurance practitioners		
	Relationship between health care providers and patients		
Others (please specify)			

Section 5: Quality assessment tool for quantitative studies

Type of bias	Tick appropriately and describe below after the tick.	Reference page/table or figure in the study
Is there selection bias? (Assess comparability of groups at baseline, confounding and adjustment. For RCTs assess sequence generation and allocation concealment).	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear	
Is there performance bias? (Assess fidelity of the interventions, and quality of the information regarding who received which interventions, including blinding of study subjects and healthcare providers)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear	
Is there detection bias? (Assess whether there was biased and correct appraisal of outcomes, including blinding of assessors)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear	

Is there attrition bias? (Assess the completeness of sample, follow-up and outcome data, reasons for loss to follow-up explained)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear	
Is there reporting bias? (Assess selective reporting of results)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear	
Is there recalling bias (Assess selective recall of information)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear	
Other biases (specify)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear	

Section 6: Quantitative study findings/results

Characteristics		Reference page/table or figure in the study
Demographic characteristics		
Economic characteristic		
Benefit package		
Type of health care facilities		
Finances and service delivery		
'Software' characteristic		

Others (please specify)		
-------------------------	--	--

Section 7: Other relevant information

	Descriptions/figures as stated in report/paper/book chapter	Reference page/table or figure in the study
Key conclusions from the authors		
Notes		

Section 8: Qualitative study characteristics

Characteristics	Description	Reference page/table or figure in the study
Overall aim/purpose		
Research/analytical question(s)		
Methodology		
Geographical setting		
Cultural setting		
Participants		
Data eliciting: Survey (household, scheme, provider, others), Interviews, Focus group discussions.		
Notes (provide any other relevant information on the participants):		

Section 9: Quality Assessment Tool for Qualitative Studies ³⁷

Type of qualitative study	Participant observation	<i>[Yes/No/Unclear]</i>
	Open- ended interviews	<i>[Yes/No/Unclear]</i>
	Structured interviews	<i>[Yes/No/Unclear]</i>
	Please state other	
Was there a clear statement of the aims of the	In terms of a) goal of the research	<i>[Yes/No/Unclear]</i>

³⁷ <http://www.sph.nhs.uk/sph-files/casp-appraisal-tools/Qualitative%20Tool.pdf>

research?	b) its relevance	<i>[Yes/No/Unclear]</i>
Is a qualitative methodology appropriate?	Does the research seeks to interpret or illuminate the actions +/- subjective experiences of participants	<i>[Yes/No/Unclear]</i>
Is a theoretical perspective given	e.g. grounded theory (Please state)	
Sampling	Is the sampling strategy appropriate to address its aims?	
	Is it clearly described where a) sample was selected from?	<i>[Yes/No/Unclear]</i>
	b) why setting was chosen?	<i>[Yes/No/Unclear]</i>
	c) who was selected?	<i>[Yes/No/Unclear]</i>
	d) how sample was selected?	<i>[Yes/No/Unclear]</i>
	e) sample size justified?	<i>[Yes/No/Unclear]</i>
Incomplete data	Number + % of drop-outs for intervention group	
	Reasons for drop-out	
	No + % of drop-outs for control group	
	Reasons for drop out	
	Incomplete outcome data addressed?	
Data collection	Were the data collected in a way that addressed the research question? Is it clear:	
	a) where setting of the data collection was chosen?	<i>[Yes/No/Unclear]</i>
	b) why the setting was chosen?	<i>[Yes/No/Unclear]</i>
	c) that study objectives were explained to participants?	<i>[Yes/No/Unclear]</i>
	d) how data was collected?	<i>[Yes/No/Unclear]</i>
	e) how data was recorded?	<i>[Yes/No/Unclear]</i>
	f) who collected the data?	<i>[Yes/No/Unclear]</i>
Data analysis		
	Was data analysis sufficiently rigorous? Is it clear a) How analysis was done?	<i>[Yes/No/Unclear]</i>
	b) How themes categories were derived from data?	<i>[Yes/No/Unclear]</i>
	c) Method of analysis explained?	<i>[Yes/No/Unclear]</i>

	d) That results were fed back to participants?	<i>[Yes/No/Unclear]</i>
	e) Was triangulation used?	<i>[Yes/No/Unclear]</i>
	f) Was analysis repeated to ensure reliability by different researcher?	<i>[Yes/No/Unclear]</i>
Research partnership relations	Is it clear that researchers critically examined: a) their own role;	<i>[Yes/No/Unclear]</i>
	b) potential influence?	<i>[Yes/No/Unclear]</i>
	Was relationship between researchers and participants considered?	<i>[Yes/No/Unclear]</i>
Findings	a) Is it possible to summarize the findings?	<i>[Yes/No/Unclear]</i>
	b) Were the findings made explicit?	<i>[Yes/No/Unclear]</i>
	c) Were the findings easy to understand?	<i>[Yes/No/Unclear]</i>
	d) Are key concepts presented?	<i>[Yes/No/Unclear]</i>
	e) Is the interpretation clearly presented?	<i>[Yes/No/Unclear]</i>
Justification of the data interpretation	a) Were all the data taken into account?	<i>[Yes/No/Unclear]</i>
	b) Are quotes numbered/ identified?	<i>[Yes/No/Unclear]</i>
	c) Do authors explain how data were selected from original sample?	<i>[Yes/No/Unclear]</i>
	d) Do authors indicate links between data presented and their own interpretation of the data?	<i>[Yes/No/Unclear]</i>
	e) Are negative, unusual or contradictory cases presented?	<i>[Yes/No/Unclear]</i>
	f) Is there adequate discussion of the evidence both for and against authors' own interpretation?	<i>[Yes/No/Unclear]</i>
Transferability	a) Is there conceptual and theoretical congruence between this and other works?	<i>[Yes/No/Unclear]</i>
	b) Are the findings transferable to another population?	<i>[Yes/No/Unclear]</i>
Relevance and usefulness	How important are the findings to practice?	
Is there congruity between the research methodology and the research question or objectives?		<i>[Yes/No/Unclear]</i>

Is there congruity between the research methodology and the methods used to collect data?		<i>[Yes/No/Unclear]</i>
Is there congruity between the research methodology and the representation and analysis of data?		<i>[Yes/No/Unclear]</i>
Is there congruity between the research methodology and the interpretation of the results?		<i>[Yes/No/Unclear]</i>
Is there a statement locating the researcher culturally or theoretically?		<i>[Yes/No/Unclear]</i>
Is the influence of the researcher on the research, and vice versa addressed?		<i>[Yes/No/Unclear]</i>
Are participants and their voices adequately represented?		<i>[Yes/No/Unclear]</i>
Are the conclusions drawn in the research flow from the analysis or interpretation of the data?		<i>[Yes/No/Unclear]</i>

Section 10: Qualitative results/findings

	Descriptions/figures as stated in report/paper/book chapter	Reference page/table or figure in the study
Findings		
Key conclusions from the authors		
Notes		

Appendix 5: STROBE Statement—checklist of items that should be included in reports of observational studies

Item	
Title and abstract	1 (a) Indicate the study’s design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done
Background/rationale	2 Explain the scientific background and rationale for the investigation being reported
Objectives	3 State specific objectives, including any prespecified hypotheses
Study design	4 Present key elements of study design early in the paper
Setting	5 Describe the setting, locations, and relevant dates, including periods of recruitment,
Participants	6 (a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of (b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of
Variables	7 Clearly define all outcomes, exposures, predictors, potential confounders, and effect
Data sources/ measurement	8* For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there
Bias	9 Describe any efforts to address potential sources of bias
Study size	10 Explain how the study size was arrived at
Quantitative variables	11 Explain how quantitative variables were handled in the analyses. If applicable,
Statistical methods	12 (a) Describe all statistical methods, including those used to control for confounding (b) Describe any methods used to examine subgroups and interactions (c) Explain how missing data were addressed (d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed (e) Describe any sensitivity analyses

Results

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram
Descriptive	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information (b) Indicate number of participants with missing data for each variable of interest (c) <i>Cohort study</i> —Summarize follow-up time (e.g., average and total amount)
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity
Key results	18	Summarize key results with reference to study objectives
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision.
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity
Generalizability	21	Discuss the generalizability (external validity) of the study results

Other information

Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based
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*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Appendix 6: Authors Guideline



Instructions for authors

Research articles

Preparing main manuscript text

General guidelines of the journal's style and language are given [below](#).

Overview of manuscript sections for Research articles

Manuscripts for Research articles submitted to *BMC Medicine* should be divided into the following sections (in this order):

- [Title page](#)
- [Abstract](#)
- [Keywords](#)
- [Background](#)
- [Methods](#)
- [Results and discussion](#)
- [Conclusions](#)
- [List of abbreviations used](#) (if any)
- [Competing interests](#)
- [Authors' contributions](#)
- [Authors' information](#)
- [Acknowledgements](#)
- [Endnotes](#)
- [References](#)
- [Illustrations and figures](#) (if any)
- [Tables and captions](#)
- [Preparing additional files](#)

The **Accession Numbers** of any nucleic acid sequences, protein sequences or atomic coordinates cited in the manuscript should be provided, in square brackets and include the corresponding database name; for example, [EMBL:AB026295, EMBL:AC137000, DDBJ:AE000812, GenBank:U49845, PDB:1BFM, Swiss-Prot:Q96KQ7, PIR:S66116].

Title page

The title page should:

- provide the title of the article
- list the full names, institutional addresses and email addresses for all authors
- indicate the corresponding author

Please note:

- the title should include the study design, for example "A versus B in the treatment of C: a randomized controlled trial X is a risk factor for Y: a case control study"
- abbreviations within the title should be avoided

Abstract

The Abstract of the manuscript should not exceed 350 words and must be structured into separate sections: **Background**, the context and purpose of the study; **Methods**, how the study was performed and statistical tests used; **Results**, the main findings; **Conclusions**, brief summary and potential implications. Please minimize the use of abbreviations and do not cite references in the abstract. **Systematic review registration**, if your reports the results of a controlled health care intervention, please list your registry, along with the unique identifying number (e.g. **Systematic review registration**: PROSPERO CRD0123456789). Please note that there should be no space between the letters and numbers of your registration number.

Keywords

Three to ten keywords representing the main content of the article

Background

The Background section should be written in a way that is accessible to researchers without specialist knowledge in that area and must clearly state - and, if helpful, illustrate - the background to the research and its aims. Reports of clinical research should, where appropriate, include a summary of a search of the literature to indicate why this study was necessary and what it aimed to contribute to the field. The section should end with a brief statement of what is being reported in the article.

Methods

The methods section should include the design of the study, the setting, the type of participants or materials involved, a clear description of all interventions and comparisons, and the type of analysis used, including a power calculation if appropriate. Generic drug names should generally be used. When proprietary brands are used in research, include the brand names in parentheses in the Methods section.

For studies involving human participants a statement detailing ethical approval and consent should be included in the methods section. For further details of the journal's editorial policies and ethical guidelines see ['About this journal'](#).

For further details of the journal's data-release policy, see the policy section in ['About this journal'](#).

Results and discussion

The Results and discussion may be combined into a single section or presented separately. Results of statistical analysis should include, where appropriate, relative and absolute risks or risk reductions, and confidence intervals. The Results and discussion sections may also be broken into subsections with short, informative headings.

Conclusions

This should state clearly the main conclusions of the research and give a clear explanation of their importance and relevance. Summary illustrations may be included.

List of abbreviations

If abbreviations are used in the text they should be defined in the text at first use, and a list of abbreviations can be provided, which should precede the competing interests and authors' contributions.

Competing interests

A competing interest exists when your interpretation of data or presentation of information may be influenced by your personal or financial relationship with other people or organizations. Authors must disclose any financial competing interests; they should also reveal any non-financial competing interests that may cause them embarrassment were they to become public after the publication of the manuscript.

Authors are required to complete a declaration of competing interests. All competing interests that are declared will be listed at the end of published articles. Where an author gives no competing interests, the listing will read 'The author(s) declare that they have no competing interests'.

When completing your declaration, please consider the following questions:

Financial competing interests

- In the past five years have you received reimbursements, fees, funding, or salary from an organization that may in any way gain or lose financially from the publication of this manuscript, either now or in the future? Is such an organization financing this manuscript (including the article-processing charge)? If so, please specify.
- Do you hold any stocks or shares in an organization that may in any way gain or lose financially from the publication of this manuscript, either now or in the future? If so, please specify.

- Do you hold or are you currently applying for any patents relating to the content of the manuscript? Have you received reimbursements, fees, funding, or salary from an organization that holds or has applied for patents relating to the content of the manuscript? If so, please specify.
- Do you have any other financial competing interests? If so, please specify.

Non-financial competing interests

Are there any non-financial competing interests (political, personal, religious, ideological, academic, intellectual, commercial or any other) to declare in relation to this manuscript? If so, please specify.

If you are unsure as to whether you, or one your co-authors, has a competing interest please discuss it with the editorial office.

Authors' contributions

In order to give appropriate credit to each author of a paper, the individual contributions of authors to the manuscript should be specified in this section.

According to [ICMJE guidelines](#), An 'author' is generally considered to be someone who has made substantive intellectual contributions to a published study. To qualify as an author one should 1) have made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; 2) have been involved in drafting the manuscript or revising it critically for important intellectual content; 3) have given final approval of the version to be published; and 4) agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content. Acquisition of funding, collection of data, or general supervision of the research group, alone, does not justify authorship.

We suggest the following kind of format (please use initials to refer to each author's contribution): AB carried out the molecular genetic studies, participated in the sequence alignment and drafted the manuscript. JY carried out the immunoassays. MT participated in the sequence alignment. ES participated in the design of the study and performed the statistical analysis. FG conceived of the study, and participated in its design and coordination and helped to draft the manuscript. All authors read and approved the final manuscript.

All contributors who do not meet the criteria for authorship should be listed in an acknowledgements section. Examples of those who might be acknowledged include a person who provided purely technical help, writing assistance, or a department chair who provided only general support.

Authors' information

You may choose to use this section to include any relevant information about the author(s) that may aid the reader's interpretation of the article, and understand the standpoint of the author(s). This may include details about the authors' qualifications, current positions they hold at institutions or societies, or any other relevant background information. Please refer to authors using their initials. Note this section should not be used to describe any competing interests.

Acknowledgements

Please acknowledge anyone who contributed towards the article by making substantial contributions to conception, design, acquisition of data, or analysis and interpretation of data, or who was involved in drafting the manuscript or revising it critically for important intellectual content, but who does not meet the criteria for authorship. Please also include the source(s) of funding for each author, and for the manuscript preparation. Authors must describe the role of the funding body, if any, in design, in the collection, analysis, and interpretation of data; in the writing of the manuscript; and in the decision to submit the manuscript for publication. Please also acknowledge anyone who contributed materials essential for the study. If a language editor has made significant revision of the manuscript, we recommend that you acknowledge the editor by name, where possible.

The role of a scientific (medical) writer must be included in the acknowledgements section, including their source(s) of funding. We suggest wording such as 'We thank Jane Doe who provided medical writing services on behalf of XYZ Pharmaceuticals Ltd.'

Authors should obtain permission to acknowledge from all those mentioned in the Acknowledgements section.

Endnotes

Endnotes should be designated within the text using a superscript lowercase letter and all notes (along with their corresponding letter) should be included in the Endnotes section. Please format this section in a paragraph rather than a list.

References

All references, including URLs, must be numbered consecutively, in square brackets, in the order in which they are cited in the text, followed by any in tables or legends. Each reference must have an individual reference number.. If automatic numbering systems are used, the reference numbers must be finalized and the bibliography must be fully formatted before submission.

Only articles, datasets, clinical trial registration records and abstracts that have been published or are in press, or are available through public e-print/preprint servers, may be cited; unpublished abstracts, unpublished data and personal communications should not be included in the reference list, but may be included in the text and referred to as "unpublished observations" or "personal

communications" giving the names of the involved researchers. Obtaining permission to quote personal communications and unpublished data from the cited colleagues is the responsibility of the author. Footnotes are not allowed, but endnotes are permitted. Journal abbreviations follow Index Medicus/MEDLINE. Citations in the reference list should include all named authors, up to the first 30 before adding '*et al.*'..

Any *in press* articles cited within the references and necessary for the reviewers' assessment of the manuscript should be made available if requested by the editorial office.

Style files are available for use with popular bibliographic management software:

- [BibTeX](#)
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Examples of the *BMC Medicine* reference style are shown [below](#). Please ensure that the reference style is followed precisely; if the references are not in the correct style they may have to be retyped and carefully proofread.

All web links and URLs, including links to the authors' own websites, should be given a reference number and included in the reference list rather than within the text of the manuscript. They should be provided in full, including both the title of the site and the URL, in the following format: **The Mouse Tumor Biology Database** [<http://tumor.informatics.jax.org/mtbwi/index.do>]. If an author or group of authors can clearly be associated with a web link, such as for weblogs, then they should be included in the reference.

Preparing illustrations and figures

Illustrations should be provided as separate files, not embedded in the text file. Each figure should include a single illustration and should fit on a single page in portrait format. If a figure consists of separate parts, it is important that a single composite illustration file be submitted which contains all parts of the figure. There is no charge for the use of color figures.

Please read our [figure preparation guidelines](#) for detailed instructions on maximising the quality of your [figures](#).

Formats

The following file formats can be accepted:

- PDF (preferred format for diagrams)
- DOCX/DOC (single page only)
- PPTX/PPT (single slide only)
- EPS
- PNG (preferred format for photos or images)

- TIFF
- JPEG
- BMP

Figure legends

The legends should be included in the main manuscript text file at the end of the document, rather than being a part of the figure file. For each figure, the following information should be provided: Figure number (in sequence, using Arabic numerals - i.e. Figure 1, 2, 3 etc); short title of figure (maximum 15 words); detailed legend, up to 300 words.

Please note that it is the responsibility of the author(s) to obtain permission from the copyright holder to reproduce figures or tables that have previously been published elsewhere.

Preparing a personal cover page

If you wish to do so, you may submit an image which, in the event of publication, will be used to create a cover page for the PDF version of your article. The cover page will also display the journal logo, article title and citation details. The image may either be a figure from your manuscript or another relevant image. You must have permission from the copyright to reproduce the image. Images that do not meet our requirements will not be used.

Images must be 300dpi and 155mm square (1831 x 1831 pixels for a raster image).

Allowable formats - EPS, PDF (for line drawings), PNG, TIFF (for photographs and screen dumps), JPEG, BMP, DOC, PPT, CDX, TGF (ISIS/Draw).

Preparing tables

Each table should be numbered and cited in sequence using Arabic numerals (i.e. Table 1, 2, 3 etc.). Tables should also have a title (above the table) that summarizes the whole table; it should be no longer than 15 words. Detailed legends may then follow, but they should be concise. Tables should always be cited in text in consecutive numerical order.

Smaller tables considered to be integral to the manuscript can be pasted into the end of the document text file, in A4 portrait or landscape format. These will be typeset and displayed in the final published form of the article. Such tables should be formatted using the 'Table object' in a word processing program to ensure that columns of data are kept aligned when the file is sent electronically for review; this will not always be the case if columns are generated by simply using tabs to separate text. Columns and rows of data should be made visibly distinct by ensuring that the borders of each cell display as black lines. Commas should not be used to indicate numerical values. Color and shading may not be used; parts of the table can be highlighted using symbols or bold text, the meaning of which should be explained in a table legend. Tables should not be embedded as figures or spreadsheet files.

Larger datasets or tables too wide for a portrait page can be uploaded separately as additional files. Additional files will not be displayed in the final, laid-out PDF of the article, but a link will be provided to the files as supplied by the author.

Tabular data provided as additional files can be uploaded as an Excel spreadsheet (.xls) or comma separated values (.csv). As with all files, please use the standard file extensions.

Preparing additional files

Although *BMC Medicine* does not restrict the length and quantity of data included in an article, we encourage authors to provide datasets, tables, movies, or other information as additional files.

Please note: All Additional files **will be published** along with the article. Do not include files such as patient consent forms, certificates of language editing, or revised versions of the main manuscript document with tracked changes. Such files should be sent by email to bmcmedicineditorial@biomedcentral.com, quoting the Manuscript ID number.

Results that would otherwise be indicated as "data not shown" can and should be included as additional files. Since many weblinks and URLs rapidly become broken, *BMC Medicine* requires that supporting data are included as additional files, or deposited in a recognized repository. Please do not link to data on a personal/departamental website. The maximum file size for additional files is 20 MB each, and files will be virus-scanned on submission.

Additional files can be in any format, and will be downloadable from the final published article as supplied by the author. We recommend CSV rather than PDF for tabular data.

Certain supported files formats are recognized and can be displayed to the user in the browser. These include most movie formats (for users with the Quicktime plugin), mini-websites prepared according to our guidelines, chemical structure files (MOL, PDB), geographic data files (KML).

If additional material is provided, please list the following information in a separate section of the manuscript text:

- File name (e.g. Additional file 1)
- File format including the correct file extension for example .pdf, .xls, .txt, .pptx (including name and a URL of an appropriate viewer if format is unusual)
- Title of data
- Description of data

Additional files should be named "Additional file 1" and so on and should be referenced explicitly by file name within the body of the article, e.g. 'An additional movie file shows this in more detail [see Additional file 1]'.

Additional file formats

Ideally, file formats for additional files should not be platform-specific, and should be viewable using free or widely available tools. The following are examples of suitable formats.

- Additional documentation
 - PDF (Adobe Acrobat)
- Animations
 - SWF (Shockwave Flash)
- Movies
 - MP4 (MPEG 4)
 - MOV (Quicktime)
- Tabular data
 - XLS, XLSX (Excel Spreadsheet)
 - CSV (Comma separated values)

As with figure files, files should be given the standard file extensions.

Mini-websites

Small self-contained websites can be submitted as additional files, in such a way that they will be browsable from within the full text HTML version of the article. In order to do this, please follow these instructions:

1. Create a folder containing a starting file called index.html (or index.htm) in the root.
2. Put all files necessary for viewing the mini-website within the folder, or sub-folders.
3. Ensure that all links are relative (ie "images/picture.jpg" rather than "/images/picture.jpg" or "http://yourdomain.net/images/picture.jpg" or "C:\Documents and Settings\username\My Documents\mini-website\images\picture.jpg") and no link is longer than 255 characters.
4. Access the index.html file and browse around the mini-website, to ensure that the most commonly used browsers (Internet Explorer and Firefox) are able to view all parts of the mini-website without problems, it is ideal to check this on a different machine.
5. Compress the folder into a ZIP, check the file size is under 20 MB, ensure that index.html is in the root of the ZIP, and that the file has .zip extension, then submit as an additional file with your article.

Style and language

General

Currently, *BMC Medicine* can only accept manuscripts written in English. Spelling should be US English or British English, but not a mixture.

There is no explicit limit on the length of articles submitted, but authors are encouraged to be concise. There is also no restriction on the number of figures, tables or additional files that can

be included with each article online. Figures and tables should be numbered in the order in which they are referred to in the text. Authors should include all relevant supporting data with each article.

Language editing

For authors who wish to have the language in their manuscript edited by a native-English speaker with scientific expertise, BioMed Central recommends [Edanz](#). BioMed Central has arranged a 10% discount to the fee charged to BioMed Central authors by Edanz. Use of an editing service is neither a requirement nor a guarantee of acceptance for publication. Please contact [Edanz](#) directly to make arrangements for editing, and for pricing and payment details.

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The abstract is one of the most important parts of a manuscript. For guidance, please visit our page on [Writing titles and abstracts for scientific articles](#).

Tim Albert has produced for BioMed Central a [list of tips](#) for writing a scientific manuscript. [American Scientist](#) also provides a list of resources for science writing. For more detailed guidance on preparing a manuscript and writing in English, please visit the [BioMed Central author academy](#).

Abbreviations

Abbreviations should be used as sparingly as possible. They should be defined when first used and a list of abbreviations can be provided following the main manuscript text.

Typography

- Please use double line spacing.
- Type the text unjustified, without hyphenating words at line breaks.
- Use hard returns only to end headings and paragraphs, not to rearrange lines.
- Capitalize only the first word, and proper nouns, in the title.
- All pages should be numbered.
- Use the *BMC Medicine* [reference format](#).
- Footnotes are not allowed, but endnotes are permitted.
- Please do not format the text in multiple columns.
- Greek and other special characters may be included. If you are unable to reproduce a particular special character, please type out the name of the symbol in full. **Please ensure that all special characters used are embedded in the text, otherwise they will be lost during conversion to PDF.**

Appendix 7: Plagiarism Declaration

1. I know that plagiarism is wrong. Plagiarism is using another's work and to pretend that it is one's own.
2. I have used the Biomedical Journal referencing style as the convention for citation and referencing. Each significant contribution to, and quotation in, this dissertation from the work, or works of other people has been attributed and has cited and referenced.
3. This dissertation is my own work.
4. I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as his or her own work.
5. I acknowledge that copying someone else's assignment or essay, or part of it, is wrong, and declare that this is my own work

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Signature Removed

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DATE: __13TH of February 2014_____