

**Review of Effective
Primary Care Models to
Prevent and Manage
Non-Communicable
Diseases**



Review of Effective Primary Care Models to prevent and Manage NCDs

A review of the literature in low and middle-income countries

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Authors: Mahua Das, Natalie King and Tim Ensor

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1. INTRODUCTION

The CHORUS (Community-Led Responsive and Effective Urban Health Systems) research programme is focused on improving the health systems in urban areas of four countries (Bangladesh, Ghana, Nepal and Nigeria). It has a particular emphasis on the needs of the poorest urban residents. Improving primary care services has been identified as a key need on most countries and in particular ensuring systems are able to provide good quality services for non-communicable diseases (NCDs) which are becoming more prevalent amongst this population.

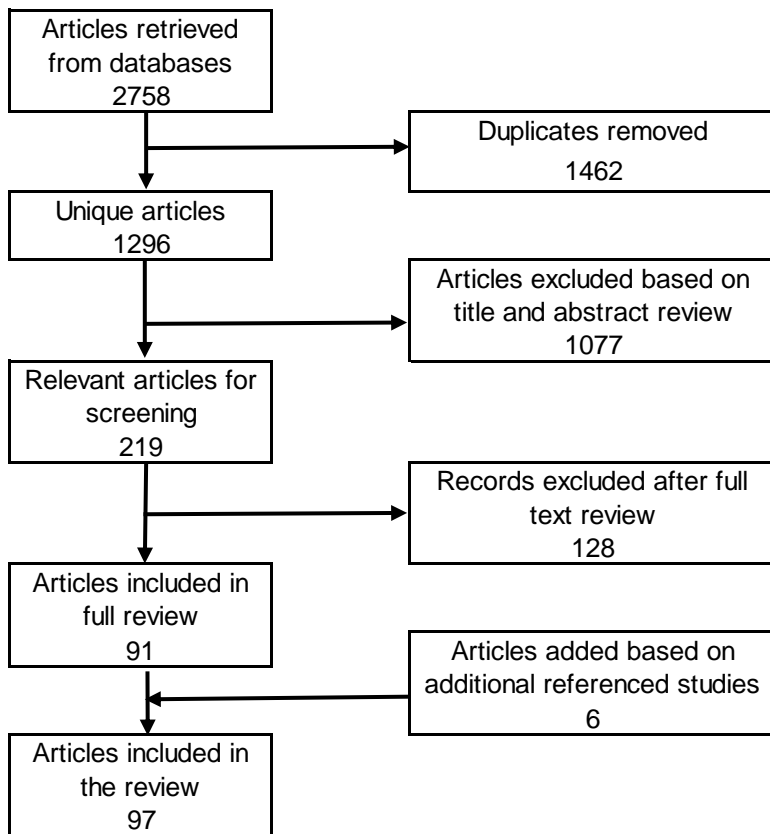
This review was undertaken to help inform the co-creation of interventions that improve primary care focused NCD services. It forms part of an evidence based on models available and their effectiveness. The review had two main objectives: i) scope out the evidence on models used to incorporate the prevention and management of non-communicable diseases into primary care in low- and middle-income countries (LMICs); and ii) document evidence of the effectiveness and where available cost-effectiveness of these approaches.

2. METHODS

We searched academic databases for studies on the integration of non-communicable disease care into urban primary care services in low and lower middle-income countries. Five databases were searched in April 2022: CAB Abstracts; Embase Classic and Embase; Global Health, Ovid Medline; and Web of Science. The searches were developed for the concepts: NCD, primary care integration and LMICs. Subject headings and free text words were identified for use in the search concepts by the Information Specialist and project team members. Further terms were identified and tested from known relevant papers. The low and lower middle countries were identified using the OECD 2022-23 DAC flows (OECD 2022). As this was rapid review the search was limited to studies published from 2000 onwards and because much of the focus on NCDs in LMICs has been since 2000 or later. The strategy was designed to remove protocol papers and studies primarily conducted in rural or village settings. The search was peer-reviewed by a second Information Specialist using the PRESS checklist (McGowan, Sampson et al. 2016). We also searched Health Systems Evidence <https://www.healthsystemsevidence.org/> using the following filters: Diseases- Non communicable diseases; Sectors- Primary care; and Area of focus- LMICS – Target document. The full search strategies are attached as Annex 1.

Search results were managed in an EndNote library where duplicates were removed automatically and manually using University of Leeds AUHE guidance (AUHE Information Specialists 2016). Further references were added as a result of searching reference lists of selected articles and in particular references to publications from the same study. Screening was performed by two reviewers using Rayyan software (Ouzzani, Hammady et al. 2016). Each reviewer initially screened half of the records with 20% of records second screened by the other reviewer. The two reviewers met to discuss and resolve any differences.

Figure 1: PRISMA diagram of searches



After removal of duplicates, 1,296 records were retrieved of which 1,077 could be excluded based on an initial review of the title and abstract. The full text of the remaining 219 articles was extracted and a further screening took place with a further 128 articles excluded (Figure 1). Most of these were excluded because they were not focused on primary care, did not present a model of NCD integration into primary care or were not focused on LMIC contexts. A number of opinion pieces and commentaries were also excluded.

No quality criteria were applied to the screened articles. The studies were however categorised to carry out a general bibliometric analysis. Categorisation fields were country, location (urban/rural/mixed/not specified), disease areas covered, focus of intervention, whether PEN package is explicitly mentioned, methods used in the study (type quantitative, type of qualitative etc), year of publication.

3. Results

3.1 Countries included

The retrieved articles included studies in 28 single countries in 62 studies, India and Nigeria accounted for 15 of these studies. A further five studies were conducted across two countries and 26 studies across multiple countries, many of these studies were reviews including systematic reviews.

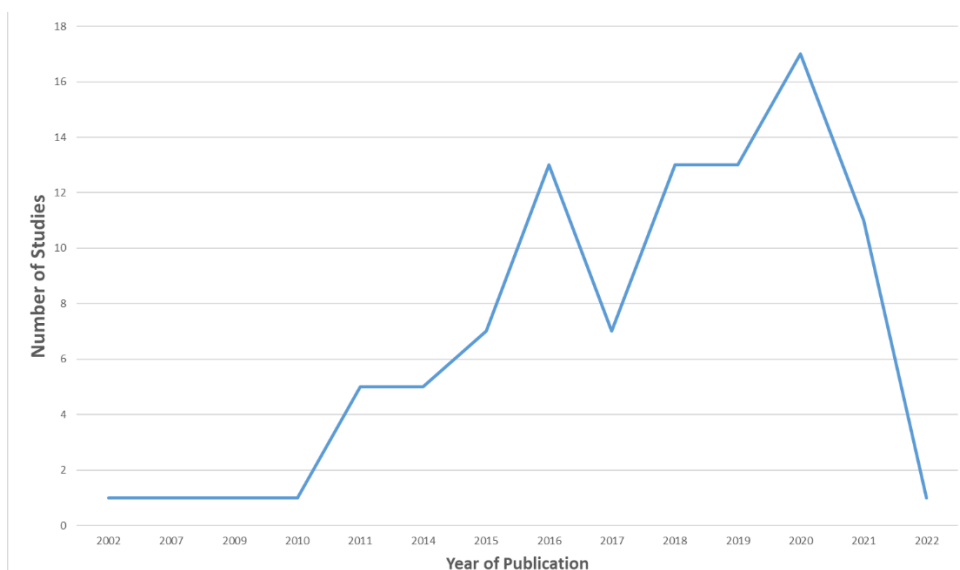
Table 1: Studies by country of focus

Single country				Multiple	
Bangladesh	1	Kenya	1	India-Pakistan	2
Bhutan	2	Lebanon	1	Tazania & Uganda	1
Botswana	1	Malawi	2	Nepal & India	1
China	1	Malaysia	2	Malawi & Zambia	1
DR Korea	1	Mexico	3		
DRC	1	Myanmar	1		
Equatorial Guinea	1	Nepal	4	SSA	4
Ethiopia	2	Nigeria	7	Humanitarian areas	1
Ghana	1	Pakistan	2	Asia-Pacific	2
Guinea	2	Palestine	1	Latin America	1
India	8	Philippines	2	Multiple	18
Indonesia	2	RSA	7		
Iran	2	Tajikistan	1		
Jamaica	1	Uganda	2		

Date of publication

Most of the studies (62) were published in the last five years (Figure 2). Although the review went back to 2000, it is perhaps unsurprising that almost all the studies (94/97) were published in 2010 or later when WHO began to focus strongly on NCDs with the publication of the first PEN (Package of Non-Communicable Diseases) package (WHO 2010).

Figure 2: Number of studies by year of publication



3.2 Disease areas covered

The most common NCD area focused on in the development of a model is mental health. Mental health services are the focus of 39 papers (41%), two of which focus on substance abuse; 21 (22%) covered cardiovascular/diabetes (metabolic syndrome) or diabetes on its own; while 19 studies (20%) cover NCDs more generally.

Table 2: Studies by NCD area of focus

Row Labels	Count of Country	%
Cardiovascular/diabetes	16	16%
Chronic Care	7	7%
Dementia	1	1%
Diabetes	9	9%
Epilepsy	1	1%
Mental health	37	38%
NCDs	17	18%
Palliative	4	4%
Respiratory	1	1%
HIV & NCDs	1	1%
Mental health (substance abuse)	2	2%
Cerebrovascular	1	1%
Grand Total	97	100%

3.3 Study types

Three main study types were found in the review: creation of models (23), evaluations of implemented models in one or more countries (57) and reviews of the literature (17).

Creation of models include high level policy analysis and advocacy, discussion of model development, formative studies that are usually empirical in nature and seek to understand the need for and availability of services and pilot implementation of integrated models.

A variety of evaluative designs are used in the studies. Out of 36 quantitative evaluations only 7 were randomised control trials. Two of these trials, in Ghana and Pakistan, were accompanied by qualitative process, in-depth evaluations. A number of other study designs are used including quasi-experimental (3), before and after with non-randomised control or comparison areas and 8 before and after without control. Two cohort designs were found where a group of patients are followed over time, before and after the intervention. Cross sectional evaluations were undertaken in two studies where intervention and comparison areas are compared after but not before the intervention. Only three studies focused on financial and economic evaluation: two cost-effectiveness studies and one cost-study.

There were 21 qualitative studies evaluating primary care interventions including feasibility studies that seek understand whether interventions are acceptable to patients and staff (2), process evaluations that provide information on how the intervention works in practice and to produce outcomes (3). There were also three mixed methods evaluations and five case study approaches both of which incorporate quantitative as well as qualitative data.

Table 3: Studies by methods used

Type of Study			
Creation of models		Quantitative evaluations	
Policy analysis	6	Trial	7
Model development	11	Quasi experimental	3
Formative Study	4	Before and after study (with comparison)	3
Pilot intervention	2	Before and after study (no comparison)	8
<i>All model creation</i>	<i>23</i>	Cross-sectional evaluation	2
		Cohort study	2
Reviews		Provider assessment	8
Systematic Review	8	Economic evaluation	2
Review of systematic reviews	1	Cost analysis	1
Other review	8	Mixed method/qualitative evaluations	
<i>All reviews</i>	<i>17</i>	Feasibility evaluation	2
		Process evaluation	4
		Mixed methods evaluation	3
		Case study evaluation	5
		Other qualitative	7
		<i>All evaluations</i>	<i>57</i>

3.4 Adapting the PEN package

Although the WHO’s PEN package is probably the best-known approach to addressing NCD service needs a relatively small number of studies (22, 23%) explicitly referenced PEN as the focus or part-focus of their intervention and evaluation (Figure 3). Five of these consider PEN amongst other packages. The others all suggest some adaptation to local context.

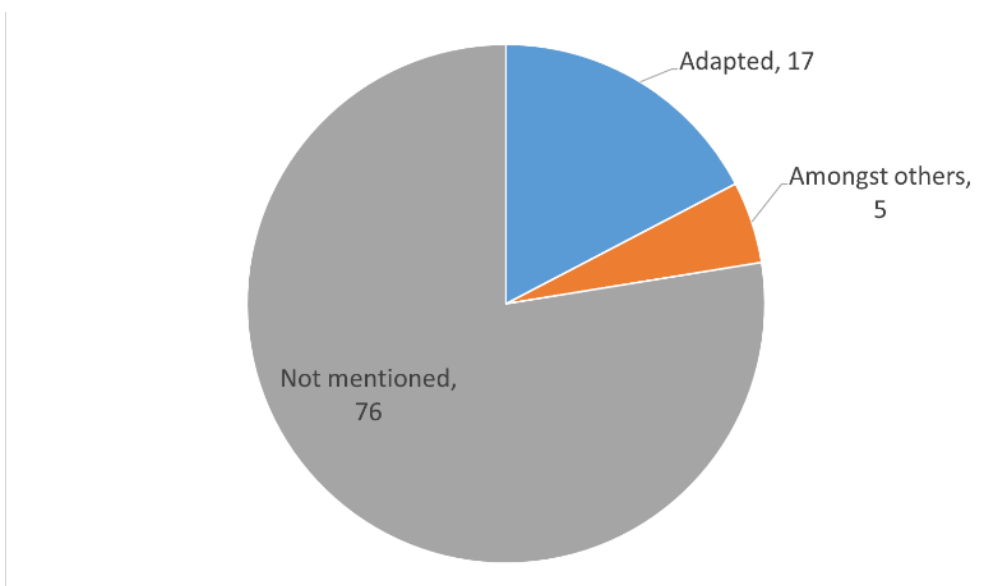


Figure 3: Studies explicitly focusing on the PEN package

Nine of the PEN-focused studies used quantitative methods to evaluate impact. There are three published trials in Ghana, Pakistan, and Tajikistan both implemented in rural and urban settings. The Ghana trial focuses on the inclusion of hypertension control as part of the insurance package and compares primary nurse-led care with services without such task shifting (Ogedegbe, Plange-Rhule et al. 2018). The study demonstrated non-inferiority of task-shifting compared to regular care, an important finding since it suggests that services can be moved to primary care safely and effectively. A companion process evaluation focused on the factors that facilitate effective operation of nurse-led care including availability of resources, patient goal setting and engagement and support from medical leaders (Gyamfi, Allegrante et al. 2020).

A study in Pakistan focused on diabetes management in primary care facilities with training on use of a care guideline (additional case management) provided in addition to the 'testing, treating and recording care provided to both control and intervention arms (Khan, Walley et al. 2018). No significant difference between the standard and enhanced case management was found. Part of the reason attributed for the finding of non-significance was that the control arm also received care that was substantially better than usual care. A supporting process evaluation focused on facility and patient behavioural factors that influence the effective uptake of care in both arms of the trial (Khan, Walley et al. 2018).

In Tajikistan, a pilot trial was undertaken of a diabetes and hypertension PEN intervention that provided training to doctors and nurses, clinical guidelines and a paper-based decision support tool at rural primary care facilities (Collins, Laatikainen et al. 2019). The pilot found significant improvements in blood pressure control in the intervention compared to control facilities.

Three of the PEN focused studies undertook evaluations using a before and after method without a control or comparison group. A study in Bhutan, focused on an intervention to train staff in screening and management of CVD/diabetes, augmented referral protocols for district hospitals and above to the protocols used within primary care (Wangchuk, Virdi et al. 2014). A study in Democratic Republic of Korea reported a significant reduction in CVD and diabetes risk factors in patients receiving primary care undergoing screening and testing (Hyon, Nam et al. 2017). In Democratic Republic of Congo, an evaluation of a training intervention focusing on protocols for clinical officers supported by community health workers found a statistically significant increase in consultation rates and treatment adherence (Ratnayake, Wittcoff et al. 2021).

There is one economic evaluation of PEN implementation in Indonesia (Rattanavipapong, Luz et al. 2016). The study makes use of a decision model that seeks to understand the probabilistic outcomes of three screening options (with variation for age and primary facility at which people can be screened) for hypertension/diabetes versus management only at primary care level. The study demonstrated that targeting screening at the over 40s (as opposed to those over 15) was more effective as well as more cost-effective.

Three of the studies focused on evaluating provider readiness to delivery primary-care led NCD services. A study using a validated health facility tool in Malawi and Zambia found that facilities were inadequately prepared to provide NCD service (Shiroya, Shawa et al. 2021). Similarly, a provider survey of facilities in Palestine found that only 40% of facilities were ready to provide PEN services (Albelbeisi, Albelbeisi et al. 2020). A study on implementing PEN in the Philippines after Typhoon Haiyan found that although all facilities surveyed had staff trained for PEN services, 44% were actually implementing PEN in terms of adhering to protocols and record keeping while only 19% had complete sets of PEN medicines (Martinez, Quintana et al. 2015).

3.5 Models of integration

This section presents a summary of the models identified in the literature that attempt to integrate NCDs care at primary care in low and low middle-income countries. Most of these models are based on providing care at the local

community level, particularly within the existing PHC system (James, Chisholm et al. 2002). This approach has yielded better NCD related health outcomes in terms of early screening and diagnosis, timely treatment and appropriate specialist care or referrals, where needed. The strengths could also be seen in widening the reach of the programme, enhanced ownership not only by the health workers but also the community in general. It also helps reduce fragmentation of health care service with more decentralisation at various levels to make service easy to access (Ventevogel 2014).

Overall, there are sixteen models of integration found in the literature spanning a variety of NCDs including mental health, diabetes, hypertension and cancer. Some of the models have been implemented in single countries while in other cases multiple countries are involved. Evidence of effectiveness varies hugely across the studies reviewed (see table 4).

1) Stepped care intervention: this approach is mostly used to address mental health needs in a primary care setting and includes screening, psychoeducation, problem solving therapy, which is implemented with anti-depressants and referral to mental health specialist, when necessary (Adewuya, Ola et al. 2019). One of the top priorities for this model is to maximize utilisation of available personnel and reduce the cost of management. It emphasizes that while simple psychological intervention may be provided to all participants by trained non-medical personnel, severe cases are treated or prescribed medication by medical personnel with referral to mental health specialists where required. The WHO mental health gap (mhGAP) project adopted the stepped care approach in Nigeria. A trial of the stepped care was undertaken in Nigeria, demonstrating significant improvements in mental health outcomes (Adewuya, Ola et al. 2019),

2) Mental Health Gap Action Programme, mhGAP (WHO, 2010) (WHO 2016): The World Health Organization (WHO) mhGAP was designed to provide a roadmap for governments in LMIC, to implement comprehensive mental health service reform that will address the challenges that hinder effective provision of care to those in need (Gureje, Abdulmalik et al. 2015, Siriwardhana, Adikari et al. 2016). It offers a complex matrix to guide the assessment and management of mental, neurological and substance use disorders, with an emphasis on pharmacological treatments and short structured psychotherapies, delivered by non-specialist health workers. The core components for this integration are training of general PHC providers in the mhGAP-IG, or adapted versions of mhGAP-IG and includes steps that will enhance patient care at the level of service delivery. A major objective of the programme is designed to assist non-specialists to recognize and offer evidence-based treatment to persons with one of nine priority mental, neurological and substance use disorders. For an effective programme, the WHO recommends that the mhGAP-IG be contextualized and adapted for the setting in which it is to be used. Contextualization is particularly important in settings where most primary care providers are non-specialists but are also mostly non-physician community health workers. Given that a crucial step in efforts to scale up mental health service is the training of primary care providers, users of mhGAP-IG are required to be trained in its use. Effective and well-conducted training is particularly necessary where the end users of the guide are non-physician community health workers. A limitation of the approach is ensuring that sufficient specialists are available to provide training to non-specialists in resource constrained LMIC contexts. A before and after study (without control) was undertaken in Nigeria to assess the model, (Gureje, Abdulmalik et al. 2015). This found improvements in worker knowledge and an increase in the use of services. The model has also been introduced and scaled up in Ethiopia, India, Nepal, Uganda, Sri Lanka and South Africa (Ventevogel 2014, Siriwardhana, Adikari et al. 2016, Petersen, Bhana et al. 2019).

3 Programme for Improving Mental Health Care

The Programme for Improving Mental Health Care (PRIME) programme focused on ways of implementing the mhGAP services and other interventions into the health systems of five countries (Ethiopia, India, Nepal, South Africa, and Uganda). It aimed to generate evidence on the implementation and scaling up of integrated packages of care for priority mental disorders in primary and maternal health care contexts in Ethiopia, India, Nepal, South Africa, and

Uganda (Lund, Tomlinson et al. 2012, Lund, Tomlinson et al. 2016). PRIME worked initially in one district or sub-district in each country, integrating mental health into primary care at three levels of the health system: the health care organisation, the health facility, and the community. It includes a strong emphasis on capacity building and the translation of research findings into policy and practice, with a view to reducing inequities and meeting the needs of vulnerable populations, particularly women and people living in poverty.

The package in Nepal, for example, was based on the mhGAP guideline at facility level together “brief psychosocial support derived from structured interventions adapted from the Healthy Activity Programme (HAP) and Counselling for Alcohol Problems (CAP), pharmacological management and follow-up for monitoring and treatment adherence” ... (Breuer, Subba et al. 2018). A before and after study including comparison areas has been used to evaluate the impact of the package in Nepal (Jordans, Garman et al. 2020, Upadhaya, Jordans et al. 2020). This suggested that management at primary care level did not appear to be effective unless psychological treatments are included.

4) Manas: Manas was an approach to providing mental health support by training and equipping lay counsellors. The approach includes training, systematic steps to build trust, the passage of time, the observable impacts on patient outcomes, and supervision by a visiting psychiatrist. However, the same study also found that private sector General Practitioners (GPs) did as well with or without the additional counsellor provided through the Manas intervention. A cluster RCT demonstrated, this is an effective intervention in the public sector primary care clinics in India (Patel, Araya et al. 2007).

5) Integrated care pathways (ICP): This model, implemented in Malaysia and focused on the management of post-stroke patients, was designed to act as a catalyst to improve the quality of care, service provision and delivery in low resource settings (Abdul Aziz, Mohd Nordin et al. 2017). It is structured around multi-disciplinary care plans for patients who need care management over an extended time period. It includes clear planning on the structure of care, co-ordination across providers and evidence-based care and standardization. This is done with the help of clear guidelines and by promoting the continuous evaluation of clinical practices and workflow processes. It also provides a useful guide through which to provide coordinated and comprehensive care for patients who have been discharged to the community after an acute stroke, and among patients who are solely managed in primary care/community public health care-centres after they present during later stages of stroke recovery. The reviewed study describes the development of the model and there is no evaluation of impact although a trial is planned.

6) Chronic Care Model: The chronic care model (CCM) was developed in the 1990s by Wagner (Glasgow, Tracy Orleans et al. 2001). CCM emphasises a number of elements of integrated care for NCDs crucially various support to patients and carers to enable care in community/home settings (e.g. support to enable self-management of illness) together with decision support to providers through training and improved information systems to enable them to better meet the needs of patients. It is a model that originated in high income contexts but has been used in some LMIC contexts including South Africa and Malaysia (Davy, Bleasel et al. 2015, Ariffin, Ramli et al. 2017).

7) Collaborative Care Model: The Collaborative Care Model is a model of integrated care approach to mental illness and linked physical NCDs that vests the overall responsibility of the programme with the primary care physician supported by a case manager and a mental health professional at the PHC level (Anwar, Kuppili et al. 2017). It has been tested in several LMIC and high-income settings including Jamaica and Chile (Abel, Richards-Henry et al. 2011, Anwar, Kuppili et al. 2017).

It includes various inter-linked components including capacity building/strengthening, strong referral systems, anti-stigma initiatives and lifestyle change adapted to the local socio-cultural contexts. It is a specialist community model, whereby psychologists and general practitioners, supported by specialists are trained within specialist programmes to provide community support and treatment for those with severe mental disorders. It followed evidence-based clinical guidelines providing pharmacotherapy as well as psychosocial interventions for diabetes, hypertension, and depression. It also included restructuring the roles of health-care providers; a team-based approach; task-shifting and

task-sharing by primary care providers and community health workers supervised by mental health specialists. This is conducted through several stages: (a) Case-finding for assessment of risk factors; (b) providing health education about the patient's illnesses, risk factors and treatment; (c) providing evidence-based pharmacotherapy; (d) providing brief psychosocial interventions; (e) teaching self-management skills; (f) active monitoring; (g) ensuring adherence to treatment; and (h) ensuring regular follow-up.

The Collaborative Care Model also identifies key actors and essential elements of a healthcare system that encourage high-quality chronic disease care: the community, the health system, self-management support, delivery system design, decision support and clinical information systems. Studies using the model emphasise a number of enabling factors. One factor is the quality of communication and building long standing relationships between health professionals and patients to provide support for self-management, seen as central to the quality of care at the primary health care level. Second, a focus on the decentralisation of the services which is generally associated with better health outcomes as services and care is made available closer to home and so more easily accessible. Third, the availability of essential medicines, diagnostics and trained personnel providing the essential package of care. Finally, strong coordination between the multiple healthcare providers (both formal and informal). This could be done by creating platforms for increased interaction between the various providers, across different systems of medicine, between public and private providers and developing well-defined referral processes to coordinate care between specialists and generalists.

8) Integrated Chronic Disease Management (ICDM) The ICDM is based on the principles of the chronic care model (CCM) and innovative care for chronic conditions (ICCC) framework to improve patient care and health outcomes (Lebina, Alaba et al. 2019, Lebina, Kawonga et al. 2020). The model was implemented in South Africa where a process evaluation and costing were undertaken (Lebina, Alaba et al. 2019, Lebina, Kawonga et al. 2020). The aim of the ICDM model is to provide a comprehensive chronic disease management that reduces unnecessary healthcare utilization and promotes self-management among patients. Patients who are incorporated into the ICDM model include adults and children with chronic communicable (HIV/AIDS and tuberculosis) and non-communicable (hypertension, diabetes, asthma, chronic obstructive pulmonary disease, mental health and epilepsy) diseases. The model consists of four inter related components, namely: (a) facility re-organization - including management of patient-flow, bookings and records to enhance clinic operational efficiency; (b) clinical supportive management- including strengthening of district clinical specialist team (DCST) and the training of nurses on management of conditions included in the ICDM; (c) assisted self-management- aiming to empower patients to become involved in their disease management and be supported at community level; and (d) strengthening of support systems that includes community level support provided by ward-based outreach teams and community healthcare workers (CHCW).

9) The Wonca model: "Seven good reasons for integrating mental health care into primary care" proposed by WHO and the World Organization of Family Doctors (Wonca) promotes the adoption of the bio-psychosocial model for holistic care, reflecting the importance of mental health for individual well-being (Dowrick, Kassai et al. 2020). Seven domains have been identified as the core competencies of family doctors in mental health care namely: (a) values; (b) communication skills; (c) assessment; (d) management; (e) collaboration and referral; and (f) reflective practice. This model is based on a collaborative approach considered essential to address challenges facing mental health service delivery challenges. This gave the impetus for both organizations to embark on a partnership, which was launched in Singapore in November 2019, to promote the enhanced integration of mental health into primary care in the APEC region health service improvement. The model was developed relatively recently, and no evaluation evidence was found in the reviewed studies.

10) Pro Mujer Integrated model: this approach, which integrates health care into a microfinance programme, focuses on early intervention through health education, facilitating access to primary health services, allowing for screening and outreach with populations of women at high risk of NCDs. Pro Mujer is a non-governmental organization that provides microfinance with health and human development services for women in urban and peri-urban areas of

Argentina, Bolivia, Nicaragua, Peru, and Mexico (Geissler and Leatherman 2015). It has direct primary care delivery and a new screening programme focused on early diagnosis with prevention and management of NCDs. Primary care is delivered by physicians and nurses. In line with international definitions primary health services are characterized by first contact, accessibility, long-term relationships between patients and providers, and comprehensiveness (Starfield, 1992; Kruk et al., 2010). The design of Pro Mujer's health programmes was influenced by the perceived basic health needs of clients and preserving the, ongoing financial sustainability of the organization. A case study of the operation of Pro Mujer in the five countries suggested that the intervention was associated with substantial provision of preventive care (Geissler and Leatherman 2015). There is however no comparison with non-intervention areas or substantive time series analysis to understand the trends in care over time.

11) The Casalud model is a comprehensive primary healthcare model that enables proactive prevention and disease management throughout the continuum of care, using innovative technologies and a patient-centred approach (Tapiá-Conyer, Saucedo-Martinez et al. 2016). The model is developed and financed through the Carlos Slim Foundation, and neither the public healthcare system nor its users/beneficiaries incur any additional costs. The model operates through a five-pillar intervention, with each pillar having specific technologies that allow its implementation in primary health clinics (PHCs).

- (a) Proactive prevention and detection of chronic diseases, and includes two tools: the MIDO, Mobile Cart and the MIDO, Backpack. The Mobile Cart is an all-in-one system used in the primary care setting that includes medical equipment to measure weight, height, waist circumference, blood pressure, and glucose on site. The MIDO Backpack is a portable version of the MIDO system, and includes a tablet, glucometer, blood pressure cuff, and measuring tape to screen for diabetes, hypertension, and abdominal obesity.
- (b) Evidence-based management of chronic diseases using electronic information systems. These include the Chronic Disease Information System, and a Digital Portfolio for healthcare professionals (HCPs). This is a hybrid (online/offline) database where physicians can capture patient data on NCD care, thereby improving care quality by standardizing healthcare protocols and implementing continuous monitoring. It also processes patient data through a series of algorithms to classify patient health and follow-up status. The Digital Portfolio is also a diagnostic and management tool for HCPs and is comprised of applications and reference materials, including health calculators to estimate body mass index as well as cardiovascular and other health risks, and a digital library with national clinical practice guidelines.
- (c) Continuous monitoring of medication supply chain. This is carried out through AbastoNET which is an online information system that standardizes metrics for stock management at PHCs. Pharmacists use AbastoNET to register supply levels of medicines and lab tests, as well as stockouts of specific medicines. This pillar is aligned with other initiatives in developing countries that have attempted to denounce and raise awareness at a government level about inefficient supply chains, such as the Stop Stockouts programme in South Africa.
- (d) Capacity building through continuous medical education, is executed through the Online Interactive Platform for Health Education. It is a hybrid (online/offline) platform that confers two degrees with academic endorsement from national and foreign universities.
- (e) Patient engagement and empowerment, the practical tools of which are still in the design phase.

No trials or controlled quasi experimental studies of CASALUD were found. A recent retrospective observational study found that those treated in CASALUD were more likely have their diabetes controlled (Gallardo-Rincon, Montoya et al. 2021).

12) TASSH: According to the World Health Organization (WHO), task shifting is a process of delegation whereby tasks are moved, when appropriate, to less specialized health workers. Task shifting from physicians to allied healthcare professionals in primary care appears to increase service provision and cost-effectiveness for areas lacking healthcare resources and personnel. Services shifted include the provision of care and coordination of patients with chronic

diseases as well as independent prescribing (Leong, Teoh et al. 2021). Nurses are seen the cornerstone of many task-shifting programmes, and their perceptions of programme implementation can provide crucial information to improving the uptake of effective health intervention.

A task shifting strategy for hypertension (TASSH) management trial was completed in Ghana (Gyamfi, Allegrante et al. 2020). This programme aimed at mitigating the burden of hypertension in the Kumasi area, the Ashanti region of Ghana. As part of the study protocol, nurses from 32 district hospitals and community health centres (CHCs) randomized to intervention and control groups received training in the World Health Organization Package of Essential Non-communicable Disease Intervention for Primary Care (WHO-PEN). The training provided the nurses practical skills to enable them to diagnose, treat, and manage uncomplicated cases of hypertension that normally would be under the care of physicians. Its implementation was fostered by leadership engagement, including site directors relieving nurses from clinic duties to address the needs of their TASSH patients, and to attend TASSH trainings. The importance of leadership, access to resources, and education or knowledge of hypertension management were identified as key factors for success. Leadership was also crucial for access to resources including space in which to conduct TASSH visits.

13) M-Wellcare Intervention is a mobile health (mHealth) system incorporating integrated management of chronic conditions, evidence-based protocols, longitudinal health data and automated short-messaging service to reinforce compliance with to drug intake and follow-up visit, used by nurses at primary health care settings in India (Jindal, Gupta et al. 2018, Prabhakaran, Jha et al. 2019). These mHealth technologies are being advocated to strengthen the health system, and systematic reviews have shown that an mHealth-based Clinical Decision Support System (CDSS) improving preventive care and the physician's clinical decision quality in hypertension and diabetes management. The m-Wellcare intervention was developed in two stages: (a) development of the clinical algorithms and (b) development of the mHealth application. The intervention intended to address the gaps in usual care and optimize its utility, acceptability, and feasibility. The intervention was further refined on the basis of extensive pilot testing with the target users, health facility assessments, and a literature review. It was concluded that a lack of systematic assessment and evidence-based long-term management are the major reasons for suboptimal treatment of hypertension and diabetes in primary care. The m-Wellcare intervention was intended to address these gaps and was designed to optimize its utility, acceptability, and feasibility. An RCT in India found no significant difference between the intervention and control areas across a range of cardiovascular outcomes (Prabhakaran, Jha et al. 2019).

14) Mental Health Scale Up (MhSUN): The objectives of mhSUN (Eaton, Gureje et al. 2018) programme were (1) to develop a model for integration of mental health into primary care in Nigeria that is evidence-based, appropriate to the local context, feasible, accessible, and acceptable to those using the service and providing the service); (2) to evaluate the service, focusing particularly on key processes for successful implementation, as well as broad outcomes such as coverage, efficacy and user acceptability, and; (3) to use the results to advocate for service reform and investment by presenting convincing evidence, in an accessible and persuasive format to key decision-makers. Services were provided by primary health care workers who are mainly nurses, community health officers (CHO) and community health extension workers (CHEWs). CHOs and CHEWs are non-physician health workers who have received 2–3 years of post-high school training specifically designed to prepare them for providing essential first-line health care service close to the community. This training includes a component teaching 'standing orders' for mental health, however this is very brief, and there is little follow-up or support resulting in a low level of confidence to use this training. Capacity building of local health practitioners was provided using the mhGAP-IG training pack Ongoing support and skills development of practitioners included monthly supervision, and support for complex cases through outreach visits (collaborative care) to each clinic at least every month. A system of referral was put in place (stepped care), including downward referral from specialist care to community follow-up. Governance was provided through the established health systems structures, with particular attention to mental health aspects through a Steering Committee, made up of government, health service leaders and staff, community leaders, service users, and

programme personnel. In addition, the service was designed to comply with national and state legislation, policy and plans (Eaton et al. 2018)

15) PREVENIMSS is a comprehensive package of preventive services, a set of practices directed towards health promotion, nutrition, reproductive health, and the prevention, control and early detection of selected diseases (Borja-Aburto, Gonzalez-Anaya et al. 2016). The services are delivered by registered and practice nurses and are tailored to the following sex and age groups: children (aged <10 years), adolescents (aged 10–19 years), women (aged 20–59 years) and elderly adults (aged ≥60 years). Additionally, the programme provides written information to motivate health self-care and to empower users. Preventive practices for each age groups were determined by consensus of an expert group based on current scientific evidence and have been continually reviewed. The infrastructure to accommodate preventive services in each primary care facility was also remodelled, and nurses were trained in the new model. An intense social communication campaign was launched with radio and television advertisements to increase awareness regarding these preventive services. In addition to continuing with the successful control of communicable diseases (measles, whooping cough, tuberculosis, diarrhoea in children etc.) and strengthening practices to promote sexual and reproductive health, PREVENIMSS aims to reduce the NCD burden by promoting healthy lifestyles as well as by screening for selected diseases. Given the nature of these diseases and their long-term duration, the impact of the programme can be more seen in the long term.

16) CHETNA: The CHETNA NCD programme was established in April 2017 in the East Champaran district of the state of Bihar, which borders Nepal (Munday, Kanth et al. 2019). The project’s aim is to raise awareness of NCDs (particularly diabetes, hypertension, and cancer) in the population and among other stakeholders, including primary healthcare providers working in government primary healthcare centres and subhealth centres. It also aims to provide screening for hypertension, diabetes and oral cancer, to facilitate the provision of appropriate and affordable NCD management, and to provide holistic palliative care to those with advanced disease. The project is delivered by the community health department of the Duncan Hospital, Raxaul, building on work previously undertaken in various aspects of health, nutrition and sanitation. Palliative care is central to the project and is delivered according to a model of community palliative care based on home visits, developed by the Emmanuel Hospitals Association, which is appropriate for rural North India.

- The community health team, made up of experienced community health professionals, is led by a community medicine specialist, and includes a registered nurse who leads the palliative care service along with several community health workers who have received training in providing palliative care. Physicians and family practitioners from Duncan Hospital with palliative care experience support the palliative care team in undertaking home visits as necessary.
- Community health staff have been taught how to take blood pressure readings and use a glucometer to measure blood sugar. Working to strict protocols, they refer people found with raised blood pressure or blood sugar readings to Duncan Hospital for formal diagnosis and implementation of management. Oral surgeons have also taught the staff how to screen for oral cancer and precancerous lesions.
- Non-clinical community health team members have produced health education material in Hindi and undertake awareness-building events in the community, including in secondary schools. They have also worked with local community groups (called ‘Sewa Dal’), which were formed as part of a previous awareness-building programme for mental health.
- Government health workers including auxiliary nurse midwives who provide village-level healthcare are being trained at Duncan Hospital to provide follow-up and maintenance for patients who have been diagnosed with NCDs. The community team also visit people diagnosed with NCDs (not in need of palliative care) who are unable to easily travel for follow-up.
- Patients, particularly those with complex problems, for example suspected cancer, are asked to attend the hospital clinic on a Friday and Saturday, when they can be accompanied by team members through the busy clinics and helped to understand the need for ongoing therapy, particularly if it includes referral to a higher centre for cancer treatment

Preliminary evaluation suggests that a programme based on the synergy between primary care led NCD management, palliative care and community health provides a promising model for integrated NCD prevention and control in a low-income context. Communities are being mobilised to engage not just with individuals using the services on offer, but by becoming partners in spreading the message about NCD prevention and control. With some members of faith-based communities starting to volunteer in providing social and psychological support, it is envisaged that with time the community will become more involved in volunteering to provide care—an important aspect of a public health approach to palliative care. In addition, palliative care is providing an example and a context to teach primary healthcare staff communication skills, taking a patient-centred approach and arranging follow-up and continuity of care. Primary care professionals with appropriate training and support have been shown capable of providing effective NCD management in North India.

17) Rainbow Model: The Rainbow Model is a comprehensive framework that includes integrated care based on the main features of good primary care. Rensburg and Fourie argue that the primary care principles of first contact care, continuous care, comprehensive care, and coordinated care play a central role in the integration of care (van Rensburg and Fourie 2016). Then, integrated care is structured conceptually along micro, meso and macro dimensions wherein (a) macro level integration refers to vertical and horizontal system integration; (b) meso level integration in terms of inter-organisational integration, through market, hierarchy, and network mechanisms, as well as in terms of partnerships between professionals within and between different organisation; and (c) micro-level integration focused on clinical aspects of service to achieve a coherent and coordinated process of health care delivery to individual patients. This model has been applied in the context of Singapore to measure the degree of integration in national policies. While several strategies were mentioned in the policies, several were also absent. A lack of attention paid to clinical dimensions of integrated mental health care—for instance client participation, information provision to clients, individual multidisciplinary care plan, client satisfaction, and patient education.

4. Conclusion

Much of the literature describes models that are either still in development or undergoing feasibility testing. There are relatively few examples of rigorous final evaluations using trials, quasi-experimental designs or before and after studies with controls. Three of PEN interventions focusing on diabetes and hypertension utilised trial design as did the TASSH hypertension task-shifting intervention in Ghana and the mWellcome CVD/diabetes intervention in India. The PREVIMISS NCD model in Mexico made use of a quasi-experimental design. Two of the mental health integration models (Stepped care and Manas) were tested using trials. Most of the rest of the models focused on model development although a few did also include before and after data which allows some understanding of the trends in activities but without a comparison with a counterfactual.

A consistent theme across the various models of NCD integration is an emphasis on improving the linkages between community and primary provision and higher levels of care. Key components of this include linking primary levels to tertiary care, clear guidelines, engagement with community health workers, build support mechanisms, within community settings that are adapted to the local socio-cultural context.

Integration between services, in general, involves raising awareness, reducing stigma about the availability and accessibility of low-cost high-quality service in the general population and more specifically in the target population (Rahman, Mubbashar et al. 1998). It is also important to note that many people with (undetected) NCDs tend to initially visit traditional healers, faith healers and also general healthcare providers as a gateway to care. As a result, integrating mental healthcare into non-specialized healthcare can optimize both health outcomes further avoiding any fragmentation of services (Ventevogel 2014).

Integration of services can reduce inequality in service access at relatively low cost, encourage collaborative working across levels of care, facilitate more rapid referral and reduce fragmentation across services. Yet weaknesses of the integration strategies are also apparent. These include the risk of overburdening primary care staff where there are often already shortages, excess expectations that cannot be met given available local resources and often evident lack of supervision to ensure that work boundaries are identified and maintained (Madlala, Miya et al. 2020).

Although various integration approaches such as task-shifting, CCM and stepped-up care have had success in LMIC contexts to deal with health problems like mental health and NCD, each comes with its own limitations. Task-shifting as a cost-effective and “stop-gap” approach has been applied in multiple LMIC contexts but have some reported barriers particularly the lack of regulation of those that are trained, inconsistent approaches to training; poor employment practices and inadequate salaries for those that are given new tasks; and often a lack of supporting infrastructure (e.g. equipment, space) to exercise shifted tasks.

The importance of improving information systems is emphasised in the development and evaluation of many of the models. Importantly, these systems are more than simply a way of aggregating patient contact data into a management information system (although this is important) but are a vital part of the monitoring patient diagnostics, medicines and treatment that are ideally portable across health care providers. Manual or electronic recording of patient level data have been a key part of the implementation of PEN packages in the trials undertaken in Pakistan, Tajikistan and Ghana (Khan, Walley et al. 2018, Collins, Laatikainen et al. 2019, Gyamfi, Allegrante et al. 2020). The Collaborative Care Model and Casalud incorporate electronic patient information systems to ensure that patients receive consistent, evidence-based care.

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Table 4: Summary table of models and evidence of impact

	Model	Focus	Type of evidence	Result (if evaluation)	Countries	Main intervention	Study citations
	PEN	NCDs (with a focus on diabetes hypertension)	cRCT; process evaluation	Significant improvements in management in Ghana & Tajikistan. Not significant in Pakistan but control thought to be better than standard care	Ghana, Pakistan, Tajikistan	Largely guidelines & training	Ogedegbe, 2017; Gyamfi, 2020; Khan, 2020; Khan, 2018; Collins, 2019
			Before and after (no control)	Significant improvements in management.	Bhutan, DR Korea, DRC	Largely guidelines & training	Wangchuk, 2014; Hyon, 2017; Ratnayake, 2021
			Economic evaluation using decision model	Targeting over 40s cost-effective	Indonesia	Targeted screening	Rattanavipapong, 2016
1	Stepped care intervention	Mental health - depression	cRCT; process evaluation	60% improvement in outcomes	Nigeria	Task shifting	Adewuya, 2019
2	mhGAP	Mental Health	Before and after (no control); qualitative process	Improvements in worker knowledge, increase in use of services & referrals	Ethiopia, Nigeria, others	Task shifting	Petersen, 2019; Ventevogel, 2014; Gureje, 2015; Siriwardhana, 2016
3	Prime	Mental Health	Various: development of model, costing, impact evaluation		Ethiopia, India, Nepal, South Africa, and Uganda	Package of mental health services based on mhGAP package with context specific health system interventions.	Lund, Tomlinson et al. 2012; Lund, Tomlinson et al. 2016

	Model	Focus	Type of evidence	Result (if evaluation)	Countries	Main intervention	Study citations
			Before and After study with comparison	Primary care management may only be effective if includes psychological treatments	Nepal	Specialist supervision of PHC staff & referral pathways; supply chain improved.	Upadhaya, 2020; Jordans, 2020; Breuer, 2018
4	Manas	Mental health	cRCT	Both public and GP arm performed better than usual care	India	Lay counsellors	Patel et al 2010; Peirera
5	Integrated Care Pathways	Stroke care	Model development		Malaysia	Protocols	Abdul Aziz, 2017
6	Chronic Care Model		Model development; provider survey	Facilities generally well equipped but still large variation in readiness to deliver primary care NCD services	Malaysia, Philippines, Myanmar, RSA, other SSA		Castellanos-Joya, Delgado-Sanchez et al. 2014; Davy et al, 2015; Ariffin, 2017
7	Collaborative Care Model	Mental Health	Model development		Various: Chile, Jamaica, Nicaragua	Task shifting	Anwar, 2017
8	Integrated Chronic Disease Management		Process evaluation and costing	Variation in implementation fidelity	RSA	Facility reorganization, clinical supportive management and assisted self-management	Lebina, 2019; Lebina, 2020
9	Wonca model	Mental health	Framework & next steps		Asia-Pacific	Integration using digital technology	Dowrick, 2020

	Model	Focus	Type of evidence	Result (if evaluation)	Countries	Main intervention	Study citations
10	Pro Mujer	NCDs (mainly diabetes hypertension)]	Case study	Substantial preventive care provided - no before/after or comparison	Argentina, Bolivia, Mexico, Nicaragua, and Peru	Combining health with micro-finance	Geissler, 2015
11	Casalud	NCDs	Mixed methods evaluation (no comparison); observational study	Inhibitors and enablers to implementation identified; improved T2D control	Mexico	Prevention & management protocols, ehealth, training	Tapia-Conyer, 2016; Gallardo-Rincon, 2021)
12	TASSH	Hypertension control	cRCT; process evaluation	Significant reduction in SBP in insurance+ task shifting group (compared with insurance alone)	Ghana	Task shifting to community nurses combined with health insurance	Gyamfi, 202; Ogedegbe, 2018; Leong, 2021
13	mWellcome	Cardiovascular/ diabetes	cRCT	No significant difference between intervention and controls.	India	Electronic records & decision support	Prabhakaran, 2019; Jindal, 2018
14	mhSUN	Mental health	Model development/co-creation	NA	Nigeria	Task shifting	Eaton 2018
15	PREVIMISS	NCD	Quasi experiment	DID reduction in mortality from key NCDs (diabetes, hypertension, CVD)	Mexico	Training and communication on prevention	Borja-Aburto, 2016
16	CHETNA	Palliative care	Model development	NA	Nepal & India	Task shifting	Munday, 2019
17	Rainbow	Mental Health	Policy analysis	NA	SSA	Profesional integration & patient centred care	Van Rensburg, 2016

Annex 1: Detailed search strategy

CAB Abstracts (Ovid) <1910 to 2022 Week 13>

Search date: 6 April 2022

- 1 exp developing countries/ 2720594
- 2 exp least developed countries/ 266814
- 3 (low* income* adj3 (countr* or nation* or economy or economies)).tw,id. 8016
- 4 (middle income* adj3 (countr* or nation* or economy or economies)).tw,id. 56742
- 5 (low* middle adj3 (countr* or nation* or economy or economies)).tw,id.20086
- 6 (LMIC or LMICs).tw,id. 2493
- 7 ((LIC or LICs) adj3 (countr* or nation* or economy or economies)).tw,id. 104
- 8 "transition* countr*".tw,id. 474
- 9 ((underserved or "under served" or deprived or poor*) adj3 (country or countries or nation? or economy or economies)).tw,id. 4967
- 10 ((Developing or "under developed" or underdeveloped or "less* developed" or "third world") adj3 (country or countries or nation? or economy or economies)).tw,id. 2691047
- 11 ((Developing or "under developed" or underdeveloped or "less* developed") adj2 world).tw,id. 6569
- 12 ((Africa* not "African American*") or (Asia* not "Asian American*")).ti,ab,in,gl. 704086
- 13 africa/ or north africa/ or egypt/ or maghreb/ or algeria/ or egypt/ or morocco/ or syria/ or tunisia/ or yemen/ or africa south of the sahara/ or southern africa/ or angola/ or comoros/ or lesotho/ or mozambique/ or swaziland/ or zambia/ or zimbabwe/ or central africa/ or burundi/ or cameroon/ or central african republic/ or chad/ or congo/ or congo democratic republic/ or "sao tome and principe"/ or exp east africa/ or exp west africa/ 607894
- 14 central asia/ or afghanistan/ or kyrgyzstan/ or mongolia/ or tajikistan/ or uzbekistan/ or xinjiang/ or korea democratic people's republic/ or mongolia/ or south east asia/ or east timor/ or exp indochina/ or indonesia/ or myanmar/ or philippines/ or south asia/ or bangladesh/ or bhutan/ or india/ or nepal/ or pakistan/ or sri lanka/ or west asia/ or iran/ or exp palestine/ 1196427
- 15 exp Melanesia/ or exp micronesia/ or papua new guinea/ or central america/ or belize/ or el salvador/ or honduras/ or nicaragua/ or Haiti/ or ukraine/ 98445
- 16 (Afghanistan* or Angola* or Algeria* or Bangladesh* or Belize or Benin* or Bhutan* or Bolivia* or "Burkina Faso" or Burundi* or Burma or Burmese or "Cabo Verde" or "Cape Verde" or Cambodia* or Cameroon* or Chad or Comoros or Congo or "ivory coast" or "Cote D'Ivoire" or Djibouti* or Egypt* or "El Salvador" or Eritrea* or Eswatini or Ethiopia* or Gambia* or Ghana* or Guinea* or Haiti* or Honduras*).ti,ab,in,gl. 427327
- 17 (India or ((Indian or Indians) not "american indian*") or Indonesia* or Iran* or Kenya* or Kiribati* or "north korea*" or "DPR Korea*" or "Korea* DPR" or "democratic people* republic of Korea*" or "Korea* democratic people* republic" or "DPRK" or Kyrgyzstan* or Lesotho or Liberia* or "Lao P*" or Laos or Madagasca* or Malawi* or Mali or Mauritania* or Micronesia* or Mongolia* or Morocco* or Moroccan* or Mozambique* or Myanmar*).ti,ab,in,gl. 1352439
- 18 (Nepal* or Nicaragua* or Niger or Nigeria* or Pakistan* or "Papua New Guinea*" or Philippine* or Pilipin* or Filipin* or Rwanda* or Samoa* or "Sao Tome*" or Principe* or Senegal* or "Sierra Leone" or "Solomon Islands" or Somalia* or "Sri Lanka*" or "South America*" or Sudan* or Swaziland* or Syria* or Tajikistan* or Tanzania* or Timor

or Togo or Tokelau* or Tunisia* or Tuvalu or Uganda* or Ukrain* or Uzbekistan* or Vanuatu* or Vietnam* or "West Bank" or Gaza or Yemen* or Zambia* or Zimbabwe*).ti,ab,in. 614938

19 or/1-18 [LMIC and lower middle only, ODA DAC flow 2022-2023]3864230

20 primary health care/ 9274

21 ("primary care" or "primary healthcare").tw,hw. 10534

22 general practitioners/ 1846

23 (general practi* or GP* or GPs).tw,hw. 86051

24 or/20-23 [primary care] 99702

25 (non communicable disease* or noncommunicable disease* or NCD* or non-infectious disease*).tw,hw. 8515

26 chronic diseases/ 9075

27 (Chronic illness* or Chronic disease*).tw,hw. 25586

28 exp diabetes/ or chronic obstructive pulmonary disease/ or exp cardiovascular diseases/ or exp cerebrovascular disorders/ or exp neoplasms/ or exp asthma/ or hypertension/ or mental health/ or anxiety/ or depression/ or obesity/ or exp mental disorders/ 536432

29 ("cardiovascular disease*" or CVD or "heart attack*" or stroke* or hypertension or diabetes or cancer or asthma or COPD or "chronic obstructive pulmonary disease*" or depression or anxiety or "mental health*").tw,hw. 412733

30 (chronic respiratory or cerebrovascular disease* or CVD or obesity).tw,hw. 153416

31 or/25-30 [NCDs named and generic] 662226

32 (Integrat* adj4 (care or service* or program* or system*)).tw,hw. 41311

33 ((coordinat* or Co-ordinat*) adj4 (care or service* or program* or system*)).tw,hw. 5964

34 ((healthcare or care) adj model*).tw,hw. 796

35 ((vertical or horizontal) adj3 integrat*).tw,hw. 4008

36 integrated health*.tw,hw. 632

37 ((seamless or collaborat* or transmural) adj4 (care or healthcare)).tw,hw. 553

38 or/32-37 [integrated care] 52003

39 19 and 24 and 31 and 38 374

40 ((World Health Organization or WHO) adj3 ("package of essential" or PEN)).tw,hw. 28

41 WHO-PEN.tw,hw. 11

42 40 or 41 28

43 42 and 19 [WHO PEN in LMICS] 23

44 39 or 43 [NCD integration all] 396

45 protocol*.ti. 12428

46 villages/ or rural communities/ or rural settlement/ or rural health/ 38527

47 (rural* or village*).ti,hw. 230265

48 or/45-47 [exclusions] 242513

49 44 not 48 317

50 limit 49 to yr="2000 -Current" 316

Embase Classic+Embase (Ovid) <1947 to 2022 April 05>

Search date: 6 April 2022

1 developing country/ or low income country/ or middle income country/ 117579

2 (low* income* adj3 (countr* or nation* or economy or economies)).tw,kf. 12108

3 (middle income* adj3 (countr* or nation* or economy or economies)).tw,kf. 32500

- 4 (low* middle adj3 (countr* or nation* or economy or economies)).tw,kf.4260
- 5 (LMIC or LMICs).tw,kf. 9630
- 6 ((LIC or LICs) adj3 (countr* or nation* or economy or economies)).tw,kf. 416
- 7 "transition* countr*".tw,kf. 451
- 8 ((underserved or "under served" or deprived or poor*) adj3 (country or countries or nation? or economy or economies)).tw,kf. 7279
- 9 ((Developing or "under developed" or underdeveloped or "less* developed" or "third world") adj3 (country or countries or nation? or economy or economies)).tw,kf. 101935
- 10 ((Developing or "under developed" or underdeveloped or "less* developed") adj2 world).tw,kf. 12297
- 11 ((Africa* not "African American*") or (Asia* not "Asian American*")).ti,ab,in,kf. 623383
- 12 north africa/ or algeria/ or egypt/ or mauritania/ or morocco/ or tunisia/ or western sahara/ or iran/ or palestine/ or syrian arab republic/ or yemen/ or "africa south of the sahara"/ or angola/ or benin/ or burkina faso/ or burundi/ or cape verde/ or central africa/ or central african republic/ or chad/ or comoros/ or congo/ or cote d'ivoire/ or democratic republic congo/ or djibouti/ or eritrea/ or eswatini/ or ethiopia/ or gambia/ or ghana/ or guinea/ or guinea-bissau/ or kenya/ or lesotho/ or liberia/ or madagascar/ or malawi/ or mali/ or mayotte/ or mozambique/ or niger/ or nigeria/ or rwanda/ or sahel/ or senegal/ or sierra leone/ or exp somalia/ or south sudan/ or sudan/ or tanzania/ or togo/ or uganda/ or zambia/ or zimbabwe/ 347127
- 13 kyrgyzstan/ or tajikistan/ or exp uzbekistan/ or exp South Asia/ or southeast asia/ or cambodia/ or exp indonesia/ or laos/ or myanmar/ or papua new guinea/ or timor-leste/ or viet nam/ or North Korea/ or mongolia/ or philippines/ or exp "Federated States of Micronesia"/ or pacific islands/ or kiribati/ or exp samoan islands/ or solomon islands/ or tokelau/ or tuvalu/ or vanuatu/ 346884
- 14 belize/ or bolivia/ or el salvador/ or honduras/ or nicaragua/ or exp Ukraine/ 28895
- 15 (Afghanistan* or Angola* or Algeria* or Bangladesh* or Belize or Benin* or Bhutan* or Bolivia* or "Burkina Faso" or Burundi* or Burma or Burmese or "Cabo Verde" or "Cape Verde" or Cambodia* or Cameroon* or Chad or Comoros or Congo or "ivory coast" or "Cote D'Ivoire" or Djibouti* or Egypt* or "El Salvador" or Eritrea* or Eswatini or Ethiopia* or Gambia* or Ghana* or Guinea* or Haiti* or Honduras*).ti,ab,in. 555901
- 16 (India or ((Indian or Indians) not "american indian*") or Indonesia* or Iran* or Kenya* or Kiribati* or "north korea*" or "DPR Korea*" or "Korea* DPR" or "democratic people* republic of Korea*" or "Korea* democratic people* republic" or "DPRK" or Kyrgyzstan* or Lesotho or Liberia* or "Lao P*" or Laos or Madagasca* or Malawi* or Mali or Mauritania* or Micronesia* or Mongolia* or Morocco* or Moroccan* or Mozambique* or Myanmar*).ti,ab,in. 1569688
- 17 (Nepal* or Nicaragua* or Niger or Nigeria* or Pakistan* or "Papua New Guinea*" or Philippine* or Pilipin* or Filipin* or Rwanda* or Samoa* or "Sao Tome*" or Principe* or Senegal* or "Sierra Leone" or "Solomon Islands" or Somalia* or "Sri Lanka*" or "South America*" or Sudan* or Swaziland* or Syria* or Tajikistan* or Tanzania* or Timor or Togo or Tokelau* or Tunisia* or Tuvalu or Uganda* or Ukrain* or Uzbekistan* or Vanuatu* or Vietnam* or "West Bank" or Gaza or Yemen* or Zambia* or Zimbabwe*).ti,ab,in. 646872
- 18 or/1-17 [LMIC and lower middle only - based on 2022-2023 DAC flows] 3236465
- 19 exp primary health care/ 190418
- 20 ("primary care" or "primary healthcare").tw,kf. 188434
- 21 general practice/ 88642
- 22 (general practi* or GP or GPs).tw,kf. 184925
- 23 or/19-22 [primary care] 447231
- 24 non communicable disease/ 9271
- 25 (non communicable disease* or noncommunicable disease* or NCD* or non-infectious disease*).tw,kf. 26890

26 exp chronic disease/ 218077
 27 (Chronic illness* or Chronic disease*).tw,kf. 134354
 28 ("cardiovascular disease*" or CVD or "heart attack*" or stroke* or hypertension or diabetes or cancer or asthma or COPD or "chronic obstructive pulmonary disease*" or depression or anxiety or "mental health*").tw,kf. 5973272
 29 (chronic respiratory or cerebrovascular disease* or CVD or obesity).tw,kf. 550240
 30 exp *cardiovascular disease/ or *chronic obstructive lung disease/ or exp *cerebrovascular accident/ or exp *malignant neoplasm/ or exp *asthma/ or *mental health/ or exp *depression/ or exp *anxiety/ or exp *obesity/ or exp *mental disease/ 7888601
 31 or/24-30 [NCDs generic and named] 11048510
 32 integrated health care system/ 12539
 33 (Integrat* adj4 (care or service* or program* or system*)).tw,kf.99593
 34 ((coordinat* or Co-ordinat*) adj4 (care or service* or program* or system*)).tw,kf. 42971
 35 ((healthcare or care) adj model*).tw,kf. 13940
 36 ((vertical or horizontal) adj3 integrat*).tw,kf. 1454
 37 integrated health*.tw,kf. 8178
 38 ((seamless or collaborat* or transmural) adj4 (care or healthcare)).tw,kf.17999
 39 or/32-38 [integrated care systems] 171830
 40 ((World Health Organization or WHO) adj3 ("package of essential" or PEN)).tw,kf. 101
 41 WHO-PEN.tw,kf. 30
 42 40 or 41 101
 43 18 and 42 [PEN in LMICs] 45
 44 18 and 23 and 31 and 39 1010
 45 43 or 44 1052
 46 protocol*.ti. 96978
 47 rural health/ or exp rural health care/ 16013
 48 (rural* or village*).ti,kf. 88731
 49 or/46-48 [exclusions] 191252
 50 45 not 49 904
 51 limit 50 to conference abstract 204
 52 50 not 51 700
 53 limit 52 to yr="2000 -Current" 679

Global Health (Ovid) <1973 to 2022 Week 13>

Search date: 6 April 2022

1 exp developing countries/ 1011795
 2 exp least developed countries/ 122589
 3 (low* income* adj3 (countr* or nation* or economy or economies)).tw,id. 7344
 4 (middle income* adj3 (countr* or nation* or economy or economies)).tw,id. 35962
 5 (low* middle adj3 (countr* or nation* or economy or economies)).tw,id.11322
 6 (LMIC or LMICs).tw,id. 3694
 7 ((LIC or LICs) adj3 (countr* or nation* or economy or economies)).tw,id. 154
 8 "transition* countr*".tw,id. 228
 9 ((underserved or "under served" or deprived or poor*) adj3 (country or countries or nation? or economy or economies)).tw,id. 3405

- 10 ((Developing or "under developed" or underdeveloped or "less* developed" or "third world") adj3 (country or countries or nation? or economy or economies)).tw,id. 998053
- 11 ((Developing or "under developed" or underdeveloped or "less* developed") adj2 world).tw,id. 4493
- 12 ((Africa* not "African American*") or (Asia* not "Asian American*")).ti,ab,in,gl. 300637
- 13 africa/ or north africa/ or egypt/ or maghreb/ or algeria/ or egypt/ or morocco/ or syria/ or tunisia/ or yemen/ or africa south of the sahara/ or southern africa/ or angola/ or comoros/ or lesotho/ or mozambique/ or swaziland/ or zambia/ or zimbabwe/ or central africa/ or burundi/ or cameroon/ or central african republic/ or chad/ or congo/ or congo democratic republic/ or "sao tome and principe"/ or exp east africa/ or exp west africa/ 248810
- 14 central asia/ or afghanistan/ or kyrgyzstan/ or mongolia/ or tajikistan/ or uzbekistan/ or xinjiang/ or korea democratic people's republic/ or mongolia/ or south east asia/ or east timor/ or exp indochina/ or indonesia/ or myanmar/ or philippines/ or south asia/ or bangladesh/ or bhutan/ or india/ or nepal/ or pakistan/ or sri lanka/ or west asia/ or iran/ or exp palestine/ 411189
- 15 exp Melanesia/ or exp micronesia/ or papua new guinea/ or central america/ or belize/ or el salvador/ or honduras/ or nicaragua/ or Haiti/ or ukraine/ 21847
- 16 (Afghanistan* or Angola* or Algeria* or Bangladesh* or Belize or Benin* or Bhutan* or Bolivia* or "Burkina Faso" or Burundi* or Burma or Burmese or "Cabo Verde" or "Cape Verde" or Cambodia* or Cameroon* or Chad or Comoros or Congo or "ivory coast" or "Cote D'Ivoire" or Djibouti* or Egypt* or "El Salvador" or Eritrea* or Eswatini or Ethiopia* or Gambia* or Ghana* or Guinea* or Haiti* or Honduras*).ti,ab,in,gl. 165456
- 17 (India or ((Indian or Indians) not "american indian*") or Indonesia* or Iran* or Kenya* or Kiribati* or "north korea*" or "DPR Korea*" or "Korea* DPR" or "democratic people* republic of Korea*" or "Korea* democratic people* republic" or "DPRK" or Kyrgyzstan* or Lesotho or Liberia* or "Lao P*" or Laos or Madagasca* or Malawi* or Mali or Mauritania* or Micronesia* or Mongolia* or Morocco* or Moroccan* or Mozambique* or Myanmar*).ti,ab,in,gl. 424666
- 18 (Nepal* or Nicaragua* or Niger or Nigeria* or Pakistan* or "Papua New Guinea*" or Philippine* or Pilipin* or Filipin* or Rwanda* or Samoa* or "Sao Tome*" or Principe* or Senegal* or "Sierra Leone" or "Solomon Islands" or Somalia* or "Sri Lanka*" or "South America*" or Sudan* or Swaziland* or Syria* or Tajikistan* or Tanzania* or Timor or Togo or Tokelau* or Tunisia* or Tuvalu or Uganda* or Ukrain* or Uzbekistan* or Vanuatu* or Vietnam* or "West Bank" or Gaza or Yemen* or Zambia* or Zimbabw*).ti,ab,in. 220841
- 19 or/1-18 [LMIC and lower middle only, ODA DAC flow 2022-2023]1402990
- 20 primary health care/ 18720
- 21 ("primary care" or "primary healthcare").tw,hw. 24430
- 22 general practitioners/ 5063
- 23 (general practi* or GP* or GPs).tw,hw. 56953
- 24 or/20-23 [primary care] 84069
- 25 (non communicable disease* or noncommunicable disease* or NCD* or non-infectious disease*).tw,hw. 10270
- 26 chronic diseases/ 19145
- 27 (Chronic illness* or Chronic disease*).tw,hw. 39392
- 28 exp diabetes/ or chronic obstructive pulmonary disease/ or exp cardiovascular diseases/ or exp cerebrovascular disorders/ or exp neoplasms/ or exp asthma/ or hypertension/ or mental health/ or anxiety/ or depression/ or obesity/ or exp mental disorders/ 715574
- 29 ("cardiovascular disease*" or CVD or "heart attack*" or stroke* or hypertension or diabetes or cancer or asthma or COPD or "chronic obstructive pulmonary disease*" or depression or anxiety or "mental health*").tw,hw. 580786
- 30 (chronic respiratory or cerebrovascular disease* or CVD or obesity).tw,hw. 174030

31 or/25-30 [NCDs named and generic] 829416
 32 (Integrat* adj4 (care or service* or program* or system*)).tw,hw. 14332
 33 ((coordinat* or Co-ordinat*) adj4 (care or service* or program* or system*)).tw,hw. 3821
 34 ((healthcare or care) adj model*).tw,hw. 1476
 35 ((vertical or horizontal) adj3 integrat*).tw,hw. 307
 36 integrated health*.tw,hw. 1309
 37 ((seamless or collaborat* or transmural) adj4 (care or healthcare)).tw,hw. 1224
 38 or/32-37 [integrated care] 20422
 39 19 and 24 and 31 and 38 440
 40 ((World Health Organization or WHO) adj3 ("package of essential" or PEN)).tw,hw. 37
 41 WHO-PEN.tw,hw. 15
 42 40 or 41 37
 43 42 and 19 [WHO PEN in LMICS] 31
 44 39 or 43 [NCD integration all] 470
 45 protocol*.ti. 8587
 46 villages/ or rural communities/ or rural settlement/ or rural health/ 17063
 47 (rural* or village*).ti,hw. 90720
 48 or/45-47 [exclusions] 99091
 49 44 not 48 382
 50 limit 49 to yr="2000 -Current" 381

Ovid MEDLINE(R) ALL <1946 to April 04, 2022>

Search date: 5 April 2022

1 Developing Countries/ 79007
 2 (low* income* adj3 (countr* or nation* or economy or economies)).tw,kf. 9790
 3 (middle income* adj3 (countr* or nation* or economy or economies)).tw,kf. 28078
 4 (low* middle adj3 (countr* or nation* or economy or economies)).tw,kf.3180
 5 (LMIC or LMICs).tw,kf. 8005
 6 ((LIC or LICs) adj3 (countr* or nation* or economy or economies)).tw,kf. 295
 7 "transition* countr*".tw,kf. 351
 8 ((underserved or "under served" or deprived or poor*) adj3 (country or countries or nation? or economy or economies)).tw,kf. 5867
 9 ((Developing or "under developed" or underdeveloped or "less* developed" or "third world") adj3 (country or countries or nation? or economy or economies)).tw,kf. 104904
 10 ((Developing or "under developed" or underdeveloped or "less* developed") adj2 world).tw,kf. 9714
 11 ((Africa* not "African American*") or (Asia* not "Asian American*")).ti,ab,in,kf. 467002
 12 africa/ or africa, northern/ or Algeria/ or Egypt/ or Morocco/ or Tunisia/ or "africa south of the sahara"/ or africa, central/ or cameroon/ or central african republic/ or chad/ or congo/ or "democratic republic of the congo"/ or "sao tome and principe"/ or africa, southern/ or angola/ or eswatini/ or lesotho/ or malawi/ or mozambique/ or zambia/ or Zimbabwe/ or exp africa, eastern/ or exp africa, western/ 251350
 13 asia, central/ or kyrgyzstan/ or tajikistan/ or uzbekistan/ or asia, southeastern/ or cambodia/ or indochina/ or indonesia/ or laos/ or mekong valley/ or myanmar/ or philippines/ or timor-leste/ or vietnam/ or asia, western/ or bangladesh/ or bhutan/ or exp india/ or nepal/ or pakistan/ or sri lanka/ or "democratic people's republic of korea"/ or mongolia/ 217986

- 14 middle east/ or afghanistan/ or iran/ or syria/ or yemen/ or exp indian ocean islands/ or pacific islands/ or melanesia/ or papua new guinea/ or vanuatu/ or micronesia/ or Polynesia/ or exp samoa/ or haiti/ or belize/ or el salvador/ or honduras/ or nicaragua/ or bolivia/ or Ukraine/ 100678
- 15 (Afghanistan* or Angola* or Algeria* or Bangladesh* or Belize or Benin* or Bhutan* or Bolivia* or "Burkina Faso" or Burundi* or Burma or Burmese or "Cabo Verde" or "Cape Verde" or Cambodia* or Cameroon* or Chad or Comoros or Congo or "ivory coast" or "Cote D'Ivoire" or Djibouti* or Egypt* or "El Salvador" or Eritrea* or Eswatini or Ethiopia* or Gambia* or Ghana* or Guinea* or Haiti* or Honduras*).ti,ab,in. 404980
- 16 (India or ((Indian or Indians) not "american indian*") or Indonesia* or Iran* or Kenya* or Kiribati* or "north korea*" or "DPR Korea*" or "Korea* DPR" or "democratic people* republic of Korea*" or "Korea* democratic people* republic" or "DPRK" or Kyrgyzstan* or Lesotho or Liberia* or "Lao P*" or Laos or Madagasca* or Malawi* or Mali or Mauritania* or Micronesia* or Mongolia* or Morocco* or Moroccan* or Mozambique* or Myanmar*).ti,ab,in. 1019840
- 17 (Nepal* or Nicaragua* or Niger or Nigeria* or Pakistan* or "Papua New Guinea*" or Philippine* or Pilipin* or Filipin* or Rwanda* or Samoa* or "Sao Tome*" or Principe* or Senegal* or "Sierra Leone" or "Solomon Islands" or Somalia* or "Sri Lanka*" or "South America*" or Sudan* or Swaziland* or Syria* or Tajikistan* or Tanzania* or Timor or Togo or Tokelau* or Tunisia* or Tuvalu or Uganda* or Ukrain* or Uzbekistan* or Vanuatu* or Vietnam* or "West Bank" or Gaza or Yemen* or Zambia* or Zimbabw*).ti,ab,in. 429833
- 18 or/1-17 [LMIC and lower middle only - based on 2022-2023 DAC flows] 2234715
- 19 Primary Health Care/ 87245
- 20 ("primary care" or "primary healthcare").tw,kf. 138479
- 21 exp general practice/ 77260
- 22 (general practi* or GP or GPs).tw,kf. 134277
- 23 or/19-22 [primary care] 316257
- 24 Noncommunicable Diseases/ 2290
- 25 (non communicable disease* or noncommunicable disease* or NCD? or non-infectious disease*).tw,kf. 18860
- 26 Chronic Disease/ 274507
- 27 (Chronic illness* or Chronic disease*).tw,kf. 94441
- 28 or/24-27 [generic NCDs] 361693
- 29 Diabetes Mellitus/ or exp Cardiovascular Diseases/ or exp Pulmonary Disease, Chronic Obstructive/ or exp Stroke/ or exp neoplasm/ or Asthma/ or Mental Health/ or Depression/ or exp Mental disorders/ or obesity/ 7831828
- 30 ("cardiovascular disease*" or CVD or "heart attack*" or stroke* or hypertension or diabetes or cancer or asthma or COPD or "chronic obstructive pulmonary disease*" or depression or anxiety or "mental health*").tw,kf. 4048535
- 31 (chronic respiratory or cerebrovascular disease* or CVD or obesity).tw,kf. 361348
- 32 or/28-31 [NCDs named and generic] 9499562
- 33 "Delivery of Health Care, Integrated"/ 13876
- 34 (Integrat* adj4 (care or service* or program* or system*)).tw,kf.76736
- 35 ((coordinat* or Co-ordinat*) adj4 (care or service* or program* or system*)).tw,kf. 31125
- 36 ((healthcare or care) adj model*).tw,kf. 9942
- 37 ((vertical or horizontal) adj3 integrat*).tw,kf. 1265
- 38 integrated health*.tw,kf. 5568
- 39 ((seamless or collaborat* or transmural) adj4 (care or healthcare)).tw,kf.12508
- 40 or/33-39 [integrated care] 131445

41 18 and 23 and 32 and 40 [integrated primary care for NCDs in Low and lower middle income countries] 755
 42 ((World Health Organization or WHO) adj3 ("package of essential" or PEN)).tw,kf. 74
 43 WHO-PEN.tw,kf. 24
 44 or/42-43 [WHO PEN] 74
 45 44 and 18 [WHO PEN in LMIC] 43
 46 41 or 45 [NCD integration all] 796
 47 protocol*.ti. 79326
 48 Rural Health/ or exp Rural Health Services/ 36881
 49 (rural* or village*).ti,kf. 78403
 50 or/47-49 [exclude study protocols and rural] 173465
 51 46 not 50 657
 52 limit 51 to yr="2000 -Current" 631

Web of science

Search date: 5 April 2022

Searched the following platforms simultaneously

- Science Citation Index Expanded (SCI-EXPANDED)--1900-present
- Social Sciences Citation Index (SSCI)--1900-present
- Arts & Humanities Citation Index (AHCI)--1975-present
- Conference Proceedings Citation Index – Science (CPCI-S)--1990-present
- Conference Proceedings Citation Index – Social Science & Humanities (CPCI-SSH)--1990-present
- Emerging Sources Citation Index (ESCI)--2015-present

26 #23 NOT #24 699 limit 2000-01-2010 to 2022-12-31
 25 #23 NOT #24 707
 24 protocol* OR rural OR village* (Title) 311,370
 23 #22 OR #20 839
 22 #21 AND #7 47
 21 ("World Health Organization" or WHO) NEAR/3 ("package of essential" or PEN) (Topic) or "WHO-PEN" (Topic)
 163
 20 #19 AND #12 AND #7 AND #8 793
 19 #18 OR #17 OR #16 OR #15 OR #14 OR #13 376,401
 18 (seamless or collaborat* or transmural) NEAR/4 (care or healthcare) (Topic) 15,829
 17 "integrated health*" (Topic) 5,875
 16 (vertical or horizontal) NEAR/3 integrat* (Topic) 8,472
 15 (healthcare or care) NEAR/0 (model or models) (Topic) 10,628
 14 (coordinat* or Co-ordinat*) NEAR/4 (care or service* or program* or system*) (Topic) 82,741
 13 Integrat* NEAR/4 (care or service* or program* or system*) (Topic) 269,793
 12 #9 OR #10 OR #11 5,864,989
 11 "cardiovascular disease*" or CVD or "heart attack*" or stroke* or hypertension or diabetes or cancer or
 asthma or COPD or "chronic obstructive pulmonary disease*" or depression or anxiety or "mental health" or "chronic
 respiratory" or "cerebrovascular disease*" or CVD or obesity (Topic) 5,804,659
 10 "chronic illness*" or "Chronic disease*" (Topic) 102,227

- 9 "non communicable disease*" or "noncommunicable disease*" or NCD* or "non-infectious disease*" (Topic) 23,421
- 8 "primary care" or "primary healthcare" or "general practi*" or GP or GPs (Topic) 358,415
- 7 #6 OR #5 OR #4 OR #3 OR #2 OR #1 6,794,653
- 6 Nepal* or Nicaragua* or Niger or Nigeria* or Pakistan* or "Papua New Guinea*" or Philippine* or Pilipin* or Filipin* or Rwanda* or Samoa* or "Sao Tome*" or Principe* or Senegal* or "Sierra Leone" or "Solomon Islands" or Somalia* or "Sri Lanka*" or "South America*" or Sudan* or Swaziland* or Syria* or Tajikistan* or Tanzania* or Timor or Togo or Tokelau* or Tunisia* or Tuvalu or Uganda* or Ukrain* or Uzbekistan* or Vanuatu* or Vietnam* or "West Bank" or Gaza or Yemen* or Zambia* or Zimbabw* (Topic) or Nepal* or Nicaragua* or Niger or Nigeria* or Pakistan* or "Papua New Guinea*" or Philippine* or Pilipin* or Filipin* or Rwanda* or Samoa* or "Sao Tome*" or Principe* or Senegal* or "Sierra Leone" or "Solomon Islands" or Somalia* or "Sri Lanka*" or "South America*" or Sudan* or Swaziland* or Syria* or Tajikistan* or Tanzania* or Timor or Togo or Tokelau* or Tunisia* or Tuvalu or Uganda* or Ukrain* or Uzbekistan* or Vanuatu* or Vietnam* or "West Bank" or Gaza or Yemen* or Zambia* or Zimbabw* (Address) 1,487,708
- 5 India or ((Indian or Indians) not "american indian*") or Indonesia* or Iran* or Kenya* or Kiribati* or "north korea*" or "DPR Korea*" or "Korea* DPR" or "democratic people* republic of Korea*" or "Korea* democratic people* republic" or "DPRK" or Kyrgyzstan* or Lesotho or Liberia* or "Lao P*" or Laos or Madagasca* or Malawi* or Mali or Mauritania* or Micronesia* or Mongolia* or Morocco* or Moroccan* or Mozambique* or Myanmar* (Topic) or India or ((Indian or Indians) not "american indian*") or Indonesia* or Iran* or Kenya* or Kiribati* or "north korea*" or "DPR Korea*" or "Korea* DPR" or "democratic people* republic of Korea*" or "Korea* democratic people* republic" or "DPRK" or Kyrgyzstan* or Lesotho or Liberia* or "Lao P*" or Laos or Madagasca* or Malawi* or Mali or Mauritania* or Micronesia* or Mongolia* or Morocco* or Moroccan* or Mozambique* or Myanmar* (Address) 3,560,949
- 4 Afghanistan* or Angola* or Algeria* or Bangladesh* or Belize or Benin* or Bhutan* or Bolivia* or "Burkina Faso" or Burundi* or Burma or Burmese or "Cabo Verde" or "Cape Verde" or Cambodia* or Cameroon* or Chad or Comoros or Congo or "ivory coast" or "Cote D'Ivoire" or Djibouti* or Egypt* or "El Salvador" or Eritrea* or Eswatini or Ethiopia* or Gambia* or Ghana* or Guinea* or Haiti* or Honduras* (Topic) or Afghanistan* or Angola* or Algeria* or Bangladesh* or Belize or Benin* or Bhutan* or Bolivia* or "Burkina Faso" or Burundi* or Burma or Burmese or "Cabo Verde" or "Cape Verde" or Cambodia* or Cameroon* or Chad or Comoros or Congo or "ivory coast" or "Cote D'Ivoire" or Djibouti* or Egypt* or "El Salvador" or Eritrea* or Eswatini or Ethiopia* or Gambia* or Ghana* or Guinea* or Haiti* or Honduras* (Address) 991,838
- 3 (Developing or "under developed" or underdeveloped or "less* developed") NEAR/2 world (Topic) or (Africa* not "African American*") or (Asia* not "Asian American*") (Topic) or (Developing or "under developed" or underdeveloped or "less* developed") NEAR/2 world (Topic) or (Africa* not "African American*") or (Asia* not "Asian American*") (Address) 1,283,574
- 2 LMIC or LMICs or "transition* countr*" (Topic) or (underserved or "under served" or deprived or poor*) NEAR/3 (country or countries or nation* or economy or economies) (Topic) or (Developing or "under developed" or underdeveloped or "less* developed" or "third world") NEAR/3 (country or countries or nation\$ or economy or economies) (Topic) 240,569
- 1 "low* income*" NEAR/3 (countr* or nation* or economy or economies) (Topic) or "middle* income*" NEAR/3 (countr* or nation* or economy or economies) (Topic) or "low* middle" NEAR/3 (countr* or nation* or economy or economies) (Topic) 44,965

Health Systems Evidence

Search date: 7 April 2022 <https://www.healthsystemsevidence.org/>

Integrat* OR collaborat* OR Co-ordinat* NOT rural NOT protocol

Filter document by: (N=52)

- Diseases: Non communicable diseases
- Sectors: Primary care
- Area of focus: LMICS – Target document



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