
How to assess and prepare health systems in low- and middle-income countries for integration of services—a systematic review

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Abstract

Despite growing support for integration of frontline services, a lack of information about the pre-conditions necessary to integrate such services hampers the ability of policy makers and implementers to assess how feasible or worthwhile integration may be, especially in low- and middle-income countries (LMICs). We adopted a modified systematic review with aspects of realist review, including quantitative and qualitative studies that incorporated assessment of health system preparedness for and capacity to implement integrated services. We searched Medline via Ovid, Web of Science and the Cochrane library using terms adapted from Dudley and Garner's systematic review on integration in LMICs. From an initial list of 10 550 articles, 206 were selected for full-text review by two reviewers who independently reviewed articles and inductively extracted and synthesized themes related to health system preparedness. We identified five 'context' related categories and four health system 'capability' themes. The contextual enabling and constraining factors for frontline service integration were: (1) the organizational framework of frontline services, (2) health care worker preparedness, (3) community and client preparedness, (4) upstream logistics and (5) policy and governance issues. The intersecting health system capabilities identified were the need for: (1) sufficiently functional frontline health services, (2) sufficiently trained and motivated health care workers, (3) availability of technical tools and equipment suitable to facilitate integrated frontline services and (4) appropriately devolved authority and decision-making processes to enable frontline managers and staff to adapt integration to local circumstances. Moving beyond claims that integration is defined differently by different programs and thus unsuitable for comparison, this review demonstrates that synthesis is possible. It presents a common set of contextual factors and health system capabilities necessary for successful service integration which may be considered indicators of preparedness and could form the basis for an 'integration preparedness tool'.

Keywords: Integration, health services, health system, assessment, low- and middle-income countries

Key Messages

- Following a decade of highly targeted (mostly communicable) disease control efforts fuelled by global health initiatives, there is growing attention to, and support for the idea of more efficient and user-friendly integrated frontline services.
- However, the variable focus and scope of integration efforts have made cumulative and comparative analysis difficult, hindering development of comprehensive guidance for integration planning.
- Findings from this review identify five ‘contextual enablers’ and four ‘health system capabilities’ necessary for integration.
- The review makes a substantive contribution by providing the basis for developing preparedness tools or similar to assess health system readiness for future service integration.

Introduction

Health service integration—what it is, and whether it is beneficial—has been the subject of intense debate among global health practitioners and policy makers for a number of decades. Advocates of service integration have pointed to the potential for financial, operational and logistical efficiencies that promote sustainability (Msuya 2005); improve service accessibility and equity (Jacobs *et al.* 2012) and strengthen quality of care via service continuity and a more person-centred approach (De Maeseneer *et al.* 2008). Others have argued that integration may in fact reduce access and quality of care through ‘watered down’ service platforms that lack focus or data with which to monitor and evaluate (Atun *et al.* 2008).

Various definitions of integration reveal a range of foci and rationales. Adopting a largely technocratic and process-focussed approach, UNAIDS defines integration as the *joining together of different kinds of services or operational programmes in order to maximize outcomes* (UNAIDS 2011). The President’s Emergency Plan for AIDS Relief (PEPFAR) similarly defines integration as *the organization, coordination and management of multiple activities and resources to ensure the delivery of more efficient and coherent services* (Ryan 2011). Others have indicated the importance of defining integration in relation to the broader health system. Atun *et al.* (2010) for example defined integration as the *assimilation of health interventions into each of the critical functions of a health system*, including governance, financing, planning, service delivery, monitoring and evaluations and demand generation. Such definitions highlight the different levels (e.g. service, programme and policy) at which integration may take place but pay little attention to the way in which adopting or assimilating health services is influenced by the nature of the health system problem being addressed (e.g. access, equity or efficiency), the service or intervention and the unit of adoption.

Despite its intuitive appeal, evidence of the benefits of integration remains uncertain (Shigayeva *et al.* 2010). In part, this stems from the above noted variability in the focus and scope of integration efforts that make cumulative and comparative analysis difficult. Further compounding this variability however is the ‘limited experience in [...] conducting systematic analysis of [integration] experiences’ (Grépin and Reich 2008). Lack of information on the impact of integration as well as the necessary pre-conditions for achieving it (including assessment of the health systems within which integration must occur), continue to hamper the ability of policy makers and programme implementers to prospectively assess how feasible or worthwhile integration may be. Lack of information about the pre-conditions necessary for implementing a successful integration programme is particularly problematic in low- and middle-income countries (LMICs), as health systems vary widely in terms of the capacity and readiness to adopt and assimilate new programs, services or interventions (Dudley and Garner 2011).

Planning health service integration requires adequate assessment and preparedness. In this systematic review, we sought to identify, examine and synthesize the evidence from studies in the literature reporting on health system assessment, preparedness and planning towards integration of health services. We sought to understand the contextual factors which facilitate or act as barriers to the preparation of LMIC health systems for integration of services. The aim of this review was to identify what health system factors are critical enablers of successful health service integration in LMIC settings.

Methods

Our approach was framed by an understanding of health systems as dynamic and adaptive, characterized by interdependent relationships and constellations of power both within and outside the system (Atun 2012). Against this backdrop, we adopted the principles of a realist review (Pawson *et al.* 2005). Realist reviews embrace the relevance of evidence from diverse sources and use an iterative process to build and refine theory to better answer research questions. Such an approach offers a way of synthesizing literature that evaluates complex social interventions, such as that focusing on identifying and understanding *how* certain processes operate in each context to produce program outcomes—both intended and unintended.

Therefore, we began this systematic review with a broad definition of integration of frontline health services that involves the adoption and assimilation of one health service with another. This definition encompassed a range of integration models—including assimilation of a specialist into a generalist service (e.g. integration of voluntary HIV testing into routine outpatient checks); harmonization of two stand-alone services into one integrated service (e.g. integration of TB and HIV testing, care and treatment) or bundling of a series of services into a new package of ‘integrated’ care (e.g. Integrated Management of Childhood Illness).

Despite a large number of published articles referring in some way to integrated service-delivery, early in this review process we found a dearth of empiric research with sufficient detail to be able to carry out a true realist synthesis. We thus adopted a modified systematic review incorporating aspects of realist review, setting broader methodological parameters for inclusion than are typical in a traditional systematic review and adapting the research question to focus on evidence of circumstances and implementation strategies that contribute to the perceived success of frontline health service integration in LMICs.

Search strategy

We searched Medline via Ovid, Web of Science and the Cochrane library using the following terms: ‘needs assessment’, ‘preparedness’, ‘assessment’, ‘planning’, ‘Delivery of Health Care’, ‘Comprehensive

Health Care', 'Continuity of Patient Care', 'Primary Health Care', 'horizontal', 'vertical', 'coordination' and a list of LMICs as defined by the World Bank. The terms were adapted from a previous systematic review on strategies for integrating health services in LMICs at the point of delivery (Dudley and Garner 2011).

Inclusion criteria

The review included both quantitative and qualitative studies assessing preparedness and capacity to implement or integrate specific integrated interventions; studies describing the planning or preparation for frontline service integration; studies primarily on integration outcomes but with some information on assessment and planning and studies describing tools to assess preparedness for service integration. The review only included studies conducted in LMICs and included literature between 1980 and June 2015.

Exclusion criteria

The review excluded studies on preparedness for emergency or pandemics, those focused exclusively on the introduction of a new drug or diagnostic or those on interventions not intended to become routine. Studies published prior to 1980 and studies published in a language other than English were excluded.

Data review and synthesis

Application of the search terms during initial database searches yielded (after removal of duplicates) 6350 entries from Medline and an additional 4200 entries from Web of Science. Authors (*blinded for peer review*) independently reviewed titles and summaries against a criterion requiring only mention of health service integration in a LMIC. Independent selections were merged and compared and duplicates removed. Four hundred and forty-one articles were selected by both reviewers and retained; 36 articles that were identified by only one reviewer were discussed and consensus reached with 24 retained. Both reviewers independently reviewed the abstracts (where available) of short-listed articles against more explicit inclusion criteria, which required a description of the nature of the integration programme or intervention (e.g. the types of services being integrated and resourcing involved). The discordant selections were re-reviewed and discussed to reach consensus. Figure 1 illustrates the review process with 200 articles retained at the final stage. The reviewers independently synthesized and expounded on the themes of health system preparedness to produce summary descriptions which were consolidated and refined. Final interpretations were agreed upon after a final series of discussions among all the authors.

Data extraction and categorization

Data and insights were not uniformly reported and were thus extracted variously from the background material, description of methods, reported results and in interpretative reflections in the discussion section of different articles. A potential weakness of this methodology is that we sometimes relied on the perception of authors regarding which factors enabled or constrained their efforts to integrate health services. Hales *et al.* (2016) recently developed guidelines for reporting implementation and operational research, recommending that 'contextual factors (i.e.) success factors, barriers and how they were overcome' should be reported in the discussion section. Nonetheless, wherever located in an article, the extraction and inclusion of experiential (sometimes viewed as 'anecdotal') data included in this review is consistent with the realist approach to evidence synthesis reviews (Wong *et al.* 2013), which emphasizes a

contextualized understanding of how and why interventions work, or not.

In line with our realist-informed approach, categorization of articles was also conducted inductively and in several stages. Following the general title and abstract review, a first level of categorization utilized the health system building blocks (WHO 2007) to identify and categorize five common themes in the literature relating to health system preparedness for integration. These themes were: (1) frontline service organization, (2) health care worker preparedness, (3) community and client preparedness, (4) upstream logistics and (5) policy and governance issues.

A second more nuanced synthesis took place as part of the final (full-text) review. This resulted in a sorting of evidence in the five 'common themes' according to four, inductively identified, cross-cutting health system capabilities, namely the need for: (1) frontline health services sufficiently functional to be able to deliver integrated services; (2) health care workers willing and capable of delivering integrated services; (3) technical tools and equipment sufficiently available and suitable to facilitate integrated frontline services and (4) decision-making processes appropriately devolved to facilitate delivery of integrated frontline services.

Findings

We present findings according to the four health system capabilities listed above. A summary matrix of the findings according to these capabilities and the five health system themes are summarized in Table 1. Systems for integrated services are often suboptimal in performance. In this presentation of findings, we were not able to cover in the narrative all the papers due to the large number of articles included in this review. Please see Table 1 for the complete list and categorization of all the studies included in this review.

Are health services sufficiently functional to deliver integrated services?

Some studies highlighted the importance of having sufficient and appropriate physical space within which to operate and deliver integrated services, especially with regard for patient privacy and smooth patient flow. Abera *et al.* (2014) assessed the knowledge, perceptions and willingness of health workers to deliver integrated mental health services in PHC settings in Ethiopia and identified the availability of appropriate space as a potential enabler of effective service integration. In a study by Mitashi *et al.* (2015) assessing the state of preparedness of PHC facilities in Democratic Republic of (DR) Congo for the integration of Human African Trypanosomiasis (HAT) diagnosis and treatment into routine PHC services, they identified that the recipient health service must be sufficiently functional in terms of physical space for service delivery. Njozing *et al.* (2011) and Topp *et al.* (2013) also identified, that although TB-HIV and HIV-outpatient co-location reduces patient waiting time and improved patient monitoring, inadequate space in the health facility limited the extent of service integration. Likewise, in their study to evaluate a policy in Ghana to integrate sexually transmitted infection (STI) services with existing family planning and maternal and child health services, Mayhew (2000) identified lack of sufficient space within health facilities to ensure privacy as a constraint on effective integration.

Another study was conducted in Kenya and Swaziland, assessing the impact on workload of integrating HIV services with sexual and reproductive health services. In the study, Sweeney *et al.* (2014) found that it was more likely for each health worker to take on

Table 1. Findings from a review of health system factors required to facilitate health service integration

Essential capabilities for integration	Health system context enabling the capabilities for integration				
	Service operations	Health workers	Community	Logistics	Policy
Health services are sufficiently functional	<ul style="list-style-type: none"> • Sufficient and appropriate space for patient flow and privacy Abera <i>et al.</i> 2014 Mitash <i>et al.</i> 2015 Njozing <i>et al.</i> 2011 Mayhew 2000 Sweeney <i>et al.</i> 2014 Hermans <i>et al.</i> 2012 Topp <i>et al.</i> 2010 Mugala <i>et al.</i> 2010 Ryan <i>et al.</i> 2012 Ouedes <i>et al.</i> 2002 Sweeney <i>et al.</i> 2012 Wallace <i>et al.</i> 2014 Topp <i>et al.</i> 2012 Uwimana <i>et al.</i> 2012 Smit <i>et al.</i> 2012 Winestone <i>et al.</i> 2012 Kermans <i>et al.</i> 2002 Van den Akker <i>et al.</i> 2012 • Sufficient and appropriate space to store drugs and equipment. Chan <i>et al.</i> 2010 	<ul style="list-style-type: none"> • Sufficient health workers to manage joint patient flow Jian <i>et al.</i> 2010 Chan <i>et al.</i> 2010 Nanser <i>et al.</i> 2010 Mitash <i>et al.</i> 2015 Harrington <i>et al.</i> 2012 Onozaki and Shakaya 1995 Mugala <i>et al.</i> 2010 Shelley <i>et al.</i> 2014 Sweeney <i>et al.</i> 2014 Baumgartner <i>et al.</i> 2014 Vance <i>et al.</i> 2013 Kouam <i>et al.</i> 2014 Wallace <i>et al.</i> 2014 Plotkin <i>et al.</i> 2014 Topp <i>et al.</i> 2012 Uwimana <i>et al.</i> 2012 Turan <i>et al.</i> 2012 Winestone <i>et al.</i> 2012 Ryman <i>et al.</i> 2012b Wallace <i>et al.</i> 2012 Mugala <i>et al.</i> 2010 Ssenbunya <i>et al.</i> 2010 Peterson <i>et al.</i> 2010 Horwood <i>et al.</i> 2009 Okot Chono <i>et al.</i> 2009 Zachariah <i>et al.</i> 2004 Fullerton <i>et al.</i> 2004 Mayhew <i>et al.</i> 2000 	<ul style="list-style-type: none"> • Baseline community trust in new and existing health services Moran <i>et al.</i> 2012 Mitash <i>et al.</i> 2015 Harrington <i>et al.</i> 2012 Thompson <i>et al.</i> 2009 Bagonza <i>et al.</i> 2014 Patel <i>et al.</i> 2014 Wallace <i>et al.</i> 2014 Ryman <i>et al.</i> 2012b Belkin <i>et al.</i> 2011 Labhardt <i>et al.</i> 2010 Anand <i>et al.</i> 2004 Schellenberg <i>et al.</i> 2004a Schellenberg <i>et al.</i> 2004b Ssenbunya <i>et al.</i> 2010 • Baseline cultural expectations of health workers. Bagonza <i>et al.</i> 2014 Shelley <i>et al.</i> 2014 Baumgartner <i>et al.</i> 2014 Shems Ariteen <i>et al.</i> 2014 	<ul style="list-style-type: none"> • Capacity to make equipment, drugs and diagnostics available Munkhuu <i>et al.</i> 2009 Mitash <i>et al.</i> 2015 Abera <i>et al.</i> 2014 Vijayaraghavan <i>et al.</i> 2012 Chan <i>et al.</i> 2010 Nanser <i>et al.</i> 2010 Kayemba <i>et al.</i> 2012 Harrington <i>et al.</i> 2012 Onozaki and Shakaya 1995 Mayhew 2000 Nsona <i>et al.</i> 2012 Sibiya and Grainger 2007 Lafort <i>et al.</i> 2003 Bagonza <i>et al.</i> 2014 Sweeney <i>et al.</i> 2014 Kouam <i>et al.</i> 2014 Hanlong <i>et al.</i> 2014 Plotkin <i>et al.</i> 2014 Kalyango <i>et al.</i> 2012 Hamer <i>et al.</i> 2012 Turan <i>et al.</i> 2012 Winestone <i>et al.</i> 2012 Van den Akker <i>et al.</i> 2012 Molina-Aguilera <i>et al.</i> 2012 Ryman <i>et al.</i> 2012a Labhardt <i>et al.</i> 2010 Bhana <i>et al.</i> 2011 Green <i>et al.</i> 2010 Ssenbunya <i>et al.</i> 2010 Gillespie <i>et al.</i> 2009 • Systems to regulate, support and monitor inter-service referrals. Baumgartner <i>et al.</i> 2014 Miller <i>et al.</i> 2014 Hanlong <i>et al.</i> 2014 Smit <i>et al.</i> 2012 Parry <i>et al.</i> 2010 	<ul style="list-style-type: none"> • High level support and coordination for formulation of locally relevant tools and guidelines Lin <i>et al.</i> 2012 Hausner <i>et al.</i> 2007 Moran <i>et al.</i> 2012 Jiang <i>et al.</i> 2010 Shayo <i>et al.</i> 2013 Hanson <i>et al.</i> 2012 Uwimana <i>et al.</i> 2012 Bryce <i>et al.</i> 2005 Mayhew <i>et al.</i> 2000 Gillespie <i>et al.</i> 2009 Bhana <i>et al.</i> 2011 Hanlon <i>et al.</i> 2014 Li <i>et al.</i> 2012 Uwimana <i>et al.</i> 2012 Smit <i>et al.</i> 2012 Awadhi <i>et al.</i> 2012 Oliff <i>et al.</i> 2003 Htay <i>et al.</i> 2003 • Policy authorizing 'integrative actions' Shelley <i>et al.</i> 2014 Kouam <i>et al.</i> 2014 Wallace <i>et al.</i> 2014 Uwimana <i>et al.</i> 2012 Smit <i>et al.</i> 2012 Awadhi <i>et al.</i> 2012 • Enabling financing policies and mechanisms (incl. sustained govt. or coordinated donor funding for integration; non-vertical programming streams etc.) Sheiman <i>et al.</i> 2014 Uwimana <i>et al.</i> 2012 Kouam <i>et al.</i> 2014 Hanlon <i>et al.</i> 2014 Hanson <i>et al.</i> 2012 Molina-Aguilera 2012 Bhana <i>et al.</i> 2012 Ssenbunya 2010 Peterson <i>et al.</i> 2009 Okot Chono <i>et al.</i> 2009 Bruce <i>et al.</i> 2005 Sshellenberg <i>et al.</i> 2004b Bainson <i>et al.</i> 1994 Zachariah <i>et al.</i> 2004 Mecaskey <i>et al.</i> 2003 Mayhew <i>et al.</i> 2000

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Table 1. (continued)

Essential capabilities for integration	Health system context enabling the capabilities for integration				
	Service operations	Health workers	Community	Logistics	Policy
Health care workers are willing and capable (polyvalent)	<ul style="list-style-type: none"> Provision of guidance on service and care pathway re-organization <p>Lin <i>et al.</i> 2012 Belkin <i>et al.</i> 2011 Molina-Aguilera <i>et al.</i> 2012 Awadhi <i>et al.</i> 2012 Fullerton <i>et al.</i> 2003 Kirunda <i>et al.</i> 2010 Guedes <i>et al.</i> 2002 Mayhe <i>et al.</i> 2000</p> <ul style="list-style-type: none"> Consistent supervision and strong leadership at service delivery and district level <p>Lin <i>et al.</i> 2012 Nsona <i>et al.</i> 2012 Birdthistle <i>et al.</i> 2014 Hermans <i>et al.</i> 2012 Mugala <i>et al.</i> 2010 Bagonza <i>et al.</i> 2014 Kouam <i>et al.</i> 2014 Uwimana <i>et al.</i> 2012 Baumgartner <i>et al.</i> 2014 Hanlon <i>et al.</i> 2014 Kalyango <i>et al.</i> 2012 Uwimana <i>et al.</i> 2012 Molina-Aguilera <i>et al.</i> 2012 Belkin <i>et al.</i> 2011 Mwala <i>et al.</i> 2012 Topp <i>et al.</i> 2010 Ssenbunya <i>et al.</i> 2010 Van den Driessche <i>et al.</i> 2009 Osterholt <i>et al.</i> 2009 Gillespie <i>et al.</i> 2009 Horwood <i>et al.</i> 2009 Okot Chono <i>et al.</i> 2009 Chabikuli <i>et al.</i> 2009 Fullerton <i>et al.</i> 2003 Oliff <i>et al.</i> 2003 Kelley <i>et al.</i> 2001 Bainson <i>et al.</i> 1994 Huntingden <i>et al.</i> 1994</p>	<ul style="list-style-type: none"> Health workers' willingness and motivation to deliver integrated services (incl. cultural and professional aspects) <p>Abera <i>et al.</i> 2014 Moran <i>et al.</i> 2012 Mayhew 2000 Hermans <i>et al.</i> 2012 Munkhuu <i>et al.</i> 2009 Sweeney <i>et al.</i> 2014 Shelley <i>et al.</i> 2014 Baumgartner <i>et al.</i> 2014 Smit <i>et al.</i> 2012 Awadhi <i>et al.</i> 2012 Huntingdon <i>et al.</i> 1994 Hermans <i>et al.</i> 2012 Belkin <i>et al.</i> 2011 Green <i>et al.</i> 2010 Misiri <i>et al.</i> 2004 Oliff <i>et al.</i> 2003 Guedes <i>et al.</i> 2002 Barua <i>et al.</i> 1999</p> <ul style="list-style-type: none"> Adequate training of health workers to take on new tasks <p>Roos <i>et al.</i> 1995 Nsona <i>et al.</i> 2012 Nanser <i>et al.</i> 2010 Chan <i>et al.</i> 2010 Mitash <i>et al.</i> 2015 Ku and Kegels 2014 Birdthistle <i>et al.</i> 2014 Kayemba <i>et al.</i> 2012 Byamungu and Ogbeiw 2002 Onozaki and Shakaya 1995 Hermans <i>et al.</i> 2012 Liambila <i>et al.</i> 2009 Chaudhary <i>et al.</i> 2005 Shelley <i>et al.</i> 2014 Kouam <i>et al.</i> 2014 Green <i>et al.</i> 2010 Sarnquist <i>et al.</i> 2014 Wright <i>et al.</i> 2014 Hanlon <i>et al.</i> 2014 Li <i>et al.</i> 2012 Kalyango <i>et al.</i> 2012 Smit <i>et al.</i> 2012 Schaan <i>et al.</i> 2012 Awadhi <i>et al.</i> 2012 Winestone <i>et al.</i> 2012 Hermans <i>et al.</i> 2013 Kurth <i>et al.</i> 2013 Molina-Aguilera <i>et al.</i> 2012 Ryman <i>et al.</i> 2012a Ryman <i>et al.</i> 2013b Wallace <i>et al.</i> 2012 Bhana <i>et al.</i> 2011 Kirunda <i>et al.</i> 2010</p>	<ul style="list-style-type: none"> Community trust and in the health workers delivering the integrated services <p>Moran <i>et al.</i> 2012 Mitash <i>et al.</i> 2015 Harrington <i>et al.</i> 2012 Thompson <i>et al.</i> 2009 Bagonza <i>et al.</i> 2014 Patel <i>et al.</i> 2014 Wallace <i>et al.</i> 2014 Ryman <i>et al.</i> 2012b Belkin <i>et al.</i> 2011 Labhardt <i>et al.</i> 2010 Anand <i>et al.</i> 2004 Schellenberg <i>et al.</i> 2004a Schellenberg <i>et al.</i> 2004b Ssenbunya <i>et al.</i> 2010 Miller <i>et al.</i> 2014 Patel <i>et al.</i> 2014 Wallace <i>et al.</i> 2014 Kalyango <i>et al.</i> 2012 Awadhi <i>et al.</i> 2012 Ryman <i>et al.</i> 2012a Ryman <i>et al.</i> 2012b Misiri <i>et al.</i> 2004</p>	<ul style="list-style-type: none"> Adequate supply of drugs and diagnostics to enable health workers deliver services (as in the 'Logistics' column of the 'Health services are sufficiently functional' row) <p>Munkhuu <i>et al.</i> 2009 Mitash <i>et al.</i> 2015 Abera <i>et al.</i> 2014 Vijayaraghavan <i>et al.</i> 2012 Chan <i>et al.</i> 2010 Nanser <i>et al.</i> 2010 Kayemba <i>et al.</i> 2012 Harrington <i>et al.</i> 2012 Onozaki and Shakaya 1995 Mayhew 2000 Nsona <i>et al.</i> 2012 Sibiya and Grainger 2007 Lafort <i>et al.</i> 2003 Bagonza <i>et al.</i> 2014 Sweeney <i>et al.</i> 2014 Kouam <i>et al.</i> 2014 Hanlong <i>et al.</i> 2014 Plotkin <i>et al.</i> 2014 Kalyango <i>et al.</i> 2012 Hamer <i>et al.</i> 2012 Turan <i>et al.</i> 2012 Winestone <i>et al.</i> 2012 Van den Akker <i>et al.</i> 2012 Molina-Aguilera <i>et al.</i> 2012 Ryman <i>et al.</i> 2012a Labhardt <i>et al.</i> 2010 Bhana <i>et al.</i> 2011 Green <i>et al.</i> 2010, Ssenbunya <i>et al.</i> 2010 Gillespie <i>et al.</i> 2009 Weber <i>et al.</i> 1997</p>	<ul style="list-style-type: none"> Development of policy for adequate pre-service (rather than in-service) training <p>Abera <i>et al.</i> 2014 Byamungu and Ogbeiw 2002 Labhardt <i>et al.</i> 2010 Htay <i>et al.</i> 2003 Mayhew <i>et al.</i> 2000</p> <ul style="list-style-type: none"> Policies enabling task-shifting—including right to prescribe <p>Mayhew <i>et al.</i> 2000</p> <ul style="list-style-type: none"> Policies linking in-service training to CPD accreditation <p>Sodhi <i>et al.</i> 2014</p>

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Table 1. (continued)

Essential capabilities for integration	Health system context enabling the capabilities for integration				
	Service operations	Health workers	Community	Logistics	Policy
		<p>Nyaberi, <i>et al.</i> 2010 Parry <i>et al.</i> 2010 Phuona <i>et al.</i> 2014 Chabilkuli <i>et al.</i> 2009 Kumar <i>et al.</i> 2009 Horwood <i>et al.</i> 2009 Gillespie <i>et al.</i> 2009 Osterhold <i>et al.</i> 2009 Van den Driessche <i>et al.</i> 2009 Anand <i>et al.</i> 2004 Misiri <i>et al.</i> 2004 Odejide <i>et al.</i> 2002 Guedes <i>et al.</i> 2002 Kelley <i>et al.</i> 2001 Sseybunya <i>et al.</i> 2004a Sseybunya <i>et al.</i> 2004b Zachariah <i>et al.</i> 2004 Fullerton <i>et al.</i> 2003 Htay <i>et al.</i> 2003 Mayhew <i>et al.</i> 2000 Barua <i>et al.</i> 1999 Simoes <i>et al.</i> 1997 Weber <i>et al.</i> 1997 Bainson <i>et al.</i> 1994 Huntingdon <i>et al.</i> 1994</p> <ul style="list-style-type: none"> • Management of health worker posting and transfer Sodhi <i>et al.</i> 2014 Uwimana <i>et al.</i> 2012 Turan <i>et al.</i> 2012 Htay <i>et al.</i> 2003 Labhardt <i>et al.</i> 2010 • Consideration of duty allocation and team dynamics Sweeny <i>et al.</i> 2014 Hanson <i>et al.</i> 2014 Ryman <i>et al.</i> 2012a Fullerton <i>et al.</i> 2003 Mercader <i>et al.</i> 2014 Smit <i>et al.</i> 2012 Horwood <i>et al.</i> 2009 Kalyango <i>et al.</i> 2012 Mugala <i>et al.</i> 2010 Sodhi <i>et al.</i> 2014 Hermans <i>et al.</i> 2014 • Sufficient caseload to maintain skill and to reap economies of scale Mitash <i>et al.</i> 2015 Onozaki and Shakaya 1995 Shade <i>et al.</i> 2013 Hanson <i>et al.</i> 2012 Molina-Aguilera <i>et al.</i> 2012 Osterholt <i>et al.</i> 2009 			

(continued)

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Essential capabilities for integration	Health system context enabling the capabilities for integration				
	Service operations	Health workers	Community	Logistics	Policy
Technical tools are available and suitable to aid frontline service delivery	<ul style="list-style-type: none"> New and user-friendly clinical algorithms and data-collection tools to aid decision making <p>Lin <i>et al.</i> 2012 Hausner <i>et al.</i> 2007 Nsona <i>et al.</i> 2012 Ku and Kegels 2014 Birdthistle <i>et al.</i> 2014 Jian <i>et al.</i> 2010 Mugala <i>et al.</i> 2010 Liambila <i>et al.</i> 2009 Mugala <i>et al.</i> 2010 Belkin <i>et al.</i> 2011 Li <i>et al.</i> 2012 Hamer <i>et al.</i> 2012 Smit <i>et al.</i> 2012 Hermans <i>et al.</i> 2012 Molina Aguilera <i>et al.</i> 2012 Kirunda <i>et al.</i> 2010 Green <i>et al.</i> 2010 Horwood <i>et al.</i> 2009 Chabikuli <i>et al.</i> 2009 Phuong <i>et al.</i> 2004 Winch <i>et al.</i> 2002 Guedes <i>et al.</i> 2002 Mayhew <i>et al.</i> 2000 Kolstad <i>et al.</i> 1998</p>	<ul style="list-style-type: none"> Health workers adequately trained and skilled to use tools As above in 'adequately trained'. 	<ul style="list-style-type: none"> Technical tools account for community needs and expectations <p>Mugala <i>et al.</i> 2010</p>	<ul style="list-style-type: none"> Information systems and tools that support (vs hinder) integrative work practice <p>Sheirman <i>et al.</i> 2014 Kouam <i>et al.</i> 2014 Topp <i>et al.</i> 2012 Hanlon <i>et al.</i> 2014 Uwimana <i>et al.</i> 2012 Smit <i>et al.</i> 2012 Awadhi <i>et al.</i> 2012 Hanson <i>et al.</i> 2012 Hanson <i>et al.</i> 2012 L. Li <i>et al.</i> 2012 Molina-Aguilera <i>et al.</i> 2012 Gillespie <i>et al.</i> 2009 Okot Chono <i>et al.</i> 2009 Chabikuli <i>et al.</i> 2009 Zachariah <i>et al.</i> 2004 Fullerton <i>et al.</i> 2003</p>	<ul style="list-style-type: none"> High level support and formulation of technical tools and information systems <p>Lin <i>et al.</i> 2012 Hausner <i>et al.</i> 2007 Moran <i>et al.</i> 2012 Jiang <i>et al.</i> 2010 Shayo <i>et al.</i> 2013 Hanson <i>et al.</i> 2012 Uwimana <i>et al.</i> 2012 Bryce <i>et al.</i> 2005 Mayhew <i>et al.</i> 2000 Gillespie <i>et al.</i> 2009 Bhana <i>et al.</i> 2011 Hanlon <i>et al.</i> 2014 Li <i>et al.</i> 2012 Uwemana <i>et al.</i> 2012 Smit <i>et al.</i> 2012 Awadhi <i>et al.</i> 2012 Oliff <i>et al.</i> 2003 Htay <i>et al.</i> 2003 Hanlon <i>et al.</i> 2014 Guedes <i>et al.</i> 2002 Mayhew <i>et al.</i> 2000</p>
Decision-making processes are devolved	<ul style="list-style-type: none"> Local (district) government capacity to assess need and reorganize services <p>Lindgren <i>et al.</i> 2011 Ku and Kegels 2014 Moran <i>et al.</i> 2012 Parry <i>et al.</i> 2010 Okot Chono <i>et al.</i> 2009 Mecaskey <i>et al.</i> 2003 Oliff <i>et al.</i> 2003 Bainson <i>et al.</i> 1994</p>	<ul style="list-style-type: none"> Health facility managers and workers have decision space to deliver new services <p>Mayhew 2000 Shayo <i>et al.</i> 2013 Hanlon <i>et al.</i> 2014 Bainson <i>et al.</i> 1994 Huntindon <i>et al.</i> 1994</p>	<ul style="list-style-type: none"> Community involvement in the planning and delivery of integrated service <p>Lindgren <i>et al.</i> 2011 Nsona <i>et al.</i> 2012 Moran <i>et al.</i> 2012 Kayemba <i>et al.</i> 2012 Shelley <i>et al.</i> 2014 Okot Chon <i>et al.</i> 2009 Winch <i>et al.</i> 2002 Mercader <i>et al.</i> 20014 Parry <i>et al.</i> 2010</p> <ul style="list-style-type: none"> Addressing previous fears/myths/misconceptions that could undermine integration <p>Wallace <i>et al.</i> 2014 Hanlon <i>et al.</i> 2014 Van der Akker <i>et al.</i> 2014</p> <ul style="list-style-type: none"> Community sensitization and information dissemination 	<ul style="list-style-type: none"> Co-ordination of operations among all stakeholders to support service delivery <p>Nsona <i>et al.</i> 2012 Jian <i>et al.</i> 2010 Njosing <i>et al.</i> 2011 Shayo <i>et al.</i> 2013 Thomas <i>et al.</i> 2014 Sibiya and Grainger 2007 Hanlon <i>et al.</i> 2014 Bhana <i>et al.</i> 2011 Peterson <i>et al.</i> 2009 Okot Chono <i>et al.</i> 2009 Bryce <i>et al.</i> 2005 Zachariah <i>et al.</i> 2004 Mecaskey <i>et al.</i> 2003 Oliff <i>et al.</i> 2003 Htay <i>et al.</i> 2003 Oliff <i>et al.</i> 2003 Guedes <i>et al.</i> 2002 Mayhew <i>et al.</i> 2000</p>	<ul style="list-style-type: none"> Development of a national policy for sub-national decision-making <p>Jian <i>et al.</i> 2012 Mayhew 2000 Bryce <i>et al.</i> 2005</p>

(continued)

Table 1. (continued)

Essential capabilities for integration	Health system context enabling the capabilities for integration				
	Service operations	Health workers	Community	Logistics	Policy
			Ryman <i>et al.</i> 2012a Mugala <i>et al.</i> (2010) Bhana <i>et al.</i> 2011 Horwood <i>et al.</i> 2009 Htay <i>et al.</i> 2003 Claeys <i>et al.</i> 2003 Winch <i>et al.</i> 2002 Levin <i>et al.</i> 1999		

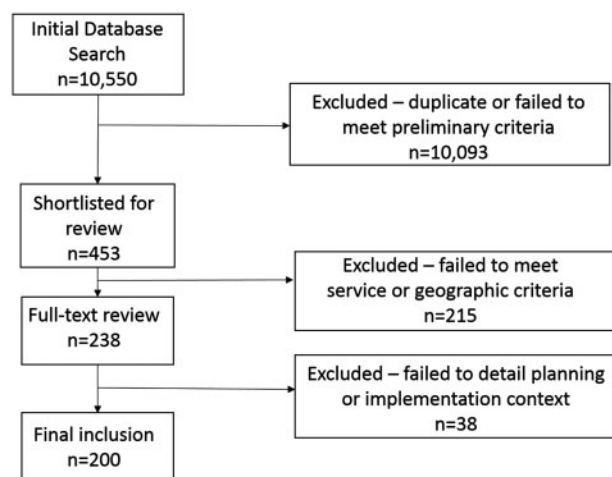


Figure 1. Review cascade.

more tasks in facilities with integrated use of physical space (i.e. where the range of services provided per room was increased as part of preparation for integration). Hermans *et al.* (2012) evaluated an intervention in which the service delivery space was reorganized to deliver integrated services in the form of an outdoor ‘One-Stop Shop’ TB–HIV clinic for attendees of an existing HIV clinic in Uganda. They found that this compact open-air setup allowed for easy communication and treatment continuity. The intervention led to improvements in TB treatment completion rate and reduction in deaths. In addition to space for service delivery, Chan *et al.* (2010) also identified the importance of space for the safe storage of medicines as enablers of the process of decentralizing HIV care from hospital to PHC facilities in Malawi.

Further, studies identified having sufficient numbers of health workers to manage the joint patient flow (including lay health workers) as a contextual enabler of service integration. Jiang *et al.* (2010) assessed a programme to integrate HIV/AIDS and STI control in four pilot provinces in China and identified the contextual features influencing implementation, one of which was insufficient human resources for HIV control and surveillance. Chan *et al.* (2010) identified the availability of medical assistants and/or nurses as a prerequisite for integrating HIV care at PHC facilities in Malawi. Similarly, Nansera *et al.* (2010) found that the lack of health workers constrained the capacity of PHC facilities to integrate TB and HIV services in Uganda. One of the factors highlighted by Mitashi *et al.* (2015) as important for the preparedness of PHC facilities was the availability of health workers to deliver services. Harrington

et al. (2012) also examined community preparedness to use family planning services among women accessing HIV treatment in Kenya and found that one of the barriers to service uptake was availability of health workers at the point of service, whether due to inadequate numbers or absenteeism. And when Mugala *et al.* (2010) examined barriers to incorporating and implementing HIV guidelines within the Integrated Management of Childhood Illness (IMCI) algorithm in Zambia, they found that due to workload, health workers prioritized conditions that they perceived or considered as important (e.g. potential emergencies) compared to HIV, suggesting the need for additional health workers at service delivery points to ensure effective integration of services.

Community trust in health services was another enabler of the capability of the existing system to deliver integrated services. Moran *et al.* (2012) developed and applied benchmark measures to quantitatively assess the readiness of LMICs to integrate and scale up newborn survival interventions, but found that factors such as the presence of a strong civil society and influence from community groups were as important although they require qualitative assessment. Mitashi *et al.* (2015) identified sufficient community trust in the health system as a contextual enabler of service integration. They found that community trust led to the uptake of frontline integrated PHC services, instead of bypassing these for (vertical) services at higher levels in the health system. Harrington *et al.* (2012) also found that community willingness to use integrated services (i.e. the use of HIV clinic as site of family planning services) in Kenya was due to convenience, familiarity (many felt like established regulars at the clinic) and provider expertise. However, they also found that the women who were seeking HIV services preferred trained clinicians, and that they do not trust volunteers and lay health workers to provide family planning services and to ensure confidentiality. And in an assessment of a community-based IMCI programme in Armenia, Thompson and Harutyunyan (2009) found that engaging clinicians already working in the community to serve as trainers of the lay health workers who would be involved in the programme demonstrated to the community that their clinicians were committed to the programme and had the additional benefit of providing the clinicians with richer perspective on community health. In a study of the performance of lay health workers delivering Integrated Community Case Management (iCCM) of malaria, pneumonia and diarrhoea in Uganda, Bagonza *et al.* (2014) found that community support was an important motivator of performance; a form of ‘intangible’ incentive for the lay health workers based on how the communities accept, cooperate with and appreciate services offered by health workers in their community.

Another essential component of health system functionality was having the logistical capacity to guarantee that drugs and equipment

Table 2. Summary findings from review of health system enablers and barriers to health service integration

	Service operation	Health workers	Community	Logistics	Policy
Health services sufficiently functional	<ul style="list-style-type: none"> Sufficient and appropriate space for patient flow and privacy (18) 	<ul style="list-style-type: none"> Sufficient health workers to manage joint patient flow (28) 	<ul style="list-style-type: none"> Baseline community trust in new and existing health services (14) 	<ul style="list-style-type: none"> Capacity to make equipment, drugs and diagnostics available (30) 	<ul style="list-style-type: none"> High level support and coordination for formulation of locally relevant tools and guidelines (18) Policy authorizing 'integrative actions' (6)
	<ul style="list-style-type: none"> Sufficient and appropriate space to store drugs and equipment (1) 		<ul style="list-style-type: none"> Baseline cultural expectations of health workers (4) 	<ul style="list-style-type: none"> Systems to regulate, support & monitor inter-service referrals (5) 	<ul style="list-style-type: none"> Enabling financing policies & mechanisms (incl. sustained govt or coordinated donor funding for integration; non-vertical programming streams etc.) (16)
Health workers willing and capable (polyvalent)	<ul style="list-style-type: none"> Provision of guidance on service and care pathway re-organisation (8) 	<ul style="list-style-type: none"> Health workers' willingness & motivation to deliver integrated services (incl. cultural & professional aspects) (18) 	<ul style="list-style-type: none"> Community trust and in the health workers delivering the integrated services (22) 	<ul style="list-style-type: none"> Adequate supply of drugs and diagnostics to enable health workers deliver services (31) 	<ul style="list-style-type: none"> Development of policy for adequate pre-service (rather than in-service) training (5)
	<ul style="list-style-type: none"> Consistent supervision and strong leadership at service delivery and district level (28) 	<ul style="list-style-type: none"> Adequate training of health workers to take on new tasks (58) 			<ul style="list-style-type: none"> Policies enabling task-shifting – including right to prescribe (1)
		<ul style="list-style-type: none"> Management of health worker posting and transfer (5) 			<ul style="list-style-type: none"> Policies linking in-service training to CPD accreditation (1)
		<ul style="list-style-type: none"> Consideration of duty allocation & team dynamics (11) Sufficient caseload to maintain skill and to reap economies of scale (6) 			
Technical tools available and suitable to aid frontline service delivery	<ul style="list-style-type: none"> New and user-friendly clinical algorithms and data-collection tools to aid decision making (24) 	<ul style="list-style-type: none"> Health workers adequately trained and skilled to use tools (58) 	<ul style="list-style-type: none"> Technical tools account for community needs and expectations (1) 	<ul style="list-style-type: none"> Information systems and tools that support (vs. hinder) integrative work practice (16) 	<ul style="list-style-type: none"> High level support and formulation of technical tools and information systems (21)
Decision-making processes are devolved	<ul style="list-style-type: none"> Local (district) government capacity to assess need and reorganize services (8) 	<ul style="list-style-type: none"> Health facility managers and workers have decision space to deliver new services (5) 	<ul style="list-style-type: none"> Community involvement in the planning and delivery of integrated service (9) 	<ul style="list-style-type: none"> Co-ordination of operations among all stakeholders to support service delivery (18) 	<ul style="list-style-type: none"> Development of a national policy for sub-national decision-making (3)
			<ul style="list-style-type: none"> Addressing previous fears / myths / misconceptions that could undermine integration (3) Community sensitization & information dissemination (8) 		



Colours/shades indicate the number of reviewed articles providing evidence of each theme. Please see online for colour table.

essential to integrated service-delivery was available. *Mitashi et al. (2015)* found that the poor provision of diagnostic tools for Trypanosomiasis constrained the successful integration of its diagnosis and treatment into routine PHC services in DR Congo. *Munkhuu et al. (2009)* also demonstrated that making onsite rapid diagnostic tests available (to replace laboratory referral for ante-natal syphilis screening) was a feasible strategy for integrating syphilis screening at the PHC level in Mongolia. *Sibiya and Grainger (2007)* also found that inadequate infrastructure and equipment to perform cervical screening constrained the integration of cervical screening with routine PHC services in rural (vs urban) health facilities in South Africa. Other studies in this category identified the importance of drug availability. *Abera et al. (2014)*, in their assessment of health worker knowledge, perceptions and willingness to deliver integrated mental health services in PHC setting in Ethiopia, found that poor medication supply was an important challenge to effective integration. *Lafort et al. (2003)* assessed the integration of STI services into family planning clinics in Cote d'Ivoire and found that one of the constraints to integration was the lack of commodities, even though provision of STI drugs were integrated into existing procurement and distribution systems. In an economic modelling of the incremental cost of adding various interventions to existing maternal and child health days in Somalia, *Vijayaraghavan et al. (2012)* identified the need for logistical capacity to secure additional drugs and commodities for such integration of services.

In addition, *Chan et al. (2010)* found that the strategy for decentralization and integration of HIV services to the PHC level in Malawi required a strengthened supply chain to expand access to essential drugs and laboratory services. *Nansera et al. (2010)* also identified that stock availability limited provision of services as part

of TB–HIV service integration in Uganda. *Kayemba et al. (2012)* evaluated the introduction of newborn care into iCCM in which patients were linked directly to the health facility from the community found that patients did not comply with referrals due to lack of medicines at the health facility. And in their study assessing a pilot integration of TB services with routine services at PHC facilities in Nepal, *Onozaki and Shakaya (1995)* found that there was low confidence in the PHC facilities without essential drugs and cold chain infrastructure. *Bagonza et al. 2014* also identified drug availability is an independent predictor of good performance among lay health workers delivering iCCM of malarial, pneumonia and diarrhoea in Uganda. Lack of drugs meant their services were perceived by the community as irrelevant or unpopular, with negative effects on health workers' motivation and performance.

Further, ensuring that services are sufficiently functional to deliver integrated services is linked to the level of government support. *Lin et al. (2012)* found that significantly increased detection of tuberculosis cases among patients with diabetes in China was enabled by a national policy (including locally relevant tools and guidance documents) to screen diabetes patients for tuberculosis. Efforts to integrate tuberculosis and HIV services in Uzbekistan, Tajikistan and Kyrgyzstan (*Hausner et al. 2007*) were facilitated by overarching policy to develop protocols, guidelines and training programmes with participation from high level stakeholders. *Moran et al. (2012)* found that having champions within the national government may be essential in efforts to integrate and scale up newborn survival interventions in LMICs; the authors emphasized that this was particularly the case where previously the same services had been separately planned and/or delivered. *Jiang et al. (2010)* also assessed a programme to integrate

HIV/AIDS and STI control in China and found that one of the enablers of integration was the strong and detailed policy framework provided by the national government to guide implementation. More specifically, some studies highlighted the need for policies authorizing integrative actions at the frontline (e.g. Shelley *et al.* 2014; Kouam *et al.*, 2014) and policies enabling financing mechanisms that support service integration (e.g. Sheiman and Shevski 2014; Uwimana and Jackson 2013). However, the capacity of government policy to facilitate integration may be constrained—a study by Shayo *et al.* (2013) found that a constraint to the effective integration of PMTCT services within PHC in Tanzania was the limited bottom-up feedback into planning decisions due to the overbearing involvement of global health agencies in decision-making.

Are health workers and managers willing and able to provide integrated services?

The second category of capabilities for integration is the willingness and ability of the health workforce to provide integrated services. Lin *et al.* (2012) found that training and assigning special staff to screen and record data and that supervision and site visits by local health managers strengthened the performance of a programme incorporating TB screening into diabetes treatment services in China. Conversely, Nsona *et al.* (2012) identified that weak supervision and monitoring of community based health workers limited the scale up of iCCM in Malawi. Abera *et al.* (2014) identified the need for ongoing supervision as one of the perceived challenges for integration of mental health into primary health care in Ethiopia. In an evaluation of the performance of lay health workers delivering iCCM of malaria, pneumonia and diarrhoea services in Uganda, Bazonga *et al.* (2014) found that receiving feedback in the form of supportive supervision from health workers in the facilities to which their work was linked was a predictor of good performance among lay health workers. Birdthistle *et al.* (2014) highlighted the importance of peer support by including mentoring (by more experienced health workers) as part of their intervention to train health workers to integrate HIV services delivery with existing maternal and child health services.

Abera *et al.* (2014) found that willingness of health workers to deliver integrated services is another potential challenge. This was linked to concerns about increased workload and competency requirements given that health workers perceive that brief stand-alone in-service training in mental health was likely insufficient. However, in a study assessing the feasibility of one-stop ante-natal syphilis testing in Mongolia, Munkhuu *et al.* (2009) found that in spite of increased workload occasioned by the use of rapid diagnostic tests for syphilis, the health workers were still willing to provide the services because of the clear benefits to their patients: reduction in costs as patients did not need to travel elsewhere for syphilis screening as part of their ante-natal care. Examining the link between workload and the integration of HIV services with sexual and reproductive health services in Kenya and Swaziland, Sweeney *et al.* (2014) found that there was no overall relationship between integration and workload at the facility level, and that to the contrary, workload may significantly reduce with integrated services, highlighting the potential for more efficient use of capacity with integration. However, Moran *et al.* (2012) and Topp *et al.* (2013) identified how the disposition of health workers, including facility managers, can influence the readiness and ease with which new tasks are introduced. Hermans *et al.* (2012) found that the formation of a dedicated team of health care workers who were convinced of the need for integrated care was paramount to the success of the

intervention to integrate TB and HIV services in Uganda. Likewise, Mayhew (2000) found in Ghana that disrespectful and abusive care by health workers limited the efforts to integrate STI services with family planning and maternal and child health services. Indeed, some of these studies highlighted duty allocation and team dynamics as being important for the willingness of health workers to deliver integrated services (e.g. Hanson *et al.* 2014; Sweeney *et al.* 2014).

While the willingness of health workers to deliver integrated services was important, so was the need to possess the skills to do so, with adequate training and opportunity to practice the new skills (including the use of new algorithms and diagnostics). In a study to identify the opportunities and barriers in efforts to implement integrated TB and HIV care at the PHC level in Uganda, Nansera *et al.* (2010) found that gaps in the knowledge of health workers (on TB in children and HIV care generally) limited the delivery of integrated services. Mitashi *et al.* (2015) showed that having polyvalent health workers was a prerequisite for integrating the diagnosis and treatment of Trypanosomiasis into routine PHC services in DR Congo. Kayemba *et al.* (2012) found that sub-optimal training and skills of lay health workers limited the introduction of newborn care into an existing iCCM programme in Uganda. Similarly, Byamungu and Ogbeiwi (2002) also found that low quality of training and skills of health workers (which showed with higher levels of task complexity) limited the effective integration of leprosy services at the PHC level in DR Congo.

In a study of the integration of diabetes care with other PHC services in the Philippines, Ku and Kegels (2014) found it essential to include in-service training to improve health workers' familiarity and competence with diabetes. Chan *et al.* (2010) also found that in-service training of health workers was an important contextual enabler of the decentralization and integration of HIV care at the PHC level, but effects of the training were limited due to rapid turnover of health workers and managers. Some studies highlight the effects of posting and transfer of health workers on turnover and skills retention as an important constraint to effective service integration (e.g. Sodhi *et al.* 2014; Uwimana and Jackson 2013).

Furthermore, Chaudhary *et al.* (2005) evaluated the in-service training of health workers to provide IMCI at various time points after training and follow up in India. They found that follow-up after training improved performance of both health workers and supervisors. They also found that longer gaps between supervision were associated with poor performance, and that gaps between the in-service training and work environment was partly responsible for sub-optimal performance. Also, policies linking in-service training to continuous professional development accreditation promote in-service training (Sodhi *et al.* 2014). Topp *et al.* (2013) additionally noted that frequent transfers of health workers between integrated and non-integrated facilities undermined the efficacy of such in-service training. But beyond episodic and *ad hoc* in-service training with its inherent weakness to prepare health workers for service integration, other studies highlighted the importance of having national policy to ensure pre-service training rather than the *ad hoc* in-service training. In a survey of health workers conducted to assess the feasibility of integrating mental health into PHC in Ethiopia, Abera *et al.* (2014) found that knowledge about mental disorder diagnoses, symptoms and treatments was generally low, but that health workers with higher levels of pre-service general health training (degree vs diploma) and pre-service clinical exposure to mental health care were associated with more favourable attitudes towards delivering mental health care. Byamungu and Ogbeiwi (2002) also found that in-service training for health workers was inadequate to ensure the skills for service delivery when leprosy diagnosis and

treatment was transferred to PHC facilities. Instead, services with higher levels of task complexity continued to be provided in many PHC facilities by health workers who had been previously received pre-service training to provide vertical leprosy services.

Linked to the requirement for training, is the need to maintain technical skills once gained; and this may require sufficient disease prevalence or clinical cases for health workers to maintain their technical skill. In a pilot study to assess the feasibility of integrating TB services with routine services at PHC facilities in Nepal, Onozaki and Shakaya (1995) found that it was difficult to maintain the technical skill of health workers when the number of specimens to use in TB diagnosis was small. They recommended a rethink of integration when service uptake is low and perhaps to only integrate services in higher uptake sites which can be used as referral facilities for lower uptake ones. Mitashi *et al.* (2015) in their study assessing the preparedness of PHC facilities in DR Congo to integrate the diagnosis and treatment of Trypanosomiasis into routine PHC services, identified the need to have sufficient disease prevalence to ensure that technical competence is maintained over time. Similarly, in an economic evaluation of the integration of family planning services into existing HIV services, Shade *et al.* (2013) found that larger health facilities (defined based on the number of HIV-infected women currently enrolled) enjoyed substantial economies of scale and were therefore more cost-effective. Cost per woman decreased more with increasing clinic size. The cost per additional woman using more effective family planning also decreased more with increasing clinic size. And the fixed costs were personnel and training costs and physical reorganization of health facility to facilitate integration. But on the other hand, recurring costs included training costs, notably when there was >40% staff turnover in a health facility, costs of supplies and materials. These findings further strengthen the argument against integration when service uptake is low, and where the challenge of rapid staff turnover is common.

Are technical tools available and suitable to aid frontline service delivery?

Studies frequently identified the importance of having or creating new and manageable clinical algorithms and decision making tools to aid health workers in the delivery of integrated services. Lin *et al.* (2012), for example, found that the creation of tools for tuberculosis symptoms screening and referral (in addition to existing diabetes tools) facilitated a significant increase in the detection of tuberculosis cases among patients with diabetes in China. Hausner *et al.* (2007) highlighted that the formation of new data collection tools and an electronic surveillance database facilitated efforts in Uzbekistan, Tajikistan and Kyrgyzstan to integrate tuberculosis and HIV services. Likewise, Nsona *et al.* (2012) found that provision and use of a job aid specifying algorithms for diagnosis and care by PHC workers facilitated the scale up of iCCM in Malawi. In a study on the integration of diabetes care with other PHC services in the Philippines, Ku and Kegels (2014) found the provision of decision tools during and after in-service training of health workers was essential for service integration. In addition to algorithms, Jiang *et al.* (2010) highlighted the potential for data collection and decision-making tools that minimize duplication of effort and reduce the impression of increased workloads in China, to provide an incentive for frontline health workers and managers to adopt integrated practices. These tools require information technology capability, and the existence of job aids and data tools may signal or require high level support.

Are decision-making processes for integrated services sufficiently devolved?

The fourth capability that is essential for successful integration of services relates to the devolution of decision-making processes. Lindgren *et al.* (2011) highlighted the need for local (i.e. district) government capacity to assess demand for and reorganize services in rural Malawi through mobile clinics providing HIV testing and treatment referral; ante-natal care, diagnosis and treatment of malaria; sputum collection for TB screening and diagnosis and treatment of sexually transmitted and opportunistic infections. Ku and Kegels (2014) also found that strong local (i.e. district) government support for a project to integrate diabetes care with other PHC services in the Philippines and decision space of sub-national health managers led to local policies being adopted beyond the scope of the project. Several, including Moran *et al.* (2012), highlighted that it is essential for national champions to create the policy space necessary for sub-national and facility managers to adapt newborn services for integration and scale up in LMICs. It is therefore important to have or develop a national policy or culture that enables sub-national decision making supportive of integration.

In a study to evaluate a policy in Ghana to integrate STI services with existing family planning and maternal and child health services, Mayhew (2000) identified as an important constraint on effective integration unclear government policy on what mid-level health workers (i.e. nurses) could do. Although the integration policy guidelines allow nurses to prescribe antibiotics to treat patients with STIs, doctors continued to expect nurses to refer patients to them for treatment at higher level health facilities, instead of initiating treatment at the PHC level. Another way in which the decision space for service providers may be limited is an overbearing involvement of international agencies in decision-making. Shayo *et al.* (2013) examined the challenge of bottom-up feedback into planning decisions (to ensure integration of PMTCT services within PHC in Tanzania) in a decentralized health system funded by an international donor agency. They found that higher levels of government (in a decentralized system) meddle in local input in planning because of their perception that planning is the responsibility of donors who leave limited decision space for local decision makers, such that there is little space to modify the programme according to the judgement and needs health workers (and in response to community needs); people who are closest to implementation and with the most relevant information.

Similar to how community trust is an enabler of functional health services, decision-making processes for service integration also requires community engagement. Indeed, community involvement in service planning is a vital contextual enabler of service integration at the PHC level. Lindgren *et al.* (2011) identified the importance of community engagement in the governance of a mobile clinic intervention designed to provide integrated HIV services in Malawi. The participation of existing village health committee members and other community leaders (in selecting intervention sites and organizing service delivery) was important for effective service integration and uptake. Likewise, Nsona *et al.* (2012) found that creating and engaging with village health committees through community dialogues and their ownership of the iCCM agenda in their communities helped facilitate the initiation, implementation and sustainability of the programme in Malawi. The village health committees supported the PHC workers who were specifically trained to implement the programme and were posted to participating communities. Committee members took responsibility for establishing housing for the health workers, identified the location of the

village health clinics, assisted in constructing the buildings and in managing service delivery, including monitoring of drug supplies. Some studies also highlight the important role of community engagement in planning integrated services as it can help address previous fears, myths and misconceptions about diseases and their treatment that could undermine integration (e.g. Hanlon *et al.* 2014; Wallace *et al.* 2014).

Moran *et al.* (2012) highlighted that the presence of a strong civil society and the influence of community groups was important for facilitating and scaling up the integration of newborn services at the PHC level. Kayemba *et al.* (2012) found that integrating newborn care within the existing iCCM programme in Uganda was facilitated by community support for health workers. The community members helped the lay health workers by identifying new mothers in the community, providing transportation support and giving donations to the lay health workers involved in service delivery.

Coordination of operations among health system managers (including both local and international non-government officials) can influence the extent to which devolved decision-making can support effective service integration. Sibiya and Grainger (2007) found that weak follow-up arrangements and feedback from referral clinic limited the effective integration of cervical screening with other PHC services. Nsona *et al.* (2012) found that coordination of operations between district and national health managers and with international NGO officials was essential for rolling out service integration activities in the intervention districts as part of efforts to scale up of iCCM in Malawi. In their assessment of a pilot programme to integrate HIV and STI control in four provinces in China, Jiang *et al.* (2010), found that coordination among health system managers along the chain of decentralized governance (from the central, provincial, prefecture to the county levels) was necessary to ensure frontline service delivery. Njozing *et al.* (2011) also found, in a study assessing TB–HIV co-location in Cameroon, that integration was facilitated by team work among health workers, especially when the same manager was in charge of the two co-located services (or when that was not the case, by both teams having a joint committee that holds regular meetings to facilitate cross-referrals). Shayo *et al.* (2013) identified that the integration of PMTCT services within PHC in Tanzania was limited by poor collaboration among health managers at different levels of decentralized government and international NGO operations. This was in part because the health managers with the power to make the most important decisions were far removed from local communities and health facilities.

Discussion

In this review, we identified a broad range of capabilities and contextual enablers and constraints influencing frontline health service integration in LMICs. These findings were synthesized into five contextual enablers or constrainters, and four capability themes, summarized in Table 2. Mapping against traditional health systems building blocks or functions, *contextual enablers and constrainters* were categorized as: (1) the organizational characteristics of frontline services, (2) health care worker preparedness, (3) community and client preparedness, (4) upstream logistics and (5) policy and governance issues. Major health system *capabilities* necessary for ensuring the success of health service integration included the availability of already functional frontline health services; sufficiently trained and motivated health care workers; the availability of technical tools and equipment suitable to facilitate integrated services, and

finally, appropriately devolved authority and decision-making processes to enable local adaptation.

Several existing reviews have examined health service decentralization and identified factors that contribute to successful integration (e.g. Atun *et al.* 2010; Dudley and Garner 2011; Legido-Quigley *et al.* 2013; Watt *et al.* 2017). The findings reported here may be differentiated from previous work in several ways. First, in this review we did not limit the search to examples of health service integration related to a specific disease(s) (e.g. HIV). Rather, we synthesized findings from literature covering all types of health service integration in any low- and middle-income setting. Adopting this broader scope was important, since disease-specific interventions and their evaluations often occur within chronological, institutional or geographical ‘bubbles’ where critical reflection on prevailing norms and implementation practices may be limited. By comparing evidence of health service integration spanning several decades of efforts in maternal and child health, neglected tropical diseases, outpatient, HIV, malaria and other frontline services, this review thus produces a more comprehensive synthesis of the health system pre-conditions necessary to enable health services integration of any type, in LMIC settings.

A second distinguishing feature of this review was our use of a realist-informed methodology. Existing reviews have tended to be conducted within a positivist paradigm with the aim of identifying generalizable evidence that controls for contextual factors. Such methods limit readers’ ability to reflect on ‘real world’ factors that have contributed to, or inhibited the success of efforts to integrate health services; all the more so, since in the reviewed literature, authors are often keen to demonstrate the impact of health service integration efforts, rather than to discuss reasons and contextual factors that influenced the outcomes. Adopting realist principles required us to engage with a diverse literature, including different types of integration studies—from experimental to implementation science studies and from prospective to retrospective evaluations—and different forms of evidence. This approach allowed us to move beyond the unhelpful characterizations of the extensive integration literature as being too diverse to enable meaningful synthesis.

As summarized in Table 2, which maps the number of articles supporting each sub-theme, comparatively more articles reflected on the intuitive need for material and instrumental aspects of health system preparedness particularly the role of health worker training and supervision, clinical guidelines and the availability of drugs and other technologies. Investment in the training of health workers to adopt new tasks and use new clinical tools and guidelines were mentioned in 58 articles. Yet consideration of other, important but relational aspects of health worker preparedness, such as the management of health worker transfers that impact on frontline service capacity, was less common. This relative emphasis on preparatory actions related to the most tangible aspects of a health system likely reflects policy makers’, program implementers’ and researchers’ preference for investing in areas that are more visible, and those considered easier to improve in the context in which many health service integration efforts are implemented—namely, short-term, disease-specific, donor-funded interventions.

This review also highlights several less-well recognized contextual factors and capabilities important to enabling health service integration. At the ‘macro’-level findings highlight the role that policy plays by enabling decisions and actions by mid- and lower-level health service actors. A large proportion of reviewed articles focused on instrumental aspects of policy, such as the need to develop nationally approved technical tools, clinical guidelines and information systems. But a subset of the literature underscored the value of

strategic policy actions such as developing pre-service training packages to reduce the need for (time consuming, expensive and often ineffective) in-service workshops, or developing national or sub-national policies that explicitly encourage health service integration. A small group of articles additionally highlighted the importance of policy and managerial actions that enable devolved decision making at the micro-level as a pre-requisite for iterative adaptations and community consultations that typically underpin locally appropriate service models.

Following a decade of highly targeted, mostly communicable disease control efforts fuelled and driven by the investment of global health initiatives, there is growing attention to, and support for the idea of integrated frontline services that are more efficient and user friendly. Despite the manifest weaknesses in many LMIC health systems, however, less attention has been paid to the conditions necessary to establish and sustain such services. This review draws on evidence from across different geographies and countries and presents the first comprehensive synthesis of health system enablers and barriers to health service integration in low-income settings. Indeed, the findings presented here may be considered the basis for developing a set of indicators or an assessment tool for integration preparedness. Each of the five 'context' categories intersecting with four 'capabilities' generates a question that should be considered in future research and implementation efforts to assess, prepare and evaluate health service integration efforts.

For example, depending on context, 'willing and capable health workers' may include an indicator to capture whether the service to be integrated is sufficient to maintain the clinical skill of health workers. Similarly, a program implementer may ensure there is community engagement in planning and delivering integrated service to ensure trust. The same indicators could be used to better evaluate why integration is successful (or not)—potentially contributing to the development of more robust theory of health service integration in the process. In this way, findings presented in this review can potentially minimize the risk that policy makers and program implementers will overlook the need to ensure health system preparedness and provide a useful tool for minimizing unintended negative consequences that can arise from efforts to integrate health services which may enhance efforts to assess and prepare health systems for health service integration.

Conclusion

In summary, this review provides a synthesis of both research evidence and experiential knowledge on how a range of system 'capabilities' necessary for health service integration interact with contextual enablers or constraints to influence the success or otherwise of efforts to integrate health services. By highlighting the cross-cutting enablers of short- and longer-term success, the findings highlight both the intuitive and the less obvious components of health system preparedness for health service integration. The synthesized findings of this review highlight both structural and relational enablers and constraints of service integration and could provide the basis for designing a tool for evaluating health systems prior to integration design or implementation.

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Supplementary Data

Supplementary data are available at *Health Policy and Planning* Online.

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