

Health systems, communicable diseases and integration

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The HIV/AIDS, tuberculosis and malaria pandemics pose substantial challenges globally and to health systems in the countries they affect. This demands an institutional approach that can integrate disease control programmes within health and social care systems. Whilst integration is intuitively appealing, evidence of its benefits remains uncertain and evaluation is beset by lack of a common understanding of what it involves. The aim of this paper is to better define integration in health systems relevant to communicable disease control. We conducted a critical review of published literature on concepts, definitions, and analytical and methodological approaches to integration as applied to health system responses to communicable disease. We found that integration is understood and pursued in many ways in different health systems. We identified a variety of typologies that relate to three fundamental questions associated with integration: (1) *why* is integration a goal (that is, what are the driving forces for integration); (2) *what* structures and/or functions at different levels of health system are affected by integration (or the lack of); and (3) *how* does integration influence interactions between health system components or stakeholders. The frameworks identified were evaluated in terms of these questions, as well as the extent to which they took account of health system characteristics, the wider contextual environment in which health systems sit, and the roles of key stakeholders. We did not find any one framework that explicitly addressed all of these three questions and therefore propose an analytical framework to help address these questions, building upon existing frameworks and extending our conceptualization of the 'how' of integration to identify a continuum of interactions that extends from no interactions, to partial integration that includes linkage and coordination, and ultimately to integration. We hope that our framework may provide a basis for future evaluations of the integration of programmes and health systems in the development of sustainable and effective responses to communicable diseases.

Keywords Health systems, communicable diseases programmes, integration

KEY MESSAGES

- Addressing questions such as what works, why and how in relation to integration and health systems demands the development of conceptual and analytical frameworks that can adequately capture system complexity yet are simple enough to be usable.
- The framework outlined in this paper adds particular insights on the ‘how’ question of integration as it relates to communicable diseases programmes.

Introduction

Over the past decade the financing of priority health programmes such as HIV/AIDS, tuberculosis (TB) and malaria in low- and middle-income countries, and the global governance structures involved in their planning, financing and implementation, have changed considerably (Samb *et al.* 2009). Substantial increases in global funding for health have taken place at a time that coincides with a growing number of global health actors involved in providing development assistance; including bilateral agencies, inter-governmental organizations, private foundations, global health initiatives and business organizations (McCoy *et al.* 2009; Balabanova *et al.* 2010). These changes and new actors have created a complex operational environment in which a growing number of stakeholders seek evidence that investments produce tangible benefits (Victora *et al.* 2006). Yet despite substantial investments in programmes to control these priority diseases (Ravishankar *et al.* 2009), evaluating their impact on health systems and public health outcomes has been challenging (Biesma *et al.* 2009; The Global Fund 2009).

HIV/AIDS, TB and malaria pandemics pose substantial challenges to health systems in the countries they affect. These pandemics affect especially the poorer and more vulnerable segments of society, who frequently suffer co-infection (Maher *et al.* 2005; Utzinger *et al.* 2009). These communicable diseases, coinciding with burgeoning non-communicable diseases, compound the health and economic burden shouldered by these groups (Freeman *et al.* 2005; Stevenson *et al.* 2007; Lonnroth *et al.* 2009; Stuckler *et al.* 2010; van Zyl Smit *et al.* 2010), who often face poverty, unemployment, poor housing and difficulties accessing health services. HIV/AIDS and tuberculosis, in particular, are often concentrated among hard-to-reach populations who experience a complex nexus of social and behavioural drivers of these disease, in some cases including injecting drug use (Aceijas *et al.* 2004; Carrieri *et al.* 2006; Li *et al.* 2009; Mathers *et al.* 2010) and alcoholism (Mathew *et al.* 2009b).

When poorly functioning health systems are superimposed upon this complex milieu, drug-resistant pathogens are likely to emerge (Coker *et al.* 2008), for example multiple and extensively resistant tuberculosis (MDR- and XDR-TB) (Coker 2004; Caminero 2010), resistant HIV strains (Este and Cihlar 2010) and drug-resistant malaria (Yeung *et al.* 2004; Dondorp *et al.* 2009). Dysfunctional health systems increase the chances that patients will experience high rates of treatment failure (Willenbring 2005; Coker *et al.* 2008; Tkatchenko-Schmidt *et al.* 2010). Co-morbidities further compound the complex needs of these patients, placing them at risk of drug interactions, drug dosing problems and serious side effects (Abdool-Karim *et al.* 2004; Andrews *et al.* 2007b; Harries *et al.*

2009). This complexity has led policy makers and health professionals in many places to advocate approaches that can integrate the diverse functions of health and social care systems (Edlin *et al.* 2005; Freeman *et al.* 2005; Unger *et al.* 2006; Andrews *et al.* 2007a; Kuehn 2008; Li *et al.* 2009). These calls also chime with recent calls for global health funds that go beyond those already existing, as well as for more concerted action by global health actors (Ooms *et al.* 2006; Van Damme 2007). However, whilst integration is intuitively appealing, there is still a paucity of evidence regarding whether integration of the elements of communicable disease management within health systems actually improves access to services, public health outputs (such as improved detection rates), clinical outcomes (such as deaths amenable to timely and effective health care) (Nolte and McKee 2003), users’ satisfaction with care and social support, or overall programme performance (effectiveness, efficiency or equity) (Dehne *et al.* 2000; Briggs and Garner 2006; Church and Mayhew 2009; Wallace *et al.* 2009; Atun *et al.* 2010b).

A lack of common conceptual understanding and agreement on what constitutes integration has impeded empirical analysis of integration within health systems, especially in the context of comparative analyses. Only recently a conceptual framework for integration of health programmes and health systems has been proposed (Atun *et al.* 2010a), allowing systematic analysis of integration in different settings (Atun *et al.* 2010b; Desai *et al.* 2010; Hanvoravongchai *et al.* 2010; Mounier-Jack *et al.* 2010; Rudge *et al.* 2010¹). This framework is used to analyse the extent and nature of integration of targeted health programmes in health systems (Atun *et al.* 2010a). This paper further develops the conceptualization of notions of integration and health systems, to address three additional but different questions (i) *why* integration is desirable, (ii) *what* structures and/or functions at different levels of the health system are affected by integration (or the lack of); and (iii) *how* does integration influence interactions between health system components or stakeholders. This framework has helped to inform the methodological approaches taken in four of the country case studies included in this supplement.

In this paper, we report our analysis of peer-reviewed literature on concepts, definitions, and analytical and methodological approaches to integration and health systems. Our review included conceptual and/or analytical frameworks of integration (these included conceptual papers and empirical studies drawing on explicit conceptual frameworks), systematic reviews and meta-analysis of integration initiatives, and reviews (overviews) of conceptual or methodological approaches to integration. The literature search included searches of Medline (from 1980), Embase (from 1950) and the Cochrane Library. The initial search was performed in December 2008 and

updated in April 2010. The search was limited to the English language and papers accessible through the University of London library services. Bibliographies of selected papers were searched to identify further publications. The search strategy included key terms related to the concept of integration including 'integrat*', 'collaborat*', 'coordinat*', 'co-ordinat*', 'link*'. The search was restricted to MeSH and Emtree headings under 'delivery of health care, integrated', 'health services' and key terms 'health program*', 'health intervention*', 'health system*'. The search was then limited further to include terms 'measure*', 'framework*' and 'model*'.

We present here our review of the published literature. We then propose an analytical framework, which draws upon this analysis and which has been developed to explore the influence (and potential influence) of integration on the sustainability of communicable disease control programmes (Shigayeva, undated) in low- and middle-income country settings.

Integration

Theoretical background

The notion of integration has its roots in organizational theory, particularly in contingency theory (Lawrence and Lorsch 1967a; Lawrence and Lorsch 1967b; Galbraith 1973), a subset of open systems theory (Scott 2002). Complex organizational systems are composed of separate but interconnected elements, which, in a functioning system, play complementary roles in the conduct of tasks in the pursuit of common aims and goals (Pfeffer 1982). However, as systems become more complex and their surrounding environment more uncertain and unpredictable, systems typically segment into subsystems. Organizations, in response to demands and uncertainties in the environment, adapt by allowing more flexible structures, division of labour and responsibilities, factors that consequently can lead to segmentation of professional norms, attitudes, behaviours and interests of firm's members (Lawrence and Lorsch 1967b). This might result in loss of effectiveness in implementing common tasks or inefficiencies. Increased differentiation thus, it is argued, requires implementation of integration, which was defined by Lawrence and Lorsch as 'the quality of the state of collaboration that exists among departments that are required to achieve unity of efforts by the demands of the environment'. However, since differentiation also allows organizations to achieve their goals, according to these authors, most successful organizations are those that can effectively balance differentiation and integration. This challenge in finding a balance between differentiations in roles, occupations and responsibilities and a need for integration and coordination that encourages people to work together effectively and efficiently towards a larger organizational mission highlights one of the fundamental tensions identified in organizational theory and practice (Jaffee 2001).

Similar tensions between integration and differentiation (or specialization) have been described in the theoretical and empirical literature on inter-organizational relations (Jaffee 2001). Inter-organizational relations have long been a topic of interest in a variety of disciplines including organizational theory, organizational behaviour, strategic management,

economics, sociology and political sciences (Whetten 1981; Galaskiewicz 1985; Oliver 1990; Smith *et al.* 1995). The theoretical developments are vast and have different facets. We did not aim to review literature on inter-organizational relations but we draw upon relevant overviews to highlight how integration is understood in this literature.

As a result of changes in the social division of labour, economic specialization and differentiation (or with increased system complexity), there is increasing interdependence among increasingly specialized organizations and the respective resources they control (Jaffee 2001). People in organizations typically pursue their own or their organization's interests, which may or may not coincide. New demands, limitations in resources, competition, needs to control environmental uncertainty or increases in an organization's influence or legitimacy create conditions for forming relations with other organizations (Galaskiewicz 1985; Oliver 1990). Broadly, formation of inter-organizational relations can be mandated (through legal or regulatory mechanisms, or by means of organizational hierarchy), be driven by market forces, or based on mutual trust and reciprocity (Oliver 1990). These forces are not mutually exclusive. Inter-organizational relationships have a potential to result in domination, overtly or covertly, of one organization over another, or control by one organization over another's resources. An alternative relationship, based on reciprocity and trust, may result in inter-organizational relations that are characterized by cooperation, collaboration and coordination (rather than domination, power and control), working together towards common interests (Oliver 1990). Organizations are, however, abstract constructs; interactions between organizations 'only emerge, grow and dissolve as a consequence of individual activities' (Ring and Ven 1994). Even when inter-organizational relationships are formed based on trust, the longevity and success of collaborative efforts is largely determined by interactions between individuals, their individual roles, interests and intentions (Smith *et al.* 1995; Hudson *et al.* 1999; Huxham and Vangen 2000).

In contrast to the corporate sector, whose ultimate goal is to make a profit, the goals of the health system are more complex (Murray and Frenk 2000; Hsiao 2003). The strategic goals of health systems are often defined as balancing gains in population health, social and financial risk protection, and consumer or patient satisfaction (WHO 2000; Atun and Menabde 2008; de Savigny and Adam 2009) through intermediate goals of equitable access and coverage, choice, efficiency and effectiveness (McPake and Kutzin 1997; Hsiao 2000). Health systems are organizationally complex. Functions include, amongst others, planning, governance, administration, finance and service delivery. Clinical care, public health and social services are provided by multiple actors, including state agencies, non-governmental organizations (including international), donor organizations, community groups and lay health workers, family members and private enterprises (Frenk 1994; Atun *et al.* 2005b). Moreover, health organizations, programmes, groups and individuals within health systems are increasingly interdependent in their use of funds, human resources, knowledge, skills and technologies (Lasker *et al.* 2001; Axelsson and Axelsson 2006). Although market forces are important in many health systems, connections between

Table 1 Selected definitions of integration, and related concepts and terms

Concept	Definition (Authors)
Integration	<p>'...a process where disease control activities are functionally merged or tightly coordinated with multifunctional health care delivery' (Unger <i>et al.</i> 2003)</p> <p>'...a search to connect the health care system (acute, primary medical, and skilled) with other human service systems (long-term care, education, vocational and housing services) in order to improve outcomes (clinical, satisfaction, efficiency)' (Leutz 1999)</p> <p>'...a process that involved creating and maintaining, over time, a common structure between independent stakeholders (and organizations) for the purpose of coordinating their interdependence in order to enable them to work together on a collective project' (Contandriopoulos <i>et al.</i> 2003)</p>
Integrated care	'...is a concept bringing together inputs, delivery, management and organization of services related to diagnosis, treatment, care, rehabilitation and health promotion... is a means to improve the services in relation to access, quality, user satisfaction and efficiency' (Grone and Garcia-Barbero 2001)
Integrated delivery networks	'A network of organizations that provide and arrange to provide a coordinated continuum of services to a defined population and is willing to be held clinically and fiscally accountable for the outcomes and the health status of the population served' (Shortell <i>et al.</i> 1994)
Integrated health services	'...process of bringing together common functions within and between organizations to solve common problems, developing a commitment to shared vision and goals and using common technologies and resources to achieve these goals' (WHO 1996)
Disease management	'...is a systematic, population-based approach involving identification of people at risk of a particular disease intervention, throughout the condition's life cycle, and packaging the entire care and disease spectrum in order to achieve better and more cost-effective health outcomes' (Kodner 2009)
Partnership	'...encompass all types of collaboration (consortia, coalitions, alliances) that bring people and organizations together to improve health' (Lasker <i>et al.</i> 2001)
Continuity of care (continuum of care)	'...is achieved by bridging discrete elements in the care pathway—whether different episodes, interventions by different providers, or changes in illness status—as well as by supporting aspects that endure intrinsically over time, such as patients' values, sustained relationships, and care plans' (Haggerty <i>et al.</i> 2003)
Coordinated care (case management)	'...system-wide efforts and/or specific policies to ensure that patients—particularly those with chronic conditions—receive services that are appropriate to their needs and coherent across care settings and over time' (Hofmarcher <i>et al.</i> 2008)

stakeholders (organizations or individuals) working on health issues are often characterized by consensus building, shared values and a shared philosophy concerning common problems rather than market imperatives. This consensual manner of working does not exclude competitive relations or power struggles, however (Alter and Hage 1993; Contandriopoulos *et al.* 2003; Axelsson and Axelsson 2006). Thus, the concept of integration in public health systems is intrinsically related to notions of cooperation, collaboration, partnerships and coordination (Bolland and Wilson 1994; Lasker *et al.* 2001; Axelsson and Axelsson 2006; Horwath and Morrison 2007; Lehman *et al.* 2009). In fact, the terms 'coordination', 'collaboration', 'alignment' and 'networks' are often used interchangeably with the term 'integration' in the health systems and health services research literature (Table 1).

Given the complexity of contemporary health systems, they are increasingly being viewed as complex adaptive systems (Frenk 1994; Plsek and Greenhalgh 2001; Atun and Menabde 2008; de Savigny and Adam 2009) or complex socio-cultural-political systems (Blaauw 2003; Atun *et al.* 2006; McDaid *et al.* 2006). This view of systems acknowledges the social nature of organizations, that the goals, roles, interests, intentions, power-relations and behaviours of actors within these systems are of critical importance, and so too are their interactions as individuals and the groups (whether formal or informal) they inhabit, be they individual health care workers, patients, policy makers, donors, patients' groups,

bureaucrats and administrators, or politicians (Frenk 1994; Blaauw 2003). Individual goals of patients and health care workers do not necessarily match the aims of health policies. Underpaid and overworked staff often see health systems as a means of their own survival, and are less likely to behave in the interest of overall organizational aims (McPake *et al.* 1999; Franco *et al.* 2002; Schneider *et al.* 2006). With the introduction of innovations or the establishment of collaborative approaches, professionals are often reluctant to lose professional autonomy and independence, status, potentially income and respect from the patients (Atun *et al.* 2005a; D'Amour *et al.* 2008). There is now recognition that for building successful collaborative and integrative approaches in health system, the local social and political culture, informal relations between providers and patients, providers, employers, policy makers, should be understood and addressed (van Raak *et al.* 1999; Atkinson 2002; Hudson 2002; Gilson 2003; Johnson *et al.* 2003; Schneider *et al.* 2006; Horwath and Morrison 2007).

Definitions and perspectives

The published literature reveals a wide range of concepts of integration in health systems (Axelsson and Axelsson 2006; Suter *et al.* 2007; Atun *et al.* 2008a; Nolte and McKee 2008; Kodner 2009). Health systems differ in governance arrangements, regulatory norms, managerial rules and funding flows, professional skill-mix, political, institutional and professional

structures, and cultural values. The notion of integration has been pursued in many ways in different health systems (Nolte and McKee 2003). There is a wealth of terminology such as 'integrated care', 'integrated services', 'horizontal programmes', 'disease management', 'case management', 'continuity of care', 'coordinated care', 'managed care', 'comprehensive care' and 'seamless care' to name a few (Atun *et al.* 2008a; Nolte and McKee 2008; Kodner 2009). Table 1 highlights some of the definitional issues surrounding a few of these terms.

This lack of a commonly adopted definition and the variety of approaches taken to analyse integration has been referred to as an 'academic quagmire of definitions and concepts analysis' (Howarth and Haigh 2007). However, recent empirical studies reveal integration to be polymorphous by nature (Nolte and McKee 2008; Atun *et al.* 2010b). Those from different disciplines and professions understand the term differently. For example, exploring the application of an 'integrated care' concept to health and social care in industrialized countries, Leichsenring (2004) distinguished discourses, which evolved either from health care perspectives ('managed care' and 'public health' discourses) or from social services perspectives that focused on broader whole system approaches ('person-centred' discourses). Complementing these perspectives, Leichsenring also explores 'institutional discourse', which focuses on organizational strategies to realize integration and/or coordination of services (Leichsenring 2004).

Despite this diversity of views and definitions, our review of the literature suggests that, broadly, integration is viewed positively in relation to health systems. Common themes found in definitions are suggestions that integration reduces fragmentation or duplication of services, improves patient care outcomes and results in greater satisfaction with services, offers benefits to overall population health, and improves the performance of health systems, their programmes and services (Table 1).

Conceptual frameworks for the analysis of integration

Reflecting the diversity of approaches to integration, there are a number of conceptual and analytical frameworks that have been developed specifically for a particular health care or contextual setting. Our search identified 40 conceptual frameworks relating to integration and 13 implementation frameworks offering roadmaps for the establishment of integrated programmes, services or systems. We were unable to identify a unifying framework for *analysis* of integration initiatives, though frameworks exist to address specific research questions.

We identified a variety of different typologies of integration in health systems (WHO 1996; Delnoij *et al.* 2002; Sobczak 2002; Simoons and Scott 2005; Axelsson and Axelsson 2006; Colombini *et al.* 2008; MacAdam 2008; Nolte and McKee 2008; Armitage *et al.* 2009; Kodner 2009; Atun *et al.* 2010a), including the concept of integration and communicable disease programmes (Mills 1983; Unger *et al.* 2003; Sylla *et al.* 2007; Wang *et al.* 2007; Grepin and Reich 2008). Existing typologies can be summarized in terms of how they address three questions: *why* integration is desirable, *what* structures and/or functions at different levels of health system are affected

by integration (or the lack of), and *how* integration influences interactions between health system components or stakeholders.

The '*Why*' of integration asks about the driving forces or the purposes of integration. Ultimately, integration is a response to real or perceived fragmentation of functions and services for users, gaps, duplication, inefficiencies or concerns about growing costs or changing population demands and expectations (Grone and Garcia-Barbero 2001; Kodner 2009).

The '*What*' of integration includes questions that relate to the *structures and/or functions* at different levels ranging from the overall health system, specific programmes and interventions, and individual and institutional stakeholders (Mills 1983; WHO 1996; Delnoij *et al.* 2002; Kodner and Spreeuwenberg 2002; Contandriopoulos *et al.* 2003; Simoons and Scott 2005; Grepin and Reich 2008; Nolte and McKee 2008; Kodner 2009; Atun *et al.* 2010a). The subjects of integration include structures and processes of governance, financing, policy, management and administration, service delivery, clinical care, demand generation and information systems (Kodner and Spreeuwenberg 2002; Atun *et al.* 2010a). The *what* of integration also includes notions of convergence of institutional or professional cultures, norms, working methods, approaches and symbols adopted by various stakeholders, taking account of their power, interests and objectives (Fabbriotti 2007).

The '*How*' of integration refers to the dynamic interactions between organizations, programmes, individual providers and/or stakeholders (Leutz 1999; Kodner and Kyriacou 2000; Boon *et al.* 2004; Simoons and Scott 2005; Horwath and Morrison 2007; Sylla *et al.* 2007; Wang *et al.* 2007; Grepin and Reich 2008; Fletcher *et al.* 2009; Atun *et al.* 2010a). These interactions include efforts to enhance joint working such as building strategic or contractual alliances, regulations, merging service delivery, establishing multidisciplinary teams, creating service networks and developing coordination mechanisms.

Connections between organizations can occur within a geographical space, at international, national, regional/district or local levels (Mills 1983; Grepin and Reich 2008; Atun *et al.* 2010a). Authors also discuss the breadth of integration. Horizontal integration involves integration of organizations or providers working at the same level of the hierarchy (for example, among hospitals), and vertical integration refers to integration across different levels of the service delivery hierarchy (for example, between hospitals and primary care facilities) (Axelsson and Axelsson 2006; MacAdam 2008; Nolte and McKee 2008; Kodner 2009).

There is an emerging acknowledgement that integration in health systems and the benefits that may accrue are, to a considerable extent, dependent upon the characteristics of different health systems and the wider context within which they are situated (Van Damme and Kegels 2006; Friedland *et al.* 2007; Nolte and McKee 2008; Okot-Chono *et al.* 2009; Atun *et al.* 2010b; Atun *et al.* 2010c; Gyapong *et al.* 2010). Particularly important are the role of key political stakeholders and decision-makers and their commitment, support and willingness to work together to resolve conflicts and provide leadership in advocating, designing, implementing and maintaining integration initiatives (van Raak *et al.* 1999; Mur-Veeman *et al.* 2003; Atun *et al.* 2005b; van Raak *et al.* 2005).

We reviewed these various frameworks, asking whether they reflect the why, what and how questions of integration, as well as the extent to which they acknowledged health system characteristics, the wider contextual environment and the roles of key stakeholders. We did not find any one framework that explicitly addressed all of these parameters. Table 2 summarizes selected frameworks.

All the frameworks reviewed address questions associated with the *what* of integration. Publications exploring integration in high-income countries contributed disproportionately to conceptualizing the dynamics of interactions (the *how* of integration) between previously separate components of the health system. Several authors conceptualized integration along a continuum of inter-organizational relationships, with increasing intensity in interactions, formalization of governance arrangements, sharing of responsibilities or pooling of resources. Integration is viewed by most as a transformative change that may lead to a complete merger of organizations or a formalized collaboration of systems of governance, accountability or service delivery, often involving resource pooling (Konrad 1996; Leutz 1999; Messeri *et al.* 2003; Boon *et al.* 2004; Axelsson and Axelsson 2006; Fleury 2006; Sylla *et al.* 2007). Formal and structured interactions on such continuums are labelled as, for example, linkage, coordination, cooperation or collaboration (though they may be defined and/or ranked differently). Some authors argue that more complex, long-term or unstable and fluctuating problems requiring multiple complex interventions may benefit from greater integration (Leutz 1999; Messeri *et al.* 2003; Fleury 2006). Coordination is often viewed as involving some degree of managerial oversight (Axelsson and Axelsson 2006), whilst collaboration, partnerships and cooperation are more commonly understood to be built upon mutual agreements, with formalized arrangements following if common goals are agreed (Konrad 1996; Lasker *et al.* 2001; Weiss *et al.* 2002; Axelsson and Axelsson 2006; de Rijk *et al.* 2007).

Several frameworks identified focus on collaboration, partnerships or cooperation as types of interactions within an overall rubric of health system or programme integration initiatives (van Raak *et al.* 1999; Lasker *et al.* 2001; Brazil *et al.* 2004; D'Amour *et al.* 2008; de Rijk *et al.* 2007; Horwath and Morrison 2007; van Raak *et al.* 2005). These considered explicitly the role of key actors and stakeholders, their influences and interests, as well as factors in promoting and sustaining cooperation or collaboration.

We identified only one analytical framework (Atun *et al.* 2010a), which builds on a clearly outlined conceptual framework of health systems and explicitly takes into account the role of key stakeholders, health system functions and the broader context. In analysing the level, nature and extent of integration, while the framework appropriately categorizes integration of targeted programmes into health systems along a continuum—fully integrated, partially integrated and not integrated—in this framework the question of *how* partial integration occurs is not explored in detail. The majority of the conceptual papers reviewed outline the purpose of integration overall (the *why* of integration) but we found only a few analytical frameworks that consider intermediate and/or final outcomes or consequences of integration (Provan and Milward 2001; Wan and Wang 2003; Vazquez *et al.* 2009).

Analytical framework: integration, communicable diseases programmes and the health system

We propose an analytical framework that has been developed for a study to explore the influence of integration on the sustainability of communicable disease control programmes within a health system (Shigayeva, undated).

As was noted, it has been suggested that integration of communicable disease control programmes with the broader health systems within which they sit may offer benefits that include improvements in coverage, access, equity, efficiency and sustainability (WHO 1964; WHO 1965; Feenstra 1994; Feenstra and Visschedijk 2002; Unger *et al.* 2003; Briggs and Garner 2006; Atun *et al.* 2008a; Mosneaga *et al.* 2008; Utzinger *et al.* 2009; Gyapong *et al.* 2010). Mirroring conceptual questions concerning integration, sustainability of communicable disease programmes has not, however, been conceptualized. Because of space limitations, we limit presentation of our proposed framework here to questions of integration and only briefly outline a conceptual development of sustainability, and its relation to integration.

Briefly, there is an emerging acknowledgement that the sustainability of communicable diseases programmes (as well as other health programmes) is likely improved where programmes are connected and aligned with other formal health system functions, and sensitive to the prevailing health culture of the affected populations, though the studies also note the paucity of evidence in this area (Streefland 1995; Lienhardt and Ogden 2004; Atun *et al.* 2005e; Allotey *et al.* 2008; Gruen *et al.* 2008). The conceptualization of sustainability of communicable disease programmes to incorporate the question of integration (Shigayeva, undated) draws upon theoretical developments and concepts from sustainability sciences (Fiksel 2003; Fiksel 2006; Folke 2006), and conceptualization of sustainability of a health programme by Gruen *et al.* (2008). This recognizes that complex adaptive systems operate in constantly changing environments, in which uncertainty, risks and surprises are unavoidable. Thus, an essence of sustainability is resilience; the ability to adapt to a wide range of external and internal pressures yet retain functioning and performance, and initiate changes through innovations in order to continuously improve performance.

Our proposed analytical framework, illustrated in Figure 1 (with an example of integrating TB and HIV/AIDS control programmes), draws on our earlier work on evaluation of complex health programmes and health systems (Atun *et al.* 2004; Coker *et al.* 2004), and the review of integration in health systems presented in this paper. We view health systems as complex adaptive systems (Checkland 1981; Plsek and Greenhalgh 2001) embedded within a broader context comprising a set of critical interacting functions that include governance, financing, planning, service delivery and evaluation, and which are designed to achieve specified objectives (Atun and Menabde 2008). We take as the fundamental goals of the health system increased health, protection from financial risk and responsiveness to users (Frenk 1994; WHO 2000; Hsiao 2003), while intermediate goals include equity, efficiency, choice and effectiveness (Atun and Menabde 2008).

Table 2 Selected conceptual and analytical frameworks

Framework					
References	Background	Concept	Why	What and/or How	Factors determining integration
Health interventions or programmes (research in low- & middle-income countries)					
Crikl <i>et al.</i> (2004)		Integration (<i>disease control programmes with basic health care</i>)	Should be justified prior to integration taking place	Administrative (structural) or operational (functional)	<i>Desirable</i> – what is added value <i>Possible</i> – whether general services have capacity to implement interventions <i>Opportune</i> – impact on improvements of general service or programmes
Grepin <i>et al.</i> (2008)	Organizational theory	Integration (<i>Neglected Topical Diseases Programmes Partnerships</i>)	Improvements in partnerships' effectiveness and efficiency	<i>Levels</i> – global, national, local <i>Domains</i> – Policy, activities (functional), structural <i>Degree</i> – coordination, collaboration, consolidation	
Atun <i>et al.</i> (2010a)	Diffusion of innovations	Integration (<i>targeted health interventions into health system</i>)	Adoption, assimilation and sustainability of interventions and programmes	<i>Levels of health system</i> – national/regional, district, local <i>Health system functions</i> (into) – governance, financing, planning, service delivery, monitoring and evaluation, and demand generation <i>Level of integration</i> – full, partial, not integrated	Nature of health problem, type of intervention, adoption system, health system characteristics, broad context
Health care organizations, health services, health or public health programmes (research in industrialized countries)					
Konrad (1996)	Experiences in US	Integration (<i>human services</i>)	Improve service accessibility, continuity, reduce services duplication, cost and inefficiencies, greater accountability	<i>Levels of integration</i> – information sharing and communication, cooperation & coordination, collaboration, consolidation, integration. Levels as continuum with increased intensity and formality, across 12 dimensions of cross-agencies activities	
Leutz (1999)	Experiences in US and UK	Integration (<i>medical and social services</i>)	Improve efficiency and users' satisfaction, better outcomes	<i>Levels of integration</i> – linkage, coordination and integration, which are set against service needs of patients and operational domains of health services; where patients with complex, fluctuating, long-term problems benefit from more integration	

(continued)

Table 2 Continued

References	Background	Concept	Framework		Factors determining integration
			Why	What and/or How	
Axelsson & Axelsson (2005)	Contingency theory, institutional economic theory	Integration and coordination (<i>public health organizations</i>)	High degree of fragmentation among organizations in public health field	<i>Dimensions</i> – horizontal and/or vertical <i>Forms of integration</i> – Coordination, cooperation, contracting and collaboration	Regulatory, financing, informational systems; organizational norms, cultures and interests; management and leadership
Vazquez <i>et al.</i> (2009)	Literature review	Integrated health care networks (<i>evaluation of performance</i>)	<i>Intermediate outcomes</i> – coordination, continuity of care, access <i>Final outcomes</i> – equity in access, efficiency	<i>Dimensions</i> – systems' goals, strategies, organizational structures and culture, resources allocation and incentives system, health care model, and coordination mechanisms	Policy goals on equity in access, equity and continuity, characteristics of insurance and health services, integration strategies, stakeholders and institutional context
Fluery (2006)	Organizational theory (inter-organizational relationships). Review of conceptual frameworks	Integrated service networks (<i>health care organizations</i>)	Efficiency, quality of services, health improvements and satisfaction of clients	<i>Main types</i> – mutual adjustment, alliance and integration (based on intensity of ties between organizations) <i>Criteria for different types</i> – governance, strategies, accountability, scope, type of health problem <i>Integration strategies</i> – structural, functional, clinical	
Lasker <i>et al.</i> (2001)	Organizational theory, review of conceptualizations of partnerships and synergy	Collaboration (<i>partnerships in health field</i>)	Increasingly interdependent health programmes	<i>Extent</i> to which resources, skills, perspectives contribute to and strengthen work of the group (synergy)	Resources, partners' characteristics and relationships, partnership characteristics (leadership, efficiency, governance, administration and management); external environment
Howarth & Morrison (2007)	Organizational theory (inter-organizational relationships). Review of conceptual frameworks	Collaboration (<i>children's services</i>)	Increased requirements from governments and policy makers for collaborations in child welfare services	<i>Levels</i> – communication, cooperation, coordination, coalition – integration <i>Dimensions</i> – goals and targets, resources and funding, service delivery, decision-making, accountability and responsibilities	Pre-disposing factors, mandate, membership & leadership, machinery, processes, outcomes
De Rijk <i>et al.</i> (2007)	Networks theory, organizational behaviour theory, resource dependency theory, new institutional theory	Cooperation (<i>public health organizations</i>)	Assumed to optimize delivery of services	<i>Level of cooperation</i> – number and variety of agreements in place, including follow-through agreements	Institutional context, goals, dependence on resources, perceptions of partners, willingness and ability to cooperate

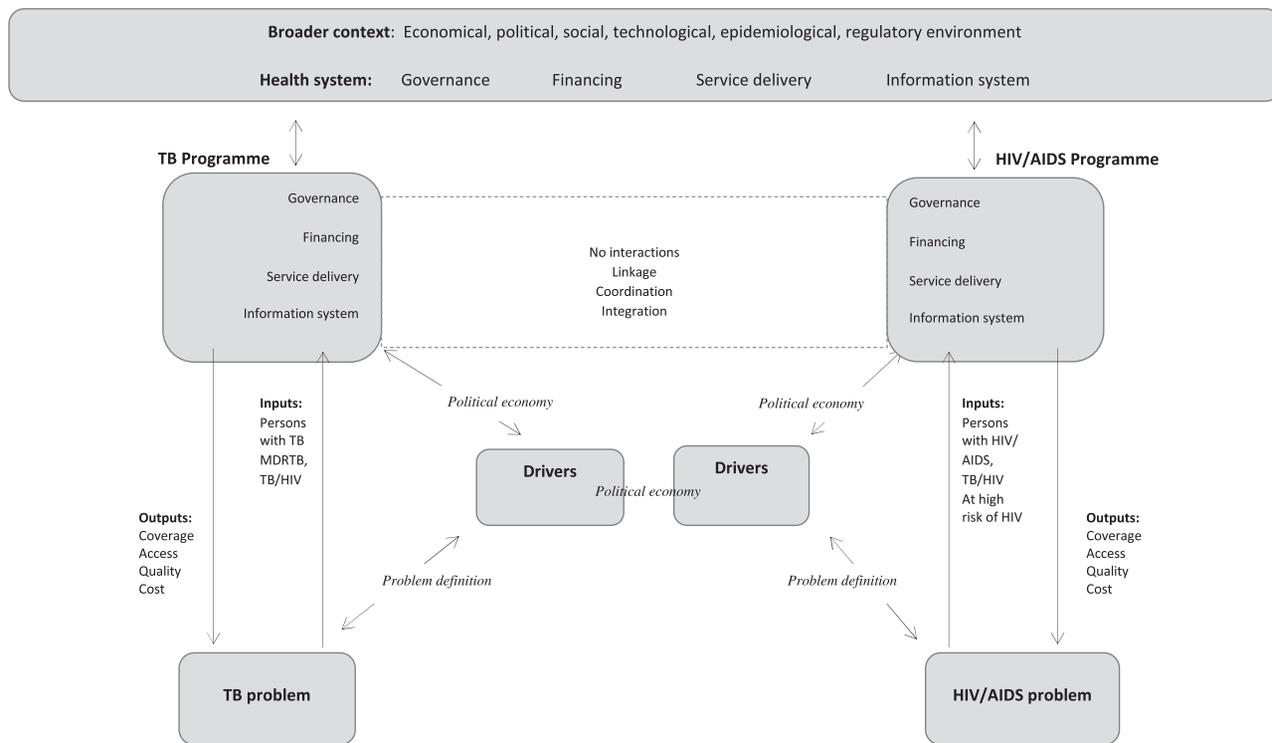


Figure 1 Analytical framework, modified following Atun *et al.* (2004), Atun *et al.* (2010a,b) and Gruen *et al.* (2008).

Communicable disease programmes are components of complex systems. Programmes are comprised of all organizations and individuals, whose purpose and activities are principally directed towards the prevention and control of a defined disease problem. Programmes are viewed as socially established and sustained, and key roles are played by stakeholders, referred to here as programme drivers, who may be funders, policy makers, managers, community leaders, groups voicing the needs of patients and users’ of services, providers of services, professional associations, religious authorities, civil society organizations and other groups who are directly or indirectly affected by a health problem (Gruen *et al.* 2008; Atun *et al.* 2010a).

We define integration as the structures and functions (i.e. the *what* of integration) associated with establishing and sustaining a health system and its components in order to ensure effective, efficient and equitable use of resources (i.e. the *why* of integration). For our framework, health systems and programmes have four key components, with each including structural and functional elements: governance, financing, service delivery and information systems (Shigayeva, undated). These are outlined in Box 1.

Whether and how a programme and the health system within which it is situated influence a disease problem—specifically whether they impact beneficially on improving coverage, access, quality and reducing cost (outputs in Figure 1), and consequently reducing the disease problem—depends on many factors.

How drivers define a problem is of considerable importance; its urgency, scope, socio-economic impact and the social narrative surrounding a problem, the needs and demands of those at risk

from and with disease (Atun *et al.* 2005d; Atun *et al.* 2008b; Tkatchenko-Schmidt *et al.* 2008; Atun *et al.* 2010a). Problem definition also often influences the choice, and balance, of preventative and curative interventions; decisions about the adoption and continuation of policies and interventions. How programme drivers view a specific disease problem or view changes in the problem (e.g. emergence of drug resistance, or HIV/ADS co-epidemics with IDUs) may influence decisions regarding the establishment of interactions with other health system components. For example, research from the former Soviet Union showed that the social narrative surrounding TB disease and perceptions of risk contributed to inhibiting the integration of TB clinical care into broader health system components (Atun *et al.* 2005a; Atun *et al.* 2005c; Atun *et al.* 2005d; Mathew *et al.* 2009a; Vassall *et al.* 2009).

A programme’s structures and functions (Box 1) are dependent upon organizational characteristics of the health system, and the broader political, legislative, economic, social and technological context (Atun *et al.* 2004). The prevailing health system’s and programme’s arrangements may determine options for and feasibility of integration of communicable disease programmes with broader health system (Atun *et al.* 2005e; Dimitrova *et al.* 2006; Floyd *et al.* 2006; Marx *et al.* 2007; Wang *et al.* 2007; Atun and Olynik 2008; Tkatchenko-Schmidt *et al.* 2008; Hasker *et al.* 2009; Tkatchenko-Schmidt *et al.* 2010).

A programme’s drivers may positively or negatively inform and influence a programme’s very existence, its resources and/or functioning, and interactions with other health system components (Gruen *et al.* 2008). We refer to relations among drivers as political economy, which is defined as the driver’s individual or

Box 1 Programme components and elements	
Programme components	
Governance	<i>Structures</i> Organizational structures Disease control policy, regulations and laws <i>Functions</i> Strategic and operational planning, Accountability Regulation Performance management
Financing	<i>Structures</i> Funds (sources) <i>Functions</i> Pooling of funds Providers payment mechanisms
Service delivery	<i>Structures</i> Facilities (infrastructure) Laboratories Drugs, medical technologies, medical supplies Human resources (including managerial) <i>Functions</i> Training and development of human resources, Procurement and distribution of drugs and medical supplies Care pathways/provision of interventions
Information system	<i>Structures</i> Informational technologies and infrastructure <i>Functions</i> Data management – collection, analysis, dissemination Monitoring and evaluation of programme activities and impact

institutional interests, influences (power) and positions in regard to a particular policy or organizational issue (Brugha and Varvasovszky 2000; Varvasovszky and Brugha 2000). *Drivers* are at the centre of the question of whether integration of communicable diseases with other health system components would be initiated, effectively implemented and maintained. Potential impediments include, but are not limited to, differences in philosophies and approaches to care and treatment (Heller *et al.* 2004), a lack for national and local leadership to dedicate resources, time and attention to those providing in integrated services (Chaulet 1998; Mayhew *et al.* 2000; Feenstra and Visschedijk 2002), reluctance from specialists to lose professional autonomy (Dimitrova *et al.* 2006), and tensions over control of resources (Hill and Tan Eang 2007).

As noted, integration may involve structural or functional elements of any of programme components (Box 1); governance, financing, service delivery or information system, where full, partial or no integration may occur (Atun *et al.* 2010a). However, with 'partial' integration a range of functional relationships may exist and understanding these is important. We explore this further drawing on previous conceptualizations of integration (Konrad 1996; Leutz 1999; Kodner and Kyriacou 2000), which view this as acting along a continuum from linkage or informal cooperation, through coordination of activities, to full integration or formal merger. In our analytical framework, we distinguish along a continuum of integration, ranging from no integration, partial integration to full integration, a range of interactions (i.e. *the how* of integration) between programmes (or indeed a programme and other components of a health system): no formal interactions when no integration exists; linkage or coordination when partial integration exists; and full integration (Figure 2). Across this continuum of interactions there is

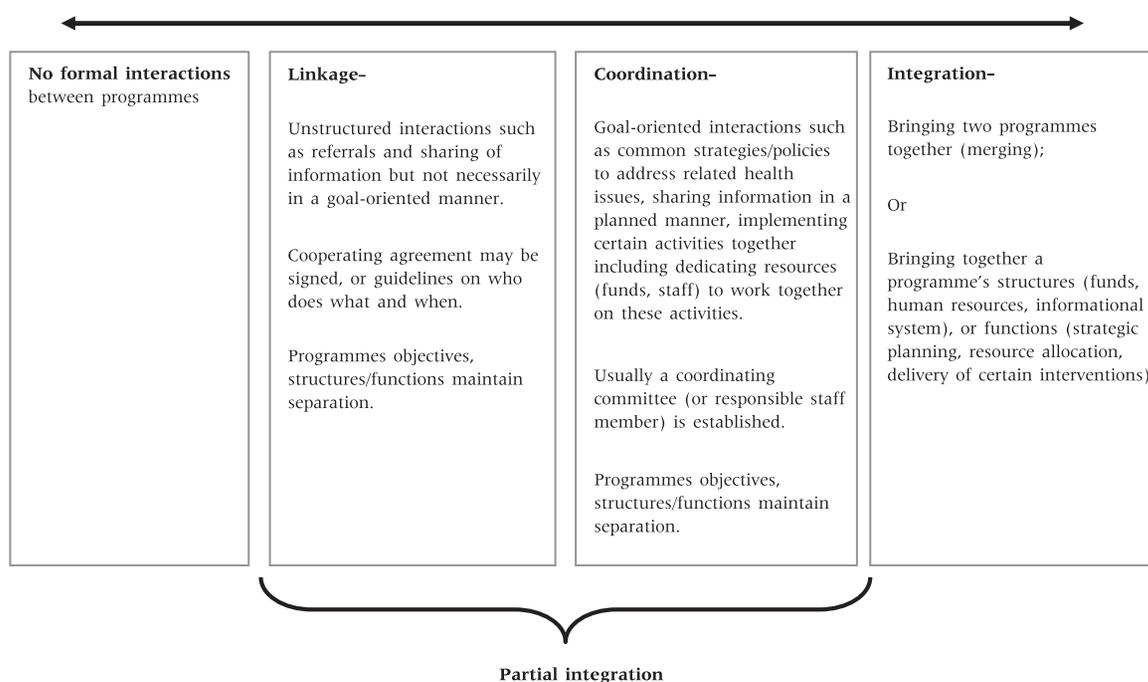


Figure 2 Levels of integration, examined through a lens of 'interaction'.

Table 3 Examples of interactions between TB and HIV/AIDS programmes (and with general health system)

Programme's component	Linkage	Coordination	Integration
Governance	Joint staff meetings or working groups for informational purposes. Guidelines might exist for reciprocal referrals at service delivery level.	Coordinating committee (or similar structure) for planning, implementing and evaluating joint activities is set up, including resources mobilization (e.g. applications and management of donors' assistance) (Gunnberg <i>et al.</i> 2008; Terris-Prestholt <i>et al.</i> 2008) [Malawi case in Friedland <i>et al.</i> (2007)].	Governance functions for both programmes are structurally and functionally, or only functionally, integrated
Finances	Informal (or cooperation) agreements between programme's stakeholders to conduct mobilization of funds or legislation change.	For collaborative activities, budgetary oversight and decision making are shared; guidelines/procedures in place – who pays for what for joint activities (Chimzizi <i>et al.</i> 2004).	Funds from all sources, including donor's funding, for both programmes are pooled, common channels of funds allocation. Joint responsibility for financial planning and management.
Service delivery	Dedicated staff for each programme; care processes are separate. TB and HIV/AIDS specialists have responsibility only within their own speciality, but cross-trained on implementation of referral procedures (Okot-Chono <i>et al.</i> 2009). Services might be co-located (e.g. VCT at TB clinics, or TB and HIV/AIDS rooms in one facility), but each programme's staff are under separate management and accountability lines. Information exchange between staff members exists, but not on a regular basis and activities are not evaluated jointly.	Care managers or focal point coordinators to manage transition of patients transition between programmes and coordinating necessary tests and care (e.g. VCT for TB patients, TB DOT for HIV positive) including follow-up and regular informational exchange relevant to clinical care and/or social support (Gasana <i>et al.</i> 2008; Terris-Prestholt <i>et al.</i> 2008). Resources (facilities, laboratories, staff) for implementing joint activities might be shared.	Multifunctional staff, or both TB and HIV/AIDS specialists, are available at clinics who work within multi-disciplinary team and under the same managerial line and common accountability [example: South Africa's case study in Friedland <i>et al.</i> (2007)]. Multidisciplinary team is jointly responsible for management of patients' care.
Information system	Indicators for each programme reported, channelled through programme-specific monitoring and evaluation (M&E) system. Data for both systems may be collected by the same individuals (e.g. at lower levels of health system). M&E indicators are not harmonized between the systems. No formal or systematic data exchange between the two systems (Rudge <i>et al.</i> 2010; Desai <i>et al.</i> 2010; Hanvoravongchai <i>et al.</i> 2010; Mounier-Jack <i>et al.</i> 2010).	Harmonization of some M&E indicators, but there are also some parallel indicators and/or reporting systems for some partners (e.g. external donors) involved in the national HIV or TB response. Formal exchange of data between HIV and TB M&E units (Rudge <i>et al.</i> 2010; Desai <i>et al.</i> 2010; Hanvoravongchai <i>et al.</i> 2010; Mounier-Jack <i>et al.</i> 2010). For joint TB/HIV activities responsibility for M&E is shared [example: South Africa case in Friedland <i>et al.</i> (2007)].	Unified (comprehensive) informational system; joint responsibility for M&E. M&E indicators for HIV/AIDS and TB are part of general health information system (Rudge <i>et al.</i> 2010; Desai <i>et al.</i> 2010; Hanvoravongchai <i>et al.</i> 2010; Mounier-Jack <i>et al.</i> 2010).

increased formality in governance, sharing of responsibilities for joint activities and pooling of resources.

When *no formal interactions* exist, a communicable disease programme is structurally organized and functions in parallel with other health system components. An example of such programmes would be communicable disease control programmes as described in the former Soviet Union (Coker *et al.* 2003; Atun *et al.* 2008c). Governance structures are separate; policy development, strategic and operational planning, and performance management are implemented exclusively by TB-dedicated institutions. Funds are planned and channelled separately, either through earmarked budget or parallel donors financing. TB detection, care and support are delivered only by specialized TB service providers.

We define *linkage* as unstructured interactions between two programmes, such as when interactions occur in an *ad hoc* manner, information is exchanged upon request or patient referrals occur. *Coordination* represents goal-oriented activities enhanced by working together on joint activities, whilst retaining a programme's distinctive structures and functions. Coordinating structures or regulatory mechanisms should exist and be supportive of organized interactions (Contandriopoulos *et al.* 2003). Shared responsibilities would be defined in the arrangements for governance, planning of resources, implementation of joint activities or coordinated collection and analysis of information. *Integration* would involve changes in both programme structures and/or functions, leading either to establishing common formalized governance structures or

uniting governance responsibilities, pooling of funding, merging service delivery or unifying information systems. We also use the term integration to refer to a merging of two programmes across all functional areas. Table 3 illustrates these levels of interactions, focusing on interactions between TB and HIV/AIDS programmes and the broader health system, drawing on the published literature and case studies presented in this supplement.

In summary, the framework extends our previous conceptualizations of health systems, communicable diseases control programmes and integration (Atun *et al.* 2010a). In particular, the framework outlined in this paper adds insights on the 'how' question of integration as it relates to communicable diseases programmes. Our literature review highlighted that the 'how' of integration is often associated with various terminologies, which are used interchangeably, and often prevent effective communication across policy makers and managers on what is meant by integration. We organized interactions into four levels, along a continuum of interactions that extends from no interactions, to partial integration that includes linkage and coordination, and ultimately to integration, in line with other authors who have defined interactions with more levels (Konrad 1996; Boon *et al.* 2004).

Conclusions

To date, reviews that have examined the benefits of integration in health systems in high-income countries (Bodenheimer *et al.* 2002; Weingarten *et al.* 2002; Soto *et al.* 2004; Ouwens *et al.* 2005; Willenbring 2005; Hesse *et al.* 2007; Suter *et al.* 2007; Butler *et al.* 2008; Ouwens *et al.* 2009) or low- and middle-income countries (Dehne *et al.* 2000; Briggs and Garner 2006; Bhutta *et al.* 2008; Lewin *et al.* 2008; Church and Mayhew 2009; Wallace *et al.* 2009; Atun *et al.* 2010b) identify a paucity of evidence that convincingly demonstrates that integration improves access to care, service quality, programme efficiency or effectiveness. There is no evidence to suggest a positive impact on equity of outcomes. This lack of evidence may be due to the nature of integration, which is clearly multifaceted and complex (Howarth and Haigh 2007; Nolte and McKee 2008). The analytical challenge also reflects disciplinary differences in approaches to research (Coker *et al.* 2004). Addressing questions such as what works, why and how in relation to integration and health systems demands the development of conceptual and analytical frameworks that can adequately capture system complexity yet are simple enough to be usable. But frameworks, by their nature, are constructs intended to simplify and thus neglect factors that may be important. Balancing these competing needs will mean the development of frameworks that support our understanding of integration and health systems will continue to evolve in an iterative and incremental manner.

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Conflict of interest

We declare no conflicts of interest.

Endnote

¹ Four country case studies submitted in parallel with this article to this supplement of *Health Policy and Planning*.

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