A systematic review of the evidence on integration of targeted health interventions into health systems

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A longstanding debate on health systems organization relates to benefits of integrating health programmes that emphasize specific interventions into mainstream health systems to increase access and improve health outcomes. This debate has long been characterized by polarization of views and ideologies, with protagonists for and against integration arguing the relative merits of each approach. However, all too frequently these arguments have not been based on hard evidence. The presence of both integrated and non-integrated programmes in many countries suggests there may be benefits to either approach, but the relative merits of integration in various contexts and for different interventions have not been systematically analysed and documented.

In this paper we present findings of a systematic review that explores a broad range of evidence on: (i) the extent and nature of the integration of targeted health programmes that emphasize specific interventions into critical health systems functions, (ii) how the integration or non-integration of health programmes into critical health systems functions in different contexts has influenced programme success, (iii) how contextual factors have affected the extent to which these programmes were integrated into critical health systems functions.

Our analysis shows few instances where there is full integration of a health intervention or where an intervention is completely non-integrated. Instead, there exists a highly heterogeneous picture both for the nature and also for the extent of integration. Health systems combine both non-integrated and integrated interventions, but the balance of these interventions varies considerably.

Keywords Health systems, targeted programmes, integration, vertical programmes, horizontal programmes
KEY MESSAGES

- Health systems combine both non-integrated and integrated interventions, but the purpose, nature and extent of integration vary enormously. Seldom are interventions wholly unintegrated or fully integrated into health system functions.
- More evidence is needed in order to fully conclude on the effectiveness of health programme integration, particularly from country case studies with robust designs using a common methodology and replication logic.

Introduction

A longstanding debate on health systems organization relates to benefits of integrating health programmes that emphasize targeted interventions into mainstream health systems to improve health outcomes; a debate long characterized by polarization of views, with protagonists for and against integration arguing the relative merits of each approach (Walsh and Warren 1979; Newell 1988; Warren 1988; Wisner 1988; Cueto 2004; Magnussen et al. 2004). Recently, this debate has been rekindled due to substantial rise in external funding for priority health, nutrition and population interventions (hereafter called ‘health interventions’) and health systems to achieve health-related Millennium Development Goals (MDGs) (World Bank 2007).

However, all too frequently the debate has not been informed by hard evidence (Atun et al. 2008). Both integrated and non-integrated programmes widely exist, suggesting benefits to either approach, but the relative merits of integration in various contexts and for different interventions have not been systematically analysed and documented. Such an analysis is complicated as the term ‘integration’ is used to describe a variety of organizational arrangements (Atun et al. 2008). Further, as the nature and extent of integration varies, there are methodological challenges to comparing various interventions.

In this paper we present a systematic review that explores (i) the extent and nature of integration of targeted health programmes that emphasize specific interventions into critical health systems functions (defined in the Methodology section), (ii) how contextual factors have affected the extent to which these programmes were integrated into critical health systems functions. We use a new conceptual framework, discussed in detail in a complementary paper in this journal (Atun et al. 2009), to guide our analysis.

Our review evaluates peer-reviewed studies of priority population, health and nutrition interventions introduced at regional or national scale. These interventions for reproductive health, maternal and child health, communicable diseases, immunization and malnutrition are fundamental for achieving the health-related MDGs (World Bank 2007).

This paper is organized in four sections. The Introduction is followed by the Methodology section, which includes a brief description of the conceptual framework used to map the nature and extent of integration into critical health system functions of the programmes presented in the studies analysed. The Results section includes for each programme this mapping and an analysis of how contextual factors influenced integration. The Discussion section provides an overview of the implications of findings for policy makers, practitioners and researchers.

Methodology

We developed a search strategy based on the use of—exploded—MeSH terms, supplemented with a broad search for keywords in the titles or abstracts for which no appropriate MeSH terms exist. In all cases, MeSH terms were chosen to represent the highest order of relevance within each MeSH tree. A systematic review by Briggs and Garner, which used Cochrane Systematic Review methodology, served as the basis for the development of the search strategy (Briggs and Garner 2006). The strategy combined two parts: the first designed to identify articles related to organizational arrangements for health care delivery, and the second designed to limit the search to specific areas identified as key health programmes for developing countries. The search strategy is shown in detail in Box 1. The considered studies were primarily programme evaluations and studies at regional or national scale assessing the relative performance of different care models following changes in organizational structure. We included studies that were randomized (or cluster randomized) trials, before or after evaluation, interrupted time series, and programme evaluations without controls. For inclusion, the study had to present data on outcome measures such as health outcomes, quality of care, access to care and service utilization, patient satisfaction and cost or cost-effectiveness. Papers just describing the development of a care model were excluded. We did not include grey literature as these publications have not undergone peer review and there are no agreed methods on assessing the quality of these studies.

We reviewed 8274 potential articles, which yielded 55 papers included in this review (Figure 1). These 55 papers are summarized in Supplementary Table 1 available online at the Health Policy and Planning website (http://heapol.oxfordjournals.org/).

The conceptual framework for analysing integration of targeted health interventions into health systems

In a companion paper (Atun et al. 2009) published in this journal, we detail the analytic framework guiding this systematic review. We define integration as the extent, pattern, and rate of adoption and eventual assimilation of health interventions into critical health system functions, which include inter alia: (i) stewardship and governance, (ii) financing, (iii) planning, (iv) service delivery, (v) monitoring and evaluation (M&E), and (vi) demand generation.
**Box 1 Search strategy and methods**


Search results were limited using the PubMed filters “English” and “humans”.

We searched the following electronic databases: PubMed; the Cochrane Central Register of Controlled Trials (CENTRAL); and the Cochrane EPOC specialized register and Database of Abstracts of Reviews of Effectiveness. Supplementary searches were conducted through reference and citation tracking of the key articles retrieved during the search.

**Review methods**

The search strategy retrieved 8274 potentially relevant articles. This was followed by selection of articles deemed relevant for further analysis by two independent reviewers on the basis of the titles retrieved. In order to establish a common set of inclusion criteria, the first 100 titles were assessed jointly. The criteria for inclusion at the first stage were based on the potential relevance of each article to the research question for the review, independent of study design. Once a common approach and understanding was developed, each reviewer independently assessed one half of the remaining 8274 titles (i.e. 4137 each). In addition, to verify sufficient inter-rater agreement, each reviewer evaluated 20% of titles assessed and rated by the other reviewer.

Each study deemed relevant by either of the reviewers was further considered for inclusion in the second stage of analysis. This yielded a total of 1551 titles, which were retained for the second stage of selection. In this stage, the two reviewers independently assessed the abstracts of each of the 1551 remaining studies for relevance to the review. This exercise showed the inter-rater agreement (Cohen’s k coefficient) to be equal to 0.78. The studies selected by each of the reviewers were then compared. Where there was concordance to include or exclude a study they were retained or discarded. Where there was disagreement, the article in question was retained for full text analysis.

A total of 200 studies were retained for the third stage of the review at which the full text was analysed. The full text of 172 of these identified papers was retrieved, whereas the remaining 28 studies could not be accessed (see list in Supplementary Table 1 available on the journal’s website, http://heapol.oxfordjournals.org/). Studies were then evaluated based on study design and relevance. We included studies that were randomized (or cluster randomized) trials, before or after evaluation, interrupted time series, and programme evaluations without controls.

**Data extraction and management**

Data extraction was done independently by the two reviewers, each using a common checklist purpose developed for this review and based on the analytical framework outlined in detail below. Extracted data included:

(i) General information: title, authors, and year of publication;

(ii) Setting: clinical area, country, setting/care delivery system, and target groups;

(iii) Intervention: description, duration, comparisons, and co-interventions;

(iv) Study characteristics: study design, duration;

(v) Participants: unit of analysis, number of participants in intervention and comparison groups;

(vi) Outcomes: outcome measures, results of the intervention;

(vii) Extent and nature of integration: stewardship & governance, financing, planning, service delivery, monitoring & evaluation, demand generation;

(viii) Contextual factors: sustainability, opportunities, desirability.

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An ‘intervention’ in this context refers to combinations of technologies (e.g. vaccines, drugs), organizational changes, process modifications and other inputs related to decision-making, planning and service delivery.

We view a health intervention through a ‘diffusion of innovations’ lens, and consider this as an idea, practice or object that is perceived as new by an individual or a unit of adoption, while recognizing that in some cases the
interventions previously implemented on a small scale are scaled up and increased in intensity. In such instances, the ‘newness’ relates less to the technical element of the intervention itself than to organizational changes, new financing schemes and novel processes that accompany scaling up, intensification, integration and eventual assimilation of the intervention.

Drawing on relevant empirical evidence and theory (Atun et al. 2009), we propose that the adoption and diffusion of new health interventions and the extent to which they are ‘integrated’ or ‘assimilated’ into the ‘general’ health system will be influenced by the nature of the problem being addressed, the intervention, the adoption system (key actors and institutions), the health system characteristics such as the absorptive capacity, and the broader context of the health system setting. The conceptual framework provides a basis for evaluating these five constituents with respect to the purpose, extent and nature of integration of the health intervention(s) under study into critical health system functions.

We consider integration of elements of a health intervention studied with critical health system functions described above and detailed in Table 1. With respect to extent, we identify whether the integration is full, partial or non-existent, and by level we refer to integration of these functions at local (provider unit), district, regional or national tiers.

Given the broad mix of outcome measures used in different studies, it was not possible to directly compare the relative success of interventions, or generalize from these. Hence, we limit our analysis to integration, but briefly describe in Box 2 for each study the reported changes in the process, output or outcome parameters measured.

Table 1 Critical health systems functions and elements of integration

<table>
<thead>
<tr>
<th>Critical health system function</th>
<th>Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stewardship and governance</td>
<td>Accountability function, Reporting, Performance management</td>
</tr>
<tr>
<td>Financing</td>
<td>Pooling of funds, Provider payment methods</td>
</tr>
<tr>
<td>Planning</td>
<td>Needs assessment, Priority setting, Resource allocation</td>
</tr>
<tr>
<td>Service delivery</td>
<td>Structural, Human resources, Shared infrastructure, Operational integration, Referral and counter-referral systems, Guidelines or care pathways, Procurement, Supply chain management</td>
</tr>
<tr>
<td>Monitoring and evaluation</td>
<td>Information technology infrastructure, Data collection and analysis</td>
</tr>
<tr>
<td>Demand generation</td>
<td>Financial incentives, e.g. conditional cash transfers, insurance, Population interventions, e.g. education and promotion</td>
</tr>
</tbody>
</table>

Results

The extent and nature of integration of health interventions into critical health systems functions

We present below an analysis that describes, for each intervention included in the study, how the intervention elements are integrated into the six critical health system functions, and map the nature and extent of integration of intervention elements into these. Our analysis draws on the data available in the published papers. The mapping of the extent of integration (Figure 2) reflects the actual situation as reported in the published paper in the period under concern rather than what was intended.

Stewardship and governance

This dimension captures aspects related to distribution of governance responsibilities, accountability and performance management for an intervention.

We considered full integration to have occurred when the governance arrangements for the intervention were the same as those for the general health services or the local/national administrative structures. For example, in a number of settings interventions for schistosomiasis control adopted a fully integrated governance structure—such as that in Brazil, where the intervention was managed by the municipality (Coura Filho et al. 1992); in Cameroon, where the primary health care (PHC) service was accountable for schistosomiasis control...
Box 2 Summary of the studies analysed

Here we present all interventions grouped by the disease area. Data underpinning the narrative in this section are presented in Supplementary Table 1 (available on the journal’s website, http://heapol.oxfordjournals.org/), which includes a summary of the studies evaluated.

**Neglected tropical diseases**

**Dengue**

To build a sustainable national programme for dengue control, Cuba integrated community working groups (CWGs) and primary health care (PHC) workers into the existing programme, which had limited integration into the mainstream health system (Toledo Romani et al. 2007). Areas with integration of CWGs reported greater improvements in entomological indices.

**Malaria**

In certain areas in Colombia strengthened community participation and networks managed by a central coordinating body to improve malaria control led to decreased malaria incidence, but there were no control sites for comparison or trend analysis showing changes in malaria incidence in the periods that preceded programme introduction (Rojas et al. 2001).

**Schistosomiasis**

Various strategies have been implemented to control schistosomiasis. Brazil, Burundi, Cameroon and Saudi Arabia have integrated some targeted interventions into primary care structures or community centres, while Uganda and China adopted unintegrated delivery structures.

In Brazil, integrated strategies helped reduce the incidence and prevalence of schistosomiasis infections at similar rates to those reported without integration (Coura Filho et al. 1992). In Saudi Arabia, integration of targeted interventions into PHC led to a greater decline in the incidence and prevalence of infections than that achieved by unintegrated interventions (Table 1) (Ageel and Amin 1997; Jarallah et al. 1993). In Cameroon, programme integration into PHC led to improved population knowledge about schistosomiasis and utilization of health centres (Bausch and Cline 1995; Cline and Hewlett 1996). In Burundi, an integrated model achieved lower utilization and treatment levels than an unintegrated model but at much lower cost (Engels et al. 1993, 1995).

In China, predominantly non-integrated programmes, which enjoyed strong community participation, succeeded in eradicating schistosomiasis in all endemic areas at an annual cost below US$0.50 per capita for the protected population (Sleigh et al. 1998a,b,c). In Uganda, use of schools and community-directed treatment for mass drug distribution helped reach poor communities in remote areas (Kabaterine et al. 2006).

**Onchocerciasis**

In Uganda, provision of additional PHC tasks by community health workers, such as family planning, immunization, malaria and tuberculosis (TB) control, was positively correlated with increased treatment quality for onchocerciasis (Katabarwa et al. 2005) (Table 1).

**Leprosy**

In many countries, leprosy services have historically been delivered as targeted interventions with no integration. In Tamil Nadu, India, following integration the number of detected cases increased slightly, but as follow-up and treatment completion were no longer monitored, completion rates declined (Rao et al. 2002).

In Andhra Pradesh, India, there were negligible differences in leprosy prevalence and newly detected cases before and after integration. After integration, detection of ‘hidden cases’ increased, but the rate of adherence to treatment in accordance with programme guidelines declined (Parkash and Rao 2003). Whereas in Maharashtra, India, a comparison of leprosy programmes in Jamkhed (integrated) and the neighbouring Osmanabad (without integration) showed a decline in social stigma experienced by leprosy patients in communities receiving integrated care (Arole et al. 2002).

In Sri Lanka, integration of targeted interventions for leprosy into PHC was associated with higher case detection (Kasturiaaratchi et al. 2002).

**Nutrition**

The nutrition programmes studied included general programmes to address under-nutrition and programmes providing micronutrient supplementation.

Evaluation of the Bangladesh Integrated Nutrition Project (BINP), designed to provide education, basic care and nutritional services to children and mothers, concluded that BINP had failed to achieve its objectives (reducing prevalence of severe under-nutrition by 40% and moderate under-nutrition by 25%). While mothers in the intervention area reported better care practices than those in the control area, there was no difference in children’s malnutrition rates (Hossain et al. 2005). Multi-country studies on micronutrient supplementation (including vitamin A, iodine and iron) demonstrate campaign-based interventions (e.g. vitamin A supplementation during immunization days) to be more successful in achieving their objectives than facility-based models (e.g. iron distribution at antenatal care clinics) (Deitchler et al. 2004).

In Peru, a multi-micronutrient supplementation programme, with an integral communication campaign and community involvement in education and distribution targeting children, women and adolescent girls, improved coverage and led to an increase in the knowledge on the beneficial effects of supplementation (Gross et al. 2006a,b; Lechtig et al. 2006a,b; Lopez de Romana et al. 2006). The programme had a protective effect on the haemoglobin levels of the three target groups, was more cost-effective and better targeted to the population needs compared with a non-integrated food-distribution programme.

(continued)
Box 2 Continued

**Immunization**

Evaluation of mass immunization campaigns (targeted interventions with no integration) in three different contexts revealed contrasting results. In India, the Pulse Polio Immunization (PPI) campaign, launched in 1995 aimed at promoting social mobilization and immunizing populations in remote areas during National Immunization Days (NIDs). It led to significant increases in immunization coverage for the first dose of polio vaccine, but coverage declined between the first and the third doses. Before and after the PPI campaigns, inequities related to gender, caste, wealth status, religion and geography for polio and other immunization did not change (Boru et al. 2003).

In Sierra Leone, mass immunization campaigns led to high coverage rates for single-dose vaccines, with lower coverage rates for vaccinations requiring three doses. With each full dose of vaccines, there was a significant decline in infant and child mortality across all the socio-economic groups (Amin 1996). There were no comparators.

Two mass immunization campaigns in seven refugee camps in Macedonia during the military conflict in 1998 achieved coverage rates of around 90% of children, but there were no comparators (Koop et al. 2001).

**Child health and development**

**Integrated Management of Childhood Illness**

Studies comparing the effectiveness of the Integrated Management of Childhood Illness (IMCI) strategy with routine care (comprising a series of non-integrated programmes) report improvements in the quality of care delivered.

In Bangladesh, the quality of care (i.e. adherence to IMCI guidelines), care-seeking behaviour and utilization of services improved in facilities providing IMCI when compared with paired facilities not implementing IMCI (El Arifeen et al. 2004). In South Africa, introduction of IMCI in selected districts led to improved process and health outcomes (as measured by a quality index based on the quality indicators developed by WHO) (Chopra et al. 2005). In Tanzania, case management, prescribing and under-5 mortality rates rose significantly in districts where IMCI was introduced compared with those where it was not (Armstrong Schellenberg et al. 2004; Masanja et al. 2005), with improvements in equity, immunization coverage, caretaker knowledge and behaviour, nutritional status and morbidity (Masanja et al. 2005). Related studies (Adam et al. 2005) at various health system levels (Bryce et al. 2005a) demonstrated that implementation of IMCI was not associated with higher costs than routine care, but led to significant improvement in case management compared with controls that used routine training approaches.

In Uganda, introduction of IMCI led to improved performance of trained health workers and the quality of care delivered to children aged under 5 years (Pariyo et al. 2005), while in China, implementation of IMCI strengthened the local health system and improved communications between physicians and patients (Zhang et al. 2007). Similarly, in Brazil (Amaral et al. 2004) and Morocco (Naimoli et al. 2006), introduction of IMCI led to significant improvements in care quality (e.g. weight checked against growth chart; checking for at least three danger signs; and evaluation of feeding practices in Brazil, and adherence to guidelines and correct prescription of antibiotics in Morocco) as compared with routine care provided in facilities where IMCI was not introduced. By contrast, in Peru, implementation of IMCI did not positively affect care quality and service utilization in facilities where it was introduced (Huicho et al. 2005a,b).

**Integrated Child Development Services**

Evaluation of the Indian Integrated Child Development Services (ICDS) programme (which comprises a package of education services, nutritional support for pregnant and nursing women and children, and links to other PHC-based health services for children) demonstrated improvements in the quality and quantity of services offered, expansion in immunization coverage and reductions in malnutrition in children aged under 6 years (Lal 1980). Uptake of immunization and antenatal care services increased, with significant improvement in feeding practices, nutritional levels and health status of children in districts that adopted the ICDS scheme compared with non-ICDS districts (Gupta et al. 1984). Addition of therapeutic food supplementation and nutritional support to ICDS led to declines in malnutrition levels in severely malnourished children (Kapil et al. 1999), improvements in weight gain for pregnant women, and reductions in the number of pre-term and low-birth-weight deliveries in ICDS districts compared with non-intervention sites (Agarwal et al. 2000). ICDS services, when delivered in a coordinated manner with the Expanded Program for Immunization (EPI), led to significant increases in overall immunization coverage, with greater improvement in knowledge, attitudes and practices of carers regarding immunization in intervention districts compared with districts where ICDS and EPI were delivered separately (Tandon and Sahai 1988; Tandon et al. 1992). While one study demonstrated strong positive correlation between nutritional status and morbidity of children and the degree of utilization of all ICDS services (Saiyed and Seshadri 2000), another found no significant impact of ICDS on malnutrition levels in intervention sites, but higher rates of coverage for DPT and measles immunization in non-ICDS districts (Trivedi et al. 1995).

UNICEF-India built on the existing ICDS infrastructure to launch the Dular programme which included an enhanced package of education, training of health workers and active community outreach. This programme led to statistically significant improvements in all measured outcomes (e.g. iodized salt use; prenatal care; colostrum feeding; and use of delivery kit for childbirth) in villages where Dular was introduced compared with those where it was not (Dubowitz et al. 2007). (continued)
Family planning services

Matlah Family Planning and Health Services Project (FPHSP)
FPHSP integrated family planning (FP) services with a basic package of maternal and child health care (MCH). When compared with the pre-existing unintegrated government programme, the uptake of contraceptive services did not change (DeGraff et al. 1986; Phillips et al. 1984), but the FPHSP proved to be more cost-effective (Simmons et al. 1991).

Combined FP and MCH programmes with basic health services
A study in Nepal compared the effectiveness of two FP/MCH programmes; one providing only FP/MCH services and the other (the ‘integrated’ programme) combining the range of FP/MCH services with other basic health services including immunization, case finding and treatment for TB and leprosy. While the non-integrated FP/MCH services achieved greater impact on knowledge of FP, intention to use FP services and infant mortality, the integrated programme had relatively greater impact on child survival (Tuladhar and Stoeckel 1982).

HIV/AIDS
The GHESKIO clinic in Haiti, established to provide voluntary counselling and testing (VCT) and care for HIV/AIDS patients (Peck et al. 2003), gradually added PHC services for communicable diseases and reproductive health, providing coordinated care for HIV co-morbidities. The integration of on-site PHC services led to an increased demand for VCT.

(INTEGRATION OF TARGETED HEALTH INTERVENTIONS

Box 2 Continued)

(Cline and Hewlett 1996); and Saudi Arabia, where the PHC team cooperated and shared responsibility with the district supervisor and regional health authorities (Jarallah et al. 1993; Ageel and Amin 1997). In India, the governance structures for interventions aimed at leprosy control were successfully integrated with the PHC services (Rao et al. 2002), while in Nepal governance structures for the FP/MCH intervention were integrated with services provided in the district health offices (Tuladhar and Stoeckel 1982).

Partial integration occurs where responsibility is shared by the existing general health care system and a specific structure created purposely for the intervention. For instance, in Cuba composite entities comprising PHC level and vector control team workers jointly managed the interventions for dengue control (Toledo Romani et al. 2007), whereas in Colombia a Central Coordinating Committee comprising representatives of the regional health services, NGOs, scientific centres, and local politicians was formed to manage and oversee the interventions for malaria control (Rojas et al. 2001). In Sri Lanka, the responsibility for managing interventions for leprosy control moved between the local health authorities and the Central Leprosy Clinic personnel (Kasturiaratchi et al. 2002). In India, anganwadi centres, created as part of a self-managed system for child health and development, were also responsible for the organization of a wide range of primary care services (Lal 1980; Gupta et al. 1984; Tandon and Sahai 1988; Tandon et al. 1992; Trivedi et al. 1995; Kapil et al. 1999; Agarwal et al. 2000; Saiyed and Seshadri 2000).

This review considers the governance role to be non-integrated when accountability remains exclusively with dedicated specialist entities charged with implementation and management of health interventions, without involvement of the general health care system—for example, interventions directly managed by dedicated units within national or regional governments without integration into main health system functions, as with the interventions for schistosomiasis control in China (Sleigh et al. 1998a,b,c) and Uganda (Kabaterine et al. 2006), nutrition-related campaigns in Peru (Gross et al. 2006a,b; Lechting et al. 2006a,b; Lopez de Romana et al. 2006) and various Asian countries (Deichler et al. 2004; Hossain et al. 2005), the Lady Health Worker Programme (LHWP) in Pakistan (Douthwaite and Ward 2005), and the Family Planning and Health Services Project (FPHSP) in Bangladesh (Phillips et al. 1984; DeGraff et al. 1986).

While non-governmental organizations and external donors work with regional or national health services, they often retain direct governance roles beyond financing or service delivery, as with the stand-alone HIV/AIDS clinic in Haiti offering voluntary counselling and testing (VCT) with additional services for HIV/AIDS, sexually transmitted infections (STIs) and reproductive health services (Peck et al. 2003); the nutrition interventions in Peru (Gross et al. 2006a,b; Lechting et al. 2006a,b; Lopez de Romana et al. 2006) (PISA); the mass immunization campaigns in Sierra Leone implemented by UNICEF (Amin 1996) and in Macedonia implemented by International Medical Corps (Koop et al. 2001); or the Dular programme in India managed by UNICEF (Dubowitz et al. 2007).

Financing
In this review, financing refers to the pooling of financial resources and the provider-payment methods used to allocate these. Revenue generation, a critical financing function, is beyond the scope of the review.

We considered an intervention to be fully integrated if it was funded entirely through the national or regional general health care budget. Examples of full integration of financing include interventions for schistosomiasis control in Brazil (Coura Filho et al. 1992) and interventions for leprosy control in India (Rao et al. 2002) and Sri Lanka (Kasturiaratchi et al. 2002).

Partial integration of the financing function was achieved with interventions for schistosomiasis control in Cameroon,
where earmarked funding was provided by the United States Agency for International Development (USAID) but channelled through the PHC system (Cline and Hewlett 1996). Under the Integrated Child Development Services (ICDS) scheme in India resources were provided by the national government directly to the intervention, which comprised a range of essential health services to supplement other general services provided locally and funded by local and national governments (Lal 1980; Gupta et al. 1984; Tandon and Sahai 1988; Tandon et al. 1992; Trivedi et al. 1995; Kapil et al. 1999; Agarwal et al. 2000; Saiyed and Seshadri 2000).

When financing was provided directly to an intervention and addressed only a particular disease or problem, the function was considered to be non-integrated. In some instances

![Diagram showing the extent and nature of integration by targeted health intervention and intervention success as reported in the study.](image-url)

**Figure 2** The extent and nature of integration by targeted health intervention and intervention success as reported in the study.
interventions were directly funded by the government; either at local level, for example dengue control in Cuba (Toledo Romani et al. 2007), or at national level, for example malaria control in Colombia (Rojas et al. 2001), and the LHWP in Pakistan (Douthwaite and Ward 2005).

Many interventions studied were directly funded by external donors: for example the Bangladesh Integrated Nutrition Project (BNIP) funded by the World Bank (Hossain et al. 2005); the Ugandan National Schistosomiasis Control Program funded from the Bill and Melinda Gates Foundation through 2005); the Ugandan National Schistosomiasis Control Program funded from the Bill and Melinda Gates Foundation through its collaboration with the international Schistosomiasis Control Initiative (Kabatereine et al. 2006); the Dular ICDS financed by UNICEF-India; the micronutrient supplementation programmes in many Asian countries supported by the Canadian International Development Agency and UNICEF (Deitchler et al. 2004), and in Peru by the NGO PROMESA (Gross et al. 2006a,b; Lechtig et al. 2006a,b; Lopez de Romana et al. 2006); and the immunization programme in Sierra Leone funded by a range of external donors (Amin 1996).

**Planning**

In our framework, the planning function includes activities, processes and systems for needs assessment, priority setting, and resource allocation. We consider planning for an intervention to be fully integrated if the decision-making in relation to the above three areas is undertaken by institutions/stakeholders who are involved in the same tasks for the general health system. Examples of full integration include leadership in schistosomiasis control in Cameroon (Cline and Hewlett 1996), and integration of decision-making for leprosy control with the PHC system in India (Rao et al. 2002).

Partial integration occurs when the decision-making responsibility for planning is retained by those managing the health intervention but involves a range of stakeholders (such as civil society representatives, PHC level, or local/regional/national government) through inclusive groupings, as illustrated by the Community Working Groups for dengue control in Cuba (Toledo Romani et al. 2007), the Central Coordinating Committee for malaria control in Colombia (Rojas et al. 2001), and interventions for leprosy control in Sri Lanka where the responsibility for planning rested with the PHC services but relied heavily on the workers from the programme (Kasturiaratchi et al. 2002).

Planning was considered to be non-integrated when the decision-making focused solely on the intervention without consideration of general health care activities. This may include specific national government units at national level, as in the schistosomiasis control project in China (Sleigh et al. 1998a,b,c) or the LHWP in Pakistan (Douthwaite and Ward 2005); dedicated units at national and local levels, as with the micronutrient supplementation programmes in several Asian countries (Deitchler et al. 2004); or NGOs and external donors—for example, PISA in the micronutrient supplementation interventions in Peru, UNICEF in the Dular programme in India (Dubowitz et al. 2007) and the International Medical Corps in Macedonia (Koop et al. 2001).

**Service delivery**

Service delivery relates to structural and organizational dimensions of a particular intervention, either at or close to the interface with the customer. In our analysis, services within a health intervention are considered to be fully integrated if their provision is the responsibility of general or multi-purpose health workers, as with schistosomiasis control in Burundi and Cameroon (Engels et al. 1993; Cline and Hewlett 1996), leprosy care in Sri Lanka (Kasturiaratchi et al. 2002) and ICDS services in India (Lal 1980; Gupta et al. 1984; Tandon and Sahai 1988; Tandon et al. 1992; Trivedi et al. 1995; Kapil et al. 1999; Agarwal et al. 2000; Saiyed and Sheshadri 2000).

Partial integration refers to instances where there is shared responsibility for the provision of services between general health workers and the health intervention staff; as with interventions for dengue control in Cuba (Toledo Romani et al. 2007), schistosomiasis control in Brazil (Coura Filho et al. 1992) and Saudi Arabia (Ageel and Amin 1997; Jarallah et al. 1993), and the interventions for leprosy control in India, which after integration with PHC services were provided by the former staff of leprosy centres as the general purpose PHC workers were insufficiently trained to take over this responsibility (Rao et al. 2002). Partial integration was also achieved in the ICDS intervention in India through collaboration of anganwadi workers and purpose-trained volunteers (Tandon and Sahai 1988; Tandon et al. 1992; Kapil et al. 1999; Agarwal et al. 2000). Partial integration also occurred when service delivery for a number of interventions was linked; for example, family planning and maternal and child health services (Tuladhar and Stoeckel 1982; Phillips et al. 1984; DeGraff et al. 1986), or integration of general health services with HIV/AIDS VCT services in Haiti (Peck et al. 2003). In Uganda, National Immunization Days were used as a vehicle to deliver interventions for schistosomiasis control (Kabatereine et al. 2006). The IMCI strategy is a good example of partial integration where interventions for management of a number of childhood illnesses are bundled (Bryce et al. 2005b), but can be administered either separately through community workers trained exclusively in IMCI or through PHC facilities using general staff.

A number of interventions rely solely on single purpose workers and have no integration with other interventions or general health services; such as the interventions for malaria control in Colombia (Rojas et al. 2001), interventions for schistosomiasis control in China (Sleigh et al. 1998a,b,c), or immunization for polio in India (Bono et al. 2003) and for other childhood illnesses in Macedonia (Koop et al. 2001).

**Monitoring and evaluation**

The M&E function of a health intervention was considered to be fully integrated if the responsibility for this rested with institutions that retained overall responsibility for M&E in the above three areas is undertaken by institutions/stakeholders who are involved in the same tasks for the general health system—for example, interventions for schistosomiasis control in Cameroon and Saudi Arabia, monitored respectively by the Ministry of Public Health and the district supervisor of the local PHC services (Jarallah et al. 1993; Cline and Hewlett 1996; Ageel and Amin 1997), or the interventions for leprosy control in Sri Lanka monitored by the regional PHC services (Kasturiaratchi et al. 2002). In contrast, M&E of interventions for malaria control in Colombia was partially integrated as it was undertaken jointly by staff from the regional health services and the malaria control programme (Rojas et al. 2001).
For many health interventions M&E is not integrated with the mainstream system. The interventions for schistosomiasis control in China used a dedicated parallel system; the international sponsor for schistosomiasis control in Uganda employed its own M&E systems (Sleigh et al. 1998a,b,c); the nutrition interventions in Peru managed by PISA had their own M&E systems administered by independent institutions (Gross et al. 2006a,b; Lechtig et al. 2006a,b; Lopez de Romana et al. 2006); and the immunization programme in Macedonia was monitored directly by volunteers of the implementing organization (Koop et al. 2001).

**Demand generation**

Demand generation, increasingly recognized as an important health system function, relies on a number of interventions such as the use of appropriate financial incentives and monetary support, insurance, or information, education and communication (IEC) activities designed to change behaviour.

Demand generation was considered to be fully integrated if mechanisms used to create financial incentives or IEC activities were provided jointly with the general services or were delivered by PHC workers. For example, in Burundi, Cameroon and Saudi Arabia, IEC for schistosomiasis control was the responsibility of staff of the public health centres (Engels et al. 1993; Jarallah et al. 1993; Cline and Hewlett 1996; Ageel and Amin 1997), and in Sri Lanka IEC activities were considered a fundamental part of the organisation and administration of services (Kasturiaratchi et al. 2002). In Haiti, VCT activities for HIV/AIDS at a clinic were used to generate demand for related services for STIs, reproductive health and basic PHC (Peck et al. 2003).

In Colombia, education on the prevention, diagnosis and treatment of malaria was provided by both community volunteers working in malaria control and staff from the general health services (Rojas et al. 2001). In Peru and Bangladesh, health education for nutrition interventions was provided jointly by the targeted programme staff and regional health workers (Hossain et al. 2005; Gross et al. 2006a,b; Lechtig et al. 2006a,b; Lopez de Romana et al. 2006). In China, IEC related to schistosomiasis control was provided through a partnership between programme staff, general health workers, schoolteachers and community health workers (Sleigh et al. 1998a,b,c). Similarly, staff involved in the LHVP in Pakistan and the ICDS in India provided a wide range of IEC activities on general health, women’s health, family planning, and maternal and child health in addition to the strategies related to their specific interventions (Lal 1980; Gupta et al. 1984; Tandon and Sahai 1988; Tandon et al. 1992; Trivedi et al. 1995; Kapil et al. 1999; Agarwal et al. 2000; Saiyed and Seshadri 2000; Douthwaite and Ward 2005). In contrast, in a number of countries, information campaigns related to health interventions tended to be stand-alone activities, focusing solely on a single problem or disease, and delivered by single-purpose health workers or volunteers: for example, for dengue control in Cuba (Rojas et al. 2001), schistosomiasis control in the Ugandan National Control Programme (Kabaterine et al. 2006), and for childhood immunization in Macedonian refugee camps (Koop et al. 2001).

**How the context influences the extent and nature of integration**

To better understand which factors have influenced the integration of health interventions, we analysed the context in which these interventions were implemented; in particular, factors pertaining to the adoption system, the health system and those relating to the wider politico-economic and socio-cultural contexts. These factors interact to create opportunities or barriers; influencing the receptivity of a context, and thereby the desirability and sustainability of an intervention. These are summarized in Supplementary Table 2 included online at the Health Policy and Planning website (http://heapol.oxfordjournals.org/) and discussed below.

**Sustainability**

Changing politico-economic and socio-cultural contexts impact on population needs, which in turn influence the sustainability of a particular programme and its design. For example, in Peru, rapid urbanization and the arrival of large numbers of indigent slum-dwellers significantly altered the morbidity profile of the local population, with a substantial rise in micronutrient deficiencies, creating a significant new burden that had to be addressed rapidly by developing targeted interventions (Gross et al. 2006a,b; Lechtig et al. 2006a,b; Lopez de Romana et al. 2006). In contrast, the rise in living standards in Saudi Arabia led to improvements in general hygiene and sanitation, thereby helping to reduce the schistosomiasis burden (Jarallah et al. 1993; Ageel and Amin 1997), which meant that the targeted schistosomiasis programme was no longer sustainable as a stand-alone intervention and was integrated into primary health care.

Understanding the local socio-cultural context is critical to the design of an appropriate intervention, as illustrated by the schistosomiasis control programme in Uganda. This intervention initially targeted schoolchildren, but as one-third of children in certain endemic areas were not enrolled in schools, the intervention failed to reach large population groups (Kabaterine et al. 2006). The intervention was then modified to facilitate integration with other targeted programmes enabling use of this intervention in a wider range of opportunities, such as National Immunization Days, for deworming activities.

While the disease-specific focus of interventions for the control and eradication of leprosy (India, Sri Lanka) or schistosomiasis (e.g. in Burundi and Saudi Arabia) was appropriate when these diseases were highly endemic, success in reducing the disease burden meant that previously cost-effective strategies that were targeted to address a specific disease became financially unsustainable in the new epidemiological context. With low endemicity and reduced prevalence, the more financially sustainable option was to integrate these interventions into mainstream PHC services.

In Brazil, integration of the intervention for schistosomiasis control into PHC was possible as municipalities possessed enough absorptive capacity to assume responsibility for planning, financing and delivery of the intervention when external funding for the targeted programme ceased (Cousa Filho et al. 1992). Similarly, the presence of a well-developed PHC infrastructure with high population coverage and utilization
rates enabled Saudi Arabia to embed schistosomiasis control into PHC (Jarallah et al. 1993; Ageel and Amin 1997), and allowed integration of IMCI into the general health services in Peru (Huicho et al. 2005a,b), South Africa (Chopra et al. 2005) and Tanzania (Armstrong Schellenberg et al. 2004; Masanja et al. 2005).

The FPHSP in Bangladesh could provide efficient family planning services for many years thanks to its dedicated human and physical resources (Simmons et al. 1991) that also ensured sustainability. However, the LHWP programme in Pakistan struggled to find a place in an already overstretched and fragile health system which experienced significant funding shortfalls (Douthwaite and Ward 2005), and was delivered as a targeted intervention. In contrast, the Dular strategy for health education and child health services was able to build at low cost on the infrastructure of the ICDS, thereby ensuring sustained delivery of a programme that could integrate health education and child health services (Dubowitz et al. 2007).

**Opportunity and necessity**

Critical events create windows of opportunity or a necessity for action—mobilizing civil society and other key actors, such as health professionals and policy makers, to introduce new systems for finance, and delivery of health interventions.

For example, an outbreak of dengue in a non-endemic area of Cuba motivated the local community to strengthen existing interventions for dengue control (Toledo Romani et al. 2007). In Cameroon, a number of development projects raised concerns about the possible expansion of snail habitats with concomitant increase in schistosomiasis infection, prompting the government to establish a dedicated intervention for schistosomiasis control with strong community involvement and integration into PHC. This intervention coincided with the government’s commitment to strengthen the national PHC system (Cline and Hewlett 1996). Confronted with unsustainably high population growth rates, the government of Bangladesh introduced the FPHSP to provide family planning education and contraceptive services (DeGraff et al. 1986; Simmons et al. 1991). Overcrowding in refugee camps that followed the military conflict in Macedonia increased the risk of rapid transmission of vaccine-preventable diseases, necessitating urgent implementation of EPI for children (Koop et al. 2001). The Peruvian nutrition supplementation programme was established in response to evidence which showed high prevalence of iron deficiency in the newly urbanized population (Gross et al. 2006a,b; Lechtig et al. 2006a,b; Lopez de Romana et al. 2006).

Synergies between targeted health interventions can create opportunities for integration and positively influence the ultimate success of these interventions. For example, positive synergies between FP and MCH services in Bangladesh (Phillips et al. 1984; DeGraff et al. 1986), HIV/AIDS VCT, STI and reproductive health services in Haiti (Peck et al. 2003), and the ICDS and EPI services in India mutually reinforced the effectiveness of each intervention with improved results. In contrast, poor coordination between related interventions can be detrimental to effectiveness and sustainability. For example, in Morocco multiple and contrasting guidelines for managing child health hindered effective implementation of IMCI (Naimoli et al. 2006). Similarly, in Peru the presence of a number of child health programmes with overlapping remits led to inefficiencies in delivery and destructive competition for IMCI resources (Huicho et al. 2005a,b). In Tanzania, successful introduction of IMCI coincided with measures to improve management of the district health systems, creating an enabling environment for implementation of the IMCI strategy (Armstrong Schellenberg et al. 2004; Masanja et al. 2005).

**Desirability**

The extent and nature of integration can be influenced by the commitment of local or national leadership and that of the health workers to a particular programme design. For example, government commitment to a targeted programme was critical to the success of schistosomiasis control in China (Sleigh et al. 1998a,b,c). Similarly, in Sri Lanka, government commitment enabled successful integration of leprosy services into PHC (Kasturiaratchi et al. 2002). In contrast, a lack of government commitment to development of an integrated programme contributed directly to the poor IMCI results in Peru (Huicho et al. 2005a,b). In India, strong opposition from National Leprosy Program staff hindered integration of the programme with PHC for a considerable time (Rao et al. 2002). Similarly, in Cuba, reluctance of health workers to relinquish responsibilities delayed integration of targeted interventions for malaria control into PHC (Rojas et al. 2001).

**Discussion**

The debate on health interventions has tended to narrowly focus on vertical or integrated descriptors. However, our analysis shows this to be a false dichotomy. We found no instances where interventions were purely vertical (wholly unintegrated) or horizontal (fully integrated into the health system functions). Instead, there exists a rich mosaic of instances where health interventions are integrated into one or more critical health system functions, producing a highly heterogeneous picture. As the nature of the problems, the interventions to address these and the adoption and assimilation of health interventions in health systems vary greatly in different contexts, as does the purpose, nature, speed and the extent of integration—influenced by the intervention complexity, health system characteristics and contextual factors.

In practice, health systems combine both non-integrated and integrated interventions, but the purpose, nature and extent of integration vary enormously between different interventions in countries, creating a diversity of local solutions to address (successfully or not) emergent problems. Perhaps the modesty of evidence creates the context for strong opinions for or against integration in global health. Given the large amounts of public and private funding invested in targeted programmes and health systems to address global health, nutrition and population problems it is important and incumbent upon donors and implementers alike to develop a context-specific evidence base to guide policies and practice in relation to programme design, rather than rely on dogma.

We find that changes in the nature of the problem (such as the epidemiology) and context (such as socio-economic development, and government commitment or health worker
inclination to a particular design) influences the nature and extent of integration. However, examples of these are few to form a strong view on the magnitude of these influences. It was not clear from the studies analysed that time in itself is an influencing factor on the integration of targeted programmes into health systems, but rather the integration is influenced by a multiplicity of factors as discussed above.

This study has a number of limitations. First, programme evaluations reported in the peer-reviewed literature used in this study provide limited but varied detail on the organizational structures surrounding the intervention and the health systems within which these interventions were implemented. However, the framework presented (Atun et al. 2009) has enabled us to consistently analyse the data on health system elements and contextual factors. Second, in the studies examined, ‘success’ was defined and measured variously, hence drawing generalizable lessons from this is not possible and we refrained from linking organizational design with success, merely describing each of the programmes and their findings to enable the reader to visualize the range of interventions examined and achievements in a particular context. Third, we selected predominantly ‘programme evaluations’—not a well-defined study design. Unlike the Cochrane criteria for appraising the quality of randomized controlled studies, there is no consensus on the criteria that could be used to appraise systematically the quality of programme evaluations as no such rating exists. Hence, we selected studies on the basis of their relevance to our research question and design (see Box 1), but it was not possible to systematically rate their quality. Fourth, we were unable to retrieve the full text of 28 studies (details available from authors). However, analysis of abstracts and place of publication suggest these were unlikely to have been included in the final 55 documents included in the study or to change the study result. Fifth, a major limitation of our study is the non-inclusion of grey literature. We did not include grey literature as these publications have not undergone peer review and there are no agreed methods for assessing the quality of these studies. Though omission of these studies may introduce a bias, as studies which report ‘success’ are more likely to be published in peer reviewed journals than those which do not, the nature, direction and magnitude of this bias is not known (Egger et al. 2003). Hence the benefits of a very time-consuming and costly exercise are not clear. Finally, the inherent heterogeneity of the included studies, both in their clinical focus and in the setting, makes it difficult to generalize findings without a better understanding of how contextual factors have shaped the organizational structures of health interventions. We intend to address this issue through a more comprehensive and in-depth approach, using a multi-country case study design.

In spite of the study limitations, which we tried to address, the findings provide new synthesis of evidence to further the debate on health systems and targeted interventions; a debate that has ossified in a binary mode. Given the highly varied contexts and adoption systems, different health system capacities and the range of problems being addressed, it is not surprising that in practice a rich mix of solutions exist. These studies should be longitudinal in nature, carried out over a period of a few years so that sustainability and long-term impacts of a horizontal approach could also be evaluated. Such studies will also need to take account of the multiple dimensions of integration, the wider health system context and the political economy in which they are set, as these factors work beyond the interventions to determine the success of the programmes

While the discussion on the relative merits of integrating health interventions will no doubt continue, discussion should move away from the highly reductionist approach that has polarized this debate. Given the paucity of evidence, we suggest that in order to deliver an evidence-based conclusion on the effectiveness of health programme integration, investments should be made in studies with robust designs, comparable control and intervention groups where possible, valid and reliable outcomes, and analysis of costs. But given the varied contexts within which targeted programmes are implemented, there is a need for country case studies which examine such health interventions to better understand the extent and nature of integration and the reasons for the designs that emerge—country case studies that use a common methodology and replication logic, informed by appropriate theoretical frameworks (such as the one used in this study). Such an approach to case studies would allow comparisons among countries and programmes, generating evidence that has relevance beyond a country. Future efforts are best spent on generating and learning from evidence rather than on the empty rhetoric which has dominated this field.

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**References**


