

REVIEW

Can interventions improve health services from informal private providers in low and middle-income countries? A comprehensive review of the literature

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Background There is a growing interest in the role of private health providers in low- and middle-income countries (LMICs). Informal private providers (IPPs) provide a significant portion of health care in many LMICs, but they have not received training in allopathic medicine. Interventions have been developed to take advantage of their potential to expand access to essential health services, although their success is not well measured. This paper addresses this information gap through a review of interventions designed to improve the quality, coverage, or costs of health services provided by IPPs in LMICs.

Methods A search for published literature in the last 15 years for any intervention dealing with IPPs in a LMIC, where at least one outcome was measured, was conducted through electronic databases PubMed and Global Health, as well as Google for grey literature from the Internet.

Results A total of 1272 articles were retrieved, of which 70 separate studies met inclusion criteria. The majority (70%) of outcomes measured proximate indicators such as provider knowledge (61% were positive) and behaviour (56% positive). Training IPPs was the most common intervention tested (77% of studies), but the more effective strategies did not involve training alone. Interventions that changed the institutional relationships and contributed to changing the incentives and accountability environment were most successful, and often required combinations of interventions.

Conclusion Although there are documented interventions among IPPs, there are few good quality studies. Strategies that change the market conditions for IPPs—by changing incentives and accountability—appear more likely to succeed than those that depend on building individual capacities of IPPs. Understanding the effectiveness of these and other strategies will also require more rigorous research designs that assess contextual factors and document outcomes over longer periods.

Keywords Informal sector, international health, lay practitioners, private providers, traditional healers

KEY MESSAGES

- The widespread presence of informal private providers (a major source of primary care worldwide) presents an opportunity to expand quality care to populations in low- and middle-income countries (LMICs).
- Of the strategies used to improve health services from informal private providers in LMICs, the ones that appear to be most successful are those which apply market-based approaches rather than interventions that rely on training and building individual capacity.
- Understanding the effectiveness of these and other strategies will require more rigorous research designs that assess contextual factors and document outcomes over longer periods.

Introduction

In low- and middle-income countries (LMICs), the public sector usually does not directly provide sufficient health services to their populations (WHO 2003). In its place, the private sector occupies most of the market for the provision of outpatient health services (Hanson and Berman 1998; Waters *et al.* 2003). The heterogeneity of the private sector is evident when one considers that it encompasses everything from large private hospitals, commercial companies and non-governmental organizations (NGOs), to unaccredited village doctors and shopkeepers. In LMICs, informal private providers (IPPs), those who practice allopathic medicine but have not been formally trained in it, are a significant part of this private sector (WHO 2006). IPPs provide the majority of care in India and Bangladesh (Peters 2002; Ahmed *et al.* 2009) and are widely prevalent across Africa, where pharmacy vendors and traditional healers provide much of the outpatient care (Oshiname and Brieger 1992).

In Africa, studies have shown that IPPs play a large role in the treatment of malaria. A high proportion of fevers are treated at home using store bought remedies, often based on advice of shopkeepers or pharmacists (Deming *et al.* 1989; Snow *et al.* 1992; Foster 1995; Mnyika *et al.* 1995; Taylor *et al.* 2001). However, the quality of anti-malarial drugs varies widely across private retailers. Unauthorized dispensing of antibiotics has been found in Nepal, India, the Philippines and elsewhere, and inappropriate use of antibiotics has frequently been demonstrated in studies of treatment of childhood diarrhoea, treatment of sexually transmitted infections (STIs), and malaria treatment (Tomson and Sterky 1986; Bojalil and Calva 1994; Wachter *et al.* 1999). While both policy makers and researchers have largely neglected the role of IPPs, there is a potentially large opportunity to build on their widespread presence to expand quality care to populations in LMICs (Bloom *et al.* 2008).

The labels given to IPPs vary widely across countries, and may range from traditional healers, often incorporating allopathic medicine in addition to traditional systems of medicine, to lay health workers (usually community members who work part-time on health projects or with other health providers), to drug shop owners who make diagnoses, provide advice, and sell medicines. These people serve as health care resources for local populations, but are not recognized by the public as doctors (Sutrisna *et al.* 1993; Syhakhang *et al.* 2004; Abuya *et al.* 2007; Ahmed *et al.* 2009). Most nations do not have accurate data on private health providers, particularly those that have not received formal qualifications or obtained licenses to

provide health services. Such providers may be reluctant to formalize their existence, particularly if the government penalizes those who illegally advertise themselves as legitimately trained. In most developing countries, traditional birth attendants who may never have received training in the modern techniques for reducing neonatal and maternal mortality assist women at childbirth. Drug shop owners receive their knowledge of medicines from pharmaceutical advertisements or promotions, but are not trained in clinical medicine and may not use clinical guidelines or know about drug interactions, and may be reluctant to disclose the limits of their knowledge. Understanding the market dynamics of these providers—their client base and realm of practice—is crucial to formalizing their existence, making it possible to employ cohesive intervention strategies or to engage in oversight of their work (Bustreo *et al.* 2003).

Much of the past research on IPPs has been descriptive, although some interventions to improve their quality and performance on malaria treatment in Africa have been documented (Goodman *et al.* 2007). If the lessons learned through work with IPPs are to have a significant impact on a meaningful scale, there is a need to examine the interventions that have been tested. This paper represents a critical review of published and grey literature from the past 15 years involving interventions to improve health services from IPPs operating in health care markets in LMICs.

Scope and definition

Due to the wide variety of private providers that are working in LMICs, this study began by developing a working definition of an IPP. We have chosen to define IPPs as those who provide allopathic medical treatment or services to the public, but have not received formal training in allopathic medicine. These providers operate in a market for health services, and provide alternative sources of health care to the government's public health providers or to non-state providers who have formal qualifications, such as in the for-profit or NGO sectors. Providers who do meet our criteria include drug compounders working as village doctors, traditional healers who advise clients to take antibiotic remedies, health care entities who operate under a business license but without a health-related certification or accreditation, and pharmacists who diagnose and treat patients, thus practicing beyond their level of training. Our definition also includes lay or community health workers who have been working independently in the health market, or if they retain their independence to work in the market when they are part of a government or NGO programme.

Volunteers are excluded from our study since we assume that they are not engaged in market transactions. The study definition also excludes individuals who self-treat or treat their family members without engaging an outside provider. In the process of self-treatment, however, many of these individuals will end up using providers based at shops and pharmacies. Cadres of health workers that are created as part of a research project and are entirely dependent on a research project for their support are not included in this review, because the projects have not been designed for the health worker to continue working in the market. Studies on these cadres are unlikely to demonstrate how they will function in the market once the project study period is over. Because of our interest in the informal sector, we do not include interventions where community health workers were trained and employed solely for the research initiative (Baqui *et al.* 2008; Klemm *et al.* 2008) or where they were formally trained and registered through a government agency. Finally, we exclude practitioners of traditional medicine unless they are also providing allopathic care in the form of prescriptions, surgical procedures or other treatments.

The conceptual basis for examining interventions with IPPs is based on the recognition of health markets systems that describe the supply and demand for health services in the informal sector (Bloom *et al.* 2008), which builds on previous analyses of interventions in the private sector (Waters *et al.* 2003; Peters *et al.* 2004). Market-based strategies on the supply side can involve institutional innovations that shape provider behaviour, such as through the creation of franchises, social marketing, or creating collaborations with other organizations. Financial incentives or subsidies comprise another set of interventions intended to change provider behaviour. Management improvement strategies are another set of interventions to change provider behaviour from within the provider organization (in many cases solo practice), and consist of building provider capabilities and systems, usually by training, job aids or provision of materials. A fourth important approach to change provider behaviour involves more directly changing the rules that govern informal health care, either by formal regulation or through informal rules such as through norms from outside agencies or associations of providers. Demand-side interventions may accompany supply-side interventions, or be done on their own, and largely consist of approaches to inform and empower the public to be better consumers of health care (see Figure 1 for a diagram of the conceptual framework). In this paper, we examine each of these types of interventions to change IPP behaviour.

Methods

We conducted a comprehensive search and review of the literature, both published and grey, to identify intervention strategies which engage informal providers in LMICs using the PubMed, and Global Health databases, and Google. IPPs were identified through the context of the article, as well as through a list of key words and phrases (Box 1) often used to denote these types of providers. Studies were included only if they were published in the past 15 years (between January 1993 and May 2008), if they occurred in a low- or middle-income

country, if at least one of the providers intervened upon in the research study was an informal private provider, if there was an identifiable intervention in dealing with the IPP, and if at least one outcome was measured for either the provider or the recipient of the service. The literature search was conducted from January 2008 through February 2009, and the full search strategy is available from the authors.

To conduct the PubMed search, key terms identifying IPPs were combined with strategies including training, accreditation, franchise, social marketing, licensing, guidelines and education, and a list of LMICs. Similar terms, without the list of countries, were used in Global Health, a much smaller database which contains some grey literature as well as internationally published journals. Bibliographies of selected articles were mined for additional studies, and two websites were used to identify additional grey literature (HRH Global Resource Center 2009 and PSP-One).¹ These websites were identified through an internet search (using Google) which employed combinations of the terms described above.

Criteria for evaluating the studies are based upon grading guidelines for evaluating evidence-based medicine, and have been adapted to encompass the many different types of outcomes examined in this review (Harbour and Miller 2001; Phillips *et al.* 2001; Atkins *et al.* 2004).

Types of outcomes

The varied nature of the strategies, as well as medical conditions targeted, led to a great number of types of outcomes measured. Outcomes were categorized by the level at which the outcome is measured—provider, facility or population—as well as the direction and statistical significance (if available) of the effect.

At the provider level, changes in provider knowledge or behaviour were assessed. Knowledge-related outcomes include the ability to define symptoms of various diseases or recite clean birth practices. These outcomes are often measured immediately after training and offer the least evidence about intervention impact. Provider behaviour outcomes, such as appropriate treatment of STIs or compliance with pharmaceutical regulations, offers evidence that the strategy is being applied by the providers, in addition to being understood by them. Facility-level outcomes were rare, but encompassed cost and cost-effectiveness data, coverage, client satisfaction and other health service characteristics.

At the population level, outcomes assessed changes in people's behaviour or changes in morbidity and mortality. These outcomes often require more elaborate sampling and measurement strategies, and are a downstream reflection of the intervention for the informal private provider. The generalizability of the study is assessed by the research design, appropriateness of the analytic methods employed and the characteristics of the study population.

Results

The PubMed search initially yielded 1125 articles, with Global Health contributing an additional 147. These titles were screened to determine if the study took place in a low- or

Interventions to Improve Health Services in the Informal Market

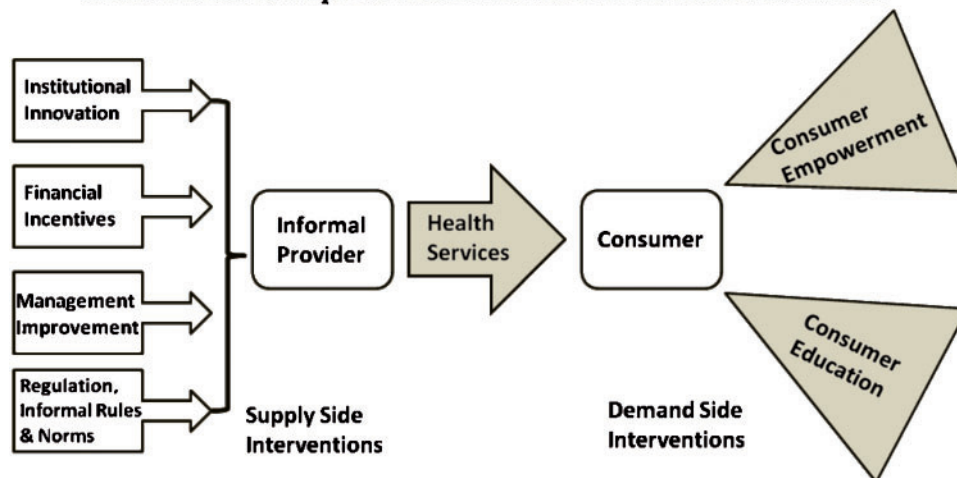


Figure 1 The conceptual framework

Box 1 Identifying phrases for informal private providers

Informal provider	Shopkeeper
Unqualified provider	Drug vendor
Untrained provider	Patent medicine vendor
Traditional healer	Community health worker
Traditional medical practitioner	Pharmacy worker
Traditional birth attendant (TBA)	
Lady health worker	

middle-income country as defined by the World Bank (World Bank 2008) and if it involved an intervention; 127 studies were selected for a further review of the abstract. Seven articles were systematic reviews or meta-analyses of randomized controlled trials (RCT). These were searched for studies that meet the specified criteria and then these individual studies were sought for analysis. Seventy unique studies met final inclusion criteria. Of these, 52% took place in Africa with the remainder split among east and south-east Asia, south Asia and Latin America (14.5%, 21.7% and 11.6%, respectively).

Table 1 outlines eight categories of quantitative research designs, with the studies having the potential to produce the highest quality of evidence listed first. The studies reviewed are ranked according to the strength of the evidence they present, however we also considered the type of outcomes measured and the potential for generalizability in our analyses.

Among the 70 studies identified for this review, 16% (11 studies) were randomized controlled trials or cluster-randomized trials. Thirty-two studies did not employ a control group for comparison, and 39 studies measured outcomes only once, after the intervention was completed. Among studies with control groups, randomized controlled trials fared best, reporting 60% of their 239 outcomes as positive, while the most popular study design, pre-post without control, reported 72% of outcomes as positive.

Many types of interventions were revealed during the review, which are categorized according to how they intend to change provider behaviour (Table 2). Many of the interventions were done in combination with related interventions. About 77% of

all the studies employed more than one intervention strategy, and nearly all had more than one outcome that was measured.

The most common strategy for working with IPPs involved management improvement strategies for IPPs, such as training, the provision of supplies, job aids ('reinforcement with printed media'), and financial incentives. Seventy-seven per cent of the studies trained informal providers directly, while a further 10% implemented cascade training (also known as training of trainers). The most successful strategies, as measured by the number of positive outcomes in the studies employing that strategy, were those involving market innovations through branding and social marketing components. Seventy-five per cent of the outcomes in studies with this intervention strategy were positive, as were 71% of outcomes in studies employing referral systems.

There were 34 unique intervention combinations present in these studies. The most popular combinations included combining training with provision of health-related supplies (i.e. antibiotics, condoms, clean birth kits), found in 29% of studies, and combining training with reinforcement through printed materials for the health care providers (21% of studies). The third most popular intervention combination was combining training with financial incentives or subsidies, seen in 11% of studies. In addition to each of the strategies revealed, Table 2 lists one example of each strategy as seen in a review study, the number of studies employing each strategy, and the number of outcomes and percentage of positive outcomes by intervention strategy. Studies with training alone reported 31% of their outcomes as positive, while those employing training in addition to other strategies reported 58% of outcomes positive. Due to the prevalence of multi-strategy studies, these outcomes are not exclusive. This is discussed further in the following section.

As the most popular intervention, training of informal providers has three different motivations, which, depending upon the breadth of the study, may have occurred concurrently. The first was to improve provider knowledge in areas where they are already engaging clients (46 studies). In Uganda, Tumwirikirize *et al.* (2004) engaged in three sessions of face-to-face training of pharmacists and drug sellers in order to

Table 1 Distribution of studies by research design employed, and example of each design

Research design	No. of studies in review
Meta-analysis: information derived after determining the universe of studies that meet a specified criteria, and then combining of data, qualitatively or quantitatively, from these individual studies (Sibley & Sipe 2004)	1 (1.4%)
Randomized controlled trial: a study where each individual or cluster has an equal, non-zero probability of being allocated to the intervention or control groups, and measurement of the outcome is taken before and after the intervention occurs (Kaona & Tuba 2003)	11 (15.7%)
Pre-post with control (non-randomized): information derived after purposively assigning one population to the intervention group, such that intervention and control populations are not similar on both observed and unobserved characteristics (Mbonye <i>et al.</i> 2007)	12 (17.1%)
Post only with control: a study where members of a population have unequal probabilities of being exposed to the intervention, and where outcomes are measured only after the exposure (Stephenson <i>et al.</i> 2004)	12 (17.1%)
Case-control study: a study where individuals with and without the outcome of interest are sought out, and then their exposure status to the intervention is determined (Nations & de Souza 1997)	2 (2.9%)
Pre-post without control: information derived after the outcome is measured before and after the intervention, but no comparison group is present (Benavides & Caffrey 2006)	17 (24.3%)
Post only without control: a study based on a survey conducted at one time, without any comparison group (Collumbien & Douthwaite 2003)	14 (20.0%)
Case study: a non-analytic study, where inference is based upon anecdotes or expert opinion (UNAIDS 2001)	1 (1.6%)
Total	70

improve their knowledge of the management of acute respiratory infection, an illness responsible for 18% of all deaths in children under 5 years in Africa (WHO 2006).

A second motivation for training is to extend the scope of work of an existing provider (20 studies). With the dearth of trained human resources for health around the world, individuals who already exist in the market can use their client base, local status or communication network to provide additional services. Bang *et al.* (2005a) attempted to train rural health workers in modern infant resuscitation methods to reduce the neonatal mortality rate, while others have engaged unqualified doctors to distribute family planning methods (Kambo *et al.* 1994).

The third motivation for training was to create a new cadre of health services providers who would then be able to work in the health care market (10 studies). In these studies, village health workers were engaged to sell insecticide-treated bed nets (Fraser-Hurt and Lyimo 1998), lay persons were taught about sanitation and disease prevention and then engaged to sell safe-water systems (Ram *et al.* 2007), or systems were devised to provide trauma care for war-related injuries in places without hospitals (Husum *et al.* 2003). In contrast to disease prevention interventions where the new health service providers are paid by the research team, these studies train those with and without prior health service jobs to provide a social good while making their own living. It did not appear as though any of these studies compensated the new providers directly, although some of the health products may have been subsidized.

We also examined what type of health services were affected by interventions with IPPs (Figure 2). Family planning and reproductive health was the most common types of health service involved. A variety of strategies were used to address the performance of IPPs in these areas, including training, supply provision (i.e. free condoms, birthing kits), information

provision (i.e. brochures or radio messages) and supervision of the practitioners. The length of training ranged from 6 hours to 10 weeks and the range of outcomes measured is equally broad (Menendez *et al.* 1994; Garcia *et al.* 2003). Just over 50% of the outcomes measured in all 28 studies were positive, and no type of outcome measurement gave overwhelming evidence of success (Figure 3).

There are a variety of informal providers targeted in these 70 studies. Thirty-two per cent of the interventions involved medicine vendors as one of the providers targeted, although they are variously called pharmacy workers, drug shop owners, patent medicine vendors and drug sellers. Traditional birth attendants are specifically mentioned in 25 of 70 studies (26%) and traditional healers in eight (11%) of the studies. Twenty-four studies (34%) engaged in strategies with a community health worker, a village health worker or with a health volunteer in conjunction with other providers, while seven (10%) worked with unqualified doctors.

Medicine vendors, drug shop owners and pharmacy workers were included in 31 of the studies. These providers directed clients towards treatments, gave advice and may also have diagnosed complaints. Consequently, it is vital that they are aware of correct treatments and dosage for illnesses, and can also give sound preventive advice. Outcomes related to the knowledge and behaviours of these providers were positive just over 50% of the time (Figure 4). Studies used a variety of strategies to work with this population, including workshop, face-to-face and cascade training; posters and charts to display in the outlet; pamphlets and packets for clients; accreditation of outlets that completed training; social marketing of key products; and regulatory enforcement. In Vietnam, face-to-face training was coupled with regulatory enforcement to decrease the sale of antibiotics without a prescription, while another randomized controlled trial in Peru coupled training seminars with pharmacy accreditation, leading to significantly increased

Table 2 Types of intervention strategies targeting informal private providers, and distribution of outcomes

Intervention	Example	No. of studies applying intervention	No. of outcomes	Positive outcomes (% of total)
A. Training alone	Two 1-day training workshops for traditional healers in TB detection and treatment through DOTS (Colvin <i>et al.</i> 2003)	9	116	31
B. Training plus other interventions	Four 2-hour training sessions on syndromic management of STDs for unqualified doctors plus provision of antibiotics, condoms and information packets (Shah <i>et al.</i> 2007)	45	550	59
C. Training of trainers	Training influential traditional Brazilian Umbanda healers through 5 seminars and 35 weekly meetings, totalling 164 hours, to disseminate AIDS knowledge to fellow healers (Nations & de Souza 1997)	7	114	69
D. Supply provision	Providing tube mask and bag-mask ventilator after training in newborn resuscitation techniques (Bang <i>et al.</i> 2005b)	22	238	56
E. Franchise	Creation of a social franchise in Pakistan for reproductive health services (Stephenson <i>et al.</i> 2004)	4	36	36
F. Branding/social marketing	Combining a social marketing campaign over radio and billboards with provision of subsidized insecticide-treated bed nets in rural Tanzania (Schellenberg <i>et al.</i> 2001)	8	149	75
G. Regulation	Engaging in a moratorium of all sales of TB drugs in private pharmacies (Lambert <i>et al.</i> 2005)	3	50	54
H. Reinforcement with printed media	Providing pamphlets and a flip chart to patent medicine vendors in rural Nigerian communities in order to promote appropriate treatment of febrile illnesses (Brieger <i>et al.</i> 2002)	17	246	69
I. Participatory problem solving	Negotiating with informal private practitioners in Uganda to develop common expectations and goals in case management of childhood illnesses (Tawfik <i>et al.</i> 2006)	3	78	72
J. Financial incentives, subsidies	Providing safe water systems to newly trained sales agents to sell in rural Madagascar (Ram <i>et al.</i> 2007)	14	158	61
K. Supervision	Monthly meetings with mental health professional during perinatal depression intervention in rural Pakistan with lady health workers (Rahman 2007)	6	65	55
L. Referral system	Creating a referral system for rural obstetric care in Nigeria (Chukudebelu <i>et al.</i> 1997)	7	111	71
M. Organization creation	Creating several associations of NGOs in rural Guatemala in order to improve their ability to have child health and family planning/reproductive health programmes (John Snow Research and Training Institute 2004)	2	25	56

recognition and management of certain STI symptoms (Chalker *et al.* 2002; Garcia *et al.* 2003). In Africa, interventions with medicine vendors have shown increases in vendor knowledge and appropriate prescribing practices for malaria, STIs and diarrhoea, but often lack pre-intervention measurement, control groups or both (Marsh *et al.* 1999; Adu-Sarkodie *et al.* 2000; Tavrow *et al.* 2003).

Evidence on the effectiveness of traditional birth attendants to impact maternal mortality outcomes is mixed. However, significant improvements in neonatal and perinatal outcomes have been demonstrated through traditional birth attendant training in clean birthing procedures, resuscitation of asphyxiated newborns, and in promoting antenatal care for pregnant women (Alisjhabana *et al.* 1995; Bang *et al.* 1999; Bailey *et al.* 2002; Sibley 2004; Bang *et al.* 2005a; Bang *et al.* 2005b). Sibley's meta-analysis reported an 8% decrease in perinatal mortality when a trained birth attendant was present, and an 11% decrease in birth asphyxia ($P < 0.05$ for both). Lay volunteers have been shown to be effective in increasing the knowledge of expectant mothers (Mbonye *et al.* 2007). Only one of the five studies measuring maternal health outcomes had a

significant positive main outcome, while three others showed no significant effect of traditional birth attendant training on maternal morbidity (Goodburn *et al.* 2000; Smith *et al.* 2000; Tsu *et al.* 2003).

Interestingly, two of these studies also had negative outcomes as a result of the intervention. Training traditional birth attendants in Ghana resulted in significantly lower odds of intrapartum fever and retained placenta, but also resulted in significantly increased odds of prolonged labour (Smith *et al.* 2000). In Mozambique, government-sponsored traditional birth attendant training had no significant impact on mortality, and actually resulted in a significant increased preference for health facility delivery by expectant mothers (Gloyd *et al.* 2001).

Of the 14 studies addressing HIV/AIDS, 14 of 19 main outcomes, and 143 of the 151 total outcomes, were measured at the provider level. The one study which measured mortality showed a 'drastic' decrease in mortality rates at one of 11 centres and reported nothing about the other 10 (Benavides and Caffrey 2006). One case study addressing home-based care in Africa reported on the low cost of yearly patient care—R1050 in South Africa—when care is given by

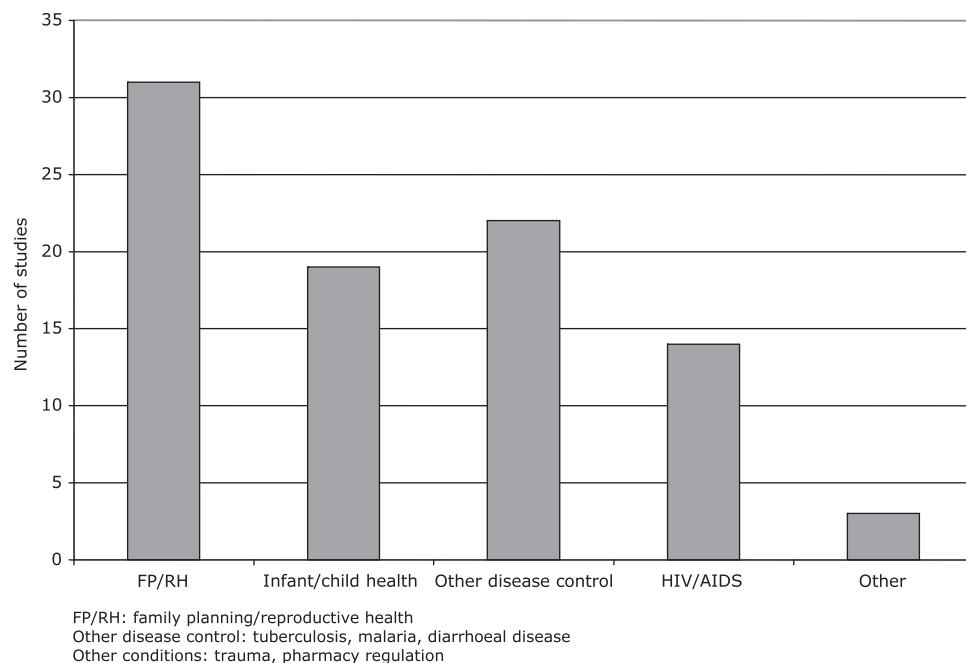


Figure 2 Type of medical condition addressed

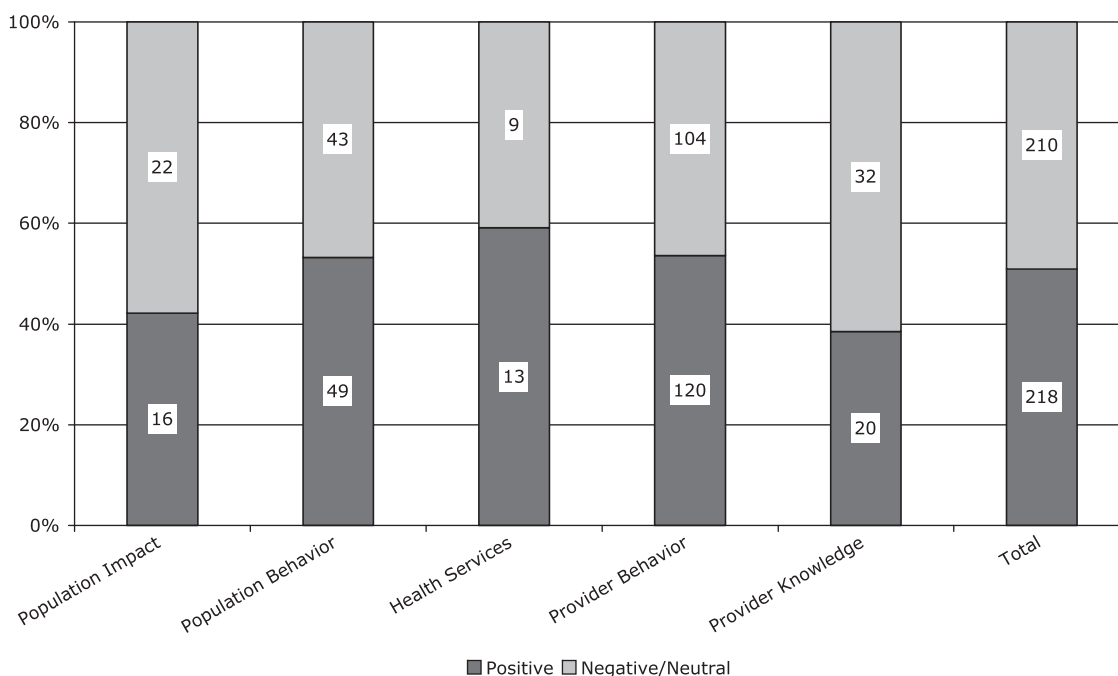


Figure 3 Positive and negative or neutral outcomes for family planning and reproductive health-related studies

palliative care givers (UNAIDS 2001). Overall, 57% of outcomes measuring changes in provider behaviour were positive, and 65% of outcomes measuring provider knowledge improved. These data are difficult to interpret as some studies measured large numbers of specific behaviour- and knowledge-related outcomes, while others reported more concisely.

Looking specifically at the 14 studies related to improving access to contraception and appropriate care for STIs, the four randomized controlled trials measured the greatest number of

outcomes, and revealed 60% of them to be positive (Kambo *et al.* 1994; Ratanajamit *et al.* 2002; Garcia *et al.* 2003; Shah *et al.* 2007). This finding is influenced by the overwhelmingly positive results from training pharmacy workers to recognize and symptomatically diagnose genital ulcers, pelvic inflammatory disease and other conditions by Garcia and colleagues in Peru (Garcia *et al.* 2003).

In Pakistan, 120 unqualified doctors were randomized to one of three intervention arms: 8 hours of training; training plus

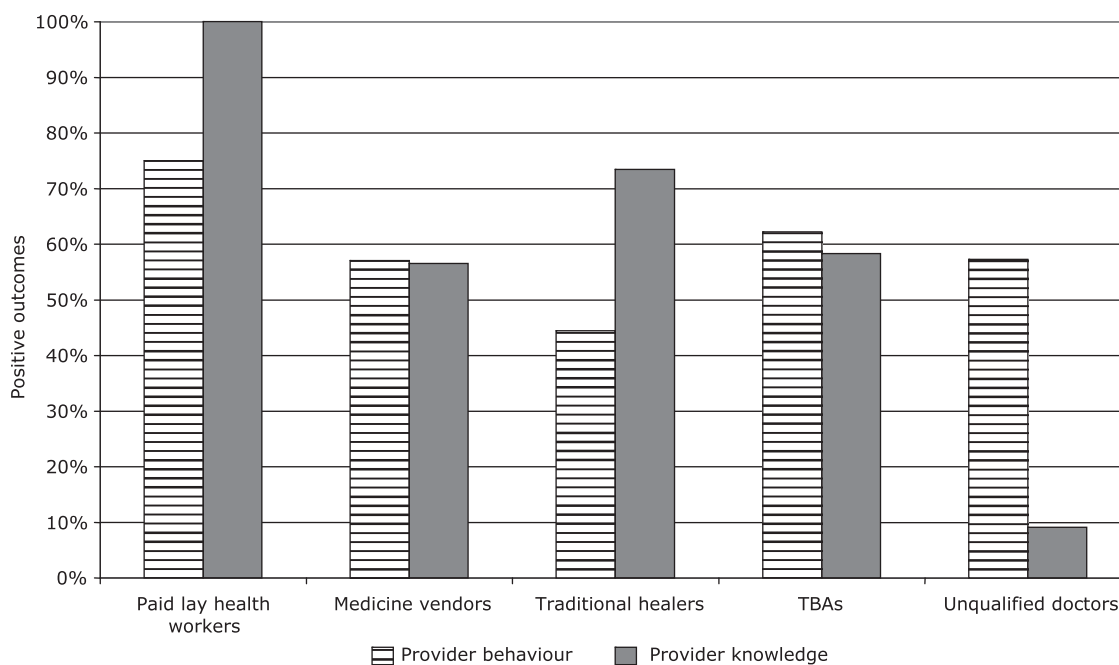


Figure 4 Percentage of provider behaviour and knowledge outcomes that are positive, by type of provider

STI syndrome packets; and a control. Shah *et al.* (2007) found no significant differences in the knowledge of the two 'treatment' groups post-intervention, no difference with regard to clients' views of the care providers, and a significant difference in provider behaviours in both of the treatment groups as compared with the control. Among the other studies, Stephenson *et al.* (2004) did not report strong evidence that the franchise intervention resulted in higher quality service provision, or even more equitable service provision than other options. The dearth of interventions with control groups and measurements over time limits the interpretations that can be made.

Although 19 studies addressed topics of infant and child health, five dealt with the mother/child pair, focusing on topics of safe births and perinatal mortality. These studies used training, supply provision, social marketing and the construction of referral systems to reduce maternal and neonatal morbidity and mortality (Alisjahbana *et al.* 1995; Miller *et al.* 1995; Gloyd *et al.* 2001; Bailey *et al.* 2002; John Snow Research and Training Institute 2004). Bailey *et al.* (2002) found no effect of training traditional birth attendants about when to refer women and infants to obstetric care centres on the rate of referral, or the family's compliance with referrals when indicated by the traditional birth attendant. In a quasi-experimental study in Mozambique, Gloyd *et al.* (2001) found no difference in perinatal and infant mortality rates among women who delivered in health facilities versus women whose birth was attended by an untrained person, and no difference in perinatal mortality when births were attended by trained versus untrained traditional birth attendants.

Studies looking specifically at the role of IPPs to reduce neonatal and infant mortality have revealed significant reductions in mortality due to birth asphyxia and sepsis, and improvement in basic infant health knowledge (Kumar 1995;

Bang *et al.* 1999; Mullins 2000; Bang *et al.* 2005b). Sixty-two per cent of the mortality outcomes in these five studies were positive, while more than 50% of the behaviour change outcomes measured by the Ssembabule Child Survival Project demonstrated improvement (Kumar 1995; Bang *et al.* 1999; Mullins 2000; Bang *et al.* 2005b; Jokhio *et al.* 2005).

Some of the more successful interventions with IPPs in child health involved interventions that went beyond training, and involved more comprehensive interventions that changed the incentives and accountability environment in which IPPs operate. In India, Chakraborty and colleagues used a package of strategies known as INFECTOM, providing information, feedback on performance, contracts with providers for maintenance of guidelines and ongoing monitoring of performance (Chakraborty *et al.* 2000). To improve compliance with the IMCI protocol in Pakistan, Luby *et al.* (2002) initiated a continuous quality improvement cycle, resulting in a significant increase in appropriate evaluation practices. In Uganda, a series of negotiation sessions with private providers was used to develop common expectations and goals with regard to diagnosis and treatment of childhood illness (Tawfik *et al.* 2006). This resulted in significant improvements in more than 80% of the items measured post-intervention.

Most of the studies collected data on some aspect of provider performance as the most basic method of determining if the intervention 'worked'. Figure 4 shows the percentage of positive outcomes related to provider knowledge and behaviour, for five classes of providers. For studies which targeted multiple classes of providers, outcomes are attributed to both classes. The greatest improvements, measured by percentage of positive outcomes, were found in the behaviour changes in lay health workers. The greatest improvement in provider knowledge was found in traditional healers, not counting the single outcome measured for lay health workers. Interestingly, for unqualified

Table 3 Proportion of positive outcomes (total number of outcomes), by research design and outcome type

Research design	Outcome type					Total
	Population impact	Population behaviour	Health service characteristics	Provider behaviour	Provider knowledge	
Meta analysis (1)	100 (2)	0 (0)	0 (0)	100 (9)	0 (0)	100 (11)
Randomized controlled trial (11)	76 (17)	71 (14)	100 (1)	64 (178)	17 (29)	60 (239)
Pre-post with control (12)	50 (18)	52 (50)	100 (2)	18 (68)	66 (29)	41 (167)
Post only with control (12)	20 (30)	41 (22)	44 (16)	22 (64)	80 (5)	29 (137)
Case-control (2)	43 (7)	50 (2)	0 (0)	0 (0)	75 (44)	70 (53)
Pre-post without control (17)	60 (5)	57 (21)	75 (4)	75 (154)	69 (36)	72 (220)
Post only without control (14)	63 (8)	84 (32)	42 (19)	63 (8)	100 (3)	69 (70)
Case study (1)	0 (0)	0 (0)	100 (1)	0 (0)	0 (0)	100 (1)
Total (70)	47 (87)	60 (141)	51 (43)	56 (481)	61 (146)	56 (898)

allopathic doctors, more than 90% of outcomes related to provider knowledge were neutral or negative, though 57% of outcomes concerning their behaviour were positive.

The majority of outcomes measured relate to provider behaviours that can be measured in the short term, irrespective of the research design (Table 3). As each study selected for this review was required to have an intervention related to an IPP, it is not unusual that researchers would wish to know if the intervention had any impact at the most proximate level. Nevertheless, it is noteworthy that the greatest numbers of population level outcomes were measured in studies with the strongest designs, and that 76% of all population impact outcomes measured for randomized trials were positive. Additionally, Table 3 shows that only 43 outcomes regarding cost, quality or access to services were reported. The large number of studies without control groups, and the reduction in number of outcomes reported disproportionate to the number of studies in each group, calls into question the validity of some findings. It is likely that several of the studies are selectively reporting outcomes; particularly as the poorer quality studies show a larger number of positive outcomes.

When restricting analyses to high quality studies—those measuring two time points, and with control groups—some evidence for effective versus ineffective strategies emerges (Table 4). Again, studies employing training alone report positive outcomes 21% of the time, and when combined with other strategies, positive outcomes are reported close to 60% of the time. Studies that used institutional innovation to change provider behaviour did particularly well, as those studies employing branding strategies, distributing educational materials to the providers such as pamphlets or flip charts, and those creating referral systems reported positive outcomes 76%, 61% and 71% of the time, respectively. However, using financial incentives as an intervention strategy resulted in positive outcomes about 55% of the time overall, demonstrating limited impact on provider behaviour, but large changes in health services characteristics among this subset of studies.

Our analysis showed that studies that focused on training alone did not produce significant effects on provider behaviour and knowledge—the most immediate level of impact. Of the nine studies where training the IPP was the only strategy

employed, only three measured outcomes at the population level (Kumar 1995; Goodburn *et al.* 2000; Colvin *et al.* 2003). In some situations, training lay health workers to take the roles of members of the formal health system is effective, and allows health workers to stretch their resources further. Yet training may not be enough to achieve impact at the population level. As the number of strategies employed by any given study increased from one to four, the proportion of positive outcomes increased dramatically, from 48% for single strategy interventions, to 88% among the three studies that had four strategic components to their intervention (Table 5).

Discussion

Worldwide, informal private providers are a major source of primary care, often bridging gaps between allopathic and traditional medicine. Yet they are often a neglected player in the health system, to the detriment of the poor who rely on them. Interventions that acknowledge their role in health care provision may help to legitimize their profession, as well as find opportunities to expand primary care in ways that are in line with public policy objectives of good quality at affordable costs. However, research in these areas is limited. Of the 70 studies we identified, there were relatively few with strong research designs: only 11 were randomized controlled trials, and another 12 were non-randomized pre-post studies with control groups. Considering the resurgent interest in primary health care, there have been surprisingly few studies undertaken to explore the potential of the informal sector to extend health care to communities. Although the studies do not provide conclusive evidence about which interventions or type of IPP will have the greatest impact, it is clear that programme initiatives to improve the coverage of basic health services through IPPs or the quality of care already being delivered by them should be coupled with robust evaluation research, published findings and dissemination of lessons in order to achieve the greatest benefit.

The strategies that appeared to be most successful were those that applied market-based approaches rather than interventions that relied on training and building individual capacity. Those interventions that changed the incentives and accountability for

Table 4 Positive outcomes by intervention strategies employed, for randomized controlled trials, pre-post with controls, and case-control studies

Intervention strategy	Outcome type					Total (%)
	Population impact (%)	Population behaviour (%)	Health service characteristics (%)	Provider behaviour (%)	Provider knowledge (%)	
Training alone	–	–	–	21	22	21
Training plus other interventions	63	51	100	56	63	58
Training of trainers	–	–	–	58	75	71
Supply provision	71	68	100	56	61	63
Franchise	43	50	–	–	–	44
Branding/social marketing	43	51	–	95	–	76
Regulation	–	–	–	53	–	53
Reinforcement with printed media	–	100	–	58	67	61
Financial incentives, subsidies	43	58	100	50	–	55
Supervision	–	100	–	50	–	59
Referral system	0	29	100	84	–	71

Table 5 Positive outcomes by number of intervention strategies employed and outcome type

No. of intervention strategies	Outcome type					Total
	Population impact (%)	Population behaviour (%)	Health service characteristics (%)	Provider behaviour (%)	Provider knowledge (%)	
1 (<i>n</i> = 16)	56	44	50	48	47	48
2 (<i>n</i> = 34)	45	48	50	51	55	50
3 (<i>n</i> = 17)	43	69	50	55	76	65
4 (<i>n</i> = 3)	60	50	100	95	–	88
Total	47	60	51	56	61	56

providers appeared more likely to change provider behaviours. Introducing institutional innovation, such as through franchising or introducing locally effective regulatory approaches, such as with review of provider performance, may create the pressures needed for IPPs to follow norms and provide better care. Training played a supplementary, though perhaps necessary role, in these types of interventions, as did marketing that was able to alter public expectation and demand. Where training of IPPs is to be done, more attention is needed to embed it in a context of other factors that are likely to encourage better practice and reinforce the training. Training effectiveness is also likely to require ongoing rather than one-off efforts, and should be measured at several time points to determine its retention. IPPs are members of the private sector, and their livelihood is often dependent upon customer satisfaction and repeat business. Therefore, external assessments of quality, imposition of training regimens, placement of printed media and other interventions which they do not perceive will affect their bottom line have not been appropriately designed.

Drug vendors are often the first providers of care for many common illnesses such as diarrhoea, fever and cough in children, and in family planning and reproductive health care in adults. Engaging them is a feasible way to ensure that appropriate drug regimes or illness advice reaches the broadest audience possible. For these entrepreneurs, however, training

alone may not create the desired effect of promoting condom use, ORS use or correct use of malaria medication, as the correct measures are often not the most profitable ones. Additional strategies, such as subsidized drug supply, increased regulatory oversight, or the establishment of referral systems to qualified providers, coupled with training, improved provider behaviour, but few studies measured outcomes at the system or population level. Further investigation into balancing the profit motives of most IPPs with the desired health goals of the public system is required.

Another factor which showed the most consistent impact on IPP outcomes was the combination of interventions that tended to reinforce each other. Three studies that combined training with organization change to establish referral systems also employed strategies of accreditation and supply of educational material and supplies. This approach worked across subject areas in different settings, as the studies ranged from creating an emergency trauma system, to pharmacy workers managing sexually transmitted diseases, to working with traditional medical practitioners on family planning services (Kambo *et al.* 1994; Garcia *et al.* 2003; Husum *et al.* 2003).

There are limitations in the range of studies beyond the limitations in methods which suggest that there is insufficient data to advocate for any particular intervention with IPPs. Very few of the studies report on the costs of an intervention, despite the fact that this data is needed to make the case for public

funding. The overall impression of the various intervention strategies dealing with informal private providers is that the long-term effect of the interventions is unknown, and that the majority of the strategies would be difficult to replicate. Very few of the articles gave details of the intervention—the training curricula, birthing kit contents or frequency of supervision. Only one of the controlled studies followed a cohort, providing 15 years of child mortality data, and studies assessing the knowledge and behaviours of providers had a short time frame for follow-up measurements, ranging from immediately after the training to a maximum of 3 years after training, with a median follow-up time of 6 months (Hill *et al.* 2000). Given the obvious logistical and cost constraints associated with population surveys seeking to measure intervention impact, studies measuring intervention outcomes should seek to ensure that the outcome measurements are robust, unbiased and replicable.

Clearly there is a strong need for high quality intervention research targeting IPPs. Given the high level of positive provider behaviours and knowledge by traditional birth attendants, further research into sustainable interventions and population-level outcomes with these providers would be especially useful. In order to achieve the greatest benefit, interventions should target the providers that are most often used by the target demographic, or for the target disease, rather than applying blanket strategies to a geographic region. The evidence for the effectiveness of IPPs in certain medical conditions is strong, such as lay health volunteers with tuberculosis, fever and malaria, and neonatal health care by trained birth attendants, and further research should focus on other conditions, such as HIV/AIDS, family planning and reproductive health, and effective methods of working with the traditional healers and unqualified doctors relied upon by so many. Without the resources to train and retain allopathic practitioners, both public and private health financiers must acknowledge the vast market access and population interaction available to IPPs, as well as their potential to be allies in extending the right to health for all persons.

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Endnotes

- ¹ HRH Global Resource Center, 2009: <http://www.hrresourcecenter.org/>; and PSP-One Private Sector Health Projects Database: <http://www.psp-one.com/section/project/>.

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