

PROMOTING INNOVATIVE PROGRAMS FROM THE DEVELOPING WORLD:

Towards Realizing the Health MDGs in Africa and Asia



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POLICY BRIEFS

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Widening access to healthcare: an evaluation of Brazil's Family Health Programme

Romero Rocha and Rodrigo Soares

KEY FINDINGS

Widening access to healthcare has reduced mortality across age groups in Brazil.

Mortality rates have been particularly reduced for children under the age of one.

The poorest areas of the country have benefited the most.

After the intervention, the north and northeast regions of Brazil have, respectively, 15 and 13.8 fewer deaths per thousand children under the age of one.

Improved healthcare increases the accumulation of human capital.

Communities experience an increase in schooling, an increase in the labour supply of adults and a reduction in fertility.

Community-based interventions are a cost-effective way to improve health and human capital.

The relatively high level of infrastructure and low cost of labour are key factors for achieving these improvements.

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Community-based health interventions are regarded as an effective, inexpensive and technologically simple way to extend basic healthcare to the poorest, while alleviating pressure on the more established public health infrastructure. Classic examples include Costa Rica, Jamaica and the Indian state of Kerala, where such programmes are associated with significantly reduced mortality within almost stagnant economic conditions (for example, Riley, 2005)

Yet evidence that establishes the causal effects of these programmes is rare, including the knock-on effects of healthcare in such areas as employment. There are also few analyses of the viability of extending these strategies to other developing countries. **Romero Rocha** and **Rodrigo Soares** of the Pontifical Catholic University of Rio de Janeiro examine these effects for Brazil's *Family Health Programme*.

INTRODUCTION

Brazil's *Family Health Programme* places professional healthcare teams in communities across the country. Each team has at least one doctor, one nurse and seven assistants serving around a thousand families with basic healthcare and working with the community to address the causes of illness.

■ **FIGURE 1** Geographic Expansion of Family Health Program, Brazil, 1998, 2000, 2005



Source: Brazilian Ministry of Health (2006)

Since the programme started in the mid-1990s, it has been constantly expanded and now involves 26,500 teams in more than 90% of Brazil's municipalities. It is estimated to cover more than 85 million people (see Figure 1).

The programme is co-financed by federal, state and municipal governments, which represents a significant change in policy. Healthcare has moved from a centralised model based on urban public hospitals to a decentralised model, where the first point of contact with the public health system is shifted to local communities. This has opened the door to a large number of poor families (see Box 1).

The federal budget for the scheme was US\$1,175 million in 2005 with the yearly cost per team estimated to be up to US\$173,400. This corresponds to a yearly cost of between US\$31 and US\$50 per person covered.

An interactive network

By working with disadvantaged families on a recurring basis, healthcare professionals are able to share best practices, such as handling and preparation of food and how to deal with simple health conditions. This interaction also enables early detection of symptoms that require more advanced healthcare.

Once established within a community, the network of healthcare professionals can be used for key health interventions, such as immunisations and campaigns against endemic

conditions. The network can also lead to the quick adoption of best practices for the professionals themselves.

Lower mortality

The research takes advantage of the staggered process of implementation of the programme since 1994 and uses a 'difference-in-difference' technique that compares the mortality rates of the participating communities with similar non-participating communities. The research also considers the impact of immunisation coverage, health and educational development and municipality population. The

sample includes almost 5,000 municipalities between 1995 and 2003.

Implementation of the *Family Health Programme* led to significant reductions in mortality for children under the age of one, children between the ages of one and four, and people between the ages of 15 and 59.

Municipalities that are eight years into the programme are likely to have 5.4 fewer deaths for every thousand children under the age of one, which represents a 20% fall from the national average in 1993.

BOX 1

Key characteristics of Brazil's Family Health Programme

- i. to serve as an entry point into a hierarchical and regional system of health;
- ii. to have a definite territory and delimited population of responsibility of a specific health team, establishing liability (co-responsibility) for the health care of a certain population;
- iii. to intervene in the key risk factors at the community level;
- iv. to perform integral, permanent, and quality assistance;
- v. to promote education and health awareness activities;
- vi. to promote the organisation of the community and to act as a link between different sectors, so that the community can exercise effective control of actions and health services and develop strategies for specific health interventions;
- vii. to use information systems to monitor decisions and health outcomes.

The fall is driven mainly by reductions in complications during pregnancy, diarrhoea, influenza, asthma and bronchitis – precisely the conditions against which the support provided by the programme should be most effective.

The results suggest that each year in the programme reduces mortality by 0.68 deaths per thousand infants. Similarly, eight years into the programme, the mortality rate of children between the ages of one and four has dropped by 0.28 per thousand, representing a 25% fall from the 1993 national average. Mortality between the ages of 15 and 59 is 0.29 lower, representing an 8.5% fall from the 1993 average. And for ages over 59, there are 1.1 fewer deaths, representing a 2.7% fall from the 1993 average.

These effects are largest in Brazil's poorest regions in the north and northeast, and in mainly rural municipalities with lower coverage of public health infrastructure, such as access to treated water and a sewerage system. In the north, a municipality eight years into the programme is estimated to experience a reduction of 15 deaths per thousand infants under the age of one. In the northeast, the fall is estimated at 13.8 per thousand. The programme had a similarly significant impact on other age groups in these regions.

Indirect effects on human capital

Economic theory suggests that improved healthcare will not only reduce mortality but also have an indirect effect on household behaviour. Families have access to technologies that were previously too expensive or unknown – such as birth control methods or rehydration therapy – allowing for better health, improved physical strength and greater ability to fight off disease.

In the long run, these changes may increase the return on investment in human capital and attachment to the labour market, shifting the trade-off between quantity and quality towards fewer and better-educated children. Communities that have benefited

from a healthcare programme can therefore expect to see improvements in their labour supply, human capital and fertility (see, for example, Lorentzen et al, 2008).

The researchers analyse a sample of 118,269 children and 279,943 adults from the north and northeast regions of Brazil, where the mortality effects were strongest. After eight years of exposure to the programme, the communities experience a 6.8% increase in the labour supply of adults, a 4.5% rise in the school enrolment of children up to age 17 and a 4.6% reduction in the probability that women aged between 18 and 55 give birth over a 21-month interval.

A cost-effective intervention

The human and geographical heterogeneity of Brazil provides a good laboratory for the likely effectiveness of this strategy in other contexts. A municipality with 100,000 inhabitants with average programme coverage of 40%, is likely to spend up to US\$1,981,714 a year to run the programme. Based on these findings, this municipality can expect to save a total of 150 lives after being in the scheme for eight years, as well as improving the accumulation of human capital in the longer run.

Nevertheless, reproducing this effort requires institutional development to allow for the coordination of actions and monitoring the performance of health teams. In addition, labour costs – which represent the largest portion of programme costs – depend on specific labour market conditions and on the wage differentials required to convince medical doctors and health professionals to work in the relevant regions.

While Brazil's *Family Health Programme* provides a cost-effective way to improve health and long-run human capital, developing countries must consider whether they are ready and able to implement such a programme.

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Tackling poor healthcare: an evaluation of Ethiopia's Health Services Extension programme

Assefa Admassie, Degnet Abebaw and Andinet Woldemichael

KEY FINDINGS

Ethiopia's Health Services Extension programme has increased the proportion of children vaccinated against tuberculosis, polio, diphtheria-pertussis-tetanus and measles.

The proportion of children and women using bed-nets treated with insecticide for protection against malaria is significantly larger.

The effect on preventive maternal care is limited.

While women are more likely to visit health facilities earlier during pregnancy, very little effect is detected on the use of other antenatal and post-natal services.

There is still a long way to go.

The programme has not reduced the incidence and duration of diarrhoea and cough diseases among children under five, and vaccination rates are far from the global target of 90% by 2010.

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The Millennium Development Goals include targets to improve the health of mothers and their children. The key ambitions are to reduce the number of deaths of children under five by two thirds between 1990 and 2015, and to cut by three quarters the proportion of mothers who die in childbirth or within six weeks of giving birth.

Yet maternal and child health has improved only slightly since the benchmark year of 1990. Worldwide, there are more than half a million maternal deaths each year, and nearly two million children die from diseases that are preventable by vaccines. A further 26 million children remaining inadequately protected.

Sub-Saharan Africa accounts for almost half of all maternal deaths worldwide. Ethiopia is one of the worst performers in the region, and has responded by setting up a *Health Services Extension* programme. **Assefa Admassie** and **Degnet Abebaw** of the Ethiopian Economics Association and **Andinet Woldemichael** of Georgia State University examine the effects of this programme on the health of mothers and children.

INTRODUCTION

Launched in 2003, Ethiopia's *Health Services Extension* programme aims to deliver preventive and basic curative health services to the whole population by 2010. By the end of 2007, the programme covered over half of the country's rural villages.

As in other developing countries, Ethiopian mothers and children face several health problems arising from poor access to modern healthcare facilities and under-use of existing facilities. Until recently, healthcare services have been primarily provided through a small number of health facilities with inadequate staff numbers. Since these facilities are concentrated in urban areas, nearly 90% of health service users must travel on foot to the nearest health facility

(CSA, 2001). Access to modern healthcare is particularly difficult for mothers and children (World Bank, 2005).

The *Health Services Extension* programme marks a significant move away from Ethiopia's traditional system of facility-based healthcare services. Its primary approach is preventing illness and promoting good healthcare. Each village receives up to two trained health extension workers, who actively visit patients in their homes rather than waiting for them to return to health facilities. In addition, the programme has expanded the construction of health posts and deployed thousands of young female health extension workers throughout the country.

The programme is jointly funded by the government, international donors and local communities. According to Ethiopia's Federal Ministry of Health, the cost of training and paying a health extension worker is around US\$500 per month. The construction cost of a health post is estimated to be about US\$75,000.

While the programme covers all areas of health, it focuses primarily on the health of mothers and children, an area in which Ethiopia has a dismal record. Only a quarter of women receive antenatal care and only one in 20 deliveries are attended by a trained health professional. For every 100,000 live births, more than 800 mothers die in childbirth or within six weeks of giving birth. One in every ten infants dies within their first year and one in every six children dies before the age of five.

Establishing the causal effect

Evidence from studies in other developing countries have shown that health reform programmes can have positive, negative or negligible effects on the target population (Johar, 2008).

This research uses 'propensity score matching', a popular technique for evaluating social programmes. Comparable villages are used as a 'control' group for the 'treatment' villages that are part of the programme. This enables researchers to establish the causal effect of the programme on the health of mothers and children.

The research analyses data from three separate questionnaires given to villages, households and health extension workers, providing a sample of 3,095 households from 128 treatment and control villages in rural Ethiopia.

Mothers engage with health facilities

The research finds that pregnant women in the programme villages are 29% more likely to visit a health professional earlier and on average will make their first antenatal care visit before the first months of pregnancy – a practice encouraged by the World Health Organisation (WHO, 1994). Earlier contact provides the opportunity for early detection of problematic pregnancies and increases the likelihood of women receiving antenatal care in the future.

The results also show that mothers are more likely to be using bed-nets treated with insecticide to protect against malaria. Currently 44% of women use nets but this proportion would be 36% without the programme.

The estimates reveal that awareness about modern contraceptive methods is over 90% in both treatment and control villages. Despite this, actual use remains limited. For example, the share of women who have used any modern contraceptive is only around 20%. While the effect of the programme on this indicator is negligible, it may suggest supply-side constraints, such as an inadequate supply of contraceptives across health posts in the treatment villages, or too high a price.

Increased protection of children

The programme villages have a significantly larger proportion of children vaccinated against major diseases, including diphtheria, whooping cough and tetanus, measles, polio and BCG (see Table 1).

Full immunisation is 10% more likely for children under the age of five in programme villages, and this effect is even stronger if the mother has a primary education. As with mothers,

children under five are 22% more likely to be using nets treated with insecticide.

Surprisingly, the programme's effect is smaller for villages with two health extension workers. This may be because the research method compares villages with two health extension workers to villages with better maternal and child health, thereby underestimating the effects. Another explanation is that administrators place two

health extension workers in the worst villages and one in the better villages, again underestimating the effects.

TABLE 1 Impact of the programme on vaccination of children under five

% IMPACT OF PROGRAMME	Polio (first vaccine)	Polio (second vaccine)	Polio (third vaccine)	BCG	Diphtheria-Pertussis-Tetanus	Measles	Full Immunisation
	5.7%	7.7%	9.1%	9.3%	11.6%	11.8%	9.9%

Areas for concern

While these results generally show a positive impact from the programme, there are several areas where there was no effect. For example, the findings show no significant effects on other indicators of maternal care, such as antenatal care visits and use of vitamin A supplements. The programme also decreased the proportion of home deliveries by nearly 8%.

The programme has not reduced the incidence of or attitudes towards illnesses caused by diarrhoea and coughs in children. In addition, the duration of illness due to diarrhoea is actually longer for children in the programme villages. This goes directly against the programme's aims of protecting and promoting child health.

One reason could be that the programme simply has low quality curative health services. A more positive reason could be that increased understanding has led to increased diagnosis of disease symptoms. It is also possible that there is a mixture of these two effects.

Finally, although the effects on child immunisation are positive, stronger efforts are needed to reach the *Global Immunization Vision and Strategy* developed by the WHO and UNICEF, which aims for at least 90% of children being vaccinated in each member country by 2010.

While the programme is successful at improving many indicators of maternal and child health, there is a still a long way to go.

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Reducing maternal mortality: an evaluation of China's Safe Motherhood Programme

Xinglin Feng

KEY FINDINGS

China's Safe Motherhood Programme has been effective in reducing maternal mortality.

After seven years of operation, it was saving more than ten mothers from haemorrhage-related deaths for every 100,000 live births. Maternal deaths from other causes have also fallen.

The programme has also improved maternal healthcare.

For example, participating counties have increased the number of hospital births by 4% of total live births.

Increased hospital births and increased visits to expectant mothers by healthcare professionals significantly reduce maternal mortality.

At under US\$40,000 per county per year, the programme is a cost-effective initiative to accelerate attainment of one of the Millennium Development Goals.

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The first target of the fifth Millennium Development Goal is to reduce the worldwide 'maternal mortality ratio' – the proportion of mothers who die in childbirth or within six weeks of giving birth – by three quarters between 1990 and 2015. This requires the annual rate of reduction of maternal mortality to be at least 5.5%. Yet by 2005, the rate was only 2.5% (Hill et al, 2007).

As the largest developing country, China bears a large burden of worldwide maternal mortality. Although the country has achieved dramatic declines in maternal mortality, the rate of decline has slowed since the mid-1990s. As a result, China has been categorised as one of 68 'countdown' countries seen as key to attaining the fifth Millennium Development Goal (UNICEF, 2008).

In an effort to make more progress in reducing maternal mortality, China has adopted a pioneering *Safe Motherhood Programme*. Xinglin Feng of Peking University has assessed the impact of the programme on maternal mortality.

INTRODUCTION

Despite China's progress on maternal healthcare, evidence produced by the country's Ministry of Health (MOH), in collaboration with international agencies, shows that there are large geographical inequalities, with rural areas marginalised (MOH et al, 2006). Following an initiative by UNICEF, the Chinese government introduced the *Safe Motherhood Programme* in 2000, with the aim of reducing the risk of maternal mortality by enhancing qualified hospital delivery.

The programme's strategy describes a three-cycle model for the key partners: 'families, communities, community supporters and the health system should make concerted efforts towards the promotion of hospital delivery' (see Figure 1). Three main measures were implemented to raise the numbers of births in hospital: health education; enhancement of health infrastructure; and social mobilisation.

FIGURE 1 Three-cycle strategy for China's *Safe Motherhood Programme*



China's *Safe Motherhood Programme* involves two main innovations. First, subsidies have been switched from traditional supply-side reimbursement to the demand side, with pregnant women now able to get direct subsidies towards treatment from local government. Second, childbirth experts from provincial hospitals are assigned to primary maternal care centres for at least two weeks each year to help reinforce local capacity, set up referral channels and train local health staff.

The Chinese government selected the poorest counties with the highest maternal mortality rates to participate – provided that the counties had sufficient finances to match central government contributions at least one for one.

For the first two years, up until 2002, the programme covered 378 counties in 12 central and western provinces of China. From 2002 onwards, the programme expanded to 428 counties and reached 1,000 counties in 2005.

Establishing causality

The research evaluates the impact of the *Safe Motherhood Programme* on maternal healthcare and maternal health outcomes by analysing 11 years of county-level panel data – from 1996 to 2006. Maternal healthcare is defined by the percentage of live births that are delivered in hospital and by the antenatal visits ratio – the percentage of live births where the expectant mother received at least one visit by a healthcare professional.

To take account of the fact that counties involved in the programme are not

selected randomly, the research uses 'propensity score matching', a popular statistical technique used for evaluating labour market policies and social programmes. By looking at non-participating counties that are comparable to the participating counties, it is possible to establish the causal effect of participation in the programme. Out of 2,013 counties in China, 283 were selected for the 'treatment' group and 1,052 for the 'control' group.

This method is not without its costs. To match each treatment county with a control county, some programme

counties with the worst mortality rates were cut from the sample. Theory suggests that the programme will be the most effective in these severe cases. As a consequence, the results are likely to be conservative estimates and, in some cases, the control counties appear to have improved more quickly.

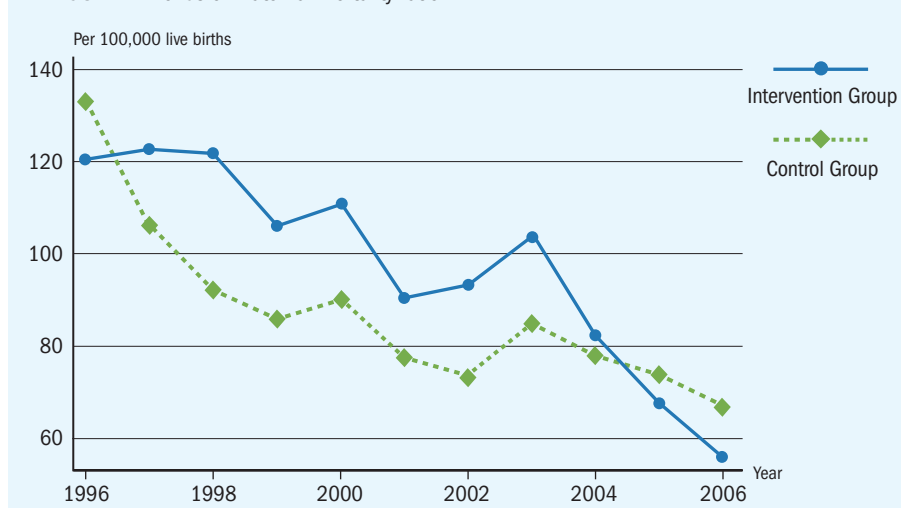
The research also analyses counties that entered the programme during the sample period, taking account of relevant differences between counties, such as income, birth rates, degree of urbanisation and existing hospital infrastructure.

Falling maternal mortality

The research asks two questions: first, does the programme reduce the maternal mortality ratio?; and second, how much of this effect can be attributed to the improvement in maternal healthcare?

The rate of change of the maternal mortality ratio for the treatment and control groups converges in 2003, but the participating counties improve their mortality ratio more thereafter (see Figure 2).

FIGURE 2 Trends of maternal mortality ratio



Various causes of maternal mortality display similar trends. Maternal mortality due to haemorrhage, hypertension and infections from childbirth has been falling quickly compared with the control group. Tetanus infection occurring shortly after childbirth, which was more likely in participating counties, dropped very quickly down to the level of the control group after 2000. Collectively, these results present persuasive evidence of the effectiveness of the programme in reducing maternal mortality.

The impact of improved maternal healthcare

Maternal healthcare has also improved in the participating counties (see Figures 3 and 4). The hospital delivery rate for the treatment group was initially lower than for the control group, but the rates have converged, and each year of the programme

has increased the rate. Antenatal visits in the treatment group have also increased dramatically since the start of the programme.

Previous research suggests that improved maternal healthcare should reduce maternal mortality (see, for example, Ronsmans and Graham, 2006). This study confirms that view by assessing the impact of the two measures of maternal healthcare – hospital delivery ratios and antenatal visits ratios – on the maternal mortality ratio.

The results suggest that improved maternal healthcare has a significant positive effect on the reduction in maternal mortality. Seven years of participation in the programme increases the hospital delivery rate by almost four per 100 live births. Seven years of participation also reduces the maternal mortality ratio due to haemorrhage by more than ten

mothers per 100,000 live births. That does not include the lives saved of mothers who would have died from other causes, such as tetanus infection.

A cost-effective measure

Since the launch of the programme in 2000, its coverage has expanded from 378 to more than 1,000 counties in China. Over that period, one billion renminbi has been invested in the programme. This breaks down to less than US\$40,000 per county per year, of which close to US\$30,000 was paid by the central government.

While this looks like a modest investment for such a significant outcome, the calculation only captures the incremental cost. The programme did not cover salaries for local health staff and other routine costs.

Nevertheless, given the significant impact on maternal mortality, the Safe Motherhood Programme is a highly effective and low-cost initiative to accelerate attainment of one of the Millennium Development Goals.

FIGURE 3 Trends of hospital delivery rate

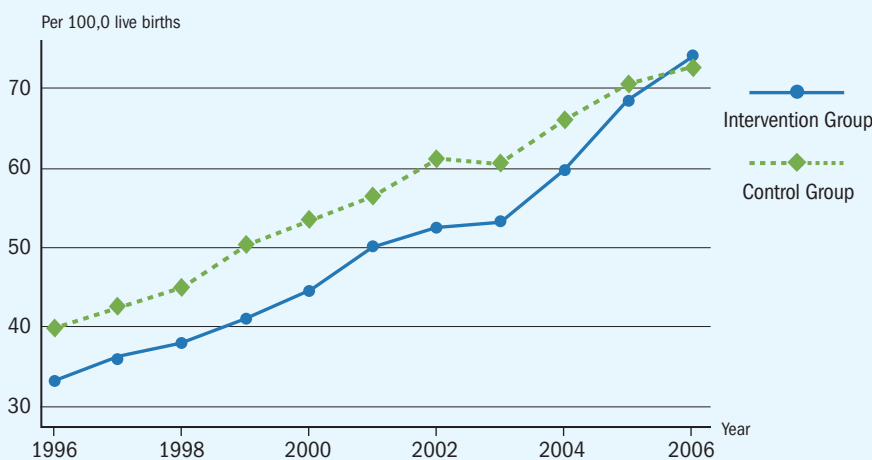
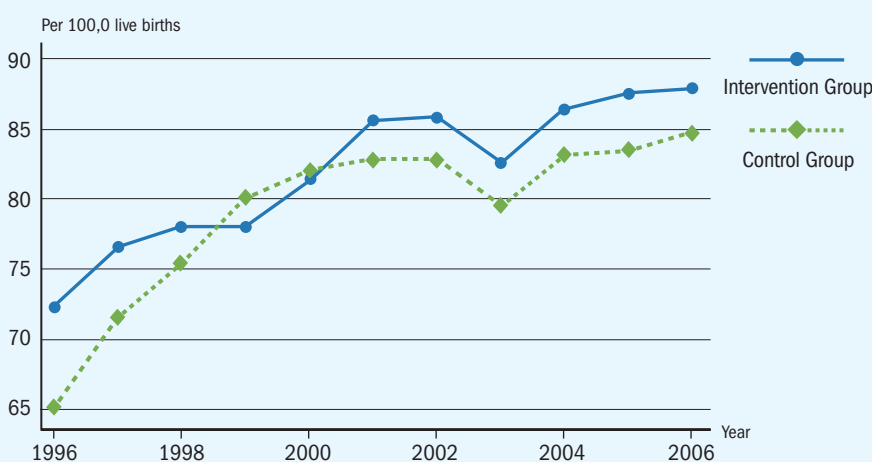


FIGURE 4 Trends of antenatal visit frequencies



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Reducing maternal and infant mortality: an evaluation of Ukraine's Mother and Infant Health Project

Olena Nizalova and Maria Vyshnya

KEY FINDINGS

Ukraine's *Mother and Infant Health Project* has improved maternal and infant health.

Maternal mortality has been reduced by 63 per 100,000 live births and infant mortality by 280 for every 100,000 pregnancies.

Different forms of care have different outcomes.

Maternal health is best improved by addressing anaemia, blood circulation, toxocosis and urinary-genital system complications. Infant health is best improved by addressing care in the antenatal period and respiratory failure during birth.

The cost of the project per pregnancy is estimated at only US\$60,000.

This compares with benefits of between US\$65,000 and US\$7 million when considering the lives saved.

A model for developing countries.

While a large part of the project's success is due to Ukraine's relatively high levels of human capital, some of the project's practices can easily be adopted in developing countries.

For more details on this study visit www.gdnet.org

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Infant illness and mortality are widely used indicators of a country's well-being. The health of mothers, however, receives far less attention – despite most maternal deaths being preventable. One reason is that maternal health outcomes are difficult to measure, particularly in developing countries.

Olena Nizalova and **Maria Vyshnya** of the Kyiv Economics Institute have sought to overcome this problem in their evaluation of Ukraine's *Mother and Infant Health Project*. Because healthcare in Ukraine is universally provided, their research is able to isolate the impact of differences in the quality of care on maternal and infant health.

INTRODUCTION

Ukraine's *Mother and Infant Health Project* aims to improve the reproductive health of women and the general health of infants. Phase one of the project began in 2002 in four regions of the country. By the end of 2006, the project had expanded to 20 maternity clinics in 12 regions.

Each region has roughly one maternity clinic and up to three women's clinics. Maternity clinics deal with delivery and post-birth issues. Women's clinics specialise in antenatal care, including monthly oversight of pregnant women, routine tests and measurements, prevention of complications during pregnancy and family planning counselling.

The project has introduced several best practices as part of its plan to work towards two of the Millennium Development Goals – improving maternal health and improving infant health. The practices include the presence of the mother's partner during delivery, and avoiding unnecessary caesareans and other surgical interventions. The project also supports training in effective antenatal technologies and the development of 'centres of excellence', which serve as models for training medical practitioners.

Quality of care is essential

Previous research has shown that improvements in health outcomes for mothers and infants are caused not so much by the availability of care, but by how it is provided – the process quality (Barber and Gertler, 2002). Indeed, some studies find that low quality providers actually make child mortality and illness worse (Sodemann et al, 1997).

The Ukrainian setting creates a unique opportunity to identify the impact of process quality. The right to free healthcare is a basic constitutional right in Ukraine. While there are at least 24,000 healthcare facilities, most are publicly owned, only a quarter have a licence to practice medicine independently and about 2% of the population have medical insurance (Lekhan et al, 2004).

Since basic medical care is universally provided, implementation of the *Mother and Infant Health Project* allows examination of the *quality* rather than *quantity* effect of medical care on maternal and infant health. Developing countries, by contrast, often have health initiatives accompanied with new facilities so the causal effect is far more difficult to establish.

At the same time, Ukraine's poor levels of maternal and infant health compared with the developed world allow the effect of the project to be more applicable to developing countries.

Assessing causality

The antenatal care provided by the project is expected to reduce maternal mortality and illness both directly and indirectly. Direct effects include the detection and treatment of pregnancy-related illnesses. Indirect effects include detection of women at increased risk of complications and referral to a suitably equipped facility (Oxaal and Baden, 1996).

The researchers use data from routine administrative reports on healthcare facilities between 2000 and 2006. A 'difference-in-difference' approach is used to compare health outcomes for 14 regions with up to

227 similar regions that were not part of the project or joined it later, thereby establishing the causal effect of the project.

This causal effect is supported by further analysis. Project participation is used to examine unrelated health outcomes that could not have been caused by the project – such as the prevalence of hepatitis. The research finds no effect of the project on these unrelated health outcomes, suggesting that being part of the project does not capture other hidden characteristics of where the mothers live, which might be causing changes in maternal and child health.

Safer pregnancy and childbirth

The researchers find significantly improved health outcomes for mothers and children in the project regions. Mothers are more likely to have normal deliveries and attend antenatal clinics. They are also 5% less likely to have caesarean sections, and are expected to have fewer complications during pregnancy, labour and after their children are born. And anaemia, problems with the blood circulation system and late toxemia are reduced.

The project also reduces infant mortality, including the total number of deaths, stillbirths and deaths before birth. The results suggest that most of this effect is caused by antenatal interventions and addressing problems during delivery, such as respiratory failure.

The positive effects of the project increase with its duration. For example, the share of normal deliveries increases sharply in the first year of the project, and the increase is even more pronounced the following year before levelling off. For infants, the impact increases over time for total infant mortality and is slightly diminishing for when infant mortality is caused by antenatal complications and respiratory system failures.

Overall, project participation leads to 1.69 fewer maternal deaths per maternity clinic per year and 7.51 fewer infant deaths resulting from

antenatal problems and respiratory system failures. This amounts to 63 fewer maternal deaths for every 100,000 live births and infant mortality cut by 280 for every 100,000 pregnancies.

A cost-effective solution

Focusing on the most ‘tangible’ indicators of cost-effectiveness, the research compares the average annual cost per expectant mother with the average annual benefits.

The project implies very little monetary intervention – all equipment has been low cost and most of the effects occur through personnel training and changes in attitudes and practices. The average annual per maternity cost is therefore estimated at only US\$60,000.

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The tangible benefits include cost savings due to fewer caesarean deliveries and the value of the saved lives of mothers and infants. Cost savings amount to just under

US\$65,000 and benefits rise to over US\$7 million when the saved lives are included (see Table 1). This suggests a project cost-benefit ratio of as much as 1 to 122.

TABLE 1 Per Mother and Child Cost Savings Calculation

	C-Section (CS)	Vaginal Delivery (VD)	CS-VD	
Post-MIHP cost 2005, UAH	118.4	26.05	92.35	
Average number of deliveries in 2005				2,806.20
Estimated impact on CS, percent				-4.71
Number of VD that would have been CS without the MIHP				132.17
Cost Savings Due to a Switch from CS to VD				12,206.09
Pre-MIHP cost 2002, UAH	267.75	133.35	134.4	
Post-MIHP cost 2005, UAH	118.40	26.05	92.35	
2002 to 2005 change in cost, UAH	149.35	107.3		
Average number of deliveries in 2005	341.51	2,464.69		
Cost savings due to a change in technology	51,005.20	264,460.75		315,465.95
Total, UAH				327,672.03
Total, USD				64,885.55
Average number of live births in 2005, MIHP sites				2,681.40
Mothers’ lives saved per year (63 per 100,000 livebirths)				1.69
Newborns’ lives saved per year (28 per 10,000 livebirths)				7.51
Total value of saved lives (VSL=0.79 mln USD)				7,267,432.78
Total Benefits (including saved lives)				7,332,318.33

- (1) MIHP is the Mother and Infant Health Project
- (2) VSL is the estimated value of a saved life
- (3) The cost (given in 2005 prices) includes the cost of the procedure for both mother and newborn
- (4) Average number of deliveries and live births per region are calculated for all participating regions in 2005

Considerations for other countries

While the project appears to be a cost-effective way to reduce maternal and infant mortality, it is possible that two other factors may explain why an inexpensive change in the quality of services has been so successful in Ukraine.

First, the country has highly qualified healthcare staff: well-trained doctors and nurses are regularly examined on how up-to-date their knowledge is. Second, Ukraine has a well-educated population generally: nearly a quarter (24%) of women and one

in six (17%) men have higher educational qualifications (Ganguli and Terrell, 2006).

Lack of human capital of this kind may prevent less developed countries from direct implementation of the project. Nevertheless, successful adoption of some of the components, such as the presence of a partner in the delivery room, may not require high staff skills and well-educated mothers to be adopted successfully.



Reducing maternal mortality: evidence from Peru's PARSalud programme

Juan José Díaz and Miguel Jaramillo

KEY FINDINGS

The training component of Peru's PARSalud programme has increased deliveries in hospital by 34%.

Improved training of healthcare professionals has also raised caesarean interventions by 94% and the number of deliveries that use oxytocin – a hormone that reduces bleeding – by 81%.

The programme's investment in infrastructure has had little impact.

Different types of training have different effects.

Training in antenatal technologies has the most positive impact.

The cost of averting post-birth haemorrhage is as low as US\$3,328.

This compares with mothers' average remaining lifetime income of US\$36,700.

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Across the developing world, the direct causes of maternal mortality are similar: severe bleeding, infections, hypertension and unsafe abortions. In Latin America, more than 100 mothers die for every 100,000 live births, compared with only four in developed countries (Ronsmans and Graham, 2006).

The *Peruvian Health Reform Support Programme (PARSalud)* is a public sector scheme aimed at reducing maternal mortality. Ten years into the programme, **Juan José Díaz** and **Miguel Jaramillo** of Grupo de Análisis para el Desarrollo have evaluated its impact on the country's maternal mortality and its cost-effectiveness.

INTRODUCTION

The *Peruvian Health Reform Support Programme (PARSalud)* is a public sector scheme aimed at reducing maternal mortality. The programme, which was launched in 1999, operates from eight regional offices of Peru's Ministry of Health, located in the seven political regions of the country with the worst rates of maternal mortality.

Selected health facilities receive equipment for emergency childbirth, for laboratory analysis and for check-up visits to mothers and their children. Programme facilities form a network to ensure that at least three quarters of the population in a region has access to maternal healthcare.

The key contribution is universal provision of the hormone oxytocin as mothers go into labour. Oxytocin prevents severe bleeding, the main cause of maternal mortality. According to former officers of the programme, prior to *PARSalud*, a slower drug was used and oxytocin was used in only 30% of hospital deliveries.

The Ministry of Health has implemented the programme through investments in infrastructure – including building new rooms or refurbishing existing ones – and personnel training.

Personnel training provides internships of up to three months, often in the capital Lima. These cover the handling of childbirth emergencies – both before and after – and intercultural communication, as many people in the worst affected regions are from rural, indigenous areas. Management training is also offered.

PARSalud selected 74 health facilities – 70 of which are hospitals or health centres – to participate in the programme. These facilities are classified as ‘basic’ – if they only offer

surgical and non-surgical services above the primary level – or ‘essential’ – if they are able to deal with the most complex cases. Although regional authorities made the scheme conditional on other nearby facilities receiving at least some investment, the programme was far more rigorous for these 74 facilities.

Staggered implementation

The researchers evaluate the effect of the *PARSalud* programme by examining monthly data from 341 facilities, covering nearly 14,000 live births between 2002 and 2005, and taking advantage of the implementation process of the programme to establish causality.

Investments in infrastructure and training were put in place at different times during the sample period. The study uses a technique called ‘difference-in-difference’ to compare the health facilities that are part of the programme with those that never join the programme and those that join the programme later. This makes it possible to establish the causal impact of the training and infrastructure on maternal health outcomes.

Since many facilities handle only a few thousands births a year and so will experience few maternal deaths, the researchers use three indicators for

improvements in maternal healthcare: the total number of deliveries assisted; deliveries assisted using oxytocin; and deliveries with caesarean intervention.

The first indicator measures facilities’ capacity to handle a larger volume of deliveries. The second captures their effectiveness in managing mothers’ labour. The third assesses whether the most appropriate procedures are used. The research also analyses the share of oxytocin and caesarean assisted births compared with total births, as well as the total number of pregnancies and deliveries with complications.

Effective training

The programme has a positive effect on total deliveries per month. Personnel training results in more than four extra deliveries within the facilities, but investments in infrastructure have little effect.

Similarly, training has a positive impact on the number of births assisted with oxytocin – more than eight extra births per month. Training also results in more than one extra caesarean delivery per month while, again, the infrastructure investment has a negligible effect. Personnel training also increases the share of deliveries using oxytocin by 5.6%, but there is no effect on the share of caesarean births (see Table 1).

Different aspects of training are more effective than others. Training in antenatal technology leads to more than four additional deliveries, nearly two added caesarean deliveries and more than nine extra oxytocin deliveries.

Cost-effective

In the ten years that *PARSalud* has been in operation, US\$51 million has been spent on training, infrastructure investments and equipment.

The results of this research, coupled with results from random checks in a previous study (Rogers et al, 1998), suggest that 15,335 cases of post-childbirth haemorrhage were averted at a cost of US\$3,328 per averted case. Using far more conservative estimates, the results suggest that 1,707 averted cases were averted at a cost of US\$29,897 each.

These figures compare favourably with the average lifetime income for a mother whose life is saved aged 20. Using per capita GDP of around US\$2,850 in 2005, an interest rate of 8%, a growth rate of GDP per capita of 0.5% and assuming the woman lives until 65, her potential income is around US\$36,700. If she is assumed to live only another 15 or 25 years, her 'discounted' lifetime income is US\$25,300 or US\$31,900 respectively.

A model for developing countries

The programme has shown clear signs of success in improving maternal healthcare, and a second phase is now being considered.

Nevertheless, it is notable that investment in infrastructure has such an unconvincing, and perhaps even negative, effect. This could be because infrastructure investments do not significantly affect the capability of facilities to perform deliveries across the board. But it could also be the case that such investments do have a positive effect on capacity but that this is captured by the effects of training.

Although it is important to pay attention to the local context when designing social policy interventions, to some extent high mortality rates have common causes across the world. The positive lessons from this intervention in Peru can make an important contribution to strategies to tackle the same problem in other developing countries.

Training for emergencies, however, is associated with fewer deliveries. This may be due to other training, which advises staff to refer patients with severe complications to facilities with greater capacity as part of the *PARSalud* network.

The same reason can explain the finding that while training for nurses is associated with more caesarean births,

training for technicians leads to fewer caesareans and nearly four fewer deliveries with oxytocin per month.

Training given to doctors has an unambiguously positive effect. It increases the total number of deliveries per month by nearly five, the number of caesarean deliveries by more than one and the number of deliveries with oxytocin by more than seven.

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Finally, training increases the number of complicated deliveries – those requiring specialist care – by more than one per month. This may be because those expecting to need specialist care will attend the programme hospitals.

TABLE 1 Estimated impact in relation to average predicted values for all facilities (2002-2005)

	Number of deliveries	Number of cesarean deliveries	Number of deliveries treated with oxytocin	Percentage of deliveries treated with oxytocin
Estimated impact	4.343	1.285	8.126	0.058
Average predicted values - All facilities (2002-2005)	12.618	1.370	10.038	0.704
Estimated impact (in %)	34.4	93.8	81.0	8.2



Achieving a ‘miracle’ of reduced fertility: evidence from Iran’s Family Planning Programme

Djavad Salehi-Isfahani, Jalal Abbasi-Shavazi and Meimanat Hosseini-Chavoshi

KEY FINDINGS

‘Health houses’ – the main outlet for primary health services in rural Iran – account for up to 18% of the country’s fertility decline between 1986 and 1996.

The government’s media campaign and credibility with the rural poor were also key factors in reducing fertility.

The returns to education for the rural poor have increased.

This has persuaded rural families to shift from high fertility and low investment in children’s education to low fertility and high investment in children’s education.

The significant role of Iran’s *Family Planning Programme* in reducing fertility is a policy that can be repeated in other developing countries.

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The effect of family planning programmes on fertility has received widespread attention from policy-makers. But there have been few rigorous evaluations of their effectiveness in developing countries, and those that have been done suggest only a moderate effect.

Iran’s *Family Planning Programme* has been called the ‘Iranian miracle’ and suggested as a model for other developing countries. **Djavad Salehi-Isfahani** of Virginia Tech, **Jalal Abbasi-Shavazi** of the University of Tehran and **Meimanat Hosseini-Chavoshi** of Iran’s Ministry of Health and Medical Education have used changes in the number of ‘health houses’ in rural areas to assess the programme’s impact on the country’s dramatic fall in fertility rates.

INTRODUCTION

Following Iran’s Islamic revolution of 1979, national fertility rose to be one of the highest in the world. Encouraged by the government, population growth reached 3.9% per year by the mid-1980s. In 1989, in response to growing pressures on schools and other facilities, the government changed direction and launched an ambitious and innovative *Family Planning Programme*, aimed specifically at reducing fertility among rural families.

The programme operates through ‘health houses’, the main outlet for primary health services in rural Iran. Each health house is typically staffed with two trained healthcare workers – at least one of whom is a woman – and serves around 1,500 individuals in the village and surrounding area. By 2005, there were over 16,000 health houses, serving 55,000 villages and covering roughly 90% of the country’s rural population.

Health houses existed before the revolution, but in 1989 their role changed and now involves ‘active delivery’. Healthcare workers not only supply maternal and child health services, they also visit women who have not attended the health house and keep track of the birth control needs of all married women. For example, women on contraceptive pills are contacted to make sure they have their monthly supply in time.

This has had a substantial effect. By 2005, the programme had covered more than 90% of the rural population and the average number of births per rural woman had fallen from eight to a ‘replacement’ level of two.

Iranian families have also become among the highest users of contraceptives in the developing world. The percentage of women aged between 15 and 49 who use contraception reached 77% in urban and 67% rural areas in 2000, up from 54% and 20% in 1976 (Hosseini-Chavoshi, 2007).

At the same time, fertility in rural areas fell even more rapidly, so that the rural-urban gap in fertility has all but disappeared. As a result, the programme has been called the ‘Iranian miracle’ and suggested as a model for developing countries. (Mehryar et al, 2001, and Boonstra, 2001).

Unique causal evidence

Despite the international acclaim, there is surprisingly little evidence of a causal link between the programme and the decline in rural fertility. The researchers address this problem by using the staggered implementation of rural health houses to identify their effect on village-level fertility.

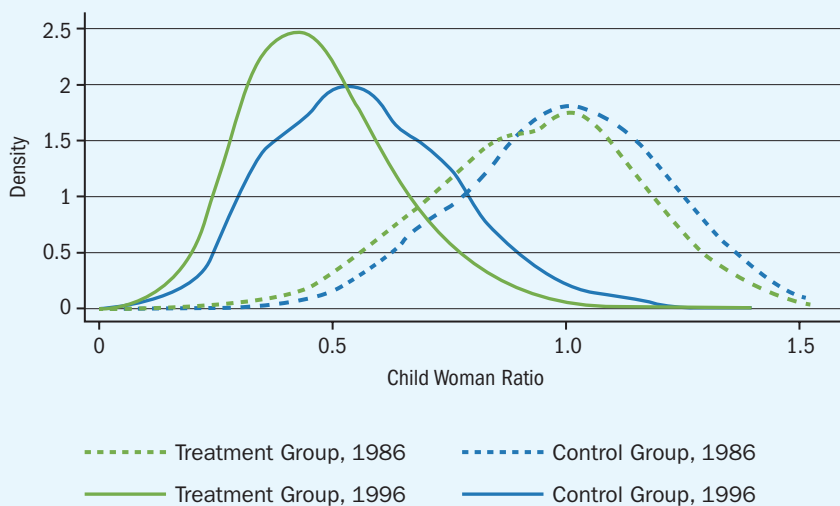
The construction of rural health houses started before the revolution and they were not initially designed for family planning. So whether a village has a health house and the timing of its establishment are not related to the fertility rate in that area.

The research uses a ‘difference-in-difference’ method to compare

fertility outcomes of ‘treatment’ villages that had health houses with ‘control’ villages that did not. This isolates the causal impact of the *Family Planning Programme*.

The research considers the ratio of children aged up to four to women aged between 15 and 49 – the ‘child-woman ratio’. It uses data from the census years 1986 before the programme and 1996 after the programme. The analysis looks at a sample of 10,000 villages, covering over one million households, and compares the quarter of these villages that had a health house in 1996 with the remaining three quarters that did not have a health house and were therefore not part of the programme.

FIGURE 1 Change in the Distribution of Child Woman Ratios for Comparison and program Group, Rural Iran, 1989-96



Significant reduction in fertility

While both groups experience sharp declines in fertility, the average decline in programme villages was between 7% and 18% greater than in comparison villages (see Figure 1). The lower bound of 7% suggests that fertility in programme villages fell by an average of 460 per thousand women and in control villages by 425, resulting in the difference-in-difference of 35 children per thousand women.

The size of this estimate increases when taking account of possible underestimation due to lower child mortality as a result of better health-care. This increases the estimated programme effect to 58 and 83 children per thousand women, suggesting an effect of up to 18% of the overall decline in fertility.

Moreover, this effect increased with time. Each year of the health house in the village reduced fertility by eight or nine births, which for the average village with five years of the programme is about 40 children per thousand women. This estimate suggests the impact of the programme is about 10% of the decline between 1986 and 1996.

Other reasons for the 'Iranian miracle'

While the programme has clearly been very effective, the research raises the question of what explains the remaining 80% of the 'Iranian miracle'. The reversal in family planning policy and changes in fertility behaviour of families should not be viewed entirely as cause and effect.

First, the pressures generated by the fertility boom may have prompted families themselves to change their approach to fertility and family planning.

Second, the onset of fertility decline in Iran actually preceded the turnaround in government policy, which suggests that factors other than family planning may have been at work throughout (Abbasi-Shavazi et al, 2009).

Third, the Islamic government's media campaign with the slogan 'fewer children, better life' was successful at promoting the virtues of smaller families. This message was credible as the government had already shown its commitment to rural development by heavily investing in rural infrastructure, such as electricity, piped water and health. In addition, the government was able to use mosques and enlist the help of the local clergy to advocate family planning.

Fourth, the government's push to reduce family size did not stop with persuasion. It actively encouraged the idea that it would back its message by policies to increase the cost to families of going beyond two children. While this never materialised explicitly, in 1989, the government began to dismantle the system of rationing basic consumer goods, which had favoured larger families.

Fifth, evidence from numerous studies suggests that the increase in education and falling income in the 1980s could explain why families were more eager to adopt family planning in 1989 than when it was first offered in the 1970s. Further, the greater equality in income and access to basic services may have changed the perceptions of returns to child education and thus altered their trade-off between quality and quantity.

But while there are many factors unique to Iran that explain the change in fertility rates, the significant role of the *Family Planning Programme* through health houses represents a policy that can be repeated in other developing countries.

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Reducing maternal mortality: an evaluation of Thailand's Safe Motherhood Hospital programme

Worawan Chandoevit and Kriengsak Vacharanukulkieti

KEY FINDINGS

The Safe Motherhood Hospital programme has had no impact on Thailand's maternal mortality ratio.

This is not surprising given that many of the programme guidelines are not effectively enforced. The programme also focuses only on mothers when they are in hospital, and it disregards many of the wider causes of maternal death.

The programme has created savings by lowering mothers' length of stay in hospital as well as the labour costs of child delivery.

The programme involves guidelines but no extra resources. Reducing the costs of child delivery without increasing the death rate can therefore be considered a success.

Participation in the programme varies widely.

It is more likely if the hospital has a more experienced director and is in the south or northeast of the country or in a region with more women. Hospitals with frequently changing directors and hospitals in areas where resources are already stretched are less likely to participate.

To improve maternal health, policy-makers need more reliable data on maternal mortality and better implementation and evaluation of maternal health programmes.

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Improved maternal health is one of the eight Millennium Development Goals. The first specific target of the fifth goal is to reduce the 'maternal mortality ratio' – the proportion of mothers who die in childbirth or within six weeks of giving birth – by three quarters between 1990 and 2015.

Thailand has embraced this challenge though the *Safe Motherhood Hospital* programme, which has now been in operation for ten years. **Worawan Chandoevit** of the Thailand Development Research Institute and **Kriengsak Vacharanukulkieti** of Phu Ka Dung Hospital have evaluated the impact of the programme on maternal mortality and the costs of child delivery.

INTRODUCTION

According to Thailand's Department of Health, the number of mothers who died in childbirth or within six weeks of giving birth stood at 36 per 100,000 live births in 1990. By 1995, the country's maternal mortality ratio had declined to 16.8 per 100,000. But the ratio then leapt to 26.9 per 100,000 in 2000. This may have been due in part to the fallout from the 1997 financial crisis, but it could also have resulted from inconsistent data collection.

The spike in maternal deaths attracted considerable attention from national healthcare officials and international health networks, and provided the motivation for setting up the *Safe Motherhood Hospital* programme in its current form.

The worldwide *Safe Motherhood Initiative* began in 1987, with Thailand first taking action in 1988. Before launching in 1995, there was a seven-year period of consultation and raising awareness in collaboration with the World Health Organization.

In 2000, Thailand's Ministry of Public Health asked every hospital under its supervision to take part in the programme, issuing an 11-step guide (see Table 1). By 2005, almost all of the larger specialised provincial hospitals in the country and well over half (63%) of all hospitals had successfully completed the process evaluation.

■ **TABLE 1** Trends of hospital delivery rate

The 11-step guide to adopting the *Safe Motherhood Hospital* programme

1. The director of the hospital adopts a policy to participate in the programme.
2. The hospital provides training courses for staff concerning the standard of pre-natal and post-natal care.
3. The hospital provides standard pre-natal care.
4. The hospital provides pre-natal care group training at least once for pregnant women and their husbands/relatives.
5. The hospital must have standard child delivery services.
6. The hospital must provide standard service for newborns in the delivery room.
7. The hospital must provide standard post-natal care, that is, group training on baby care, breastfeeding and family planning.
8. The hospital must provide standard care for newborns, that is, vaccination, and training for baby feeding and health monitoring.
9. The hospital collects maternal, child delivery and newborn data and analyses the data with healthcare personnel.
10. The hospital provides counselling services for unwanted pregnancies and complications in child delivery.
11. The hospital should collaborate with other hospitals in providing documentation for monitoring pre-natal and post-natal healthcare.

Issues with evaluation

There are two problems with evaluating this programme. The first is the reliability of the data. From interviews with hospital staff, it is clear that many do not fully understand the definition of maternal death. Many healthcare workers also lack the resources to record accurately whether maternal deaths occur within 42 days of childbirth. This means that the recorded number of maternal deaths is likely to be too low.

Second, the numbers are highly variable across the country. The average

maternal mortality ratio in 2003 was 23.6 deaths per 100,000 live births. But in many provinces, the ratio was substantially higher – for example, Narathiwat, with 83.7 deaths per 100,000, and Mae Hong Sorn, with 263.3 per 100,000. In the centre of Thailand, the ratio was much lower at 16.8 per 100,000, whereas in northern Thailand it was 48.6 deaths per 100,000.

Analysing data from a survey of nearly 700 hospitals conducted between September 2007 and April 2008, the researchers use a technique

called 'propensity score matching', a popular approach to evaluating labour market policies and social programmes. They compare hospitals in the *Safe Motherhood Hospital* programme with a 'control' group of non-participating hospitals that are as similar as possible to the programme hospitals.

This comparison enables the researchers to establish the causal effect of participation on the maternal mortality ratio and on the cost per child delivery, as well as the incentives for hospitals to participate.

Non-monetary incentives for participation

There is no financial incentive for participation in the programme – hospitals do not receive extra resources for following the guidelines – and no monetary penalty for not participating. Participation can therefore be better understood by examining the incentives facing hospital directors.

The Department of Health made maternal death a serious issue in every hospital. In the event of a death, the provincial office and all public hospitals in nearby provinces are required to organise a confidential case conference and report their findings in the hope of developing best practice. This is a non-monetary penalty for directors.

Geography, local demography, hospital resources and directors' work experience all have an impact on participation. For example, when the size of a district is large with a high proportion of population per nurse, the director is less likely to participate because of the already extensive workload. Hospitals in the south and northeast are more likely to participate, as are hospitals with more women in the area.

No impact on the maternal mortality ratio

The programme's lack of impact on maternal death is not unexpected since it does not allocate more resources to participating hospitals. Indeed, many of directors anticipated the lack of impact, arguing that while the programme set guidelines that would improve the quality of care, they would not reduce the number of maternal deaths.

Directors and nurses report that the causes of maternal death are mainly haemorrhage and hypertension. They also note that in many cases, pregnant women do not have antenatal care because of a lack of time or resources, and thus are unaware when they are high-risk. And the programme makes no attempt to reduce the causes of maternal death beyond the guidelines for hospitals.

Hospitals also routinely fail to follow the 11-step guidelines. For example, the ratio of nurses to doctors for child delivery should be three to one, but almost all of the hospitals use two nurses for natural child delivery. Some hospitals use only one nurse.

Reduced length of stay and reduced labour costs

Participation in the programme reduces mothers' length of stay in hospital and the labour costs of child delivery compared with similar hospitals that are not participating.

The programme also increases referred-in cases and decreases referred-out cases of participating community hospitals. Participation encourages community hospitals to refer high-risk pregnant women to better-resourced community, general or regional hospitals. If referrals are made early during antenatal care, the mortality risk is reduced. During labour, however, the probability of death is high.

Key lessons for other countries

First, the Safe Motherhood Hospital programme fails to address the main causes of maternal mortality. Beyond the hospital, no provisions are made for women who are poor, who live in remote areas or who have the most high-risk pregnancies. Within the hospital, the process is poorly followed.

Second, a guideline for data collection and reporting should have been set up with clear benchmarks for success. Process evaluation should have been conducted by an independent institution – rather than the Department of Health – with explicit sanctions to guarantee compliance.

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Motivating healthcare workers: evidence from Rwanda's performance-based financing policy

Paulin Basinga, Paul Gertler, Agnes Binagwaho, Agnes Soucat, Jennifer Sturdy and Christel Vermeersch

KEY FINDINGS

Health centres in Rwanda that are participating in performance-based financing have 11% more deliveries each month.

This is largely due to deliveries having the highest payment rate at \$4.59 per delivery.

More infants receive check-ups and vitamins.

There are also fewer underweight births reported.

Checks and balances in the auditing process are essential.

Effective auditing ensures that protocol is followed and reduces the opportunity for corruption.

Performance-based financing should be regularly reviewed to ensure higher payments are given for the most important services for improving health outcomes.

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Performance-based finance policies have been widely used in developed countries and increasingly in developing countries to motivate workers to provide better quality public services. Health centres, for example, will be offered payments for performance on the basis of both quantity indicators – for example, number of deliveries – and measures of the quality of the services they provide.

Twelve years after the devastating 1994 genocide, Rwanda has started a *performance-based financing* policy to improve the productivity of its health service. **Paulin Basinga** of the National University of Rwanda School of Public Health, **Paul Gertler** of the University of California, Berkeley, **Agnes Binagwaho** of Rwanda's Ministry of Health and **Agnes Soucat**, **Jennifer Sturdy** and **Christel Vermeersch** of the World Bank examine the impact of Rwanda's new policy on the health of mothers and children.

INTRODUCTION

The 1994 genocide decimated Rwanda's fragile economic base. The small, landlocked country in sub-Saharan Africa has a population of around nine million and per capita GDP of roughly US\$250. In 1994, close to one million people died and a large number of people became refugees. Poverty rose dramatically – particularly among women – reaching 78% of the population.

One major challenge to emerge from the genocide is the rebuilding of Rwanda's destroyed health infrastructure. In 2005, Rwanda had only one doctor for every 50,000 inhabitants and one nurse for every 3,900 inhabitants.

The low salaries of healthcare workers have resulted in a disproportionate concentration in urban areas. Only 17% of nurses are working in rural areas and, despite having

only 15% of the population, the Rwandan capital Kigali is home to 75% of all doctors and about 60% of all nurses in the country.

Competition for scarce, skilled healthcare workers has seen many switch to the private sector or donor-funded projects, where they can earn up to six times their public sector salary. This is seen as a critical reason for public healthcare workers' lack of motivation.

In 2006, Rwanda's Ministry of Health launched a *performance-based financing* policy with support from aid organisations. The policy's aim is to improve the quantity and quality of health services by motivating healthcare workers and retaining them in rural areas.

Comprehensive quality control

The policy focuses on the services of health centres, which have a catchment area of roughly 20,000 people and are responsible for contracting services out to smaller health posts and private health centres within the area.

A steering committee has been established in each district to provide independent monitoring of the performance of the local health centre. The results of the review directly affect the amount of funding received by the centre and hence its staff. Over 70% of the extra funding from the scheme is allocated to staff salaries.

Payments for performance are based on the quantity of outputs achieved. They are also conditional on the quality of these services. For example, health centres receive nearly US\$5 for a delivery, but will only receive a fraction of this depending on the value of the quality indicator between 0 and 1. There are 14 outputs measured monthly, while quality is measured quarterly as an index of 13 indicators.

For outputs, the first seven indicators consist of the number of visits to the centre for various types of service, such as curative care and institutional delivery. The next seven indicators concern the care provided during visits (see Table 1).

■ **TABLE 1** Quantity indicators and unit payments for performance-based financing (PBF) formula

	Indicator	Amount paid by PBF per case (US\$)
Quantity indicators: Number of...		
1	curative care visits (New cases)	0.18
2	first antenatal visits	0.09
3	women who completed four antenatal care visits	0.37
4	first time family planning visits (new users: IUD, pills, injections, implants)	1.83
5	contraceptive users at the end of the month (monthly protection)	0.18
6	deliveries in the facility	4.59
7	growth monitoring visits	0.18
Output indicators: Number of...		
8	women who received tetanus vaccine (second to fifth dose) during antenatal care	0.46
9	women who received second dose of malaria prophylaxis during antenatal care	0.46
10	at risk pregnancies referred during antenatal care to the hospital for delivery	1.83
11	emergency transfers to hospital for obstetric care during delivery*	4.59
12	children who completed vaccinations on time	0.92
13	malnourished children referred for treatment during preventive care visit*	1.83
14	other emergency referrals*	1.83
* A proof of counter referral (patient arrived in the hospital and seen by a medical doctor/treated) is needed for the payment to be made.		

TABLE 2 Service and weights used to construct the quality score for performance-based financing formula

Service	Weight	Share of weight allocated to structural components	Share of weight allocated to process components	Means of assessment
1 General administration	0.052	1.00	0.00	Direct observation
2 Cleanliness	0.028	1.00	0.00	Direct observation
3 Curativecare	0.170	0.23	0.77	Medical record review
4 Delivery	0.130	0.40	0.60	Medical record review
5 Prenatal care	0.126	0.12	0.88	Direct observation
6 Family planning	0.114	0.22	0.78	Medical record review
7 Immunization	0.070	0.40	0.60	Direct observation
8 Growth monitoring	0.052	0.15	0.85	Direct observation
9 HIV services	0.090	1.00	0.00	Direct observation
10 Tuberculosis service	0.028	0.28	0.72	Direct observation
11 Laboratory	0.030	1.00	0.00	Direct observation
12 Pharmacy management	0.060	1.00	0.00	Direct observation
13 Financial management	0.050	1.00	0.00	Direct observation
Total	1.000			

For quality, measures cover the extent to which the health centre has the equipment, drugs, medical supplies and personnel necessary to be able to deliver a specific medical service, as well as the clinical content of care provided (see Table 2).

To ensure the assessment is not abused, each district hospital sends supervisors to the health centres in their catchment area on a quarterly basis. The auditors review the registry and patient medical records, and directly observe the centre's operations, care and record-keeping. After the evaluation process, the auditors discuss the results with the health centre's personnel, providing practical recommendations to improve the quality of services where needed.

Assessing maternal and child health outcomes

There is substantial evidence to suggest that maternal health and child health are good indicators of overall healthcare (see, for example, Lavy et al, 1996).

The research uses 'difference-in-difference' methodology to compare these health outcomes in 79 health centres that were part of the programme with 86 otherwise similar health centres. Together these 165 health centres account for over one third of all Rwanda's health centres. Data are collected from questionnaires on the main characteristics and services provided by the centres between 2001 and 2008.

Improved maternal and child healthcare provision

The research finds that policy health centres have on average four more deliveries each month – an 11% increase. This is largely due to deliveries having the highest payment rate, at \$4.59 per delivery. These are so lucrative that not only are pregnant women encouraged to deliver while receiving antenatal check-ups, but the health centre also offers healthcare workers an informal commission of up to US\$2 to search the community and bring in pregnant women to deliver in the facility.

Policy health centres also increase the provision of child healthcare. Each quarter, policy health centres monitor the growth of 14 more infants under one year old, and 13 more infants at the policy health centres receive vitamin A supplements each month.

Policy health centres also register a decrease in the number of under-weight babies. This is evidence of the effectiveness of interventions, such as the prevention and treatment of malaria during pregnancy.

But the research also suggests that performance-based financing policy has had no effect on the availability of equipment and drugs at the health centres. This is not surprising given the fact that on, average, the health centres allocate three quarters of performance-based payments to salaries, leaving insufficient funds for investment in drug or equipment.

Policy implications

The results suggest that the *performance-based finance* programmes have strengthened Rwanda's health system. Nevertheless, the importance of establishing a finance system with checks and balances to ensure good practice while preventing 'gaming' and misreporting should not be underestimated.

The success of payments in providing incentives suggests that higher payments should be given for the most important services for improving health outcomes. It is also vital to get the prices of indicators right and update the list of indicators regularly. As part of this updating, the results show that collaboration between health centres and health workers seems to work informally and has the potential to be exploited formally.

To provide policy-makers with clearer guidelines, a qualitative study is needed to help understand the 'how' of these findings. Focus groups and in-depth interviews will provide a better understanding of how to ensure the continued success of the programme.

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Financing healthcare for the informal sector: experimental evidence from extending Nicaragua's social security health insurance

Rebecca Thornton, Laurel Hatt, Mursaleena Islam, Erica Field, Freddy Solis and Martha Azuzena González Moncada

KEY FINDINGS

Micro-finance institutions in Nicaragua seem to be no more effective at extending health insurance than the government.

Retention rates are below 10% once a subsidy has been removed.

Out-of-pocket expenditures on healthcare are reduced, but the average savings are lower than the unsubsidised insurance premiums.

Reducing 'time costs' is vital for increasing enrolment in insurance schemes.

On-site registration increased enrolment by 17% without the need for subsidies.

This scheme represents a first step for national insurance programmes hoping to extend healthcare access to the informal sector with the help of private institutions.

For more details on this study visit www.gdnet.org

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Health insurance for the poor and vulnerable has received growing interest from policy-makers in developing countries. Yet research suggests that the uptake of health insurance among low-income workers is typically low (see, for example, Chankova et al, 2008). This has led policy-makers to try new ways of providing insurance, such as through micro-finance institutions, though, to date, there is little evidence on their effectiveness.

Rebecca Thornton of the University of Michigan, **Laurel Hatt** and **Mursaleena Islam** of Abt Associates, **Erica Field** of Harvard University, and **Freddy Solis** and **Martha Azuzena González Moncada** of ALVA Coultiores, Nicaragua, have conducted an experiment extending a social security health insurance programme to informal sector workers in the capital city, Managua.

INTRODUCTION

In many parts of the developing world, the damage caused by a family health crisis can be devastating for the self-employed and workers in the informal sector (Dercon, 2002). These workers are often forced to divert resources from their businesses to cover healthcare bills at the expense of investing in future growth. This, in turn, can have a significant impact on household income (see, for example, McIntyre et al, 2006).

Health insurance can provide vital risk protection for small businesses, as well as increasing access to priority health services for informal workers and their families. Recognising this, the government of Nicaragua extended its national health insurance to the informal sector in 2007.

Prior to the expansion, only formal sector workers and government employees – just 18.5% of the economically active population – were eligible for social security health insurance. The self-employed, the unemployed and those working in the informal sector were only eligible for free care at Ministry of Health clinics or they could pay out-of-pocket for services from private providers.

Innovative implementation

More than half the small business owners in Managua have a loan, and the majority of these are with a micro-finance institution. Nicaraguan policy-makers therefore suggested using these institutions to extend the coverage of health insurance.

Micro-finances signed a one-year contract with the social security office to register subscribers and collect payments in exchange for a fee for each enrolment. Individuals could then sign up for the insurance at any branch of participating micro-finances, which send all paperwork to the social security office.

Newly insured informal sector workers pay a flat monthly fee of between US\$15 and US\$18 for covered services. These include primary and specialist care, medication, hospitalisation and emergency care, as well as maternity services, including deliveries, for subscribers' wives and coverage of dependent children up to the age of 12.

Experimental evidence

The researchers evaluate the programme via randomised incentives for informal sector workers to obtain health insurance. A few months after the extension of the insurance programme, roughly 2,600 workers in open-air markets in Managua were surveyed. To test the effectiveness of micro-finances as a delivery agent, individuals were randomly assigned a 'prize' on site.

The prizes included a brochure on the insurance product; a two-month

insurance subsidy with instructions to sign up at the social security office; a two-month insurance subsidy with instructions to sign up at a micro-finance office; a six-month insurance subsidy with instructions to sign up at the social security office; a six-month insurance subsidy with instructions to sign up at a micro-finance office; and a blank lottery ticket of no value to create a 'control' group.

Subsidies were all provided in the form of a voucher and recipients were told that payments would be made to the social security office on their behalf.

In a second phase, the respondents were visited at random, with some of the prize-winners who had not subscribed offered the opportunity to sign up at the market, thereby removing any costs of travel and time to apply. One year after the survey, all respondents were contacted for a follow-up, and some were asked to participate in a focus group.

Ineffective change

The results suggest that micro-finance institutions are no more effective at providing insurance than the government. Once the subsidies finish, after two or six months, the retention rates were very low. Fewer than 10% were still enrolled in the insurance programme after one year.

The focus group expressed a preference for signing up for the insurance directly with the government rather than through intermediaries. The social security office is perceived as a more stable institution, where as micro-finances are potentially vulnerable to bankruptcy and possibly less trustworthy. Micro-finances are also perceived as less knowledgeable about the insurance (see Box 1).

Another reason for low retention is the cost. While total out-of-pocket expenditures fall for insured workers, the average out-of-pocket savings are lower than the unsubsidised insurance premiums.

BOX 1

'Social security offices know the benefits, what's not covered, while micro-finances are lending institutions and don't understand health. Health is not their speciality; their thing is money.'

Micro-finance client who enrolled

BOX 2

Average total expenditures over the year are US\$42, and US\$88 when including children. But these expenditures are less than the equivalent unsubsidised cost of the insurance of US\$176 per year. Only 13% of respondents spent more than \$176 per year on themselves and their children. This explains why insurance is sometimes perceived as a net gain only for the long-term sick or those who suffer a shock to their health.

Poor feedback but shades of optimism

The programme was also blighted by ineffective marketing and bureaucracy. Few participants in the focus group had heard of the social security insurance programme for informal workers. There was confusion about the benefits of the insurance – some participants thought that it would only provide benefits in old age. Better information about what benefits were covered, how to enrol, what fees are charged and how to make payments are clearly necessary (see Box 2).

While flawed in its implementation, the project represents a first step towards broadening access to health insurance in the informal sector. Most focus group participants felt that it was ‘worth it’ to pay for health insurance. Respondents were impressed by the coverage of young children and health emergencies in general.

One success from the programme was the use of on-site opportunities to sign up. According to the survey, registering through the micro-finances or a social security office took about a day of effort – a substantial ‘time cost’ for small business owners.

On-site enrolment removed the opportunity cost of going to an office to sign up. Providing on-site enrolment and information alone, without a subsidy, increased enrolment rates by 17%. Adding the six-month subsidy increased enrolment by a further 14%. Simply reducing the time costs of going to an office to sign up had about half the effect of offering a six-month subsidy worth around \$100.

‘I think that is the reason that most people don’t pay into the insurance, we don’t know where to do it or with whom to do it. I think there needs to be more publicity.’

Micro-finance client who won a subsidy but did not enrol

‘I was told that they would notify me when I could use the insurance, a thing that never happened. After a week passed, then two weeks, I said that it was a real joke because they never notified me. Then eight months later, a statement arrived that I owed two months of insurance payments.’

Non micro-finance client who enrolled

Government-run health insurance programmes have many advantages, including their ability to spread risk and costs, and to generate confidence and trust in the population. But legal and political constraints often make it difficult for public sector health programmes to meet the needs of all citizens, including informal sector workers. This leaves room for private institutions to take on a greater role and projects such as these should be encouraged – though there is considerable room for improvement.

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Improving maternal and child health: evidence from Ghana's National Health Insurance Scheme

Joseph Mensah, Joseph Opong and Christoph Schmidt

KEY FINDINGS

National insurance schemes are an effective tool for increasing access to healthcare and improving maternal health outcomes.

Women are more likely to receive antenatal care, deliver in hospital, have their deliveries attended by trained health professionals and experience fewer birth complications.

Nearly half the population of Ghana are still not members of the scheme.

Increased access is needed. The poor should be better targeted with exemptions from premiums. Marketing needs to raise awareness among people with little education.

A model for sub-Saharan Africa – but health insurance alone will not improve healthcare.

Improving healthcare systems requires reliable infrastructure, well-located healthcare facilities, efficient healthcare providers and a competent and accountable administration.

For more details on this study visit www.gdnet.org

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The popularity of social health insurance in Latin America has attracted the attention of governments from across sub-Saharan Africa. Many of these governments were compelled to remove subsidies for healthcare as a result of 'structural adjustment policies' imposed by the International Monetary Fund (IMF) and the World Bank (Mensah, 2006).

In 2003, Ghana launched the pioneering *National Health Insurance Scheme* to improve healthcare delivery. **Joseph Mensah** of York University, Canada, **Joseph Opong** of the University of North Texas and **Christoph Schmidt** of the Rheinisch-Westfälisches Institute have evaluated the impact of this programme, with particular emphasis on the fourth and fifth Millennium Development Goals – the central objective of which is the improved health of mothers and children.

INTRODUCTION

At independence in 1957, Ghana was a prosperous country with the highest per capita income in west Africa. It provided 'free' medical services to all citizens. But by the early 1980s, difficult economic challenges, arising from state-owned enterprises, deteriorating health infrastructure and substantial emigration of health workers, forced the government to implement a *cash-and-carry system* to recover costs. This formed part of the IMF- and World Bank-sponsored 'structural adjustment programmes' – considered to be among the most extreme (see Mensah et al, 2006, and Saris and Shames, 1991)

The availability and use of health services plummeted. Faced with high treatment costs, many low-income households regularly postponed medical treatment, resorted to self-treatment or used alternatives provided by unregulated healers, spiritualists and drug vendors – often with disastrous results (Opong, 2001).

Maternal health improved between 2005 and 2006, but the number of recorded maternal deaths rose from 197 for every 100,000 live births in 2006 to 244 by 2007 (Ghana Ministry of Health, 2008). Antenatal care attendance among teenage mothers was 12% in 2007, down from 14% in 2005.

Ghana's maternal and infant healthcare varies widely by region and socio-economic group. While nearly 70% of women have at least four antenatal clinic visits, the effectiveness and quality of antenatal care varies according to their background. Giving birth at home is more likely in the poorest areas.

A pioneering scheme

As a response to deteriorating health outcomes, in 2003, the government of Ghana established the *National Health Insurance Scheme* following consultation with its health development partners, including the World Health Organization.

The scheme aims 'to ensure equitable universal access for all residents of Ghana to an acceptable quality of essential health services without out-of-pocket payment being required at the point of service use' (Ghana Ministry of Health, 2004). Eventually, the scheme is intended to replace the *cash-and-carry* system.

Insurance premiums are generally based on clients' ability to pay. Insurance committees categorise residents into four main social groups and vary their required contributions: the core poor or the indigent; the poor and very poor; the middle class; and the rich and very rich. The core poor and people who are over 70 years old and legitimately retired are exempt from paying premiums.

While premiums vary slightly across districts, generally members pay a minimum of US\$8 a year. For members in the formal sector, 2.5% of their monthly contribution to social security is taken as their

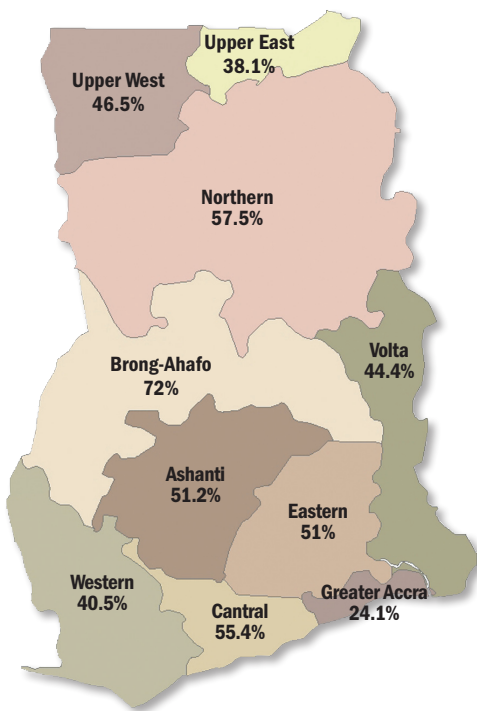
health insurance premium. The self-employed and people in the informal sector pay between US\$8 and US\$50 a year depending on their income. All contributors' premiums cover their children and dependents under the age of 18.

In 2004, the government introduced a 2.5% sales tax on selected goods and services to help fund the scheme, with the rest of the funding being covered by the government budget and donor contributions.

The benefits package covers 95% of common health problems in Ghana, including general outpatient and inpatient services, emergencies and maternity care. HIV antiretroviral therapy is not included.

By the end of 2007, the scheme had accredited 800 private healthcare providers in addition to government health facilities and 55% of the total national population had registered with the scheme.

FIGURE 1 Percent of Population Registered with NHIS, Ghana



Quality of care

The researchers use ‘propensity score matching’, a popular technique for evaluating social programmes, to establish the causal impact of the scheme on maternal health. A group of ‘treatment’ women – those who are insured – are matched with a ‘control’ group of women with similar characteristics, such as income and education, but who are not insured. The maternal health outcomes are then compared.

The researchers analyse a survey of 400 scheme members and 1,600 non-members. Survey respondents include women of childbearing age (between 18 and 49 years) from the Brong Ahafo and Upper East regions of Ghana (see Figure 1).

The results show that membership in the scheme increases the likelihood of a birth being attended by a trained professional by 7%. Women

with scheme membership also have more births in hospitals and receive more antenatal care than uninsured women. Women in the scheme have 4% fewer birth complications and 2% fewer infant deaths.

Women enrolled in the scheme have more preventive check-ups and visit hospitals’ outpatient departments more frequently. This could be why women in the scheme are less likely to be admitted to hospital for longer periods.

Cautious optimism

The scheme can be considered a success at achieving its stated aim of facilitating affordable access to healthcare. Better access, in turn, is likely to lead to better health outcomes.

Nevertheless, almost half of the population is still without the benefits of national health insurance. Increased efforts to expand membership are needed if this benefit is to cover all Ghanaians.

Since cost remains a major obstacle to enrolment, one way to extend coverage is be better at identifying the poor and core poor to provide exemptions from premiums. Another is to improve access to the health facilities, perhaps by increasing the number of centres in the more remote areas.

People who lack education are less likely to enrol. Information on the scheme should therefore be disseminated in ways that reach those with low education to ensure that these segments of the population are not excluded.

Clearly, health insurance alone will not improve healthcare. The healthcare system as a whole must be improved with reliable infrastructure, well-located healthcare facilities, efficient healthcare providers and a competent and accountable administration.

While it is difficult to generalise, studies suggest that the healthcare system in Ghana is similar to those in many other sub-Saharan African countries, including Cote d’Ivoire, Guinea, Kenya, Rwanda and Tanzania (see, for example, Mensah, 2006). How to extend the *National Health Insurance Scheme* to all Ghanaians without compromising the quality or access to care remains a challenge. But the scheme is certainly a step that other African countries should follow.

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Financing healthcare for the poor: an evaluation of the India's Yeshasvini community-based health insurance programme

Aradhna Aggarwal

KEY FINDINGS

The health insurance scheme in India has increased the use of healthcare.

It has also reduced out-of-pocket spending and ensured better health and economic outcomes.

The effects are strongest for health services directly covered by the programme.

The effects remain small for other services.

Insurance acts to reduce the price of healthcare but the secondary impact on income remains small.

The greatest impact on incomes is for the poorest.

Financial sustainability is a concern.

The fixed premium, high payout model with voluntary opt-in cannot continue without change. Nevertheless, community insurance presents a workable model for providing high-end services in resource-poor settings.

For more details on this study visit www.gdnet.org

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Community-based health insurance programmes have become commonplace in developing countries yet evidence of their effectiveness remains scarce. Most studies have focused on two outcomes: healthcare use; and financial protection. But a key question remains: what is the impact on the health and economic well-being of the poor communities in which they are often based?

Aradhna Aggarwal of the University of Delhi has examined the impact of *Yeshasvini Health Insurance*, a voluntary, non-profit scheme with three million members based in the south Indian state of Karnataka.

INTRODUCTION

Yeshasvini Health Insurance is a community programme primarily for cooperative rural workers in the Indian state of Karnataka. It is run as a tri-sector partnership between the public, private and cooperative sectors and governed by an independent trust.

Launched in June 2003, the scheme enrolled 1.6 million members in its first year, a number that has since swelled to three million. The programme offers free outpatient care and laboratory tests at discounted rates and, most importantly, it covers the costliest and most critical surgical procedures.

The annual premium is fixed at 120 rupees (US\$2.40) per person. The payouts are extremely generous, with maximum annual coverage per person of 200,000 rupees (US\$4,000) – nearly 13 times the average annual salary – as well as free outpatient care.

At the current level of premium, however, the programme is not financially sustainable. This is partly due to the high-end medical treatment it funds. But it is mainly due to the programme being voluntary and attracting members who are at high risk of extreme illness. Figures 1, 2 and 3 show that, along with enrolment, the claims ratio has increased – from 30% in 2003/04 to over 195% in 2007/08 – requiring an increased government subsidy to fill the gap.

FIGURE 1

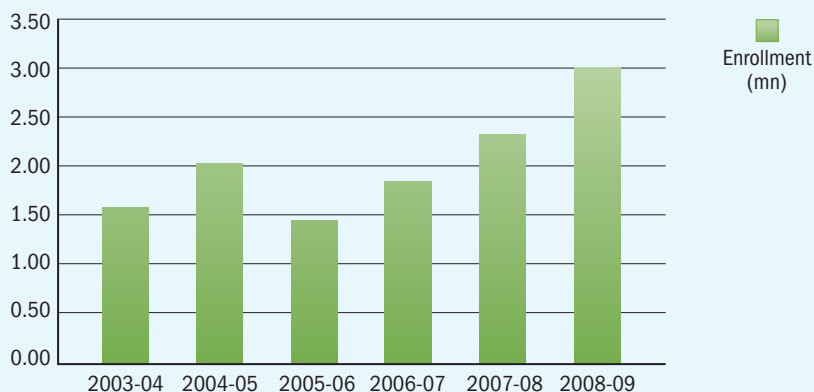


FIGURE 2

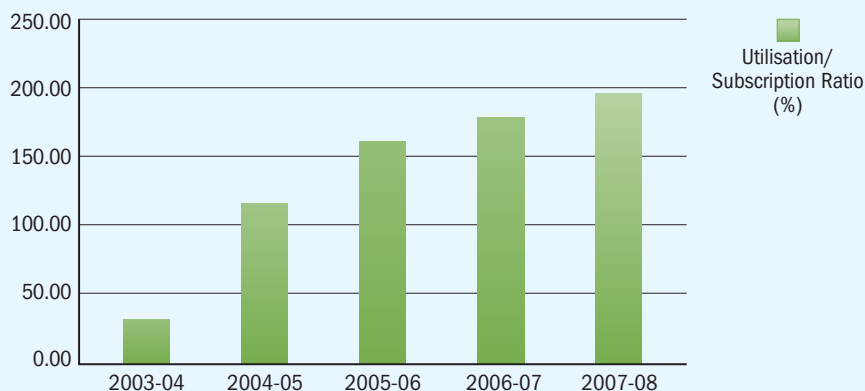
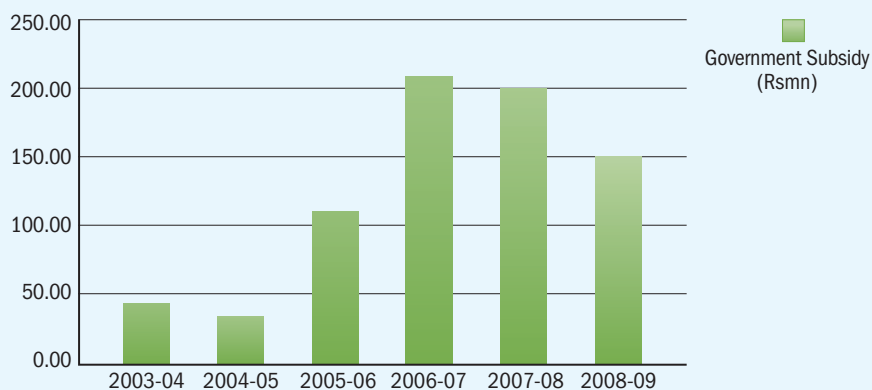


FIGURE 3



Healthcare use increases

Economic theory suggests that such a scheme will have two effects. The primary effect is to lower the price of healthcare – a price effect. The secondary effect is to increase members’ available income as they no longer need to save as much – an income effect.

The research analyses information from structured interviews with over 4,000 randomly selected households across 82 villages in Karnataka. A statistical technique called ‘propensity score matching’ is used to find a ‘control’ group of similar uninsured households, and thereby establish the causal effect of participation in the Yeshasvini scheme on healthcare outcomes.

As might be expected, health insurance increases the likelihood of undertaking surgery – one of the main benefits of the scheme. Since the programme began, there has been a rapid increase in the number of surgery cases: from around 9,000 in 2003/04 to well over 60,000 by 2007/08. Surgical interventions are extremely expensive, and the scheme therefore provides significant financial protection against health risks.

The number of consultations and visits to medical facilities when ill is 5% higher for insured cooperative members than it is for uninsured cooperative members. This effect is particularly strong for the poorest.

Membership also results in a 20% reduction in visits to government medical facilities despite the fact that such services are free of any charge. This may be a reflection of the poor services, absenteeism and corrupt practices often found in such facilities.

Using borrowing or sale of assets to meet medical payments as an indicator of financial desperation, health insurance causes significantly less indebtedness – particularly with surgical procedures that otherwise cause the worst impoverishment. Total borrowings are reduced by nearly a third and out-of-pocket expenditure by nearly a half compared with the uninsured.

Income effects remain small

Given that premiums are small and flat but payouts are large, the programme is expected to generate substantial income transfer effects – the difference between the payout and the premium (Nyman, 2001).

Economic theory suggests that this should result in increased healthcare use, not only of surgical processes but also of primary services as the members have a higher effective income. Consumption will be more stable and probably even higher, thereby improving the health of all household members. Both increased consumption and better health contribute to overall income. This in turn should have positive effects on savings.

The research finds some evidence in support of these hypotheses. There is a weakly significant difference in consumption and savings between insured and uninsured households. In general, income effects are larger for the poorest members.

Better treatment and economic outcomes

Increased access to healthcare services and financial protection should translate into better treatment outcomes, better health status and improved economic well-being (Grossman 1972). But there are concerns that the coverage of high-end services could result in the overuse of expensive surgery with little overall positive impact on health or wealth.

The evidence of this evaluation removes this concern. The price schedule of service providers is significantly below the market rate. Furthermore, tight monitoring and the possibility of punitive actions discourage over-prescription of healthcare services. Non-compliant hospitals are dropped from the scheme and never used again.

The satisfaction levels after treatment are around 6% higher for the insured, and more individuals feel that they can work regularly after the treatment. Considering that people in rural areas rely mainly on their own labour, serious income falls can

be prevented when people recover fully and quickly (Jütting, 2004).

An initiative worth exploring

Yeshasvini Health Insurance employs a chief executive, assisted by a coordinator and around ten staff. Hospitals cover the expense of extra hospital staff, facilities and a dedicated telephone line. The cost per member is as low as 3.82 rupees (US\$0.06). Better care, greater financial protection and better treatment results could be ensured at the cost of only 112 rupees (US\$2.24) per member per year.

Nationally, with over 70% of the Indian population excluded from high-quality treatment, it is difficult to achieve economies of scale in healthcare provision. This creates a vicious circle of high cost and non-accessibility of treatment. The access to high-end treatment provided by the Yeshasvini scheme provides an example of how a community-based health insurance programmes can break this vicious circle.

At the same time, however, the scheme cannot continue to offer such a comprehensive benefit package with voluntary participation and small contributions. While managers have tried to maintain low operational costs and a fixed surgery price schedule, these steps have created dissatisfaction among hospitals. There is a feeling that the fixed prices are inadequate and irrational: hospitals cannot cover the costs and do not have sufficient in-house resources.

Managers could boost available resources by introducing a sliding contribution scale rather than a flat rate premium. Family packages and additional health checks could also improve membership and collection of resources.

Membership could be made compulsory along the lines of social insurance. The vast cooperative infrastructure could be used to implement this social insurance within the healthcare sector. This would help to create a larger pool of resources, capable of offering an even better package of services.

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Raising school attendance and changing sexual behaviour: evidence from conditional cash transfer programmes in Malawi

Sarah Baird, Ephraim Chirwa, Craig McIntosh and Berk Özler

KEY FINDINGS

Participants in the Malawi programme who were school dropouts are four times more likely to return to school than comparable non-participants.

Those already in school are 35% less likely to leave.

Participants are less likely to get married.

They are also less likely to become sexually active and less likely to become pregnant.

Participants who had dropped out of school at the start of the programme are 40% less likely to get married and 30% less likely to start having children.

A good idea whose time has come.

In addition to the short-term benefits of the programme, increases in age at first marriage and first pregnancy, as well as improved education, may lead to better outcomes for the next generation.

[For more details on this study visit www.gdnet.org](http://www.gdnet.org)

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There is growing interest in programmes of ‘conditional cash transfers’, in which people are given money for taking part in socially desirable activities, such as going to school or participating in public health initiatives. At least 24 developing countries have such programmes in place, with many others planning to follow suit.

There is considerable evidence that these programmes have improved the lives of the poor – but only modest evidence of their impact on broader outcomes, such as education and employment (World Bank, 2009).

Sarah Baird of George Washington University, **Ephraim Chirwa** of the University of Malawi, **Craig McIntosh** of the University of California, San Diego and **Berk Özler** of the World Bank have gathered experimental evidence on a programme of cash transfers in Malawi, focusing particularly on the impact on school attendance and participants’ sexual behaviour.

INTRODUCTION

Malawi is a poor country even by Africa’s standards. The population of around 14 million has a per capita income of around \$750, which compares with an average of \$1,870 for sub-Saharan Africa. Malawi has the eighth highest concentration of HIV/AIDS in the world with 14% of the adult population infected. Young women aged between 15 and 24 who have HIV/AIDS outnumber infected men in the same age group by four to one.

The study focuses on the Zomba district, which has an HIV/AIDS rate of nearly 25%, the highest in Malawi. Households receive around \$10 each month conditional on the children attending school – this amounts to roughly 15% of total household consumption. On top of cash payments to the household, the programme pays fees directly to the secondary schools.

A social vaccine

Education has been called a ‘social vaccine’ for preventing the spread of HIV/AIDS. The simple act of attending school may be enough to change sexual behaviour – for example, by raising the opportunity cost of pregnancy (Jukes et al, 2008). But almost all evidence of this effect comes from cross-sectional studies where the causality is difficult to determine.

Between October 2007 and January 2008, the researchers surveyed 3,821 unmarried young women aged between 13 and 22 in 176 enumeration areas, the majority of whom were eligible to receive a diploma within two years. Around one quarter of these girls were school dropouts.

1,230 girls in 88 enumeration areas were then randomly selected from the sample to be part of the programme – the ‘treatment’ group. The remaining girls formed the ‘control’ group. Both groups of households received a questionnaire at the beginning and 12 months later to evaluate the programme’s impact.

As the girls were randomly selected to be in either group, this research provides the first experimental evidence of the impact of cash transfers on risky sexual behaviour in sub-Saharan Africa.

The impact on education

The short-run impact is on schooling. For those who were dropouts at the start of the programme, over 60% of the treatment group were in school at the end of the year compared with 17% for the control group, suggesting

that participants are nearly four times more likely to return to school than non-participants.

For the control group, 89% of schoolgirls were still enrolled in school at the end of the 2008 school year, compared with 93% in the treatment group. Thinking of these as dropout rates, the programme reduced the dropout rate by more than a third – from 11% to 7%.

Changes in sexual behaviour

The research also analyses self-reported sexual behaviour. For the dropouts, 16% got married during the year compared with 28% for the control group. Previous research has shown that early marriage increases sexual activity, significantly decreases condom use and virtually eliminates sexual abstinence, thus increasing the likelihood of sexually transmitted disease.

The cash transfers also delayed sexual activity, with dropouts being 47% less likely to start having sex and those who started the year at school being 33% less likely. The self reported number of sexual partners was 25% smaller for the programme beneficiaries regardless of whether they started the year in school.

Around one quarter of the dropouts and three quarters of the schoolgirls surveyed had never had sex. Of those who are sexually active, the questionnaire asked about frequency of sexual activity, having sex with older partners and condom use.

The results suggest that those in school at the baseline were significantly less

likely to have sex on a weekly basis but that there was no impact for dropouts. Similarly, the likelihood of having an older sexual partner was lower for baseline schoolgirls. In both groups, there was no effect on condom use.

But the group of sexually active respondents included those who might not have been sexually active had they participated in the programme. As a result, it is not possible to interpret these results as being caused exclusively by the programme.

Nevertheless, if those who would have stopped having sex as a result of the programme are also less likely to take sexual risks and if it were possible to remove these individuals from the sample, then the results would be comparing students who are likely to have sex regardless. This focus on sexually active students would probably suggest that the programme has an even stronger impact on reducing risky sexual behaviour, such as having several partners.

A good idea whose time has come

Cash transfers conditional on schooling for young women in poor countries with high rates of HIV/AIDS appear to be ‘win-win’. After just one year, the programme had not only increased schooling for young women, but also reduced early marriage, teenage pregnancy and sexual activity, thereby significantly lowering the risk of infection (see Table 1).

■ **TABLE 1** Overall impact of the programme on schoolgirls and dropouts together

% IMPACT OF PROGRAMME	Likelihood of being in school	Likelihood of having sex
	16.3%	-2.9%

This is potentially a very important impact for sub-Saharan Africa, where conditional cash transfer programmes are likely to become more common and where the risk of HIV/AIDS is disproportionately high among young women and schoolgirls.

In addition, increases in age at first marriage and pregnancy, as well as improved education, may lead to better outcomes for the next generation. Evidence points to negative outcomes for children from early marriages, such as higher child mortality and lower educational attainment (Morrison and Sabarwal, 2008).

While it cannot be assumed that changes in self-reported sexual behaviour will result in a decline in the prevalence of HIV/AIDS, the high infection rates among young people in sub-Saharan Africa and the burden this poses on these economies mean that the impact of a change in sexual behaviour should not be underestimated.

Future research should explore these longer-term effects. Meanwhile, this evidence provides impetus for the expansion of conditional cash transfer programmes – which already cover much of Latin America – to the African continent.

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Combating HIV/AIDS: experimental evidence from provider-initiated counselling and testing in Thailand

Yot Teerawattananon

KEY FINDINGS

Programmes of provider-initiated counselling and testing have the potential to reduce the burden of HIV/AIDS.

Provided awareness of HIV infection status can encourage good practice as well as facilitate better prevention, treatment and care, then such programmes can contribute towards the goal of halting and reversing the spread of the disease.

In Thailand, after the eight-week intervention period, the acceptance rate of free counselling and testing is nearly 24 times higher.

Programme hospitals detect an additional 12 HIV infections.

Due to better diagnosis, nearly two HIV infections are averted.

The programme is cost-effective and within the Thai government's guidelines.

The additional cost of the programme is less than US\$65,000. Dividing this by each HIV case detected gives a cost of around US\$5,000. Similarly, the cost for each HIV infection averted is over US\$35,000.

[For more details on this study visit www.gdnet.org](http://www.gdnet.org)

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Across the world's low- and middle-income countries, nearly 70,000 people become infected with HIV and more than 5,700 people die from AIDS every day – mostly because of inadequate access to prevention and treatment services. Combating HIV/AIDS and other diseases is one of the eight Millennium Development Goals. The first specific target of the sixth goal is to halt by 2015 and begin to reverse the spread of HIV/AIDS.

Efforts to achieve this objective include 'provider-initiated counselling and testing', whereby HIV/AIDS services are provided free-of-charge to the whole population without needing to see a doctor – as recommended by the World Health Organization (WHO) and UNAIDS (WHO/UNAIDS 2000).

To date, there has been little evidence of the effectiveness of such interventions in settings with HIV epidemics. **Yot Teerawattananon** and colleagues at the Health Intervention and Technology Assessment programme have evaluated provider-initiated counselling and testing in Thailand.

INTRODUCTION

Thailand's HIV/AIDS epidemic began in the late 1980s and peaked in the mid-1990s. Since then, the number of people living with HIV/AIDS has continually declined as a consequence of effective prevention programmes, in particular 100% condom use, with intensive education and information campaigns (UNDP Thailand, 2004).

Despite this, an estimated one million Thai people became infected with HIV in 2007, and accumulated AIDS deaths amounted to 600,000 (Thai Working Group on HIV/AIDS Projections, 2001).

Recent surveys of sexual behaviour and risk of HIV infection indicate a lack of knowledge about HIV prevention and an increasing trend of unsafe sex practices among secondary school and vocational students.

To counter this epidemic, Thailand has adopted a comprehensive HIV/AIDS strategy. A voluntary counselling and testing service was first provided in Thailand in 1991 and is now available in 1,000 hospitals and clinics. The service is free-of-charge if prescribed by a doctor but costs up to US\$10 otherwise. From October 2007 to March 2008, over 80,000 visits were made with over 11% of people found to be HIV-positive.

But the programme is held back by a shortage of human resources, inadequate training of staff and the lack of referral for psychological support (WHO SEARO, 2005).

Provider-initiated service

This programme is an experiment of *provider-initiated* counselling and testing. All patients are offered free HIV tests and counselling as before but without the need for a doctor's prescription. The aim is to increase the availability and acceptance of HIV treatment as well as detecting unsuspected cases.

Invitation cards are presented at the reception of hospitals to each patient aged between 13 and 64. The cards have the words: 'the hospital is now conducting a study that offers free counselling and HIV testing and this card can be used as a coupon for getting a free HIV test.'

Hospital outpatient departments also have a seven-minute promotional TV programme as patients wait to see the doctor. This TV programme is designed to represent 'pre-test HIV counselling', such as basic information about HIV/AIDS and its routes of transmission, the clinical and prevention benefits of testing, information about the confidentiality of the test and potential treatment.

In addition, each hospital has a specialised nurse for the project, helping patients to clarify issues related to HIV/AIDS, HIV testing and the study project.

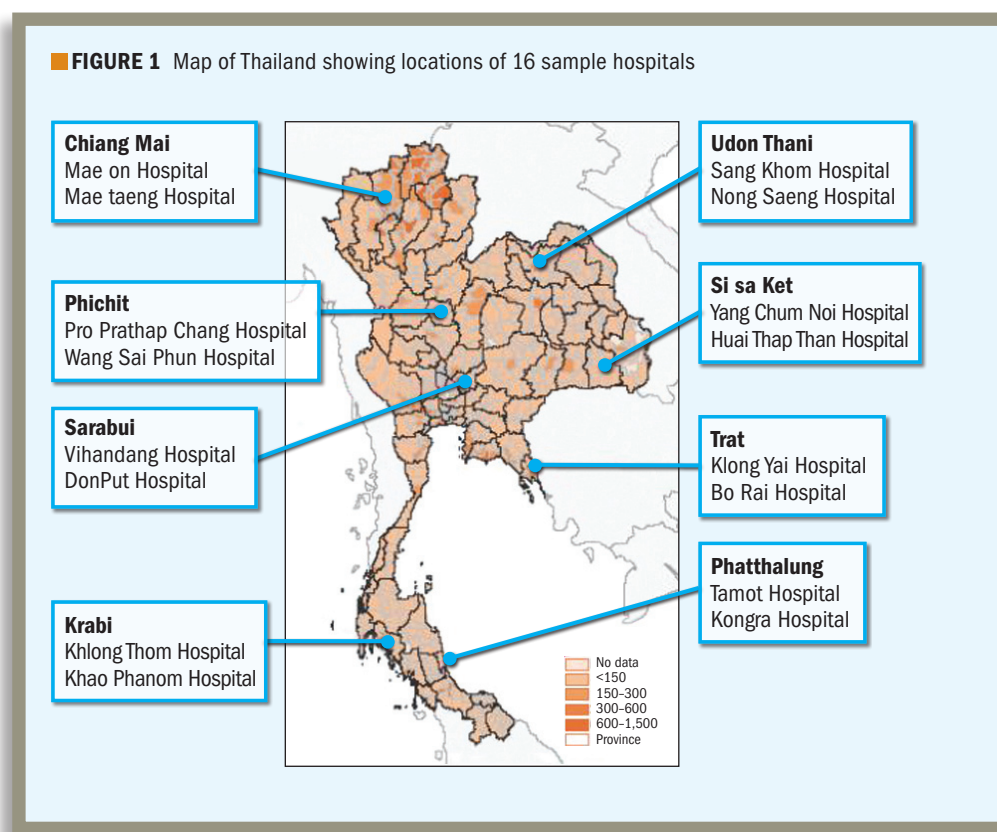
After seeing the doctor, those patients who wish to get tested can present the invitation card to receive a free test. Following a blood sample, the patient is asked to return for individual post-test counselling within two weeks. Patients with a positive test result are then referred to HIV clinics, where routine investigation, prophylaxis and

treatment medications are provided for free to all people living with HIV/AIDS in Thailand.

Experimental evidence

The research analyses the results of a survey of patients in 16 hospitals conducted between August and November 2007 (see Figure 1). Eight of the

■ **FIGURE 1** Map of Thailand showing locations of 16 sample hospitals



hospitals were randomly chosen to receive the 'treatment' of belonging to the programme and the remaining eight formed a 'control' group.

Patients from both groups were asked to provide individual information anonymously, such as age, sex, education, occupation and HIV risk behaviours. One patient for every ten taking the test was also surveyed at random.

The first eight weeks of the survey took place before the intervention, thus providing further 'control' data to compare the outcomes before and after the programme. This research method provided over 45,000 'treatment' patients to be compared with over 37,000 'control' patients.

The results show that programme hospitals significantly increased the number of patients who accept the offer of free counselling and a test. Patients in a programme hospital were nearly 24 times more likely to take the HIV test. The acceptance rate was even greater in areas with high HIV prevalence.

The detection rate was also significantly higher among the programme hospitals, particularly in high-risk areas. Programme hospitals detect an additional 12 HIV infections.

A cost-effective programme

The costs of the intervention include capital, labour and materials for offering the service, pre- and post-test counselling and HIV testing. The costs of antiretroviral treatment is not included as the majority of cases detected were without symptoms. The programme hospital costs were nearly three times higher than control hospitals.

The benefits of the intervention include new HIV infections detected as well as HIV infections avoided. The first outcome comes from the study while HIV infections averted are estimated using a disease model (Pinkerton et al, 1998). The model predicts the cumulative probability that an uninfected individual with known sexual behaviour will become infected. This suggests that the programme hospitals result in nearly two fewer HIV infections.

The additional cost of offering provider-initiated counselling and testing as compared with standard voluntary counselling is under US\$65,000 per hospital. Dividing this by each HIV case detected gives a cost of around US\$5,000. Similarly, the cost for every HIV infection averted is over US\$35,000. Both these are in line with the Thai government's guidelines on cost-effectiveness.

Extension underway

The research only measures the immediate effects of the acceptance of HIV testing and the testing results. A longer-term evaluation, which examines such health outcomes as longer survival and better quality of life, could bring more policy implications.

Nevertheless, as a result of the project's success, the programme is being extended. Bangkok adopted a slight variation of this policy in August 2008 to serve a population of around 12 million. The government is planning to implement the scheme across the country.

If awareness of HIV infection status can encourage good practice to reduce risk behaviours in both

infected and uninfected people, and also facilitate an earlier uptake of an appropriate prevention, treatment and care, then these findings suggest that provider-initiated counselling and testing has the potential to reduce the burden of HIV/AIDS. It can be used to speed up progress towards the Millennium Development Goal of combating HIV/AIDS, which has faltered in many settings in Asia and sub-Saharan Africa.

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Improving children's health: experimental evidence from Colombia's use of alcohol-based hand sanitizers

Juan Correa, Diana Pinto, Juan Camacho, Juliana Quintero, Martín Rondón and Lucas Salas

KEY FINDINGS

The introduction of hand sanitizers led to cases of acute diarrhoea being cut by nearly one half in nine months. The effect of the programme after six months was a cut of over 35%.

Acute respiratory infection was reduced by almost one third in nine months. The effect of the programme after six months was a cut of just under 20%.

Hand sanitizers provide a transitory solution before water and sanitation infrastructure become available. Sanitizers can also be helpful in areas where handwashing with soap and water is uncommon despite available facilities.

Hand sanitizers can contribute to reducing child mortality rates.

For more details on this study visit www.gdnet.org

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Two of the leading contributors to child mortality in the developing world are acute diarrhoea and acute respiratory infection (WHO, 2007). Handwashing with soap and water is the key defence against these infections. But many people live in places where water is scarce and that scarcity is expected to increase (Bloomfield et al, 2007, and WHO, 2006).

Identifying hand-hygiene alternatives for these places is therefore a priority. **Juan Correa, Juan Camacho, Juliana Quintero** and **Lucas Salas** of Fundación Santa Fe de Bogotá and **Diana Pinto** and **Martín Rondón** of Pontificia Universidad Javeriana have investigated the use of alcohol-based hand sanitizers on the incidence of diarrhoea and respiratory infection in children under the age of five in Colombia.

INTRODUCTION

Between April and December 2008, the researchers conducted a randomised trial of alcohol-based hand sanitizer gel in childcare centres in six urban settings. Centres licensed to care for 12 or more children aged under five, for eight hours a day, five times a week, with limited tap water availability, were randomly selected. All childcare staff and teachers were then invited to attend a workshop that provided training in hand hygiene.

The centres included 'community homes', where caregivers trained in basic childcare take a maximum of 14 children into their own homes, which have a bathroom but some of which do not have hand sinks. The centres also included pre-schools, which have up to eight age-specific classrooms and usually one or more bathrooms with hand sinks – though sometimes not working – and where the teachers have formal training.

The centres were provided with hand sanitizers with 62% ethyl alcohol as the active ingredient. One dispenser was installed in each centre with fewer than 14 children. In centres with more than 28 children, one dispenser was installed for every classroom with an additional dispenser for common areas. Safety conditions and proper use of each dispenser were monitored periodically. Monthly half-hour refresher workshops were provided to the assigned centres.

A randomly selected 'control' group did not receive the sanitizers or any hand-hygiene recommendations other than to continue current practices. The use of a randomised trial makes it possible to establish the causal impact of the programme.

Diagnosing the effects

The researchers use case definitions based on those in previous studies as well as the opinions of experts in paediatrics and epidemiology. Teachers in both the 'treatment' and control groups received training in diagnosis before the trial. If a child was absent, the parents were asked for signs and symptoms of diarrhoea or respiratory infection.

To avoid the possibility of interference with the results, the teachers completed a check-list of symptoms and the criteria for both diseases were kept secret. All completed check-lists were reviewed by the project coordinator – an independent trained physician – who decided if the information met the criteria for a case. Any doubts were clarified with teachers and, if necessary, children were examined.

In January 2008, 42 centres with around 1,700 children were randomly selected for the trial. Eligible children were between one and five years old with no health conditions likely to affect the chances of contracting an infectious disease.

The programme was applied in 21 of the centres and involved 800 children

who used the gel as a complement for handwashing. The control group was made up of the remaining 21 schools and around 900 children who continued previous hygiene standards. Health outcomes in the two groups were compared after three, six and nine months.

Effects increase over time

The research provides the first experimental evidence that alcohol-based sanitizers can reduce diarrhoea and respiratory infection in childcare settings in developing countries.

For both diseases, the researchers find no difference in the risks between the treatment and control groups during the first three months of the trial. But after six and nine months, there is a significant effect in the treatment group: acute diarrhoea is reduced by 36.5% after six months and by 49.8% after nine months. Acute respiratory infection is cut by 18.3% after six months and 29.4% after nine months.

These results are in line with studies in more affluent countries. In addition, no adverse outcomes are reported, suggesting positive longer-term effects in reducing child mortality.

Favourable international comparison

Most programme childcare centres substituted alcohol-based sanitizers for handwashing with water and soap and the frequency of use was equal to or greater than handwashing in control centres. As a result, these findings are comparable with randomised trials of handwashing interventions in other countries.

Evidence from developed and developing countries suggests that handwashing reduces diarrhoea by about 30% (Ejemot et al, 2008). Other reviews also find a protective effect on respiratory infections of handwashing combined with hand-hygiene education, although the impact is far less significant (Aiello et al, 2008).

Three reasons for increasing effects over time

First, surveys of teachers suggest that the programme followed a learning curve, and there was a lag before teachers felt confident using the gel as recommended. This is confirmed by a rising trend in the number of gel washes per child from the beginning to the end of the trial (see Figure 1).

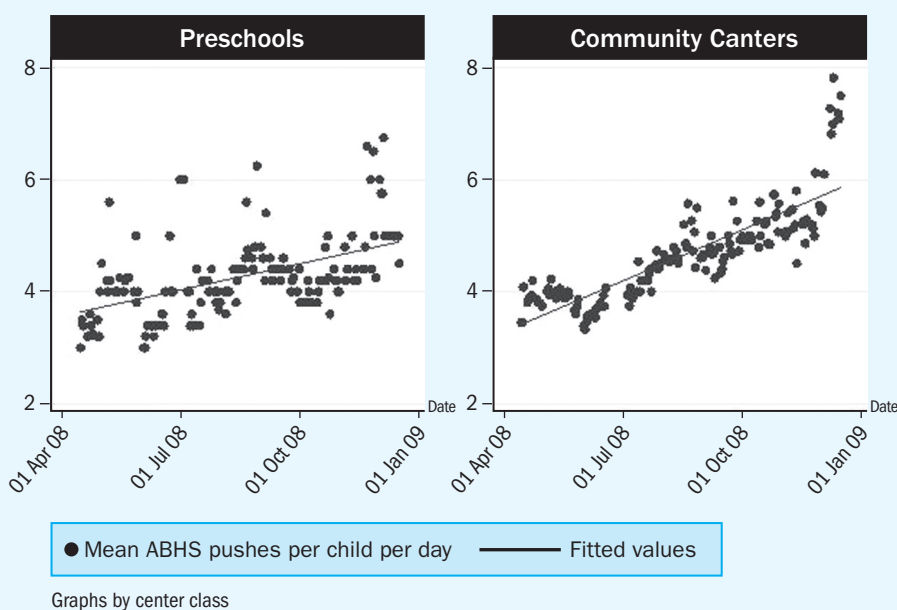
Second, the increased 'doses' of alcohol-based sanitizers are likely to have had an increasing effect in reducing

diarrhoea and respiratory infections (Sandora et al, 2005).

Third, there were seasonal peaks in both illnesses in the third three-month period. This could mean that

the programme centres experienced an even larger effect by avoiding these outbreaks (Secretaría Distrital de Salud, 2009).

FIGURE 1 Trend in average use of alcohol-based hand sanitizers (ABHS) per child per day, pre-schools and community centres



Study limitations

This study only observes signs and symptoms rather than microbiological assessments. Sanitizers may not therefore have the same impact in countries with different pathogens responsible for the diseases.

In addition, the effectiveness might not be replicated in a larger-scale application. Compliance in this trial might have been artificially high as a result of intense follow-up and monitoring as well as guaranteed availability of the gel.

A trial to be extended

Despite the limitations of the study, alcohol-based sanitizers seem to offer a transitory solution before water and sanitation infrastructure become more widely available.

Promotion of handwashing continues to be vital for preventing infectious disease. The procedure is simple and the rationale well understood. But

ensuring its adoption and compliance can be complex, and may need to be tailored to different target populations. Even in places where handwashing with soap and water is available, alcohol-based sanitizers can therefore offer an alternative solution.

Teachers report that they are very satisfied with the sanitizers. This suggests that there may be a further advantage over handwashing with soap and water by being easier to implement in schools.

Further research on the factors that influence the adoption of hand-hygiene procedures in different settings and the cost-effectiveness of such procedures is needed. But this research suggests that national public health policies for the prevention of diarrhoea and respiratory infection should seriously consider the use of alcohol-based sanitizers.

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Combating malaria: evidence from a school-based treatment programme in Malawi

Bertha Nhlema Simwaka, Kisukyabo Simwaka and George Bello

KEY FINDINGS

Malawi's malaria treatment programme has reduced school 'sick days' by 29%.

The number of pupils who need to repeat a year's schooling has been reduced by 51%.

Drop-out rates are 39% lower.

The programme restricts growth in mortality rates.

But there is no evidence to evaluate if the programme reduces malaria-related deaths.

The programme can help reduce the burden of pupils repeating a year's schooling across sub-Saharan Africa.

The programme's net benefit per pupil is US\$7.86; the long-run benefits are likely to be considerably larger.

[For more details on this study visit www.gdnet.org](http://www.gdnet.org)

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One target of the Millennium Development Goals is to reduce the rates of illness and death associated with malaria. The World Health Organization (WHO) estimates that at least 40% of the world population is at risk of malaria – a disease that kills one child every 30 seconds. The economic impact is considerable. Malaria is estimated to reduce gross national product by up to 2%. The disease costs Africa about US\$12 billion every year.

In an effort to tackle malaria, *Save the Children* has piloted a school-based treatment programme in the Mangochi district of Malawi. **Bertha Nhlema Simwaka** of the Malaria Control and Evaluation Partnership, **Kisukyabo Simwaka** of the University of Kwazulu Natal and **George Bello** of the Community Health Sciences Unit, Malawi have evaluated the effect on school attendance, school performance and mortality.

INTRODUCTION

Malaria accounts for 40% of outpatient visits in the Mangochi district of Malawi and 18% of all hospital deaths. The disease is a major cause of anaemia in children under the age of five, which in turn is responsible for 40% of all hospitalisations of children under five. Mangochi district experiences year-round malaria transmission, which increases the vulnerability of pupils to malaria and the risk of school absenteeism and school drop-outs (Bruce et al, 2008).

To address these challenges, *Save the Children*, a US-based non-governmental organisation, ran a school-based malaria treatment programme between 2000 and 2006. The programme's aim was to decrease malaria mortality rates and enhance positive school outcomes for pupils.

Time-saving treatment

The programme covered 101 of the 242 primary schools in Mangochi district, a pupil population of over 90,000, which is about half of the total pupil population in the district. The programme assigned two or three teachers from each school to receive three days training in how to use the malaria treatment kits.

Teachers were instructed in diagnosis, and given a manual and a flow chart of signs and symptoms to help them decide what treatment should be given and when a child should be referred to the health centre. The teachers detected malaria cases and provided age-appropriate doses of *sulfadoxine-pyrimethamine* tablets and paracetamol to the pupil at school and extra doses of paracetamol to be taken at home.

The medication was given free of charge – as in most public health facilities in Malawi. The main advantage that the ‘treatment’ pupils in the programme had over the ‘control’

school pupils was their access to the treatment within schools, thereby removing the need to travel long distances to health facilities.

Sick pupils were monitored by the teachers and if there was no improvement within 48 hours, the pupil was referred to the local health centre. Pupils received treatment kits, which include tetracycline (for eye infections) and iodine and dressings for minor cuts and wounds.

The pupils’ treatment kits cost around \$40 per school. *Save the Children* covered 90% of the cost of the first kit, while parents and communities paid the remaining 10% and an increasing percentage for additional kits. By the end of the programme, the communities were fully supporting the cost of the intervention.

One-day training for school health committees was provided to help them understand, support and sustain the project within the community.

Knock-on effects

There is strong evidence that limited access to health services, such as treatment for malaria, leads to increased absences and low performance at school (see, for example, Brooker et al, 2008, and Fernando et al, 2003). Malaria, particularly cerebral malaria, can also damage children’s intellectual development.

The researchers use school administrative records between 2000 and 2006 to compare the outcome of treatment schools, which belonged to the programme, with similar control schools that did not. Similar schools are found using ‘propensity score matching’, a popular technique for evaluating social and labour market reforms. After matching the schools, 422 pupils from over 60 treatment schools are compared with 229 pupils from 30 control schools.

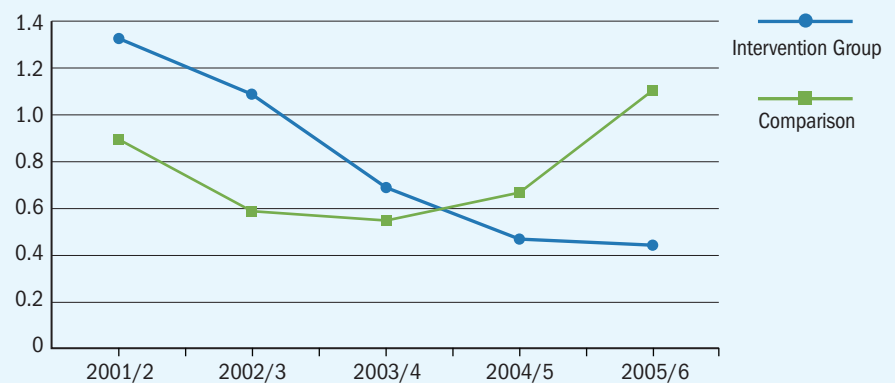
Strong performance

The research finds that the programme reduced school reported ‘sick days’ by 29%. Absence due to other causes was reduced by between 12%. The intervention reduced total absence by 5% (see Figures 1 and 2).

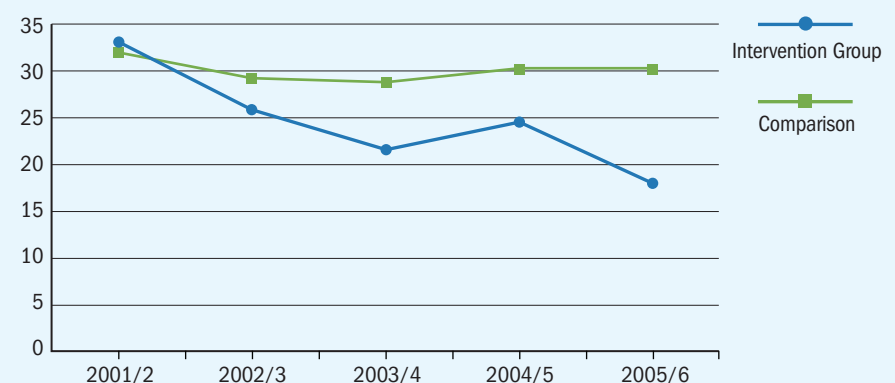
The programme also reduced ‘grade repetition’, with 51% fewer pupils forced to repeat a year’s schooling due to low grades. The proportion of pupils who dropped out was also up to 39% lower.

The research also examines the impact on mortality (see Pasha et al, 2003). The number of deaths in each group of schools showed no difference at the beginning of the sample in 2000. By 2006, mortality had risen in both sets of schools, but the programme schools had a lower mortality at 0.5 deaths per 1,000 pupils per year compared with 1.1 for the control group (see Figure 3). The reason for this is unclear.

■ FIGURE 1 Trends in reported pupil sickness



■ FIGURE 2 Trends in pupil absence



A cost-effective solution

Using a cost-benefit analysis, the research compares the administrative cost of the programme with the benefits of averting grade repetition. The total cost of the intervention is over US\$35,000 per year, of which the cost of teacher and committee training accounts for the largest portion and kits contribute roughly 10%. For a total pupil population of 91,284 pupils, the average cost of the programme per pupil is US\$0.40.

Benefits are calculated as the saved costs from pupils not repeating a year. The average cost of a primary school pupil in Malawi is US\$14 per year. Using these results, the total benefit of the programme is just under US\$3,500 for a total of 422 pupils in the programme schools. The average benefit per pupil is therefore US\$8.26, resulting in a net benefit of US\$7.86.

Long-run benefits

The cost-benefit analysis does not consider the long-run returns on

investment in the education system. It is estimated that grade repetition is as high as 25% in some countries (World Bank, 2004) and studies in Africa have shown that governments are needlessly spending vast resources on grade repetition.

For example, in 1998, nearly 40% of all resources were being lost due to repetition and school dropout in French-speaking Africa, and one quarter of resources were lost in English-speaking Africa. According to World Bank estimates, a reduction of 1% in repetition in sub-Saharan countries would lead to savings of up to US\$300,000.

Education also has wider benefits for the economy. Households with adults with primary and secondary education have higher incomes in Malawi and other sub-Saharan countries.

The programme has clearly been successful at reducing absence from school and grade repetition.

The policy ended in 2006 and the Malawi government has changed its treatment policy for malaria, with the introduction of *artemisinin*-based combined therapy. These new drugs are relatively more expensive and therefore further research is needed to evaluate the cost-effectiveness of this new programme and to see if lessons from the *Save the Children* pilot can be applied.

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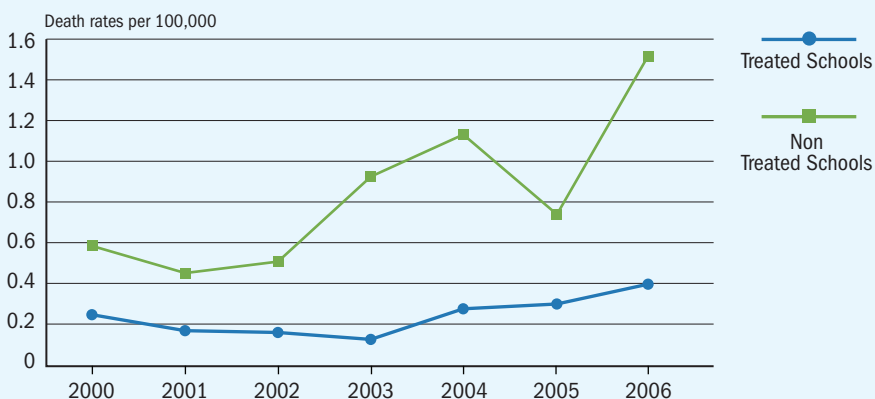
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■ FIGURE 3 Trends in mortality rates per 1,000 pupils per year





Combating malaria: evidence from the provision of free anti-malarial drugs to remote regions in Kenya

Jacob Oduor, Anne Kamau and Evan Mathenge

KEY FINDINGS

Easy access to free anti-malarial drugs is essential.

The incidence of malaria is reduced by 6% if patients do not have to walk further than five kilometres to the nearest outlet.

Kenya's programme to combat malaria has had significant 'spillover' effects.

The incidence of malaria is reduced by up to 5.5% in locations neighbouring those in the programme.

But the programme appears to have very little impact on malaria-related mortality.

This may be a result of problems with the data.

The programme contributes towards achieving several of the Millennium Development Goals.

With a lower threat of malaria – particularly for women and children – a healthier workforce can reduce poverty and healthier children can attend school.

For more details on this study visit www.gdnet.org

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One target of the Millennium Development Goals is to reduce the rates of illness and death associated with malaria. The World Health Organization (WHO) estimates that at least 40% of the world population is at risk of malaria – a disease that kills one child every 30 seconds.

Up to 500 million clinical cases of malaria are believed to occur every year, with over 60% of cases and around 90% of deaths occurring in sub-Saharan Africa. This amounts to nearly one million deaths. Malaria is estimated to account for about 20% of all childhood deaths (WHO, 2006).

In response to this threat, the Kenyan government and the Sustainable Healthstore Foundation have launched a programme to provide free anti-malarial drugs to remote regions. **Jacob Oduor** of Kenyatta University and **Anne Kamau** of the Kenya Institute for Public Policy Research and Analysis and **Evan Mathenge** of the Kenya Medical Research Institute have investigated the impact on illness and deaths caused by malaria.

INTRODUCTION

It is estimated that the entire population of Kenya is at risk of malaria. One in six (16%) people are estimated to be at negligible risk, 30% at epidemic risk and 54% at endemic risk. More than one in four deaths in the country are malaria-related, while reports suggest that nearly two thirds of inpatients are suffering from malaria (MOH, 2001, WHO, 2008).

Despite this recognition of the threat, access to timely and effective anti-malarial medicines among the rural poor remains low. Barely half of the cases receive appropriate anti-malarial drugs from formal health facilities (WHO, 2006). Kenya's Ministry of Health estimates that for many districts, only about 2% of children with malaria receive the correct treatment within 24 hours of the onset of fever.

Distributing anti-malarial drugs

In response to this crisis, the Kenyan government has set up a micro-franchise scheme to provide the anti-malarial drug *Coartem*TM free of charge to the remote rural poor. The programme was launched in 2005, in partnership with a local non-governmental organisation, the Sustainable Healthstore Foundation.

The foundation distributes the medicine to the rural poor through small,

privately-owned stores branded as *Child and Family Wellness* shops. These are located deep in the rural villages where there are no public health facilities.

The franchise agreement binds the shop owners to adhere to good practice in diagnosing malaria, dispensing medicine and keeping accurate records. The medicine must be distributed by a trained and registered nurse, often an employee of the shop owner.

The shops generally offer better service than public hospitals. There are none of the long queues so common in government clinics and which can easily discourage sick patients from attending. The shops also offer a personalised service and advice to patients in their local languages – beyond the English and Kiswahili spoken in public hospitals.

Positive results

The researchers analyse data collected between 2004 and 2007 from 371 ‘sub-locations’ – the country’s smallest administrative level – in the Kirinyaga, Embu, Mbeere, Thika and Nairobi districts of central Kenya.

The research uses a technique called ‘difference-in-difference’ to compare illnesses and deaths caused by malaria in locations that benefited from the programme – the ‘treatment’ group – with those that did not benefit – the ‘control’ group.

The research uses several conditional definitions of treatment: if there is an outlet within five kilometres; if there is an outlet within 10 kilometres; if there is an outlet within five kilometres or in a neighbouring sub-location; and if there is an outlet within five kilometres or within the sub-location, *including* outlets without free anti-malarial drugs.

The results show that the incidence of malaria falls by 6% on average for each sub-location within five kilometres of the nearest outlet providing free *Coartem*TM. The effect is smaller when the patients have to walk up to 10 kilometres to access the drugs. Malaria falls by only 3% when including households further away from the outlets.

The impact of distance is not surprising. The survey indicates that 94% of patients or carers are willing to walk for up to 30 minutes – a distance of roughly 3.5 kilometres – to access the

free drugs. But only 1% of care-givers are willing to walk for up to two hours – a distance of around 11 kilometres.

The results also show that the programme has a ‘spillover’ effect on neighbouring sub-locations. When every individual within a sub-location is within five kilometres of an outlet, or if this is the case for the neighbouring sub-location, the incidence of malaria drops by 5.5% (see Table 1).

The findings show that the existence of the outlets – even without the free anti-malarial drugs – has reduced malaria morbidity in the areas where the shops are located. In areas where there is an outlet with or without free anti-malarial drugs, the incidence rate is reduced by 3.9%.

This suggests that even if the government stopped providing the free anti-malarial drugs, the outlets are still important in reducing malaria and that the construction of more outlets should be encouraged. Nev-

ertheless, outlets alone are not as effective as outlets with the free drugs.

The impact of the programme on malaria mortality appears to be insignificant. This could be due to mortality being an infrequent event. Or it could be because of the poor quality of the facility-based mortality data. It is common in the rural areas to bury the dead without establishing the cause of death, especially for deaths in the house. In this case, a reduction in mortality cases would not be captured if the deaths are not reported.

TABLE 1 Effect of the programme on different catchment areas

EFFECT ON INCIDENCE OF MALARIA	Outlet within 5km	Outlet within 10km	Outlet within 5km or neighbouring sub-location	Outlet within 5km or within the sub-location including outlets without free anti-malarial drugs
	6.0%	3.0%	5.5%	3.9%

Three long-run contributions to the Millennium Development Goals

First, young children and pregnant mothers are at the greatest risk of contracting malaria. So if access to effective anti-malarial drugs to this vulnerable group is enhanced, there will be a reduction in child mortality and improved maternal health – the central objectives of the fourth and fifth Millennium Development Goals.

Second, the reduction of the burden of malaria across the population will result in a healthier workforce and help to foster national development. This in turn will help to achieve the first of the Millennium Development Goals – to mitigate extreme poverty and hunger.

Third, repeated attacks from malaria among children results in cognitive impairment, low concentration and absence from school. Reversing this trend by improving access to effective anti-malarial drugs is an effective way to contribute to the second Millennium Development Goal of universal primary education.

This programme is unique in its main objective of increasing access to anti-malarial drugs free of charge. The programme has clearly succeeded in this aim and is therefore a policy model for the distribution of other essential drugs and for replication in other countries. Policy-makers should aim to improve the model by providing more outlets nearer to vulnerable population groups.

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Improving reproductive healthcare: an evaluation of the Sisterhood programme in Vietnam

Anh Ngo, Ha Phan, Van Pham, Thang Trinh and Khoa Truong

KEY FINDINGS

Health centres that are members of Vietnam's Sisterhood programme have seen improvements in perceptions of service quality among their local communities.

Client satisfaction has risen.

Clients are more likely to return and recommend the services to others.

Social franchising provides a feasible business model for improving perceptions of service quality.

Social franchises should aim to improve the expertise and attitudes of healthcare staff.

Efforts should be made to ensure that the community is aware of these changes.

For more details on this study visit www.gdnet.org

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'Social franchising' is an application of the idea of commercial franchising to achieve social goals, such as improved public services in developing countries. In healthcare, it might involve some or all services within a local health centre (the franchisee) being required to provide a standard level of care at costs defined by the franchiser – typically a government body or non-governmental organisation.

As part of its national strategy to promote reproductive health, Vietnam has adopted a social franchise scheme called the *Sisterhood* programme. **Anh Ngo** of the University of Queensland, **Ha Phan, Van Pham** and **Thang Trinh** of the Centre for Promotion of Advancement of Society and **Khoa Truong** of the Hanoi School of Public Health have examined the programme's impact on perceptions of reproductive health in communities in central Vietnam.

INTRODUCTION

Healthcare reforms in Vietnam began in 1989, just three years after the country's transformation from a planned to a market economy. Since then, the government has allowed private healthcare practices, including commercial supplies of pharmaceuticals and fees for certain healthcare services.

The basic units in Vietnam's healthcare system are called 'commune health stations'. They are responsible for providing primary care, including reproductive health and family planning services, to local people. The services are subsidised by the government, and people are entitled to free services at their local health station but not in other communes.

The longstanding perception of healthcare in Vietnam is one of 'asking-for and giving'. As healthcare is a public service, it is considered a 'favour' by the receiving patient. Healthcare staff believe that their responsibility is only to fulfil the government quota for the services they provide, regardless of patient satisfaction.

As a result, there has been an increasing trend of patients seeking healthcare at private clinics or bypassing commune health stations to go to district or provincial hospitals (Khe et al, 2002).

Despite making significant headway in preventive and curative healthcare compared with similar developing countries, Vietnam has a shortage of reproductive healthcare and family planning services.

A government social franchise

In 2006, the *Government Social Franchise* was set up to alleviate unmet demand for high-quality reproductive health services. The model assigns the role of franchiser to provincial departments of health while commune health stations act as franchisees.

The departments of health invited 38 commune health stations from two provinces to be part of the franchise. All invited stations were required to reach a pre-defined standard of facilities, to complete social marketing training and to adopt a programme of service quality evaluation. Their doctors and midwives also received specialised training in care quality and clinical skills.

The franchise was formally launched in July 2007 under the brand name *Sisterhood (Tinh Chi Em)*. As part of the shared values of the franchise, each health station was instructed to have a 'branded room' as a physical representation of the brand promise and key values – a comfortable place where clients would be respected and treated with understanding.

The branded room is considered critical. In Vietnam, a couple's decision to use reproductive health services often depends on agreement between partners, and familiarity with the brand is vital for both partners to become comfortable with the programme.

Abortion rates in Vietnam are as high as 40%, and few pregnant women receive antenatal care or deliveries attended by healthcare professionals. The service quality at commune health stations is perceived to be low and associated with unqualified staff, outdated equipment and limited drugs and supplies (MOH and WHO, 2007).

■ **TABLE 1** Questionnaire on service quality and client satisfaction. Responses given in Likert scales.

GENERAL PERCEPTIONS:
1 Evaluate the overall quality of the reproductive health and family planning services provided by your local commune health station based on your own experience and/or on what you heard from others.
2 Evaluate the service providers' expertise at your local commune health station based on your own experience and/or on what you heard from others.
EXPERTISE:
1 Commune health station staff were very ignorant/very knowledgeable about reproductive health and family planning.
2 The advice from commune health station staff was not trustworthy at all/very trustworthy.
ATTITUDES:
1 Staff at commune health stations were very unwilling/very willing to help whenever you visited commune health station.
2 Commune health station healthcare staff did not care at all/care a lot about you at your visit.
3 Commune health station healthcare staff treated you with a lot of disrespect/a lot of respect whenever you visited.
COMMUNE HEALTH STATION CLINIC:
1 Overall, the commune health station clinic facilities were very dirty/very clean.
2 Equipment used by the commune health station clinic was very dirty/very clean.
CLIENT SATISFACTION:
1 Were you satisfied with types of reproductive health and family planning services provided?
2 Were you satisfied with the support given while receiving reproductive health and family planning services?
3 Overall, were you satisfied with commune health station reproductive health and family planning services?
LIKELINESS TO RETURN/RECOMMEND OTHERS:
1 How likely would you be to return to the commune health station for reproductive health and family planning services?
2 How likely are you to recommend commune health station to others?

Quasi-experimental evidence

Theory suggests that joining a franchise will improve clients' perceptions of quality, their satisfaction and the likelihood that they will return and recommend franchised outlets to others (see, for example, Stephenson et al, 2004).

To establish whether this works in practice, the researchers investigate the programme's effect using a matched 'control' group of 38 stations in two neighbouring provinces. Matching is based on four criteria: the availability of a medical doctor; whether the station is urban or rural; whether there has been a recent physical upgrade; and the availability of reproductive health services.

The researchers analyse data from household surveys of users and potential users in a sub-sample of 13 communes. The surveys comprise responses from when the franchise model was first implemented, and then six months and one year after implementation. This provides a sample of 508 users in the 'treatment' provinces and 673 individuals in the control provinces.

The survey data include measures of client satisfaction and likeliness to return and to recommend the service to others (see Table 1). Clients were interviewed in their communities to ensure that they were most comfortable and hence more likely to provide accurate appraisals, thereby avoiding 'courtesy bias'.

Satisfying results

The results show that after one year, there was a significant positive association between franchise membership and an improvement in both the local community's assessment and individual clients' assessment of service quality.

At the individual level, the surveys indicate that those who visited their local station in the time between the two surveys gave higher scores on service quality than those who had not visited the station. This suggests an improvement based on first-hand experience.

But clients were only more likely to recommend the service to others after one year, which suggests that time is required for a reputation to develop. Clients also had higher perceptions of staff attitudes – enthusiasm and consideration – after 12 months.

The provision of ultrasound tests within the franchise stations – a specialised service that was not subsidised by the government – was strongly associated with positive outcomes, including assessment of staff attitudes. As fees for the ultrasound service were paid by the clients, this positive evaluation suggests that clients prefer high-quality services at affordable prices to 'free' services perceived as low quality.

Improved expertise, attitude and marketing is needed

While these findings are based on surveys rather than direct health outcomes, this evaluation suggests that the social franchise model can produce positive effects at both the community and client level. This achievement reflects the effectiveness of concentrated marketing efforts to promote the brand name and reproductive health services in the wider community.

The integration of franchising into primary public healthcare is a feasible and sustainable business model. Franchised health stations can generate income from their services to reinvest in facilities, technology and equipment and thereby meet client expectations for high-quality services.

But at the same time, this research finds little evidence that franchise membership is associated with clients' assessment of staff expertise. This may be because training was unable to improve staff expertise to the level that meets clients' expectations within the sample period. Future schemes should therefore place greater emphasis on improving service providers' clinical skills. The importance of healthcare workers' attitudes for community and client satisfaction suggests that this too should be a focus for future franchises.

Service quality should meet clients' medical and psychological needs and be socially accepted (Mendoza et al, 2001). So improving the quality of care, the level of expertise and workers' attitudes should be carried out along with social marketing and communication efforts to promote these changes in the wider community.

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Increasing access to healthcare: evidence from Vietnam's Young Medical Volunteers for Rural Mountains Project

Vu Ngoc Uyen and Vu Quoc Huy

KEY FINDINGS

Medical volunteers in Vietnam's remote regions have improved residents' knowledge of how to prevent diarrhoea.

The number of people who know how to use the drug oresol for diarrhoea has increased by nearly 20%. Improved knowledge can help to reduce diarrhoea in the long term.

The intervention has had no effect on the risk of maternal death.

The incidence of diarrhoea is not reduced. There are no changes in hygienic behaviour, such as using boiled water for drinking or having a hygienically acceptable toilet.

Staff incentives need to be improved.

As a result of keeping costs down, pay in the public health sector is unreasonably low and demotivating. The quality of healthcare is held back by low pay.

The project represents a short-term intervention to be considered when reform of the public health system will take time.

Longer-run improvements in healthcare require more systematic changes.

For more details on this study visit www.gdnet.org

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People living in the remote and poor rural areas of developing countries typically have less access to healthcare facilities than their compatriots, often leading to worse health. This is particularly true for mothers and their children – whose improved health is the central objective of the fourth and fifth Millennium Development Goals.

Community-based health interventions can offer effective, inexpensive and technologically simple ways to extend access to basic healthcare to the rural poor. One example is an emergency intervention to tackle shortages of health workers in remote mountainous communities of Vietnam – among several national initiatives to provide primary healthcare to the poorest and least accessible. **Vu Ngoc Uyen** and **Vu Quoc Huy** of Vietnam National University have evaluated the project.

INTRODUCTION

The *Young Medical Volunteers for Rural Mountains Project* was set up by the Vietnam Union of Students with government funding and ran between 2002 and 2005. It offered an emergency response to the critical shortage of health workers in the country's public health system, particularly in remote and mountainous regions.

In the early 2000s, Vietnam's mountainous regions had roughly 270 maternal deaths for every 100,000 live births, compared with 80 in the deltas, according to the World Health Organization (WHO). Among ethnic minorities, the rate was as high as 315 (WHO, 2005).

Geographical isolation and poor transport conditions are not the only factors that put residents of mountainous regions at a disadvantage in access to health services. Health centres in these regions are insufficiently staffed and equipped. In 2002, only 28% of all health staff in mountainous areas had any medical qualifications, and 13% of communes had no doctors at all.

The main factors contributing to maternal mortality in Vietnam are delays in the decision to seek healthcare, delays in transferring pregnant woman to the appropriate facility because of the distance, poor roads

or lack of transport, and delays in providing essential treatment, well-trained health workers, drugs or necessary equipment (Ministry of Health, 2006).

Well-trained volunteers

The project allocated young medical graduates to health stations in the poor rural and mountainous communes. The student union organised teams of medical graduates, who volunteered to work for two years, while the government provided a budget to support volunteer teams and facilitated the operation of the project. As well as providing subsistence pay, the government agreed to recognise volunteers when they later applied for a job in the public sector or continued further education.

Between 2002 and 2005, the Young Medical Volunteers Project recruited 545 volunteers and operated medical teams in 350 communes of Vietnam – around 4% of the country's communes. On average, there was one volunteer per 2,500 local inhabitants. The project members consisted of 133 doctors and 412 graduates from medical secondary and vocational schools who were qualified as assistant or nurses.

Out of the 350 communes, 213 communes were in mountainous areas. The government described the majority of these communes as 'in extremely difficult circumstances', with little access to trained medical staff or basic facilities, such as running water.

The volunteers provided primary examination and treatment, referred patients to hospitals, carried out national disease prevention programmes of vaccination and family planning, and promoted hygienic lifestyles and the use of traditional medicinal herbs among local communities. They also delivered training in primary care for village health activists, ran literacy classes, assisted in organising agricultural extension courses for farmers and promoted youth clubs.

Positive communication

The research uses 'propensity score matching', a popular technique for evaluating social programmes. Mothers from 180 participating 'treatment' communes are matched with similar mothers from 270 'control' communes that were not part of the programme.

The data are drawn from a questionnaire designed for female respondents who had children born within the three years of the project. Overall, 13,365 mothers were surveyed on household characteristics, use of boiled water,

hygienic toilets and cases of diarrhoea (see Table 1).

The research shows that the programme improved residents' knowledge of how to treat diarrhoea. The number of residents who know how to use the simple drug Oresol for diarrhoea increased by 18.7%.

But the intervention had no effect on maternal risk of death or on hygienic behaviour, such as using boiled water for drinking or having a hygienically acceptable toilet. The incidence of diarrhoea was not reduced.

■ **TABLE 1** Definitions of selected outcome indicators for commune health stations in Vietnam

Index	Indicator	Definition
1	Mothers having at least three pregnancy checkups	Number of mothers who received at least three check-ups in their last pregnancy divided by the number of mothers surveyed
2	Delivery attended by health workers	Number of deliveries attended by professionally trained medical staff divided by the number of mothers surveyed*
3	Mothers receiving post-natal consultation	Number of mothers who received post-natal consultation in their last birth divided by the number of mothers surveyed
4	Use of boiled water for drinking	Number of households which always boil water for drinking, divided by number of households surveyed
5	Use of acceptable toilet	Number of households which use flushed toilets with sewage/septic tank, double vault compose latrine pour flush toilet, divided by number of households surveyed
6	Mothers knowing how to use simple drug for diarrhoea	Number of mothers who know how to use drug oresol for diarrhoea, divided by the number of mothers surveyed
7	Incidence of diarrhoea	The number of diarrhoea cases in a surveyed household divided by the number of household members

NOTE: *Mothers surveyed are mothers who have children born in the period 2002-05

Too 'low-cost'

Given the small changes relative to the sample size, it is not surprising that the results cannot confirm whether the programme has an overall effect. But there are other factors beyond the statistics.

One reason is the weak incentives for healthcare workers. The intervention was implemented at very low cost, partly because of the payment system in place across Vietnam's public health sector, which demotivates workers. Reconsidering the incentives for staff is vital for improving the supply of healthcare in the poorest areas.

The main cost of the project was labour. Almost 80% of the funding went on subsistence allowances for the volunteers. Transport and housing support added a further 10%, with the rest made up of administrative costs and extra support.

In total, the central budget provided about US\$560,000 for the project. The volunteers were paid the minimum salary that public health workers at commune health centres may receive, plus some petty cash to cover transport expenses from their place of living to the work place and to support them in finding a place to live. The volunteers usually stayed at the commune health centre or in village homes.

In total, the subsistence allowances and field support reached up to US\$35 per month. The central budget also covered a volunteer's social insurance and health insurance, which amounted to 17% of the salary.

Since the government salary is very low, provincial authorities were asked to contribute further salaries. Reports show that most of the provinces provided money incentives but the level varied. The contribution from the provincial budget is estimated at about US\$300,000 over the project.

Unreasonable pay

Vietnam's current 'fee-for-services' financing system for healthcare provides weak incentives in poor areas where the overwhelming majority of

patients are too poor to pay additional fees for services. Health workers in such areas do not receive the part of income supposed to be paid from the fees collected. This keeps pay at unreasonably low levels.

Low costs in a labour-intensive sector such as healthcare are not necessarily beneficial for health outcomes. Inadequately low costs may lead to low-quality services. Improvement in maternal health outcomes requires more systematic changes to the delivery of health services than simply lowering costs.

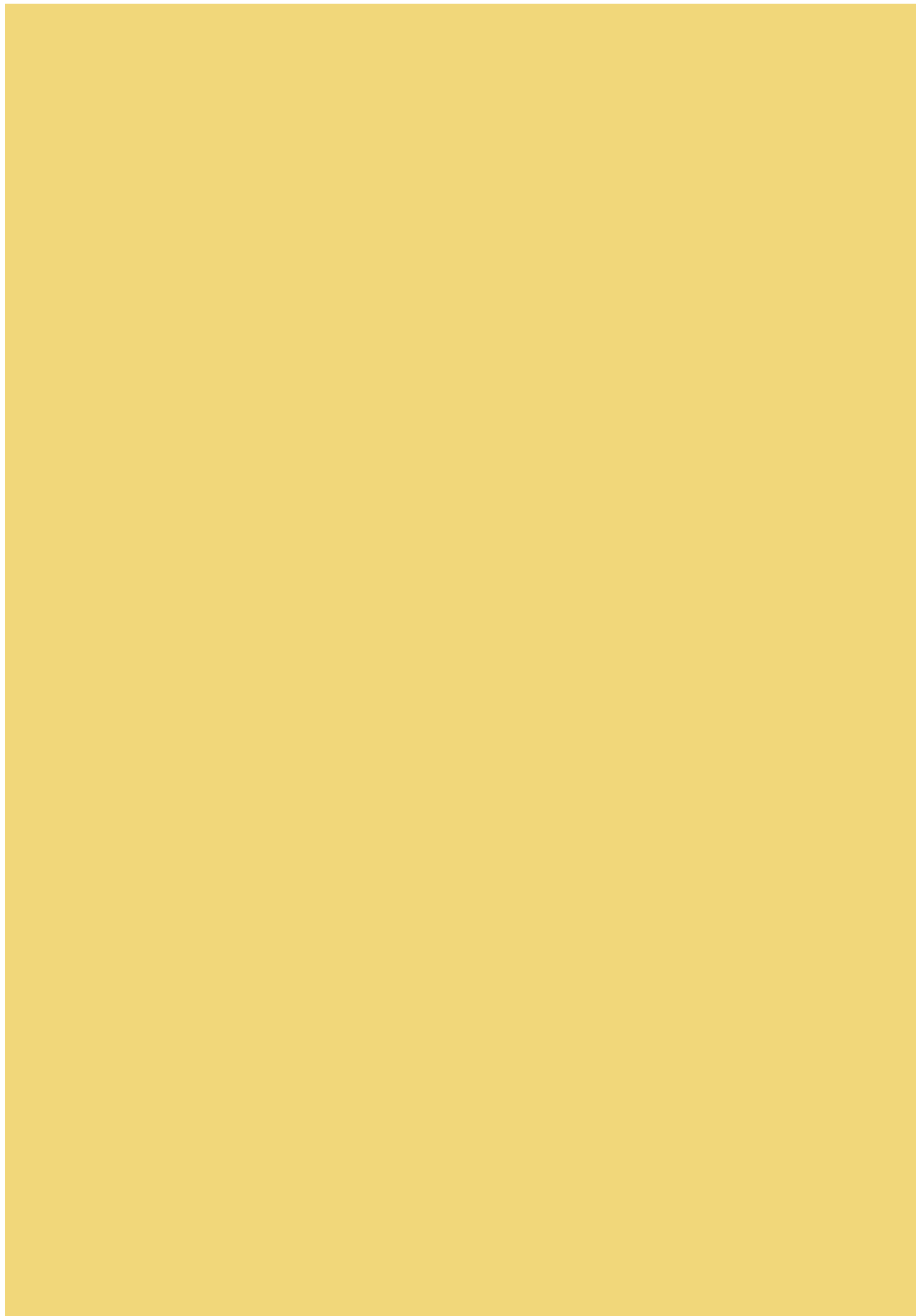
Nevertheless, low cost is an advantage of the volunteer approach. Provided other incentives are in place, a voluntary scheme is worth considering as an emergency support to fill the gaps before much needed reforms of the whole public health system.

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