In rural Navrongo, Ghana, a program to deliver health care to people in their own homes has succeeded in cutting deaths among children younger than five years by more than half and is on track to achieve a two-thirds reduction in the next few years. See story, page 2.
Innovative Program Dramatically Lowers Child Mortality in Ghana

If you live in a remote location where more than one in ten babies die before age five, what do you do? Scientists at the Navrongo Health Research Centre in rural northern Ghana teamed with researchers at the Population Council to design and test an innovative program—employing nurses on motorbikes and using community volunteers—to deliver health care to people in their own homes. The program has succeeded in cutting deaths among children younger than five years by more than half and is on track to achieve a two-thirds reduction in the next few years. A two-thirds reduction of mortality among children under age five by 2015 is one of the eight Millennium Development Goals set by the United Nations in 2000. The program has thus demonstrated how professionals in a resource-poor setting can reach such a goal relatively quickly. The program has also increased contraceptive use, reduced fertility, and sought to reduce or eliminate female genital mutilation/cutting. The program has been so successful that the government of Ghana is scaling it up across the country.

Two strategies for delivering care

The program tested the relative effects of two strategies for delivering primary health care services to rural residents in Kassena-Nankana District. In one strategy, nurses lived and worked in community-constructed health compounds and provided health and family planning services door to door. Health services included providing contraceptives and family planning counseling, advising on nutrition, and supplying antibiotics and immunizations. In the other strategy—known as zurugelu, which means “togetherness” in the local language—door-to-door services were provided by local volunteers and supported by community leaders. Volunteer services did not include antibiotics or immunizations, but did include referrals for those services, and nurses offered these essential health services in regularly convened community outreach clinics. Community leaders also hosted gatherings, known as durbars, that fostered community dialogue about health and reproductive matters.

The results from Navrongo challenge the rationale for volunteer-based health programs designed to improve child survival.

The program was conducted in four geographic regions in Kassena-Nankana District. People in Area 1 were exposed to the zurugelu strategy alone. Residents of Area 2 received care from nurses alone. In Area 3, people had contact with both the zurugelu and nurse-plus-zurugelu arms. In these three experimental areas as well as in Area 4, a comparison area, residents had access to Ministry of Health fixed-location clinics. These clinics, however, can be distant and hard to reach.

The lives of people in this program were tracked with the Navrongo Demographic Surveillance System. “This powerful tool, a computer program, registers all demographic events—including births, deaths, major illnesses, educational attainment, migrations, marriages, and pregnancies—that occur in the lives of all 142,000 individuals residing in Kassena-Nankana District,” says Ayaga A. Bawah, a research fellow at the Navrongo Health Research Centre. When the research center was founded in 1992, mortality rates in the area were well above national levels in Ghana. When children became sick, parents usually sought out traditional healers rather than modern health care options.

Analysis of the early results of the program produced the astonishing result that in the zurugelu and nurse-plus-zurugelu arms of the study, child mortality was actually increasing, compared with mortality before the intervention. In contrast, the nurse-only and comparison areas saw decreased child mortality. An early meeting of researchers pinpointed the problem. Volunteers had been allowed to distribute fever-reducing liquid medicines for infants and small children, similar to Tylenol®. Villagers believed these medicines to be actual curative treatments, and thus delayed seeking medical care for their sick children. Once these medicines were removed from the volunteers’ toolkit, child mortality returned to its previous levels. “We’ve found that, in the long run, volunteers provide no effect, either detrimental or beneficial, in terms of child survival, as long as they are not providing anti-fever medicines,” said Population Council demographer James F. Phillips, a senior technical advisor to Ghana’s Community-based Health Planning and Services Project. “Volunteers do help to reduce fertility, however, by reaching men with family planning advice.” On average, total fertility rates in Area 3, where people had contact with both nurses and volunteers, were one birth less than expected if there had been no intervention.

The results from Navrongo strongly challenge the rationale for volunteer-based health programs designed to improve child survival. Instead, the data suggest that convenient, accessible professional nursing care can reduce child mortality in impoverished African settings. “This happens
because people begin to seek nurses, who can provide preventive and curative health care, rather than traditional healers,” explains Fred N. Binka, executive director of the INDEPTH Network (an international network of field sites with continuous demographic evaluation of populations and their health in developing countries), and former director of the Navrongo Health Research Centre. The addition of community volunteers to the mix has no impact on child mortality, in part because volunteers cannot offer antibiotic therapy and in part because volunteers lack sufficient credibility to supplant traditional health-seeking behavior. “However, volunteers can reach men in the community with new ideas about family planning,” says Binka.

**Community-based health planning and services**

In response to initial promising results, policies in Ghana were changed to adopt the Navrongo approach to community-based nursing services as the national model for primary health care. Known as the CHPS Initiative (for Community-based Health Planning and Services), the national scaling-up effort is underway in 110 of the 138 districts of Ghana. Of these, 38 have implemented fully functioning Navrongo-like community nursing operations for over a quarter of their district populations.

Additionally, the Population Council has received assistance from USAID to help scale up the implementation of CHPS in 30 deprived districts in seven regions in southern Ghana. The project has improved the service delivery skills of community health officers as well as the managerial skills of their supervisors. Motorbikes, bicycles, and medical equipment, such as scales and refrigerators for vaccines, have been distributed to 60 community health compounds to improve the quality of service delivery. The Council has succeeded in increasing support for the CHPS program among members of the District Assembly, an important factor in the successful expansion of the program.

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**SOURCES**


Comprehensive Program Successfully Decreases HIV Risk Behaviors

Researchers with the Population Council’s Horizons program recently concluded a project to provide HIV-related testing and counseling services to truck drivers traveling through a customs station at the southern border of Brazil. These services were offered as part of a broader set of health services, including testing for diabetes and high blood pressure, in order to reduce the stigmatization associated with HIV services. A study found that the project greatly improved access to voluntary counseling and testing for HIV and significantly reduced the incidence of behaviors known to increase HIV risk, as compared to a control site that did not offer the services.

Mobile population

Research around the world has shown that men engaged in mobile work, such as truck drivers, tend to be exposed to greater HIV risk, and to have a higher prevalence of HIV and other sexually transmitted infections (STIs), than are men in less-mobile professions. Truck drivers, like other highly mobile groups, spend much of their time away from family and community, which increases the likelihood that they may engage in risky sexual behaviors and limits their access to health services. The Brazilian Ministry of Health asked the Population Council’s Horizons program to determine which populations in Brazil’s border regions were most in need of HIV prevention activities. The research revealed a highly mobile, international trucker community passing through the customs area at Foz do Iguaçu, Brazil, a city of about a quarter million inhabitants at the border with Paraguay and Argentina. Each day approximately 400 trucks cross this border; at any given time as many as 1,500 truckers are in approximately 400 trucks cross this border; at any given time as many as 1,500 truckers are in the customs area, which is in close proximity to a red-light district.

The research team designed and implemented a project at the Foz do Iguaçu customs station. They compared truckers passing through that station with truckers passing through a similar station in Uruguaiana, which had no such program. The design of the intervention was informed by data collected in interviews with truckers from Brazil and neighboring countries, staff members from the customs stations, sex workers, and others.

As part of the resulting project, truckers who were waiting to cross the border were approached by two outreach educators who gave them informational materials. The educators also invited the truckers to receive health services, including testing and counseling for HIV and syphilis, at a mobile health post were asked to complete surveys to determine satisfaction with the services. The costs of implementing the project were also tracked.

The project greatly improved access to voluntary counseling and testing for HIV and significantly reduced the incidence of behaviors known to increase HIV risk.

Key findings

The researchers found that truckers were highly sensitive to the common belief that truck drivers spread disease. During the initial stages of the study, truckers expressed concern that HIV-specific programs for truck drivers would reinforce negative stereotypes about them. These findings helped inform the project design: rather than providing services related only to sexual health, the project provided HIV and STI services alongside other health services that were of interest to truckers.

Before the study, 45 percent of all respondents reported having more than one sexual partner during the past six months. Reported condom use varied widely by type of partner; the majority of respondents—85 percent—reported consistent condom use during sex with sex workers, fewer reported consistent use with occasional partners, and services, such as blood pressure and diabetes screening; and a syndromic management consultation for STIs. (Syndromic management of STIs involves diagnosing infection based on the presence of symptoms and signs, rather than on laboratory tests.)

To evaluate the success of the project, the researchers collected cross-sectional data from male truck drivers passing through the customs station in Foz do Iguaçu before the services began, in April–July 2003, and then again between April and June 2005. Researchers compared that data with data from truckers going through customs in Uruguaiana (where the program was not instituted). Before the start of the project, researchers interviewed 1,775 truckers (779 in Foz do Iguaçu and 996 in Uruguaiana). At the end of the study, researchers interviewed 2,415 truckers (1,204 in Foz do Iguaçu and 1,211 in Uruguaiana). In addition, truck drivers who visited the health post were asked to complete surveys to determine satisfaction with the services. The costs of implementing the project were also tracked.
almost no truckers reported consistent use with regular partners, such as their wives. Prior to the study, the researchers surmised that lack of condom use with occasional partners was likely to be the most easily changed sexual risk behavior. The study results proved this to be true. Between the beginning and end of the study, the percentage of participants who reported ever using condoms with an occasional partner increased significantly, by 21 percent, in Foz do Iguaçu, but decreased by 3 percent in Uruguaiana. In both locations, condom use with sex workers did not change much; condom use with regular partners remained low.

The researchers found a significant increase in reported communication about condoms with all types of sexual partners in Foz do Iguaçu following the study. Communication about condom use did not change in Uruguaiana in the two years between surveys. Similarly, more truckers in the intervention site reported discussing HIV testing with their partners, with the greatest percent change demonstrated among truckers speaking with their regular partners about testing. Communication about STIs improved significantly between truckers and their regular partners, again only in Foz do Iguaçu.

**Access to voluntary counseling and testing**

Before the start of the study, less than half of the truckers had ever had an HIV test; truckers visiting the comparison site (Uruguaiana) were more likely than those visiting the study site (Foz do Iguaçu) to have ever been tested. By the end of the study, truckers in Foz do Iguaçu were significantly more likely to have received an HIV test than those in Uruguaiana. Moreover, “the proportion of truckers who returned for their test results and post-test counseling was quite high, more than 80 percent, especially considering the mobile nature of their profession,” said physician Juan Díaz, Population Council country director for Brazil and principal investigator on this study. The truckers were as likely to return for test results as were permanent residents of Foz do Iguaçu at their local clinic.

Truckers responded positively to the intervention activities and found them to be non-stigmatizing. One Brazilian trucker told researchers, “This service is the best thing in this region. Now, you have a problem and you have all you want here. There is no need to go to other places. You use the time when you are waiting for the liberation of your truck.” Another trucker, from Paraguay, told researchers, “I really loved the way I was treated. The nurses and all the health workers are very helpful and kind. They know how to treat people.”

Only five of the 1,821 truckers tested for HIV were positive (0.5 percent), a prevalence comparable to that of the general population in Brazil. This unexpectedly low prevalence was corroborated by independently collected data from Uruguaiana, which found an HIV prevalence of 0.7 percent among truck drivers tested during 2001–2005. Prevalence of syphilis (active and past infections) among truckers tested in Foz do Iguaçu was also lower than expected at 4.4 percent.

**Conclusions**

The project strategy of placing a health unit inside the customs station and offering HIV- and STI-related services with other services to meet the general health needs of truckers was successful in reaching truckers. These men found the project to be acceptable, and they welcomed it. Moreover, the project promoted some important behavior changes that would reduce HIV risk. As the study wound to a close, the researchers worked hard to create links with other institutions that could sustain the project. “Ultimately, the University of the Americas in Foz do Iguaçu made a commitment to maintain the clinic and to add more health services,” said Horizons/PATH researcher Julie Pulerwitz. Nevertheless, given the low prevalence of HIV and moderate prevalence of STIs, truckers in southern Brazil may not be a priority population for HIV- and STI-specific programs at this time.

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**Key communication and sexual risk behaviors in Foz do Iguaçu reported in the six months prior to baseline (2003) and at follow-up (2005)**

<table>
<thead>
<tr>
<th>Partner Type</th>
<th>Baseline (n=779)</th>
<th>Follow-up (n=1,204)</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Occasional partner</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Always use condom</td>
<td>55</td>
<td>62</td>
<td>12.7</td>
</tr>
<tr>
<td>% Ever use condom</td>
<td>67</td>
<td>81</td>
<td>20.9††</td>
</tr>
<tr>
<td>% Talked about using condoms</td>
<td>76</td>
<td>87</td>
<td>13.4††</td>
</tr>
<tr>
<td>% Talked about getting HIV test</td>
<td>28</td>
<td>34</td>
<td>22.5††</td>
</tr>
<tr>
<td>% Asked if partner had an STI</td>
<td>46</td>
<td>50</td>
<td>8.8</td>
</tr>
<tr>
<td><strong>Commercial partner</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Always use condom</td>
<td>79</td>
<td>84</td>
<td>6.3</td>
</tr>
<tr>
<td>% Ever use condom</td>
<td>93</td>
<td>90</td>
<td>–3.2</td>
</tr>
<tr>
<td>% Talked about using condoms</td>
<td>84</td>
<td>89</td>
<td>6.7†</td>
</tr>
<tr>
<td>% Talked about getting HIV test</td>
<td>16</td>
<td>22</td>
<td>38.3†</td>
</tr>
<tr>
<td>% Asked if partner had an STI</td>
<td>38</td>
<td>32</td>
<td>–17.4</td>
</tr>
<tr>
<td><strong>Regular partner</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Always use condom</td>
<td>9</td>
<td>9</td>
<td>0.0</td>
</tr>
<tr>
<td>% Ever use condom</td>
<td>27</td>
<td>31</td>
<td>14.8</td>
</tr>
<tr>
<td>% Talked about using condoms</td>
<td>76</td>
<td>84</td>
<td>10.6††</td>
</tr>
<tr>
<td>% Talked about getting HIV test</td>
<td>41</td>
<td>63</td>
<td>54.3††</td>
</tr>
<tr>
<td>% Asked if partner had an STI</td>
<td>47</td>
<td>59</td>
<td>23.9†</td>
</tr>
</tbody>
</table>

* Among sub-groups of respondents who reported having more than one sexual contact with partner type in the past 6 months
† Percent change from baseline to follow-up significant within Foz do Iguaçu (p<.05).
‡ Percent change significant from baseline to follow-up between Foz do Iguaçu and Uruguaiana (p<.05).

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**SOURCE**

Chinaglia, Magda, Sheri A. Lippman, Julie Pulerwitz, Macee de Mello, Rick Homan, and Juan Díaz. 2007. “Reaching truckers in Brazil with non-stigmatizing and effective HIV/STI services,” Horizons Final Report.

**OUTSIDE FUNDING**

Foz do Iguaçu Municipal Secretariat of Health, EADI-SUL, Goodyear Tires, the United States Agency for International Development/Brazil and Washington, DC, through the President’s Emergency Plan for AIDS Relief (PEPFAR), and DKT International
Pakistan: Multifaceted Approach Reduces Infant Deaths

A Population Council project has succeeded in significantly reducing perinatal deaths (including stillbirths and neonatal deaths) in Dera Ghazi Khan, a predominantly rural district in Pakistan’s Punjab province. The project addresses multiple factors that contribute to maternal and infant deaths. “This project shows that simple actions, such as educating women about danger signs that can arise in newborns and in women before, during, and after pregnancy; improving access to emergency care; and changing age-old practices can lead to considerably better health outcomes for babies and their mothers,” said Zeba A. Sathar, director of the Population Council’s Pakistan office.

Maternal and infant death and illness remain serious public health problems in Pakistan. According to UNICEF, a woman in Pakistan has a one-in-31 lifetime risk of death from causes related to pregnancy and childbirth. Although the country has made progress recently, it ranks 183rd out of 220 countries in terms of infant mortality.

Three delays

The vast majority of maternal and perinatal deaths can be attributed to delays in getting appropriate and timely emergency medical care. These delays have been described as the “three delays.” The Council’s Safe Motherhood Applied Research and Training (SMART) project was designed to reduce maternal and perinatal mortality by addressing the causes of these delays.

The first delay occurs at the household level, as lack of knowledge and other factors impede the decision to seek emergency care. The second delay occurs at the community level because of the absence of telephones and regular ambulance services, a particularly acute problem in rural areas. The third delay occurs at the hospital or health facility, and is largely due to a lack of trained staff, lack of supplies and equipment, and poorly organized emergency services.

The main objective of the SMART project was to test the hypothesis that reducing all three delays through a concerted effort is significantly more effective than reducing any of the delays individually, as had been tested in prior studies. The project was developed with the expectation that the results would be used, replicated, adapted, and scaled up nationally in Pakistan, as well as in other developing countries facing similar challenges of reducing maternal and infant mortality.

The SMART project was implemented in three sites. Two intervention strategies, one involving a community-based intervention plus a health services intervention (“site 1”), the other involving the health services intervention only (“site 2”), were compared against a control site (“site 3”) with no intervention. The community-based intervention included community organization, education for women and men, and the training of community health workers and traditional birth attendants (dais). The health services intervention included training in technical skills and client-centered counseling for relevant public sector physicians and paramedics.

The ultimate goal of the project was to reduce maternal and neonatal mortality. However, it was impossible to measure declines in maternal mortality with statistical certainty given the relatively small number of people involved in the project. (Each of the three sites consisted of 60 communities, with an average of roughly 5,000 people in each community.) Thus, the researchers chose perinatal mortality (stillbirths plus early neonatal deaths per 1,000 live births) as their key indicator.

In less than two years, perinatal mortality declined by a statistically significant 22 percent (from 81.7 deaths per thousand births to 63.4 deaths per thousand births) in site 1, where the community-based and health services interventions took place. This decline applied to both stillbirths and early neonatal deaths. There was no decline in such deaths in sites 2 or 3. “It is not clear which particular components of the intervention caused this decline, but it appears likely that the innovative program of dai training had an important effect,” states Council public health expert Peter C. Miller, a researcher on the study. On the other hand, in-service training of doctors and paramedics in both technical skills and client-centered counseling in site 2 did not in itself have a substantial effect in reducing perinatal mortality. Although maternal deaths were reduced in all three areas, the numbers were too small to be statistically meaningful.

“Addressing all three delays is necessary to improve maternal and neonatal health,” said project director Gul Rashida, a Population Council researcher. “The results of the SMART project present a useful blueprint for how to address these delays in a poor and vulnerable area of Pakistan. We suggest that if this can be done in a setting such as Dera Ghazi Khan, with its logistical, cultural, and other challenges, it can be replicated in most other places in Pakistan.”

SOURCES


OUTSIDE FUNDING

European Union
RECENT PUBLICATIONS

HIV and AIDS


Sweat, Michael, Kevin O’Reilly, Caitlin Kennedy, and Amy Medley. “Psychosocial support for HIV-infected populations in developing countries: A key yet understudied component of positive prevention,” AIDS 21(8): 1078–1071.


POVERTY, GENDER, AND YOUTH


Publications are by Population Council staff members, consultants, or staff from partner organizations. Year of publication is 2007 unless otherwise noted. Names in boldface are staff members or those from partner organizations.

www.popcouncil.org/popbriefs  P O P U L A T I O N  B R I E F S  1 3 ( 2 )  O C T O B E R  2 0 0 7 7
Tests Suggest New Microbicide Will Have Improved Efficacy

Petri-dish tests of a new candidate microbicide indicate that the formulation is likely to be more effective at preventing the sexual transmission of HIV than the first-generation candidates currently in clinical trials. The new compound, called PC-815, combines Carraguard®, the Population Council’s first-generation candidate, with an anti-HIV drug called MIV-150. The drug stops HIV from reproducing by blocking the reverse transcriptase enzyme, which normally allows the virus to replicate and spread.

Microbicides

Vaginal microbicides would be products designed to reduce the male-to-female transmission of HIV when used during sex. Currently there are no microbicides on the market. In March 2007, the Population Council completed data collection for a large Phase 3 clinical trial in South Africa to test the efficacy and long-term safety of Carraguard vaginal gel. The trial is the first Phase 3 trial of a product designed as a microbicide completed anywhere in the world. Results are expected by early 2008.

Promising candidates

“While developing and testing Carraguard, we have continued investigating ways to improve the formulation,” says Robin A. Maguire, director of microbicides product development at the Population Council. “PC-815 is one of the most promising second-generation microbicide candidates being developed at the Council.” Candidate microbicides that combine two or more anti-HIV approaches represent a potentially more effective tactic for limiting HIV infection. PC-815 blocks virus attachment with Carraguard and directly targets virus replication with the reverse transcriptase inhibitor MIV-150.

Studies have shown that MIV-150 is not absorbed by the body, even when given orally in high doses. This characteristic may make it an ideal candidate for use in microbicides. “It is not desirable for the product to be absorbed by the body,” says Population Council immunologist Melissa Robbiani. If the drug were absorbed, it could contribute to the development of resistant strains of virus, interact adversely with other medications the person is taking, or cause unwanted side effects. Moreover, extensive toxicology studies have shown that MIV-150 appears to be safe and well tolerated.

Effective product

Drugs similar to MIV-150 generally act after virus enters susceptible immune system cells. Ideally, however, drugs used in microbicides would neutralize HIV before it enters and infects cells. In the recent Population Council experiments, researchers found that MIV-150 inactivates free virus—that is, virus that is not in cells—making it impossible for the virus to enter and infect cells.

Because sexual transmission of HIV occurs in the presence of semen, the researchers tested MIV-150 and Carraguard in the presence of human seminal fluid. Seminal fluid had no effect on the antiviral activity of either compound. Finally, PC-815 was approximately ten times stronger than Carraguard alone in blocking the varieties of HIV found in sub-Saharan Africa.

“This study shows that PC-815 is likely to be a more efficacious microbicide than Carraguard,” says Population Council virologist David M. Phillips, lead researcher on the study. Currently, the Council is conducting two-year stability studies on the product. Toxicological testing has established that PC-815 is not toxic to human vaginal cell samples outside the body or vaginal epithelial cells in rabbits. Additional testing has demonstrated that PC-815 appears to have no effect on the vaginal epithelia of rabbits and rats. Phase 1 safety trials in humans are expected to be completed later this year.

SOURCE


OUTSIDE FUNDING

National Institutes of Health, Swedish International Development Cooperation Agency, Swedish Ministry of Foreign Affairs, and United States Agency for International Development