



USAID
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Report to Congress

Health-Related Research and Development Activities at USAID

An Update on the Five-Year Strategy, 2006–2010

September 2008



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Acronyms and Abbreviations

ACT	Artemisinin-based combination therapy
AIS	AIDS Indicator Surveys
AMR	Antimicrobial resistance
AMTSL	Active management of the third stage of labor
ARI	Acute respiratory infection
ART	Antiretroviral therapy
ARV	Antiretroviral
CAPRISA	Centre for the AIDS Programme of Research in South Africa
CBHI	Community-based health insurance
CCM	Community case management
CDC	U.S. Centers for Disease Control and Prevention
CHW	Community health worker
CMAM	Community-based management of acute malnutrition
CONRAD	Contraceptive Research and Development Program
CSB	Corn soy blend fortified food
CSHGP	Child Survival and Health Grants Program
CSSA	Child Survival Sustainability Assessment
DALY	Disability-adjusted life year
DHS	Demographic and Health Survey
DOTS	Directly observed therapy, short course
DSMB	Data Safety Monitoring Board
ECSA	East, Central, and Southern Africa Health Community
ENC	Essential newborn care
EONC	Essential obstetric and newborn care
FY	Fiscal year
GALT	Gut-associated lymphoid tissue
GHS	Ghana Health Service

GSKBio	GlaxoSmithKline Biologicals
Hib	H. influenzae type b
HRRD	Report to Congress: Health-Related Research and Development Activities at USAID
IAVI	International AIDS Vaccine Initiative
IFA	Iron-folic acid
InterVA-M	A model for interpreting verbal autopsy data
ITN	Insecticide-treated net
LNS	Lipid-based nutrient supplements
MAM	Moderate acute malnutrition
MCH	Maternal and child health
M&E	Monitoring and evaluation
MMV	Medicines for Malaria Venture
MOH	Ministry of Health
MOHFW	Ministry of Health and Family Welfare
MVI	Malaria Vaccine Initiative
NGO	Nongovernmental organization
NHA	National health account
NIAID	National Institute of Allergy and Infectious Diseases
NIH	National Institutes of Health
OFDA	Office of U.S. Foreign Disaster Assistance
OGAC	Office of the Global AIDS Coordinator
ORS	Oral rehydration salts
PATH	Program for Appropriate Technology in Health
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
PPH	Postpartum hemorrhage
PVO	Private voluntary organization
RAPID	Rapid assessment process for maternal death
R&D	Research and development
RPF	Regional Pharmaceutical Forum

RUTF	Ready-to-use therapeutic food
SDM	Standard Days Method
SIDA	Swedish International Development Cooperation Agency
SSS	Sampling at Service Sites
STI	Sexually transmitted infection
TB	Tuberculosis
UN	United Nations
UNAIDS	The Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Program
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USAID	U.S. Agency for International Development
USG	U.S. Government
WFP	World Food Programme
WHO	World Health Organization
WRAIR	Walter Reed Army Institute of Research

Executive Summary

Health research is integral to USAID’s ability to achieve its health and development objectives worldwide. Research allows USAID to develop and introduce affordable health products and practices and contribute to policies appropriate for addressing health-related concerns in the developing world. USAID’s research role is to assess local health conditions, develop and adapt appropriate health products and interventions, and support their field testing and introduction, while strengthening local health systems.

In 2006, USAID outlined its five-year health research strategy: Report to Congress: Health-Related Research and Development Activities at USAID (HRRD), May 2006, http://pdf.usaid.gov/pdf_docs/PDACH111.pdf.

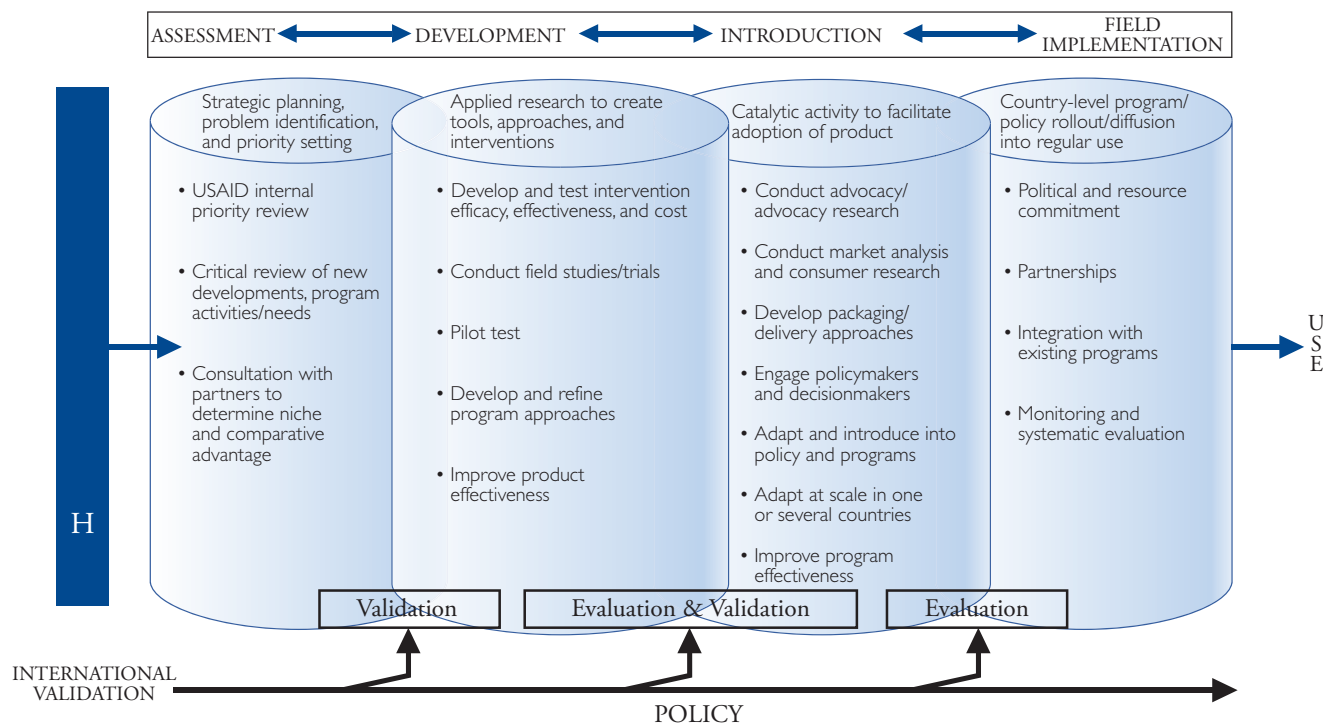
With this report, USAID provides an update on this strategy for using research funds to stimulate the development and introduction of key products. Significant

progress has been made in many areas, influencing policies and programming on the ground in real time.

Examples of progress toward the goals of the health research strategy outlined in the 2006 HRRD include the completion of:

- a study that demonstrated the equivalence of home treatment of severe pneumonia in young children to facility-based care, potentially significantly changing the way the illness is managed in developing countries, saving a significant number of lives every year, and taking pressure off health systems.
- introduction trials in several countries providing an understanding of how to increase the availability and uptake of zinc treatment in the public and private sectors, while also increasing the uptake of oral rehydration salts for reduced childhood morbidity and mortality from diarrhea.

Pathway From Research to Field Implementation and Use



Source: USAID

- a new tool, Sampling at Service Sites (SSS), which measures the rates of maternal mortality in the community and offers potential lower cost and time savings over traditional house-to-house surveys for the evaluation of safe motherhood interventions.

Some findings during the past year have initiated changes in the strategy, specifically in vaccine and microbicide development. Because of the technical leadership at USAID and the development process of the original strategy, alternative pathways were anticipated. USAID and our partners were ready to adjust next steps and quickly move forward with alternative activities to maintain momentum toward our goals.

The activities highlighted in this document represent approximately 80 percent (\$142 million) of the total amount USAID used in 2008 for the main areas of research on product development and introduction. This report does not cover an estimated \$35.5 million for research that is mainly funded by USAID field Missions on local questions and needs, such as formative research on child feeding practices, measurements of local disease burdens, or improvements in district health services.

This report leads with an update on maternal, newborn, and child health research. With a new Maternal and Child Health Strategic Approach¹ and the support of Congress, USAID is committed to accelerating the development, introduction, and scale-up of the delivery of effective interventions in high-mortality countries to help them achieve the Millennium Development Goals for maternal and child health.

Maternal and Newborn Health

Globally, the number of maternal deaths, an estimated 536,000 per year, has remained essentially unchanged since 1990. Four million of the nearly 10 million children who die annually before age 5 are newborns within their first month of life. Mothers die most often from hemorrhage, followed by hypertensive disorders and infection. Newborns die from infections, asphyxia, and complications of premature birth.

USAID supports research to accelerate the introduction and incorporation of morbidity and mortality reduction interventions into relevant community- and facility-based delivery programs for mothers and newborns.

- The largest study to date of the relationship between the spacing of pregnancy intervals and perinatal,

newborn, infant, child, and under-5 mortality and nutrition status was completed. The findings confirm that, for the under-5 age group, 36-month birth-to-pregnancy intervals are associated with the lowest risk of mortality and poor nutrition status (stunting and underweight). These findings are being integrated into postpartum education programs and other venues.

- A study in Bangladesh showed that a home-care strategy to promote an integrated package of preventive and curative newborn care reduces newborn deaths in communities with a weak health system, low health care use, and high neonatal mortality. Neonatal mortality was reduced by up to 34 percent through combined prenatal and neonatal care.

Nutrition

Nearly one-third of children in the developing world are chronically malnourished, and 2 billion people suffer from micronutrient deficiencies. USAID's nutrition research strategy addresses vitamin A deficiency, zinc therapy, iron anemia prevention and treatment packages, community-based management of acute malnutrition, and dietary quality and diversity.

- A neonatal trial demonstrated that giving a single oral dose of vitamin A (50,000 IU) to Bangladeshi newborns shortly after birth reduced infant deaths by 15 percent. These findings show great promise for southern Asia, where newborn vitamin A could prevent 250,000 to 500,000 infant deaths each year.

Acute Respiratory Infections

Pneumonia is the largest single killer of children under 5 around the world. A key component of USAID's child survival program supports the introduction and implementation of country-level programs for non-severe pneumonia in areas with barriers to access to care. Ongoing research and introduction efforts build on this proven approach by investigating the management of severe pneumonia in the community and facilitating the joint treatment of pneumonia and malaria, along with diarrhea – also known as community case management.

- A study from Bangladesh showed that routine vaccination of infants against H. influenzae type b (Hib), a bacterium that causes deadly Hib pneumonia and meningitis, prevented more than one-third of pneumonia cases and approximately 90 percent of Hib meningitis cases. A similar impact would be expected in other parts of the region. India and Bangladesh

¹ www.usaid.gov/our_work/global_health/mch/index.html.

are expected to add Hib vaccines to their national programs.

Reproductive Health and Family Planning

The objective of USAID's contraceptive research program is to improve and expand family planning use through provision of new and improved contraceptive methods, including methods that also reduce the transmission of HIV and other sexually transmitted infections. USAID's operations research program improves the availability and effectiveness of family planning and integrated reproductive health care in developing countries.

- A comprehensive worldwide review showed that progestin-only contraceptive --injectables are safe for use by women with sickle-cell anemia. This finding is particularly relevant in sub-Saharan Africa, where Depo-Provera is popular and sickle-cell disease is widespread.

HIV/AIDS

Infected persons worldwide number nearly 33 million, while an estimated 2.5 million new infections occur each year. Through the International AIDS Vaccine Initiative (IAVI), a nonprofit organization that acts as a virtual pharmaceutical company, USAID supports informative biomedical research in all phases of HIV vaccine clinical research and development, and other activities pivotal to the field. USAID's strategy to promote the development of microbicides, a class of health products to provide women with an effective chemical barrier to sexually transmitted HIV, is to focus support on the advanced testing of the most promising candidates available.

- In 2007, a large trial of a promising vaccine was halted early as data revealed that the vaccine was not providing protection against infection. In 2008, the National Institute of Allergy and Infectious Diseases cancelled plans for a large clinical trial of the government's most advanced HIV vaccine candidate to date. With this cancellation, the field has been redirected to put more emphasis into fundamental research. As a result, the scientific community is revisiting nonhuman primate experiments to identify and prioritize new candidate vaccines that may move into human trials, while carefully reviewing data available from past trials and studying the dynamics of early infection events.

- At the recommendation of the respective Data Safety Monitoring Boards, the Phase III trials for the microbicides Savvy™ and UsherCell™ have been ended. The Carraguard™ Phase III trial is a milestone, as it is the first large clinical trial for effectiveness to be successfully completed. Although the results indicate that the product is safe and acceptable, it did not significantly prevent infection in this trial. Despite this outcome, the Carraguard trial demonstrates for the microbicide field the feasibility and best practices of conducting large trials with extensive community involvement in developing countries.

Malaria

An estimated 300 million to 500 million people become ill with malaria each year, and more than 1 million die. USAID focuses on vaccine and drug development research, in concert with other global development efforts, to accelerate the availability of affordable and appropriate treatments for developing countries. USAID's Malaria Vaccine Development Program operates in the context of the worldwide malaria vaccine development effort, with a particular focus on vaccines for residents of endemic areas, primarily children and pregnant women. USAID supports the discovery and development of new antimalarial drugs and drug formulations, especially those that will be affordable to populations living in malaria-endemic areas. Operational and field research is supported that lays the groundwork for the safe and effective use of existing and new antimalarial drugs and drug combinations by national malaria control programs.

- The USAID-supported blood-stage vaccine trial, FMP1/AS02A, showed no overall efficacy. It did, however, provide important clues as to how to proceed with further research and development. A similar but more promising vaccine has been developed and is being tested in the United States. Based on the results of the trial, a decision will be made whether to pursue further development in an endemic area.

Tuberculosis

Tuberculosis (TB) is one of the world's deadliest infectious diseases, with an estimated 9.2 million new cases and approximately 1.5 million deaths each year. Developing countries account for 95 percent of all TB cases and 98 percent of all TB deaths worldwide. USAID invests in research that will improve the performance and public health impact of country-level TB programs while mitigating the risks of drug resistance.

- USAID collaboratively supported the research and translation of evidence into global policy for the procedural shift from three to two smears in diagnosing TB. This policy change has the potential to increase case detection rates while reducing the burden on both patients and laboratories of conducting multiple tests.

Health Systems Strengthening

In its approach to health systems strengthening, USAID focuses on ensuring that the priority interventions discussed throughout this report are widely used with consistently high quality for improved human health impact. In 2007, the development community agreed on six core building blocks of health systems strengthening: service delivery; health workforce management; information management; management of medical products, vaccines, and technologies; financing; and leadership and governance. USAID advances research in these core functions in collaboration with host governments, international partners, and other U.S. Government agencies.

- Through research on quality improvement, Niger increased compliance with evidence-based guidelines for children hospitalized with severe malnutrition, facilitating a drop in the case fatality rate from 29 percent to 13 percent. The average level of compliance with standards for child health services increased from 37 percent to 76 percent through an organized process in which a network of health workers shared best practices.

Maternal and Newborn Health

Issues and Rationale

Globally, the number of maternal deaths – an estimated 536,000 per year – has remained essentially unchanged since 1990. The difference in statistics between the developed and the developing world is striking: A woman's lifetime risk of dying in childbirth in Afghanistan is 600 times greater than in the United States. Although newborn deaths declined by 16 percent between 1996 and 2005 worldwide, they increased by 5 percent in Africa over the same period. Four million of the nearly 10 million children who die annually before age 5 are newborns within their first month of life. Mothers die most often from hemorrhage, followed by hypertensive disorders and infection. Newborns die from infections, asphyxia, and complications of premature birth. Other indirect causes of neonatal death are poor maternal health and nutrition, malaria, and maternal infections.

Areas of Research and Introduction

USAID supports research to accelerate the introduction and incorporation of interventions to reduce morbidity and mortality of mothers and newborns into community- and facility-based delivery programs. With systematic reviews of evidence to target investment in research and introduction activities, USAID aims to accelerate the testing and introduction of feasible prevention and management interventions for the main causes of maternal and newborn deaths.

Progress toward the five-year strategic plan is highlighted below, with a brief introduction on the focus of each research area.

Healthy Pregnancy and Birth Outcomes

For the past several years, USAID has sponsored analyses to determine the birth-to-pregnancy spacing intervals associated with the lowest mortality and morbidity risks for newborns, children, and women. As findings become available, USAID is supporting operations research to evaluate the effectiveness of communication, education, and service delivery activities to educate recently delivered or postpartum women about the health benefits of longer birth-to-pregnancy intervals.

In 2008, USAID-supported researchers completed the largest study to date of the relationship between pregnancy intervals and perinatal, newborn, infant, child, and under-5 mortality and nutrition status. The researchers used pooled data from 52 USAID Demographic and Health Surveys (DHS); the sample involved more than 1 million births. The findings confirm those of smaller, earlier studies that for children under 5, 36-month birth-to-pregnancy intervals are associated with the lowest risk of mortality and poor nutrition status. For children to survive and thrive, three years between a live birth and the next pregnancy is best.

USAID is funding operations research in Nepal to evaluate the effectiveness of a health education strategy involving mothers' clubs to educate recent mothers or postpartum women about the health benefits of at least two-year birth-to-pregnancy intervals. The study is examining family planning use and continuation rates and health outcomes among women who have received such counseling compared with those who have not.

USAID has expanded a similar study in Bangladesh to evaluate the use of community health workers (CHWs) who reach postpartum women in their homes with pregnancy spacing guidance. The study is examining whether women will follow the guidance and, when they do, if it is associated with improved perinatal and newborn health outcomes. The findings from these studies will be applied in USAID-supported service delivery programs globally and shared with governments, nongovernmental organizations (NGOs), and other donors.

In Egypt, USAID tested two approaches to helping women achieve the longer pregnancy intervals they prefer using education about the multiple health benefits to mother and child associated with longer intervals. One approach used existing health facilities and staff. A second approach placed greater emphasis on community involvement. Both models were associated with visiting the clinic at day 40 postpartum. Contraceptive use at 10 to 11 months postpartum was higher in the two intervention groups. In conclusion, both models are equally effective in changing women's pregnancy spacing attitudes and behaviors. These findings are being used to

strengthen family planning and maternal and child health programs.

USAID partners worked with Kenya’s Division of Reproductive Health to develop and introduce a strengthened postnatal care package for Kenyan women. Researchers documented the package’s feasibility and quality of care, its acceptability to providers and clients, and the estimated costs for sustaining and scaling up the services. Messages on healthy timing and spacing of pregnancies have been incorporated into training and job aids.

Assessment of Birth Care and Outcomes

USAID supported the refinement of a maternal mortality estimation model that was applied to 1990 data for a global re-estimation of changes between 1990 and 2005. The data showed an overall 5 percent reduction in maternal mortality rates, with less than 1 percent reduction in Africa, 20 percent reduction in Asia, and 26 percent reduction in Latin America over 15 years. This analysis provided the evidence base for developing countries, especially in Africa, to intensify their efforts to reach Millennium Development Goal 5.

Maternal and Newborn Health Research Strategy 2006–2010

Total FY08: \$7,008,000	
Strategy Themes	Areas of Research and Introduction: Five-Year Strategy
Healthy Pregnancy and Birth Outcomes	Determine the health impact of healthy timing and spacing of pregnancies
	Develop and support the implementation of effective communication, education, and service delivery activities for healthy timing and spacing of pregnancies
Assessment of Birth Care and Outcomes	Impact of cesarean section on birth outcome
	Global systematic review of direct causes of maternal mortality
	Review of physical, psychological, and economic consequences
	Impact of family planning in different settings on maternal mortality
Maternal Mortality Measurement Tools	Evaluation of effectiveness and cost effectiveness of approaches
	Sampling at Service Sites (SSS) to measure population-based maternal mortality
	Rapid Assessment Process for Maternal Death (RAPID) to measure maternal mortality in facilities
New Pregnancy and Birth Interventions and Introduction	Refine and validate Verbal Autopsy (InterVA-M) tool and apply in two to three countries
	Complete study on effect of low dose vitamin A supplementation on pregnancy outcome and disseminate findings globally
	Uniject Oxytocin: conduct stability studies, scale up production, launch in multiple countries
	Active management of the third stage of labor (AMTSL): test simplified regimens
Neonatal Research and Newborn Care Practices	Efficacy and outcomes of practices for fistula repair
	Essential Newborn Care (ENC): complete effectiveness and cost-effectiveness studies and implement and evaluate minimal package of essential care
	Treatment and prevention of infections: effectiveness and cost-effectiveness studies, alternative formulations, and delivery strategies
	Strategies for care of low-birthweight infants: evaluate and implement coordinated kangaroo care in facility- and community-level care
	Resuscitation device availability: work with manufacturers to produce and distribute low-cost devices

USAID supports ongoing surveys in seven countries in Africa and eight in Asia to document the relationships between modes of delivery, including cesarean section, in birth outcomes. This research is yielding information on the burden of maternal and perinatal complications and deaths.

An ongoing USAID-supported study in Bangladesh documents the burden of maternal morbidity. The study, undertaken in conjunction with companion studies in Burkina Faso and India, is linked with a study in Tanzania supported by other donors. The Bangladesh study examines the consequence of pregnancy-related morbidity and impact of pregnancy-related complications. It also documents the social and economic impact of negative pregnancy outcomes and risk factors for severe maternal pregnancy-related complications. This information will guide ministries of health, United Nations (UN) agencies, and donors on key areas and interventions to improve ongoing safe motherhood programs.

Maternal Mortality Measurement Tools

USAID supported the analysis of existing tools to measure maternal mortality and to develop a new set of tools to evaluate safe motherhood interventions. An analysis has been completed measuring maternal mortality that included death registration, health facility statistics, decennial censuses, population-based surveys of various types, Sampling at Service Sites (SSS), and various surveillance options. The advantages and disadvantages of the options have been identified, and strategies for choosing options have been outlined based on the status of civil registration. This analysis and guidance for countries is available online: www.immpact-international.org/index.php?id=67&top=60.

Among the most promising new developments is the now-completed SSS. This technique measures the rates of maternal mortality in the community and offers potential cost and time savings over traditional house-to-house surveys.

New Pregnancy and Birth Interventions and Introduction

USAID has undertaken a concerted research and introduction effort to reduce postpartum hemorrhage, the single most important cause of maternal death worldwide. The goal is to expand the use of an approach to prevent severe bleeding in a woman giving birth, known as the active management of the third stage of labor

(AMTSL). USAID is working with professional societies, researchers, UN agencies, and the private sector to safely and effectively introduce AMTSL in high-mortality countries. USAID supported the World Health Organization (WHO) in conducting systematic reviews and developing guidelines to inform decisionmaking by host-country governments on prevention of postpartum hemorrhage.

USAID is also advancing research to simplify AMTSL, undertaking product development on delivery mechanisms and determining the safest and most feasible strategies for introduction. USAID funded WHO to undertake an eight-hospital, multicountry trial of up to 20,000 patients to test a simplified version of AMTSL. If this study has positive results, a simplified AMTSL regimen would reduce the complexity of training workers in health facilities and in the community. Product development is under way on a single-use drug delivery device, Uniject™ with oxytocin. This device could increase the use of AMTSL by reducing logistic and programmatic barriers and could overcome limitations to access in the community due to facility-based care policies for injections.

The oral drug misoprostol, when properly administered, reduces postpartum hemorrhage. USAID is supporting studies in Nepal, where women in the community have been provided instructions and doses for use by female community health volunteers. Preliminary analysis suggests this can achieve a 64 percent reduction in maternal mortality when compared with the expected maternal mortality rate. Studies are ongoing in Afghanistan, Bangladesh, and Senegal to assess the safety, acceptability, feasibility, and program effectiveness of misoprostol given to women by volunteer CHWs in home births and in health huts.

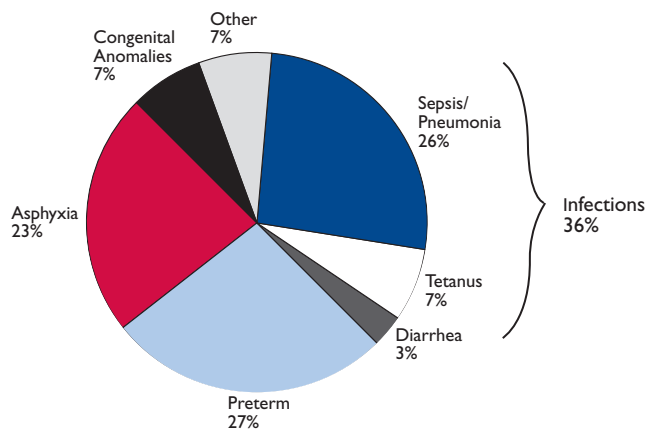
Research is under way to better understand and treat obstetrical fistulas, the result of obstructed labor and lack of emergency obstetrical care. USAID is sponsoring a multicountry study to capture the basic characteristics of obstetrical fistulas in an examination of the determinants of postoperative outcomes of fistula repair surgery. The study was initiated in countries in East Africa, West Africa, and South Asia. Expected to be completed in 2009, it will provide information about the worldwide characteristics of fistula and provide a basis for developing an evidence-based classification system, essential for promoting the standardization of high-quality surgical care.

Facility- and community-based insurance and incentives for promoting skilled birth attendants are important for addressing the ubiquitous financial barriers in accessing maternity care and in quality-of-care issues. USAID and other donors funded a set of studies to evaluate different program experiences in Burkina Faso, Ghana, and Indonesia. Details related to reducing the financial barriers to accessing needed care can be found in the Health Systems Strengthening section of this report (page 45).

Essential Newborn Care (ENC)

Half of all births in developing countries occur at home, making access to care one of the biggest barriers to reducing newborn mortality. A USAID-supported study in Bangladesh showed that a home-care strategy to promote an integrated package of preventive and curative newborn care reduces newborn deaths by up to 34 percent in communities with a weak health system, low health care use, and high neonatal mortality.

Causes of Newborn Death



Source: J Bryce et al. Lancet 2005; 365: 1147-52

The study promoted a package of obstetric and neonatal care interventions through community health workers and showed an increase in the use of antenatal care services, use of clean cord-cutting instruments, immediate breastfeeding, and delayed bathing (>3 days). Care-seeking showed an increased use of qualified providers, facilities, and CHWs and use of referral facilities for care of the sick neonate. CHWs used a simplified algorithm to identify danger signs for disease and severe illness. Newborns with two or more danger signs were given one dose of injectable antibiotics prior to referral or a full 10-day course of daily injections at home, with consent, if referral was refused.

A study in India documented that neonatal mortality was lowered by 51 percent through improvements in birth preparedness, hygienic delivery, thermal care (including skin-to-skin care), umbilical cord care, skin care, breastfeeding, and care-seeking. Concurrently with this research, USAID is introducing simple health-promoting behaviors and care practices in the postbirth period in 24 USAID partner countries. Bilateral programs and USAID-supported Child Survival and Health Grants Program (CSHGP) NGO partners are testing ENC packages in different program contexts.

Treatment and Prevention of Infections

USAID is approaching the reduction of neonatal mortality due to infection consistent with the research-to-use strategy. Studies are under way in Bangladesh to assess the effectiveness and feasibility of infection prevention in the community through an antiseptic wash for the umbilical cord. Simultaneously, product development and testing is under way to accelerate the uptake of a product by public and private health sectors should the replication study confirm its effectiveness. Multicountry research on combination oral and injectable antibiotic therapy for simplified treatment of newborn sepsis in the community is now being explored.

A user-friendly diagnostic algorithm to detect danger signs in newborns and young infants has been developed. This simplified, seven-sign tool has been incorporated into Integrated Management of Childhood Illness guidelines to improve the identification of young infants who require referral for severe illness.

Strategies for Care of Low-Birthweight Infants

In low-resource developing country settings, many unanswered questions remain about strategies to manage and care for low-birthweight (<2,500 gms) and premature newborns. One promising approach already practiced in hospitals in developed and some developing country settings is skin-to-skin care, or kangaroo mother care. A completed study in India will advance the evidence base for application in community settings (publication of data pending). Concurrent to the community research, this approach is being introduced into facility settings in the USAID-supported country programs of Rwanda, Nigeria, Malawi, Nepal, and Bangladesh.

Increasing Availability of Resuscitation Devices

Birth asphyxia accounts for 23 percent of the estimated 4 million neonatal deaths annually. Reducing birth asphyxia requires neonatal resuscitation skills and appropriate technologies for health workers present at birth. In 2007, USAID continued to advocate for the availability and use of low-cost resuscitation devices. Previous work identified high-quality resuscitation devices that were available for under \$30. Studies conducted in Africa and India revealed that the supply and maintenance of neonatal resuscitation devices in facilities was inadequate. When devices are available, they are unnecessarily expensive. For the African region alone, procurement of lower-cost, high-quality devices could result in a savings of more than \$3 million to facilities, which could be used for appropriate training or other neonatal care interventions.

A study of effectiveness of low-cost resuscitation devices in the community is under way in Zambia. USAID is using the results of these studies to advocate with global partners and host-country governments on the importance of addressing birth asphyxia and strengthening distribution networks for high-quality, lower-cost resuscitation devices as a crucial component to neonatal care.

The Child Survival and Health Grants Program

USAID's Child Survival and Health Grants Program (CSHGP) works through U.S. private and voluntary organizations (PVOs), NGOs, and their local partners to support projects integrating cutting-edge interventions, specifically maternal, newborn, child health, and TB, at household and community levels.

Grantees consistently demonstrate improvements in health outcomes in their largely underserved project areas, addressing major service delivery challenges. In 2007, CSHGP supported 57 projects implemented in 32 countries by 40 U.S. PVOs in collaboration with ministries of health and local NGOs. The grants program presents important opportunities for operations research on packaging and delivering new or high-impact interventions and delivery modalities for reaching underserved populations, and provides country-specific evidence for policy consideration.

Country-level examples of research by CSHGP partners include:

Rwanda: Building upon an initial successful NGO collaboration (International Rescue Committee, Concern Worldwide, and World Relief) piloting community case management for malaria in partnership with Rwanda's National Malaria Control Program (2004–2006), a second collaborative research study (PVO-MOH) is currently examining factors associated with the quality of care provided by community health workers for children with additional diseases or disorders. The study will contribute to the evidence base for the design of integrated community case management programs that address malaria, pneumonia, and diarrheal diseases.

Mozambique: World Relief, in collaboration with the CORE Group and Johns Hopkins University, conducted a validation study focusing on the impact of the community-based Care Group model in the Chokwe District using two methods: 1) a community-based vital registration and disease surveillance system instituted by the program and 2) a rigorous DHS method using pregnancy histories. A 66 percent drop in infant mortality and a 62 percent drop in under-5 mortality were documented in three years using a vital registration system with data collected by community volunteers.¹

Philippines: CSHGP grantee International Aid is conducting a two-phase study on zinc in Sarangani Province to 1) determine key issues affecting the treatment of diarrhea in children, including identification of local concepts related to diarrhea prevention and cure, and 2) evaluate the acceptability of zinc as a treatment, the effectiveness of proposed messages, and the importance of pricing. Since zinc as a treatment for childhood diarrhea has not yet been introduced in the Philippines, the study aims to establish an evidence base for informing the Department of Health about the feasibility of zinc introduction in rural areas.

Further strengthening the contribution by CSHGP partners to introduction and implementation research, a primary emphasis on innovation was created with the FY 2008 five-year award cycle. This emphasis allows PVOs/NGOs to develop and apply innovative tools and research methods and catalyze the uptake of community-oriented program models.

To support this emphasis, the CORE Group convened 155 representatives from 62 organizations to promote dialogue and action to strengthen PVO participation in global health research in 2008.² Presentations highlighted research findings and innovative program designs in

¹ Edward E. et al. Examining the evidence of under-five mortality reduction in a community-based programme in Gaza, Mozambique. *Transactions of the Royal Society of Tropical Medicine and Hygiene* (2007), Vol. 101, Issue 8, pp. 814-822.

² The CORE Group is an association of 47 international health and development NGO members in more than 180 countries, including eight technical working groups that facilitate collaborative learning and action.

key areas of interest to the PVO community. Topics included community case management, community-level distribution of artemisinin-based combination therapy (ACT), community-based newborn care, postpartum care, CHW motivation, promotion of insecticide-treated net (ITN) use, family planning, community responses to TB, assessing equity and social determinants of health in PVO programs, measuring community capacity, and applications of the Child Survival Sustainability Assessment (CSSA) framework.³

For more information on specific grant programs, please visit the Child Survival Technical Support+ Web site at www.childsurvival.com/projects/active_projects.cfm?sort_type=pvo.

Key Partners in Maternal and Newborn Health Research and Introduction

Abt Associates
Bill & Melinda Gates Foundation
Boston University
Concern Worldwide
CORE Group
European Commission
ICDDR,B (Bangladesh)
International Aid
International Confederation of Midwives
International Federation of Obstetricians and Gynecologists
International Research Committee
JHPIEGO
Johns Hopkins University
Host government ministries of health
National Institutes of Health
ORC/Macro
PATH
Saving Newborn Lives/Save the Children
Schering-Plough
The Futures Group
The Partnership for Child Health Care, Inc./BASICS
U.K. Department for International Development
University of Aberdeen (Scotland)
University Research Corporation
Wellcome Trust
WHO
World Relief
Wyeth

³ http://www.coregroup.org/resources/meetings/april08/2008_Research_Brief.pdf.

Nutrition

Issues and Rationale

Nearly one-third of children in the developing world are chronically malnourished, and 2 billion people suffer from micronutrient deficiencies. Undernutrition is the underlying cause of 3.5 million deaths – 35 percent of the disease burden in children younger than 5 years and 11 percent of total global disability-adjusted life years (DALYs).¹ Vitamin A deficiency affects more than 254 million children, impairing their immune systems and causing blindness, early morbidity, and mortality. Iron deficiency is one of the primary causes of anemia, which

is responsible for 22 percent of maternal deaths and 24 percent of perinatal deaths.

USAID’s systematic and coordinated research-to-use strategy, first reported in the June 2005 Health-Related Research Report to Congress, addresses vitamin A deficiency, zinc, iron anemia prevention and treatment packages, and community-based management of acute malnutrition (CMAM), formerly known as community therapeutic care for the management of severe acute malnutrition. This report further outlines an additional

Nutrition Research Strategy 2006–2010

Total FY08: \$2,350,810	
Strategy Themes	Areas of Research and Introduction: Five-Year Strategy
Vitamin A Deficiency–Prevention and Control	Establish effectiveness of newborn dosing in Asia to reduce infant mortality and delivery approaches in an effective and cost-effective manner
	Establish effectiveness of maternal vitamin A supplementation in reducing maternal mortality
Zinc–Diarrhea Therapy and Prevention	Assess impact of inclusion of zinc into diarrhea treatment programs to reduce child morbidity and mortality
	Develop and support the implementation of effective use of zinc in diarrhea treatment programs
Iron–Anemia Prevention and Treatment Packages	Organize WHO/UNICEF consultation on safe delivery of iron to deficient children in order to provide programmatic guidance to countries and to identify and undertake priority research as appropriate
	Establish best practices for the increased coverage and implementation of reproductive health packages that include anemia control and prevention
	Determine the constraints to anemia control and develop programmatic options to overcome them
Dietary Quality and Diversity	Assess impact of micronutrient powders on treating anemia and other micronutrient deficiencies
	Prevent and cure undernutrition through use of lipid-based nutrient supplements
	Improve the measurement of dietary quality and diversity
Community-based Management of Acute Malnutrition (CMAM)	Implement developed and accepted WHO guidelines for community therapeutic care and home-based care in five countries
	Assess and identify suitable locations and institutions for local production of ready-to-use therapeutic foods (RUTF)
	Test alternative formulations of RUTF for cost and local effectiveness

¹ Maternal and Child Undernutrition Series, *Lancet*, January 2008, Vol. 371.

area of focus for the nutrition research strategy: dietary quality and diversity.

Areas of Research and Introduction

Vitamin A Deficiency – Prevention and Control

USAID is supporting confirmatory effectiveness and safety research to determine neonatal dosing of vitamin A to reduce mortality and morbidity. Operational research and analytical strategies are under way to guide efforts to expand sustainable vitamin A coverage through supplementation and food fortification delivery.

Two double-masked, cluster-randomized, placebo-controlled trials have been completed. The neonatal trial demonstrated that giving a single oral dose of vitamin A (50,000 IU) to Bangladeshi newborns shortly after birth reduced infant deaths by 15 percent. These results build upon the findings in South India, where newborn vitamin A reduced mortality in infants under 6 months by 23 percent, and in Indonesia, where it reduced mortality by 64 percent. The combined results suggest that giving newborns a two-cent oral dose of vitamin A can reduce their risk of dying by 21 percent. These findings show great promise for southern Asia, where newborn vitamin A could prevent 250,000 to 500,000 infant deaths each year.

Based on findings supported by USAID in the 1980s, vitamin A is currently distributed to children 6 to 59 months of age through child survival programs, reducing child mortality by 23 percent. These new findings indicate that early postnatal administration of vitamin A bolsters neonates' body stores of the vitamin in undernourished settings. The next steps involve operational issues related to the introduction of newborn dosing into programs and piloting them in multiple country settings. USAID supports a partnership that is designing and implementing pilot neonatal vitamin A programs with national governments in Nepal and Bangladesh.

A maternal dosing trial examining routine vitamin A supplementation of pregnant women in Bangladesh also was completed in 2007. As reported at the 2007 Micronutrient Forum meeting in Turkey, data showed no impact of maternal supplementation on perinatal, neonatal, or infant mortality to 12 weeks of age. This research replicated a Nepal maternal supplementation trial that had documented a 40 percent reduction in maternal mortality. The difference in impact appears to be due to differences between the sites, such as baseline pregnancy-related mortality and the prevalence of early

gestational vitamin A deficiency. In settings similar to that of the Bangladesh study, vitamin A supplementation appears to play no role in reducing risks of maternal, fetal, and infant mortality.

Zinc – Diarrhea Therapy and Prevention

USAID is supporting the revision of country-level diarrhea treatment policies and health worker training manuals in an effort to ensure priority countries integrate zinc into existing public health programs. Introduction trials in several countries have been completed, providing an understanding of how to increase the availability and uptake of zinc treatment in the public and private sectors. Models of private-sector engagement were tested and evaluated, such as social marketing through NGOs and commercial marketing through pharmaceutical companies.

In India, an effectiveness study tested the addition of zinc to the current case management package of diarrhea in a primary health care setting. The 24-hour prevalence of both diarrhea and acute respiratory infections (ARIs) were lower in the intervention communities, hospitalizations for diarrhea were reduced, and the prescription of drugs of unknown identity for diarrhea was lower. The study demonstrated that diarrhea is more effectively treated when caregivers receive education on zinc treatment and have ready access to supplies of oral rehydration salts (ORS) and zinc. This approach does not adversely affect the use of ORS; in fact, it greatly increases use of it.

USAID is conducting operations research in Uttar Pradesh, India, to determine the best strategies for ensuring zinc treatment is available to the approximately 30 million children under 5 in the state. USAID is identifying effective delivery strategies for reaching rural health providers, chemists, wholesalers, and caregivers with information on improved diarrhea treatment. Five delivery approaches are being tested over a six-month period to determine which are scalable, sustainable, and cost effective, and will increase the knowledge, prescription, and use of zinc with ORS to treat childhood diarrhea. Results of this operations research are expected by the end of 2008.

A study in Mali evaluated the operational issues and trends associated with the introduction of zinc for childhood diarrhea through first-level health facilities and community health workers. Promotion of zinc for diarrhea significantly increased ORS use and decreased

antibiotic use. Significant gains in coverage were observed when zinc was available at the community level.

An effectiveness trial in Pakistan distributed zinc tablets through public- and private-sector outlets, both in the community and at health facilities. Findings from this activity suggest that it is feasible to introduce zinc for the treatment of diarrhea in health systems at scale, especially through community health worker cadres, known in Pakistan as “lady health workers.” A social marketing scheme for the use of zinc and public-sector training led to a significant uptake of zinc and changes in prescribing patterns by private care providers and pharmacies.

Iron – Anemia Prevention and Treatment Packages

Inadequate iron intake is one of the primary causes of anemia, a disease that is responsible for 22 percent of maternal deaths and 24 percent of perinatal deaths and irreversibly compromises cognitive development in children. USAID is supporting targeted research on safe approaches for iron supplementation. Operations research is under way to develop best practices for the increased coverage and implementation of maternal health packages that include anemia control and prevention.

To combat maternal anemia, USAID analyses generated solutions to supply and logistics problems that had been major program barriers in the past. Now more than 3.3 million pregnant women in Uttar Pradesh and Jharkhand states in India have access to iron-folic acid (IFA) supplementation as a direct result of USAID intervention to ensure the availability of IFA tablets as part of reproductive health packages.

As a result of a USAID-supported prevalence study documenting high levels of helminth infection (a cause of anemia) in children 6 to 24 months and their mothers, the Government of India’s child anemia package now includes deworming for infants and older children, and deworming will be incorporated into the biannual vitamin A distributions in both states.

In Bangladesh, enrollment has been completed in a study to assess the effect of iron and zinc supplementation given on alternate days compared with giving them together in a combined supplement. Data analysis will be completed by the end of 2008, providing insight to the safe delivery of iron to deficient children.

Dietary Quality and Diversity

Infant and young child feeding is part of a continuum of critical nutrition and health practices that begins during pregnancy and continues through at least the first two years of life. A package of key interventions includes maternal nutrition, immediate initiation and exclusive breastfeeding through the first six months of life, high-quality and high-quantity complementary foods, appropriate complementary feeding practices, and safe and active feeding during and after illness. USAID’s research strategy focuses on approaches to improve complementary foods, including enhancing the quality of complementary foods through micronutrient powders and nutrient supplements and improving measurement of dietary adequacy.

USAID supported the original efficacy studies for micronutrient powders and is now supporting an effectiveness study in Cambodia. This study will evaluate the effectiveness of providing infants 6 through 11 months of age with daily micronutrient powders – in addition to nutrition education targeted to caregivers to improve infant and young child feeding practices – for anemia, vitamin A and zinc deficiencies, and growth. Formative research was completed in Uttar Pradesh and Jharkhand in India to determine the acceptability and household use of micronutrient powders for reducing anemia in children 6 through 24 months of age.

Lipid-based nutrient supplements (LNS) are readily packageable and deliverable and potentially locally producible. Like other point-of-use supplements such as micronutrient powders (e.g., Sprinkles), LNS make it possible to provide the appropriate amounts of micronutrients needed by each age subgroup (e.g., 6 through 12 months, 12 through 24 months) regardless of how much food they eat and without the need to make major changes in dietary practices. They also provide essential fatty acids, which appear important in promoting growth of infants and young children.

LNS have been shown to improve linear growth of children, prevent severe stunting, reduce iron deficiency anemia, and enhance behavioral development when provided starting at 6 months of age. Recent evidence suggests that LNS are more effective than fortified cereal-legume blends for prevention of stunting. There is growing evidence of the importance of essential fatty acid intake during pregnancy and lactation, with consequences for child neurological development and maternal health. Thus, LNS may be a superior way to ensure adequate nutrition during these critical periods of the life cycle.

Over the next five years, USAID will work with international and national partners to identify effective interventions and delivery mechanisms that can be implemented by national governments at scale. USAID and its partners will work to:

Build the evidence base on the impact of LNS on:

- Prevention of chronic malnutrition through large-scale effectiveness trials in four to six countries.
- Prevention of seasonal increases in acute malnutrition through effectiveness trials in two to four countries, implemented in collaboration with Office of U.S. Foreign Disaster Assistance (OFDA)-funded implementing partners.
- The impact of integration of LNS into emergency food ration packages for prevention of acute malnutrition in vulnerable, disaster-affected populations through effectiveness trials in two to four countries, implemented in collaboration with OFDA- and Food For Peace-funded implementing partners.

USAID and its partners will also work to:

- Identify effective and sustainable public/private production and delivery mechanisms for broad-based programs aimed at prevention of chronic malnutrition and targeted programs aimed at prevention of seasonal increases in acute malnutrition.
- Develop and establish global guidelines and integrate LNS for both chronic and acute malnutrition into national health and/or private-sector systems in three countries.

Community-Based Management of Acute Malnutrition (CMAM)

Chronic malnutrition (stunting) affects approximately 178 million children under 5. Acute malnutrition (wasting) affects approximately 63 million children. Some children are both stunted and severely wasted. USAID works with partners to complete the necessary research and introduction activities to develop and establish global guidelines and introduce CMAM at the national level in five countries. USAID and partners work to strengthen research and activities related to national production of ready-to-use therapeutic foods (RUTF) in developing countries.

Internationally accepted normative standards and guidelines were developed to facilitate the integration of the CMAM approach into national health service systems. In May 2007, a Joint Statement by WHO/World Food Programme/United Nations Standing Committee on Nutrition/United Nations Children's Fund (UNICEF) was issued.²

With CMAM incorporated into national health systems to varying degrees in Ethiopia, Malawi, and Niger, USAID undertook a comprehensive review of the challenges, successes, and lessons learned from the experience in these three countries. The findings of these reviews will strengthen the understanding of how CMAM can be implemented in a sustained and successful way in post-emergency situations. The country reviews were carried out in 2007, and the country-specific and summary review reports will be completed in 2008.

Spotlight: Research-to-Use Model Ghana Tackles Malnutrition Through Community-Based Management of Acute Malnutrition

Despite advances in meeting economic targets and reducing poverty, food insecurity persists in Ghana, particularly in the north during the lean season from March to September. Acute malnutrition affects 7 percent of children under 5, which is 3.5 times the level expected in a healthy population.

USAID is working with UNICEF to support the Ghana Health Service (GHS) to integrate CMAM into the national health system. As a first step, a seven-day training workshop on management of severe acute malnutrition was held for Ghanaian health professionals, including frontline health care providers and nutritionists from throughout the country, June 20–27, 2007, in Accra, Ghana. During FY 2008, GHS is implementing key steps in the introduction and scale-up of CMAM services in Ghana, including strengthening the enabling environment for CMAM; improving access to CMAM services; facilitating access to CMAM supplies, including supporting the national production of ready-to-use therapeutic foods; strengthening the quality of CMAM services; and strengthening the competencies of health service providers for CMAM.

² Community-based Management of Severe Acute Malnutrition; A Joint Statement by the World Health Organization, the World Food Programme, the United Nations System Standing Committee on Nutrition and the United Nations Children's Fund, May 2007.

USAID is developing a CMAM cost-analysis tool to facilitate national planning of CMAM introduction and scale-up. The first phase of the cost-analysis tool was completed in FY 2007, and a draft tool will be finalized and field tested in Ghana in 2008.

USAID is supporting a study comparing the impact of supplementation with RUTF made with milk/peanut (MP-RUTF), soy/peanut (SP-RUTF), and corn soy blend (CSB) on recovery of children with moderate acute malnutrition (MAM) in Malawi. Blended foods such as CSB are commonly used to address MAM in children, and this study will provide information about the relative effectiveness of CSB and RUTF for such populations. Because MP-RUTF is relatively expensive, the study will also compare its effectiveness with that of SP-RUTF, which is about half the price. Final results will be available in 2008.

Key Partners in Nutrition Research and Introduction

Abt Associates

Academy for Educational Development

Bill & Melinda Gates Foundation

Canadian International Development Agency

Concern Worldwide

Global Alliance for Improved Nutrition

Host government ministries of health

ICDDR,B (Bangladesh)

International Food Policy Research Institute/Harvest Plus

Johns Hopkins University

Management Sciences for Health

National Institutes of Health

Saving Newborn Lives/Save the Children

UNICEF

United Nations Foundation

University of California at Davis

University of Malawi, College of Medicine

U.S. Pharmacopeia Drug Quality and Information

Valid International

Washington University in St. Louis

WHO

Acute Respiratory Infections

Issues and Rationale

Pneumonia is the largest single killer of children under 5 around the world. Nearly four children die from pneumonia every minute. Approximately 60 percent of pneumonia cases in the developing world are caused by bacteria and can be treated with antibiotics.

Areas of Research and Introduction

A key objective of USAID’s investment to manage pneumonia is supporting the introduction and implementation of country-level programs for non-severe pneumonia in areas with barriers to access to care. Ongoing research and introduction efforts will build on this evidence-based approach, including investigating the management of severe pneumonia at the community level and facilitating the joint treatment of pneumonia and malaria, along with diarrhea – also known as community case management (CCM).

Introduction efforts for community management of non-severe pneumonia are under way in Madagascar, Rwanda, the Democratic Republic of the Congo, Nicaragua, Cambodia, and Benin. This work, undertaken in partnership with host governments, NGOs, and UN agencies, is anticipated to expand under USAID’s recently announced Maternal And Child Health (MCH) Strategic Approach programming.

Current WHO guidelines advise health workers to refer severe pneumonia cases to hospitals for treatment with antibiotics by injection. However, many children with severe pneumonia who are currently referred for admission to a hospital either die prior to arrival or are so ill by the time they arrive that nothing more can be done to save them.

A multicenter study in Pakistan demonstrated the equivalency of treating severe pneumonia with oral antibiotics at home to treatment in a health facility. This study built upon the findings of a previous trial conducted in Africa, Asia, Europe, and Latin America which showed that oral antibiotics were just as effective as injectable antibiotics in treating hospitalized children with severe pneumonia. Ongoing research is testing the validity and safety of this approach in additional representative countries. A companion study will document the ability of community health workers to both diagnose and treat severe pneumonia entirely in the community.

This research, when completed, will strengthen the way pneumonia is managed in developing countries while saving a significant number of lives every year and taking pressure off strained tertiary facilities.

A study from Bangladesh showed that routinely vaccinating infants against H. influenzae type b (Hib), a

Acute Respiratory Infections Research Strategy 2006–2010

Total FY08: \$638,000	
Strategy Themes	Areas of Research and Introduction: Five-Year Strategy
Community Treatment of Non-severe Pneumonia	→ Conduct demonstration studies in selected countries
Community Treatment of Severe Pneumonia	→ Effectiveness studies of outpatient and community health worker treatment of severe pneumonia
Joint Treatment of Malaria and Pneumonia	→ Effectiveness studies of antibiotics with artemisinin-based combination therapy (ACT)

bacterium that causes deadly Hib pneumonia and meningitis, could save hundreds of thousands of children in Asia. Results showed that routine immunization of infants with an Hib conjugate vaccine prevented more than one-third of life-threatening pneumonia cases and approximately 90 percent of Hib meningitis cases. A similar impact would be expected in other parts of the region. India and Bangladesh are anticipated to add Hib vaccines into their national programs.

Key Partners in Acute Respiratory Infection Research and Introduction

- Aga Khan University
- Boston University
- Children's Hospital, Islamabad
- Host governments
- ICDDR,B (Bangladesh)
- Johns Hopkins University
- Nongovernmental organizations
- UNICEF
- WHO

Reproductive Health and Family Planning

Issues and Rationale

Family planning reduces unintended pregnancy and consequently reduces abortion, improves birth spacing, and enables couples to achieve their desired family size. Thus, a wide range of contraceptive choices ultimately promotes maternal health and child survival.

In addition to the unmet need for contraceptives, nearly every developing country needs substantial improvements in coverage and quality of family planning services and effective ways to reach out to youth, men, and the hard-to-reach urban and rural poor. For example, access to services that can provide a minimal range of contraceptive options is not available to 75 percent of people living in sub-Saharan African countries.

Areas of Research and Introduction

Contraceptive Research and Development Program

The objective of USAID’s contraceptive research and development program is to improve and expand family planning use through provision of new and improved contraceptive methods, including methods that also reduce the transmission of HIV and other sexually transmitted infections (STIs).

Contraceptive Research

Results of a nested pharmacokinetic study of the NES/EE contraceptive vaginal ring showed that the manufactured ring was as effective as the handmade ring previously tested, allowing for the start-up of Phase III trials.

Reproductive Health and Family Planning Research Strategy 2006–2010

Total FY08: \$29,673,000	
Strategy Themes	Areas of Research and Introduction: Five-Year Strategy
Contraceptive Research	→ Improve and expand the range of barrier methods
	→ Develop and improve fertility awareness-based methods
	→ Develop long-acting hormonal methods in novel delivery systems
	→ Develop and improve other long-acting and permanent methods
Improving and Expanding the Use of Contraceptive Methods and Services	→ Improve and expand the use of barrier methods
	→ Improve and expand the use of hormonal methods
	→ Improve and expand the use of fertility awareness-based methods
	→ Improve and expand the use of long-acting and permanent methods
Improving Approaches to Address Unmet Need for Family Planning Services of Underserved Groups	→ Improve service delivery approaches to reach underserved populations, including postpartum women, the urban poor, and men
	→ Determine effective and appropriate programs to improve the reproductive health of youth
	→ Identify effective models to provide family planning safely through rural community networks, especially in Africa
Improving Integration of Family Planning and Other Health Care Services	→ Improve the integration of family planning into MCH, HIV/AIDS, and other health services
	→ Assess cost efficiency of integrated services

Preliminary results indicate good contraceptive effectiveness and minimal side effects.

Pfizer and Becton-Dickinson developed an agreement to supply Depo-Provera injectable contraceptive in the novel Uniject™ for USAID distribution.

A comprehensive worldwide review shows that progesterin-only contraceptive injectables are safe for use by women with sickle-cell anemia – particularly relevant in sub-Saharan Africa, where Depo-Provera is highly popular and sickle-cell disease is widespread.

Improving and Expanding the Use of Contraceptive Methods and Services

Developed by USAID-supported researchers using complex data analysis, the Standard Days Method (SDM) helps couples to recognize when they are most fertile and avoid unprotected sex during fertile periods of the menstrual cycle. Studies on long-term continuation rates of SDM showed that the 36-month continuation rate was 67 percent, with most discontinuing for a desired pregnancy. Among the users, total pregnancy rates in years two and three were 2.8 percent and 4.7 percent, respectively. SDM has been successfully expanded in several countries. In Peru, SDM is currently available in 1,400 clinics; in the Democratic Republic of the Congo, the method is available in 181 health zones (an increase of 110 percent from 2006); and in Guatemala, SDM is available in 30 percent of the departments in the country and through 38 social security institute health units.

USAID-supported research previously demonstrated the safety and feasibility of provision of Depo-Provera by trained local members of the community. This finding and the materials developed are being used to promote community-based distribution of Depo-Provera throughout Africa.

Family Planning Operations Research

The objective of USAID's family planning operations research program is to improve the availability and effectiveness of family planning and integrated reproductive health care in developing countries. This objective is achieved through assessing the needs and gaps in existing programs, developing new program and service delivery

approaches to address these gaps, developing tools and materials to improve provider performance, and improving the capacity of communications and behavior change programs to increase client awareness and use of existing services.

Improving Approaches to Address Unmet Need for Family Planning Services of Underserved Groups

The Kenya Ministry of Health (MOH) endorsed and is now scaling up a nationwide program to provide midwifery services at the community level. The community midwife is self-employed and provides maternal and newborn care, as well as family planning for postpartum women.

USAID supported the development of a multisectoral model for addressing adolescents' reproductive health needs in Kenya and Senegal. The program involves ministries of health, education, and youth and reaches in- and out-of-school youth, their families, and community members. Following development of this approach, guidance is being prepared in Senegal on developing and costing adolescent reproductive health operational plans. The educational and training curricula have been adopted as national documents for in-school youth, providers, and peer educators. The government has successfully leveraged support from multiple donor organizations for capacity building, advocacy, and expansion into new regions. The model is now being introduced into Burkina Faso and Mauritania.

A simple quality assurance tool designed to improve family planning service delivery, developed with USAID support, is now being used in all districts of Gujarat, and the Ministry of Health and Family Welfare of India is now scaling it up in six more states with technical assistance from USAID-supported implementing partners.

Coupled with effective training, checklists can be important tools for health care workers at various levels to apply the latest WHO medical eligibility criteria and guidelines for contraceptive use. Use of these specialized tools developed with USAID support is leading to increased access to family planning services. The pregnancy, Depo-Provera, oral contraceptive, and IUD checklists have been introduced and scaled up in Romania. The Kenya MOH has launched a country-

wide initiative to train providers in their use. These checklists have also been included in the national norms and standards of Madagascar and Senegal.

Improving Integration of Family Planning and Other Health Care Services

Systematic screening is a simple checklist tool that is effective for improving the integration of clinical maternal and child health and family planning services and increasing provider productivity. In a systematic screening strategy, health care providers first identify each client's needs and desires for services using a checklist or brief questionnaire. Then they provide these services either during the same visit, through a separate appointment at the same health facility, or through referral to another facility. The tool is being scaled up in Senegal and India, and is now being introduced in Bangladesh and Madagascar.

Following endorsement by the MOH in Egypt, a USAID project is building national capacity for integrating family planning within postpartum services with a special emphasis on enhancing the correct use of the lactational amenorrhea method (a contraceptive method based on the natural postpartum infertility that occurs when a woman is amenorrheic and fully breastfeeding). Scaling up will be done in collaboration with the USAID bilateral project and will result in an updated national Standards of Practice manual and training manual for postpartum family planning.

The module "Contraception for Women and Couples with HIV," developed by USAID-supported cooperating agencies, is being adapted by the U.S. Centers for Disease Control and Prevention (CDC) to be included in its new initiative, "Prevention with Positives" in Kenya, Namibia, and Tanzania. The module is also being used in several other African countries, including Nigeria, South Africa, and Uganda.

Key Partners in Reproductive Health and Family Planning Research and Introduction

Becton, Dickinson and Company

CONRAD

Extending Service Delivery

Family Health International

Georgetown Institute for Reproductive Health

PATH

Pfizer

Population Council

Schering AG

WHO

HIV/AIDS

Areas of Research and Introduction: Five-Year Strategy 2006–2010	Vaccines	FY 2008 Funding: \$77,012,500
	Microbicides	
	Applied research and public health evaluation	

Issues and Rationale

HIV infection rates continue to rise in many developing countries. An estimated 2.5 million new infections occur every year, and no cure is available. Infected persons worldwide number nearly 33 million. In sub-Saharan Africa, almost 60 percent of infected individuals are women.

Current strategies for preventing HIV infection, including delay of sexual debut, partner reduction, and use of condoms, are not possible for many women in developing countries. Novel technologies to prevent new HIV infections are needed to complement current effective methods of HIV prevention. All existing and developing HIV/AIDS prevention approaches must be tailored for different disease situations and target populations.

Areas of Research and Introduction

Since 2001, responding to congressional directives, USAID, now through the U.S. President’s Emergency Plan for AIDS Relief (PEPFAR), has funded the International AIDS Vaccine Initiative (IAVI), a nonprofit organization that acts as a virtual pharmaceutical company to accelerate the development and clinical testing of HIV vaccine candidates. IAVI facilitates collaboration among university, government, and private-sector groups to ensure that the appropriate resources are available for each phase of product development.

USAID support of microbicide research has led to the development of several potential products, two of which – Tenofovir 1% Vaginal Gel and Oral Truvada in Women – are in the final stages of international clinical trials to evaluate safety, effectiveness, and acceptability in preventing or decreasing HIV transmission. USAID supports targeted activities to ensure that after testing is completed, introduction and distribution of microbi-

cides will be expedited in the developing country populations where the need is greatest.

USAID supports applied research and public health evaluations to provide local implementing partners, donors, and national governments with the evidence base to improve HIV/AIDS services and inform policy. Specifically, projects are undertaken to facilitate 1) improved solutions to HIV/AIDS service delivery issues, 2) improved utilization of applied research results, 3) improved capacity of developing country organizations to conduct applied HIV/AIDS research and use research results, and 4) new and improved HIV/AIDS program models available in developing countries.

Vaccine Development

An effective AIDS vaccine will significantly advance a comprehensive prevention strategy. The search for this promising HIV prevention tool must be intensified despite the distinct challenge of developing and introducing such a product. Although scientific advances in defining how the human immune system may protect itself against HIV are unfolding, the hope for an effective vaccine remains elusive. In 2007 and 2008, two pivotal National Institutes of Health (NIH) trials have redirected the field to put more emphasis into fundamental research, taking a step back to re-examine the earliest events in natural infection to inform vaccine design.

Through IAVI, USAID supports biomedical research in all phases of HIV vaccine clinical research and development (R&D) and other activities pivotal to the field. For IAVI’s part, its R&D is focused on developing and evaluating novel vectors and vaccine designs, and testing them in nonhuman and human trials while preparing communities so they can understand the wide variety of HIV vaccine trial results. IAVI supports the Neutralizing Antibody Consortium and Live-Attenuated Consortium to inform immunogen design to elicit broadly neutralizing antibodies against HIV – key to the eventual success of an AIDS vaccine. They also support exceptional core immunology laboratory operations, which have driven regional quality standards and yielded new information about normal laboratory values for reference ranges.

In keeping with the mission of USAID, IAVI’s work also builds local capacity at trial sites in human resources,

laboratory, clinical, IT, and other sustainable infrastructure while establishing reliable incidence and prevalence estimates through extensive cohort studies that define early HIV infection immunologic events and guide decisions on where large-scale efficacy trials may be possible for vaccines and other new prevention technologies. USAID advisors ensure that IAVI establishes referral patterns to interface with existing U.S. Government (USG) programs for HIV/AIDS treatment, care, and prevention services under PEPFAR and the Global Fund to Fight AIDS, Tuberculosis and Malaria while strengthening the capacity to accelerate clinical trials of AIDS vaccines in developing countries. These synergies will set the stage for eventual product introduction and distribution. To inform public policy, USAID's partnership with IAVI supports analytical models to forecast estimates of global demand for AIDS vaccines.

Although widespread treatment programs are dramatically impacting the epidemic, they represent a lifelong commitment fraught with logistical burdens and reach only a fraction of those in need. Strategically expanded and sustainable treatment programs, in combination with new prevention technologies such as vaccines and microbicides, provide the best hope for extinguishing the AIDS pandemic or, at the very least, controlling its expansion.

Vaccines classically work by eliciting antibodies capable of disabling a virus from causing disease, but it has proven difficult to stimulate a protective antibody response against HIV. Equally elusive is the production of functional cellular responses able to thwart the transmitted virus. Among the serious challenges HIV poses to scientists trying to develop effective vaccines capable of counteracting the virus are its high rate of genetic variability, its capacity to escape natural immunity early after infecting its host, and its relentless ability to establish latent reservoirs of infection.

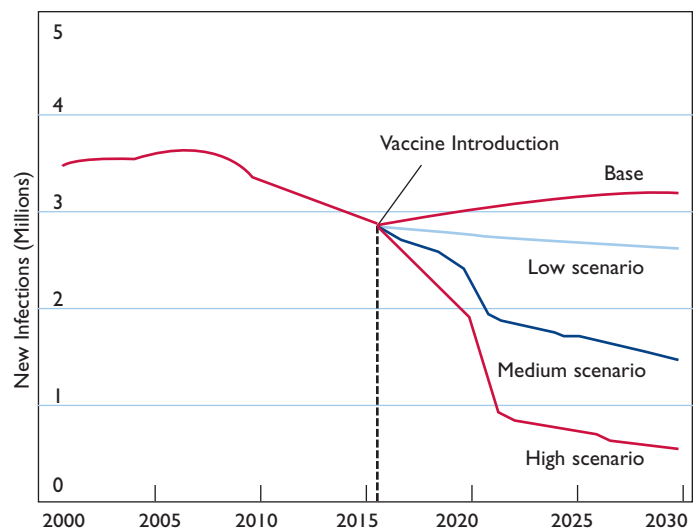
Scientists are particularly focused on a few essential areas of viral behavior to inform and accelerate vaccine discovery. Among the most important efforts are the need to develop more reliable animal models that may be more predictive of HIV pathology and resistance in humans; to understand early events in HIV infection; to understand the behavior of HIV and how it does irreversible damage to the host, and how host genetic profiles affect HIV acquisition and disease progression; to discover how protection can be mobilized to the infection site while defining the structures on the HIV envelope that are the targets to broadly neutralizing antibodies; to design a man-made vaccine capable of inducing

antibodies that can be effective against many strains of HIV; and to optimize lab techniques capable of more accurately and quickly measuring responses to HIV candidate vaccines, particularly in resource-poor areas.

As candidate vaccines are developed, they must be tested – despite the challenges, potential risks, and expense – while in parallel, plans are created for their eventual roll-out to weaken the grip of the global HIV burden. It is likely that first-generation HIV vaccines will be only partially protective, unable to prevent transmission and subsequent infection but effective enough to create immune responses that can mitigate the disease.

Epidemiological modeling exercises suggest these tools would nonetheless be powerful and result in stemming the flow of the pandemic. An AIDS vaccine could avert millions of infections in developing countries, and vigorous efforts to continue the biomedical search for this tool are imperative.

Possible Scenarios for the Impact of an HIV Vaccine



Source: International AIDS Vaccine Initiative (2006), "The Impact of an AIDS Vaccine in Developing Countries: A New Model and Preliminary Results." Policy Research Working Paper #8. New York: IAVI. Available from <http://www.iavi.org/viewfile.cfm?fid=41748>.

Lessons are being applied from new tools for other STI, TB, and malaria control as they emerge. Plans are ongoing for the introduction of, and future access to, safe and effective HIV vaccines in developing-country settings, including engaging host country governments to register the new products, managing supply chain and logistics of vaccine delivery, developing acceptable protocols, and training health care workers to integrate this new technology into the dynamic landscape of HIV prevention.

Looking to the future, as promising vaccine candidates are identified, USAID will keep policymakers and opinion leaders informed regarding the need for sustained support of AIDS vaccine R&D while holding fast to the notion that HIV vaccine research and development is a relevant component of the comprehensive global AIDS response within a robust development agenda.

Microbicides

Current strategies for preventing HIV infection are not available to many women in developing countries. Microbicides are a new class of health products that would provide women with an effective chemical barrier to sexually transmitted HIV. USAID's strategy to promote the development of microbicides is to focus support on the advanced testing of the most promising candidates available. Clinical trials demonstrating the effectiveness of these products must be completed for

their approval by the appropriate regulatory agencies. Proof of concept (demonstration of effectiveness at reducing the risk of HIV acquisition) will speed up the availability of the best product, stimulate the future development of alternative or better products, permit the determination of the most appropriate preclinical models for evaluation of candidate products, and attract additional resources, investigators, and donors.

USAID's role in microbicide development is coordinated through extensive representation and collaboration with the efforts of other USG agencies, as outlined in the 2006 HRRD.

The history of pharmaceutical development shows it is usually necessary to evaluate clinically a number of product leads because a portion will be eliminated, even at advanced stages of testing. In 2006 and 2007, this had

Microbicides Research Strategy 2006–2010

Total FY08: \$44,635,000	
Strategy Themes	Areas of Research and Introduction: Five-Year Strategy
2006	<ul style="list-style-type: none"> → Continue Phase III large-scale clinical effectiveness trials initiated in FY 2004 and FY 2005 → New clinical trial sites for Ushercell and Savvy to begin in Africa and India → Continue next-generation microbicide research/capacity building for future trials
2007	<ul style="list-style-type: none"> → Continue Phase III trials: Carraguard, Ushercell, and Savvy → Phase IIB/III trials: Tenofovir 1% Vaginal Gel and Oral Truvada in Women → Address policy and logistical issues for successful introduction into countries → Pursue transfer of manufacturing capacity to developing country sites
2008	<ul style="list-style-type: none"> → Ushercell and Savvy trials ended by Data Safety Monitoring Board (DSMB) → Phase IIB/III trials: Tenofovir 1% Vaginal Gel and Oral Truvada in Women → Final results of Carraguard trial available → Continue to address policy and logistical issues for introduction → Continue to transfer manufacturing capacity
2009	<ul style="list-style-type: none"> → Phase IIB/III trials: Tenofovir 1% Vaginal Gel and Oral Truvada in Women → Continue to address policy and logistical issues for introduction → Continue to transfer manufacturing capacity
2010	<ul style="list-style-type: none"> → Phase IIB/III trials: Tenofovir 1% Vaginal Gel and Oral Truvada in Women → Continue to address policy and logistics for introduction: procurement and financing distribution networks within public and private sector; health delivery systems, information needs, licensing safety → Potential need for additional trials to be determined

become the history of microbicide development as well. Since early 2004, USAID has moved five promising candidates – Carraguard, Ushercell (cellulose sulfate), Savvy (C31G), Tenofovir 1% Vaginal Gel, and Oral Truvada in Women – into the final stages of clinical testing in international trials for their safety, effectiveness, and acceptability in reducing the risk of HIV transmission.

At the recommendation of the respective Data Safety Monitoring Boards (DSMBs), the Phase III trials for Savvy and Ushercell have been ended. The Savvy trial was ended because trial data indicated that it was unlikely that there would ever be a sufficient number of seroconversions at the study sites to demonstrate whether Savvy had an effect or not. The Ushercell trial was ended because the number of seroconversions observed in the group using Ushercell exceeded the number in the group using the placebo to an extent that exceeded the predefined criteria for stopping the trial. Possible explanations for this outcome are being investigated.

The Carraguard Phase III trial is a milestone as the first large clinical trial for effectiveness to be successfully completed, although the results, publicly announced in February 2008, indicate that while the product is safe and acceptable, it did not significantly prevent infection in this trial. Despite this disappointing outcome, the Carraguard trial demonstrates for the microbicide field the feasibility and best practices of conducting large tri-

als with extensive community involvement in developing countries. The findings of this trial are also important because Carraguard is a key component of next-generation microbicide candidates.

The two trials still ongoing involve the use of a specific antiviral agent and unique delivery regimens that may ultimately help increase both user compliance and product effectiveness. These trials will be completed in 2010 and 2012. Other next-generation microbicide leads are in the product development pipeline and will also be tested clinically, if they continue to show promise in preclinical testing.

In FY 2008, USAID continues to support the large-scale, multiyear, clinical effectiveness trials for USAID-sponsored microbicide candidates that are currently under way. These Phase IIB/III trials are evaluating the Tenofovir 1% Vaginal Gel and Oral Truvada in Women in thousands of volunteers in international Phase III studies (see Table 2). These large clinical studies are required by the U.S. Food and Drug Administration, along with European and African regulatory agencies, to determine if these products can meaningfully reduce or prevent the sexual transmission of HIV. These trials in humans will evaluate the effectiveness of this prevention technology and have a critical role in the effort to demonstrate that a microbicide can be effective and make a significant contribution to reducing the risk of HIV infection. The initiation and

Table 1: USAID Cooperative Agreements for Microbicide Research and Development

USAID COOPERATING AGENCY	FY06 Funding (\$ thousands)	FY07 Funding (\$ thousands)	FY08 Funding (\$ thousands)
Population Council	7,150	7,227	6,505
CONRAD	14,097	13,982	13,506
Family Health International	13,776	12,551	14,913
WHO	100	406	837
Global Campaign for Microbicides	735	728	905
Int'l Partnership for Microbicides	2,347	2,500	3,269
CDC	623	1,405	2,715
PATH	286	676	1,004
AIM Project	186	125	351
Alliance for Microbicide Development	300	0	580
GH Tech	0	0	50
TOTAL	39,600	39,600	44,635

Table 2: Phase IIB/III Microbicide Studies Currently Supported by USAID

	Tenofovir 1% Vaginal Gel	Oral Truvada in Women
# of Sites and Locations	1 in South Africa	2 in Kenya 1 in Tanzania 2 in South Africa 2 in Malawi
Start of Screening and Enrollment	May 2007	July 2008
# of Volunteers to be Screened	980	3,900
Final Report Expected	Early FY 2010	Early FY 2012
USAID Partner Conducting Trial	Family Health International, CONRAD, CAPRISA	Family Health International

progress of these landmark trials confirm the success of the USAID strategy in this research effort and are conducted in collaboration with other agencies and donors to the greatest extent possible to share costs and maximize the speed and efficiency of this work.

Until one or more microbicides that are safe, effective, and acceptable are available for regulatory approval and introduction in developing countries, it is necessary to continue supporting research and development of the most promising next-generation microbicide leads. The present leads in the pipeline incorporate multiple agents that will prevent viral infection and inactivate the virus and/or prevent key replication steps. Careful targeting of funds to the essential early-stage research is required to allow these leads to advance to clinical testing.

In the next year, as in recent years, a large part of the USAID microbicide research and development budget will support the Phase III clinical studies for the most promising product leads. The remaining funds will be used to advance research on selected next-generation microbicide leads and develop capacity at sites for future clinical studies. This will entail targeted studies of local HIV incidence among risk groups and assessment and/or development of research capacity and community awareness in preparation for clinical trials of new microbicides. Some funds will be used to prepare for the needed policy and regulatory requirements that must be addressed for the approval and introduction of these new products.

In FY 2009, FY 2010, and FY 2011, the Phase IIB/III trials for the Tenofovir 1% Vaginal Gel and for Oral Truvada in Women will continue and be completed.

Applied Research and Public Health Evaluation

Through partners under Project SEARCH (Supporting Evaluation and Research to Combat HIV/AIDS), USAID carries out HIV/AIDS program research and public health evaluations to improve coverage, quality, and effectiveness of HIV/AIDS programs in developing countries. The project also aims to strengthen local capacity in HIV/AIDS operations research and public health assessments through training and in-country collaborations. Major tasks under this mechanism include:

- evaluation of service delivery models for HIV/AIDS prevention, care, and treatment programs.
- applied research to investigate effectiveness of interventions and translate results into public health guidelines.
- development of international standards and indicators for the purpose of program monitoring and evaluation.
- systematic analyses of clinical, community-level, and population-based epidemiological, demographic, and surveillance data.
- development and application of new technologies and intervention models in resource-poor settings.

Through FY 2008, a multicountry effort is under way aimed at developing and testing a comprehensive program model for preventing HIV among vulnerable girls. Project SEARCH partners participated in a PEPFAR international consultation on identifying HIV/AIDS applied research and evaluation priorities in developing countries.

Key Partners in HIV/AIDS Research and Introduction

Aga Khan University
AIM Project
Alliance for Microbicide Development
Bill & Melinda Gates Foundation
Boston University
CAPRISA
CONRAD
Constella Futures
Crucell
Elizabeth Glaser Pediatric AIDS Foundation
Family Health International
Global Campaign for Microbicides
Global Fund to Fight AIDS, Tuberculosis and Malaria
Global HIV/AIDS Vaccine Enterprise
International AIDS Vaccine Initiative
International Clinical Epidemiology Network
International Partnership for Microbicides
International Working Group on Microbicides
JHPIEGO
Johns Hopkins University
Macro International
National Institutes of Health
PATH
Population Council
Population Services International
QED Group, LLC/Global Health Technical Assistance
Synergy Project
University of North Carolina at Chapel Hill
University of the Witwatersrand, South Africa
U.S. Centers for Disease Control and Prevention
U.S. Department of Health and Human Services
U.S. Food and Drug Administration
U.S. Military HIV Research Program
U.S. President's Emergency Plan for AIDS Relief
WHO

Malaria

Areas of Research and Introduction: Five-Year Strategy 2006–2010	Vaccines	FY 2008 Funding: \$10,000,000
	New drugs, formulations, and approaches	

Issues and Rationale

Approximately 3.2 billion people worldwide live in areas at risk of malaria transmission. An estimated 300 million to 500 million become ill with malaria each year, and more than 1 million die. More than 80 percent of these deaths occur in sub-Saharan Africa. Although eradication efforts during the 1950s and 1960s successfully eliminated or controlled malaria in other parts of the world, malaria has remained a major killer in sub-Saharan Africa due to a combination of natural and social conditions, including an ideal climate for malaria transmission, poverty, and political instability. While anyone living in an area where malaria is transmitted can be infected, three populations are particularly vulnerable: children under 5, pregnant women, and people with HIV/AIDS. Malaria is a leading cause of death in African children, accounting for approximately 18 percent of deaths in children under 5.

Areas of Research and Introduction

Vaccines

In the 2006 HRRD, USAID reported the testing of a blood-stage vaccine, FMP1/AS02A. Although this trial showed no overall efficacy, it did provide important clues as to how to proceed with further R&D. In the meantime, a similar but more promising vaccine has been developed with USAID support. It is being tested in 2008 in the United States and, based on the results of the trial, a decision will be made whether to pursue further development in an endemic area.

As detailed in the 2006 HRRD, USAID’s Malaria Vaccine Development Program operates in the context of the worldwide malaria vaccine development effort, which focuses on vaccines for travelers, including military and diplomatic personnel, and vaccines for

residents of endemic areas, primarily children and pregnant women.

The most advanced malaria vaccine currently is RTS,S/AS02a (see the 2006 HRRD for details), developed by the Walter Reed Army Institute of Research (WRAIR) and GlaxoSmithKline Biologicals (GSKBio). It is on track for licensure through funding from the Malaria Vaccine Initiative (MVI) at PATH. Most recently, this vaccine was shown for the first time to have efficacy in infants, albeit at suboptimal levels – 35 percent at six months.¹

The results of another vaccine efficacy trial, performed in Mali in 2006–2007, will be disclosed in an unblinding in late FY 2008.

Because negative outcomes are expected in vaccine development, USAID is poised to continue the strategy it has used for more than a decade: creating a robust pipeline of investigational vaccines, the most promising of which will be evaluated in field trials for efficacy. Failures during the development process are normal, so this pipeline is necessary. USAID will continue this strategy because although RTS,S/AS02a could be an adjunct to current control measures, it is not optimal. However, it does give encouragement that more advanced vaccines will be more efficacious.

To further this strategy, USAID will continue to work closely with partners, both those funded by USAID—MVI, U.S. Department of Defense, and, since 2007, National Institute of Allergy and Infectious Diseases (NIAID)—as well as those with whom USAID coordinates activities without provision of funding. The new agreement with NIAID is designed to expand both USAID’s and NIAID’s partnerships in malaria vaccine development. The initial activity of this new agreement was a meeting on “Rational Design of Children’s Malaria Vaccines,” which took a fresh look at strategic and tactical issues in malaria vaccine development. USAID and NIAID served as the organizing committee for this meeting on behalf of the malaria vaccine community. The main purpose of the meeting was to enhance the strategic alliance among the funders in the most innovative manner possible. USAID expects

¹ Fact Sheet: Malaria-038 Trial of RTS,S, October 17, 2007: http://www.malariavaccine.org/files/101707/MAL_038_Fact_Sheet_Oct_15_Final%20version%202.pdf

to invest in new vaccine platforms that exploit emerging technologies to enhance the immune response.

Figure 1 outlines USAID’s current and planned malaria vaccine development activities, assuming continued support for efforts to develop new vaccines shown to be efficacious.

New Drugs, Formulations, and Approaches

USAID has a two-pronged malaria drug development strategy:

(1) Discovery and development of new antimalarial drugs and drug formulations, especially those that will be affordable to populations living in malaria-endemic

areas and that will target pregnant women and children under 5, the two most vulnerable groups

(2) Operational and field research that lays the groundwork for the safe and effective use of existing and new antimalarial drugs and drug combinations by national malaria control programs

Since 2004, USAID has provided \$1.5 million per year to the Medicines for Malaria Venture (MMV), a non-profit, public-private partnership created to replenish and then sustain the global pipeline of antimalarial drugs. MMV’s goal is to register at least one new antimalarial drug every five years, with an emphasis on drugs that are effective against drug-resistant strains of *Plasmodium falciparum* and can be used safely in young

Figure 1. USAID Malaria Vaccine Development Program Activities

Research Phase: Development	2006	2007	2008	2009	2010
Field Trials	Kenya Mali				
Preliminary Efficacy Trials	United States				
Safety Trials	United States →				
Laboratory Support of Trials	[Bar spanning 2006-2009]				
Development and Implementation of Next-Generation Approaches	[Bar spanning 2006-2009]				
Preparation for Introduction					
Advanced Development				→ Dependent on study findings	

Source: USAID

Spotlight: Research-to-Use Model

Improving Access to Malaria Treatment Through Community Drug Kits

The Save the Children project in Sikasso Region of Mali, funded by USAID's Child Survival and Health Grants Program¹ (CSHGP), is increasing community-level access to treatment for malaria through large-scale implementation of community-managed drug kits in five districts, covering a total population of nearly 1 million. By partnering with the Ministry of Health (MOH) at the health center, district, and regional levels, the project has maximized both the scale and the potential for sustainability of this intervention. It has strengthened government capacity at the health center level to train and support community-level activities, and has put management systems in place at the community level to ensure honest and effective management of the drug kits in a way that will not depend on project support.

In addition, in partnership with the University of Bamako and the Johns Hopkins Bloomberg School of Public Health, USAID funded an operations research study documenting the effective distribution and use of artemisinin-based combination therapy (ACT) through community-based drug kits. These combined efforts coincide with the national policy retiring chloroquine from use and the project's establishment of support structures for community treatment. With the increasing ineffectiveness of chloroquine and other antimalarial drugs, the international community is seeking effective treatment without losing the access and potential for early treatment that has been possible to date. The project is thus uniquely situated to implement ACT distribution at the community level on a large scale.

Save the Children recently completed a mid-term evaluation of the project that demonstrated effectiveness in establishing and sustaining community-based drug kits in five districts of Sikasso Region. At present, there are 478 drug kits in 79 functioning health center areas, operating with community management and oversight. Health centers provide support, including resupplying the drugs and carrying out monthly meetings for the community volunteers in their areas. The majority of drug kits are achieving cost recovery and are providing more than half of the malaria treatments in the five districts.

The regional MOH reviewed and accepted the operations research results and presented the results at the national level. Based upon the research findings, the MOH has now also agreed for Save the Children to make ACT available through Kolondieba District through community-based drug kits to improve access for early malaria treatment. Save the Children is working with a MOH technical working group that is reviewing Mali's experiences with community health workers. It is hoped that continued advocacy with this group will lead to a decision to make effective malaria treatment available at the community level throughout Mali.

¹ CSHGP is housed in the USAID Bureau for Global Health's Office of Health, Infectious Diseases and Nutrition (GH/HIDN). GH/HIDN strongly supports the role and contribution that PVOs/NGOs and their local partners play in improving the quality of life of some of the most disadvantaged populations in developing countries.

children and pregnant women. The research and development activities are carried out at a broad variety of institutions, comprising more than 40 academic and pharmaceutical organizations located in 10 countries, including the United States. MMV currently has a portfolio of 38 different pharmaceuticals at various stages of development, from initial laboratory studies to Phase III field testing and registration. Several of these products are of particular interest to USAID:

- A pediatric formulation of lumefantrine-artemether (Coartem), which is expected to be registered in 2008
- Dihydroartemisinin-piperaquine and lapdap-artesunate, two new artemisinin-based combination therapies (ACTs), which should have their dossiers submitted to regulatory authorities in 2008

- Pyronaridine-artesunate, a third new ACT that has already been used for several years in China

To complement this funding, USAID also supports the UNICEF/United Nations Development Program (UNDP)/World Bank/WHO Special Programme for Research and Training in Tropical Diseases, which has focused on operational and field research related to ACT and artemisinin drugs. These activities include:

- a registry in countries using ACTs to assess the safety of these combination drugs in pregnant women.
- evaluations of the use of ACTs by community health workers with and without rapid diagnostic tests.
- evaluations of the integrated management of malaria and acute respiratory illnesses at the community level.

Key Partners in Malaria Research and Introduction

Center for Vaccine Development

GenVec, Inc.

GlaxoSmithKline, PLC

Host countries

Johns Hopkins University

Kenya Medical Research Institute

Malaria Research and Training Center

Medicines for Malaria Venture

National Institute of Allergy and Infectious Diseases

PATH's Malaria Vaccine Initiative

UNICEF/UNDP/World Bank/WHO Special Programme
for Research and Training in Tropical Diseases

USAID country Missions

U.S. Naval Medical Research Center

Walter Reed Army Institute of Research

WHO

Tuberculosis

Issues and Rationale

Tuberculosis (TB) is one of the world's deadliest infectious diseases, with an estimated 9.2 million new cases and approximately 1.5 million deaths each year. TB disproportionately affects poor countries and marginalized populations, with developing countries accounting

for 95 percent of all TB cases and 98 percent of all TB deaths.

Areas of Research and Introduction

USAID invests in research that will improve the performance and public health impact of country-level TB

Tuberculosis Research Strategy 2006–2010

Total FY08: \$8,400,000	
Strategy Themes	Areas of Research and Introduction: Five-Year Strategy
New Drugs Improved Regimens	Identify and introduce new, shorter treatment regimens, new second-line drugs for resistant disease, and drugs compatible with antiretrovirals (ARVs) for HIV; supporting trials of drugs at Phase IIB and beyond
	Evaluate different formulations and combinations of drugs (existing and new) for effectiveness and impact on resistance
New Diagnostics	Increase the sensitivity and specificity of existing diagnostic technologies in individuals with and without HIV infection
	Evaluate new diagnostic technologies that more easily detect TB in individuals with and without HIV infection, enable rapid detection of drug resistance, and detect latent TB infection; supporting trials of diagnostics at Phase IIB and beyond
New Vaccines*	Test a vaccine that prevents infection with TB; supporting trials of vaccines at Phase III and beyond
	Develop an effective vaccine to protect TB-infected individuals from developing TB disease; supporting trials of vaccines at Phase III and beyond
Improve the Care of Persons Infected With TB and HIV	Improve diagnosis of TB among HIV-infected individuals
	Improve detection of latent TB in HIV-infected individuals
	Evaluate efficacy and safety of TB drug regimens used in combination with ARVs for children and adults
	Test approaches to increase HIV testing among TB patients as an entry point to care
Improve the Performance of and Accessibility to DOTS Programs	Determine effective initiation, duration, and programmatic impact of preventive therapy regimens in consideration of ARV use
	Monitor patterns of drug resistance, TB-HIV, and TB prevalence**
	Enhance laboratory and program readiness for the adoption of new tools
	Evaluate innovations in service delivery to improve case finding, increase access to treatment, and improve program performance
	Build and utilize capacity for clinical trials in priority countries
	Identify and address epidemiological risk factors for TB such as tobacco and diabetes

* It is not anticipated that this work will begin until 2011.

** As much of this work is considered routine surveillance, costs are not included in the total research budget.

programs while mitigating the risks of drug resistance by 1) reducing diagnostic delay, 2) reducing the duration and improving efficacy of treatment, 3) preventing disease, and 4) increasing access to directly observed treatment, short course (DOTS).

Tremendous momentum is building toward the development of new tools to fight TB. New diagnostics are being tested in the field and adopted into global policy; new drugs that may be effective for drug-sensitive and drug-resistant disease are progressing into Phase III trials, and new vaccines may be ready for Phase III trials by 2011. USAID has fully aligned its TB funding with the 2006 USAID research strategy presented to Congress and, as such, has been a leading supporter of late-stage research that is having a direct effect on country-level TB programs. Between FY 2006 and FY 2007, USAID's investments in research related to TB increased by 32 percent. USAID has remained an active partner in the Stop TB Partnership's Working Groups for new diagnostics, new drugs, and new vaccines.

USAID is drawing on its unique position – namely its field presence and prominent role in the Stop TB Partnership – to promote research that is relevant to high-burden countries and to ensure that important research results are brought into global policy.

New Drugs/Improved Regimens

Last year, approximately 42 percent of USAID's research funding for TB was used to support the evaluation of promising new drugs. In the last year, two of the compounds supported made important steps along the development continuum. It is expected that a new drug that can shorten drug regimens and may be effective against drug-resistant disease may be registered by 2010.

USAID is leading several key clinical trials that may impact current treatment standards. These trials include a comparison of the treatment outcomes of patients given fixed-dose combination tablets versus loose formulations. This study was designed to confirm that the current standard of fixed-dose combination drugs is not contributing to the emergence of drug resistance. Through the CDC, USAID is supporting an evaluation of treatment for drug-resistant TB. In addition, an ongoing study of the potential drug interactions

between anti-TB drugs and antiretrovirals for HIV/AIDS made considerable progress in the last year.

New Diagnostics

In the past year, a new diagnostic technology and a revised diagnostic approach were adopted into global policy through WHO. Included in the new policy recommendations were two liquid culture techniques for which USAID supported field trials. Currently, USAID supports an adaptation to one liquid culture technique that may reduce contamination, which is a prominent barrier to success rates during field usage. Additionally, USAID supported a portion of the research and the translation of evidence into global policy for the procedural shift from three to two smears in diagnosing TB. This policy change has the potential to increase case detection rates while reducing the burden on both patients and laboratories of conducting multiple tests. USAID continues to fund research investigating alternative diagnostic algorithms and approaches, as well as developing new technologies to screen and test for TB. In particular, USAID support is targeting the optimization of smear microscopy for routine cases, rapid detection of drug-resistant disease, and improved TB diagnosis among people infected with HIV/AIDS.

New Vaccines

USAID continues to work closely with NIH and the vaccine community to monitor the progress of vaccine research. As described in the 2006 HRRD, NIH will support vaccine research through the development phase and will look to USAID to support field trials of vaccines that progressed to Phase III. It is expected that this support may occur as early as 2011.

Improved Performance of and Accessibility to DOTS Programs

Through USAID Missions, important operational research has been conducted to better inform programmatic investments and to improve the performance of national TB programs. This year, for example, Missions supported research to identify the barriers to coordinated TB-HIV care and assessed reasons for poor treatment compliance among patients.

Key Partners in Tuberculosis Research and Introduction

Aeras

Foundation for Innovative New Diagnostics

Global Alliance for TB Drug Development

International Union Against TB and Lung Disease

Johns Hopkins University

Office of the U.S. Global AIDS Coordinator

PATH

Stop TB Partnership Working Groups

UNICEF/UNDP/World Bank/WHO Special Programme
for Research and Training in Tropical Disease

University of Alabama

U.S. Centers for Disease Control and Prevention

WHO

Health Systems Strengthening

Issues and Rationale

In its approach to health systems strengthening, USAID focuses on ensuring that the priority interventions discussed throughout this report are widely used and maintain consistently high quality for improved human health impact. Information and technologies known to save lives and prevent disease have been available for years, and in some cases, decades. However, many health developments and innovations do not reach substantial numbers of people who desperately need them.

Assisted deliveries, for example, are known to save mothers' lives, yet in 22 of the countries where USAID works, fewer than half of women have assisted deliveries; another 18 countries do not have the basic information to estimate the percentage of women reached with assisted deliveries. Despite the availability of an effective measles vaccine since 1963, in 2005 one-third of all eligible children in sub-Saharan Africa and South Asia were not immunized. By 2003, 182 countries had adopted directly observed treatment, short-course (DOTS) as their official approach to combat TB, but as late as 2006, 40 percent of TB patients identified through smear microscopy did not receive DOTS treatment. That same year, 1.6 million people died from this disease.

These examples of gaps between what is known and what actually benefits people in developing countries stem largely from problems these countries face in carrying out six core health system functions: service delivery; health workforce management; information management; management of medical products, vaccines, and technologies; financing; and leadership and governance. In 2007, the development community agreed on this typology of six building blocks to health systems strengthening. USAID advances research in these core functions in collaboration with host governments, international partners, and other USG agencies, in alignment with the four research products outlined in the 2006 HRRD.

Areas of Research and Introduction

The vast majority of service delivery in developing countries does not benefit from modern quality improvement approaches, even though these approaches have proved to be highly effective in even the poorest health systems.

These systems are burdened with service delivery that does not follow evidence-based standards and by inefficient practices. These problems can not be addressed by training alone.

Although the health workforce represents about 70 percent of the cost of health care, management of human resources in developing countries is widely acknowledged to be weak. The general principles for maximizing the productivity of the workforce are well established, but these principles need to be adapted to each health system, and many obstacles to change exist in this politically sensitive area. Producing more health workers is an important strategy in many countries, but every developing country also needs to make better use of the human resources they have.

Few developing countries have sufficiently strong and effective health information systems to permit adequate monitoring of progress toward their health goals, including the identification of problems and needs, in order to make evidence-based decisions on health policy and allocate scarce resources optimally.

An estimated 30 percent of the world's population lacks regular access to medicines, with this figure rising to more than 50 percent in the poorest areas of Africa and Asia. Health programs are further challenged by the need to ensure that medicines are of assured quality and safety and are used appropriately by providers and consumers. Health systems with inadequate regulatory capacity are ill-equipped to control the entry of counterfeit medicines (representing as much as 10 percent of sales in some developing countries) and substandard products into the marketplace. Along with inappropriate use of medicines, the use of poor-quality medicines can contribute to the more rapid emergence of resistance and the need to use more costly second-line medicines with potentially longer treatment duration for patients.

An estimated 180 million people in developing countries suffer from financial catastrophe because of the cost of health care. The root causes of this are high out-of-pocket expenditures and scant availability of financial subsidies in most low-income countries. According to Transparency International, 40 percent of the most corrupt nations in the world are also the poorest countries

Health Systems Strengthening Research Strategy 2006–2010

Total FY08: \$7,333,230	
Strategy Themes	Areas of Research and Introduction: Five-Year Strategy
Service Delivery	Make quality improvement an integral part of health care by documenting and raising its cost effectiveness
	Spread improved health care practices through the health system
	Develop a knowledge management approach to encourage global sharing of improved practices
Health Workforce	Refine the methodologies used to assess the size and performance of human resources for health
	Identify the determinants of workforce productivity to inform global guidance and improve host country health workforce management
Information	Advance the area of monitoring and evaluation
	Engage with U.S. Government and international partners to provide highest-quality data to inform health planning
Medical Products, Vaccines, and Technologies	Develop national approaches and intervention packages to contain the emergence of antimicrobial resistance
	Enhance access to medicines and pharmaceutical services of assured quality utilizing the private sector
	Improving screening for the detection of counterfeit and substandard medicines
Financing	Improve global understanding of health financing patterns
	Reduce gaps in access to essential services for most vulnerable populations
Governance	Benchmark health systems performance through application of health systems assessment approach
	Determine the best approaches for reducing corruption and increasing accountability within health sector
	Demonstrate that improved governance can contribute to increased utilization of priority health services

in the world. The lack of accountability and transparency in governance leads to poorly managed and underfunded health systems, which in turn result in low availability of basic, lifesaving health care.

All USAID health systems research meets four criteria: 1) It is relevant to the successful implementation of health interventions in HIV/AIDS, malaria, tuberculosis, reproductive health and family planning, maternal and newborn health, and nutrition; 2) it has the potential to improve access, quality, and/or affordability; 3) it can achieve demonstrable and measurable improvement within three to five years; and 4) it is suitable for sustained use in low-resource settings.

Using Improvement Collaboratives to Strengthen Service Delivery

Research on quality improvement in service delivery is conducted by USAID through Improvement Collaboratives, an advanced methodology that spreads best practices through a peer-to-peer network of health workers and provides a low-cost strategy for scaling-up. Its focus is on improving communication between management and providers, and it fosters self-evaluation and collaboration among professional staff so that physicians, nurses, and midwives can work together for the improvement of quality for their clients.

In Niger, quality improvement collaborative efforts to increase compliance with evidence-based guidelines for children hospitalized with severe malnutrition were associated with a drop in the case fatality rate from 29 percent to 13 percent. The average level of compliance with standards for child health services in four areas (emergency triage, diarrheal diseases, malaria, and pneumonia) increased from 37 percent to 76 percent. In Ecuador, the first improvement collaborative to address obstetrical complications was implemented in six hospitals, with nearly 17,000 deliveries per year. In the first year, the collaborative increased health worker compliance with national standards from 7 percent to 65 percent. This change was associated with a drop in mortality from each of the major three causes and an overall drop in maternal deaths in these hospitals, from 19 per year to 12.

Gauging and Improving Health Workforce Satisfaction and Productivity

USAID's health workforce research aims to improve tools to measure workforce satisfaction and productivity. A study of workforce satisfaction and retention in Uganda showed that retention rates are higher than expected (75 percent intend to stay for three years or more) despite somewhat low job satisfaction, especially among nurses. Based on this experience, USAID is refining tools for measuring job satisfaction and retention, and is sharing the Uganda case study for use in other countries. Similarly, workforce productivity studies were conducted by USAID in Zanzibar and by the National Institute for Medical Research on mainland Tanzania to determine productivity levels and correlates of increased productivity as a basis for global guidance. From this work, USAID is developing a productivity

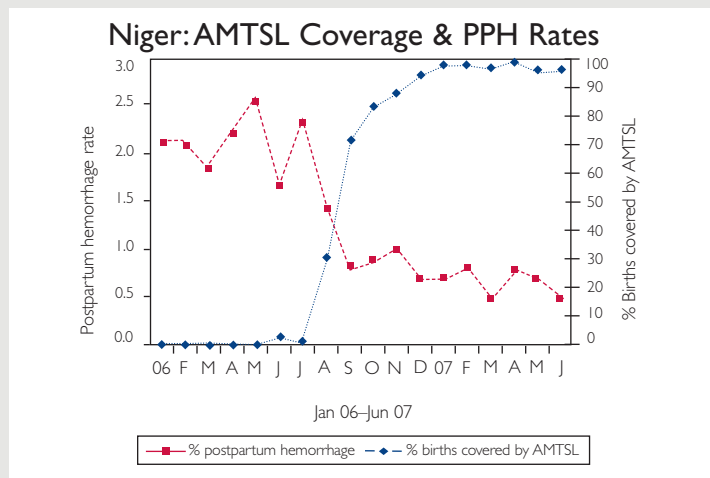
Spotlight: Research-to-Use Model

Niger Public Health Improvement Collaborative on Essential Obstetric and Newborn Care (EONC) Illustrates How Health Systems Research Translates Into Health Improvements

Across 28 hospitals participating in this collaborative, average compliance for active management of the third stage of labor (AMTSL) and essential newborn care (ENC) rose from 0 to more than 90 percent and was sustained for more than six months at the time of the evaluation. Meanwhile, the incidence of postpartum hemorrhage (PPH) dropped to less than half the previous rate, as shown in the table and graph below.

Niger: EONC Collaborative Results

Indicator	Jan 06	Dec 06	Mar 07	Jun 07
% births AMTSL applied	0%	95%	96%	96%
% births given immediate breastfeeding	23%	89%	97%	94%
% compliance ENC standards (composite)	17%	78%	94%	96%
% compliance AMTSL standards (composite)	25%	97%	96%	99%
Postpartum hemorrhage rate (# PPH/#births/mth)	2.1%	0.7%	0.5%	0.5%



improvement model, including a package of measures and tools, to improve productivity at what are traditionally less-productive times (late in the day, end of the week, etc.) for use in other countries.

Introducing New Methods for Information Management

The Monitoring & Evaluation (M&E) System Strengthening Tool was developed collaboratively by USAID/MEASURE Evaluation; the Global Fund to Fight AIDS, Tuberculosis and Malaria; the Office of the U.S. Global AIDS Coordinator; the Joint United Nations Programme on HIV/AIDS (UNAIDS); WHO; the World Bank; the Health Metrics Network; and Roll Back Malaria to allow stakeholders to evaluate how M&E activities are linked and integrated within the national M&E system, and to develop costed action plans to strengthen this system. The Global Fund now mandates use of this tool as part of its grant negotiation process.

To provide the highest quality data to inform global HIV/AIDS efforts, USAID's Demographic and Health Surveys (DHS) and AIDS Indicator Surveys (AIS) are important sources for global efforts coordinated by UNAIDS to estimate HIV/AIDS prevalence among the general population. USAID partners also have created statistical models to estimate the HIV prevalence rates of nonhousehold populations, such as inmates, the homeless, and sex workers. In FY 2007, five countries implemented a DHS or AIS that included HIV testing.

Spotlight: Research-to-Use Model Health Systems Information Function: Household Population HIV Estimates Through DHS

India implemented a DHS with HIV testing in 2005–2006. The HIV prevalence results from this DHS were released in FY 2007, with a general household population HIV prevalence estimate of 0.28 percent. Prior to the results of this survey, UNAIDS had estimated India's national HIV prevalence to be 0.9 percent (about 5.2 million people). With the release of the DHS prevalence rate of 0.28 percent, the Government of India, UNAIDS, USAID's MEASURE DHS project, and others collaborated to revise India's official HIV prevalence rate. The revised national estimate for India is 0.36 percent (about 2.47 million people), which reduces by more than half the estimate of the number of people in India who are infected with HIV.

Understanding and Protecting the Effectiveness of Medical Products

The appropriate use of medical products, vaccines, and technologies is of growing importance as accelerating antimicrobial resistance (AMR) poses a mounting public health threat. *Building Local Coalitions for Containing Drug Resistance: A Guide* and the companion document, *Containing Antimicrobial Resistance: Guide for USAID Missions to Promote Institution-Based Interventions Operational Guide*, provide guidance to developing countries and USAID Missions, respectively, on how to implement the 2001 WHO Global Strategy for the Containment of Antimicrobial Resistance. Zambia and Ethiopia have used the first AMR Guide to design a systematic and comprehensive approach to AMR containment. USAID has also worked at the regional level by collaborating with the Regional Pharmaceutical Forum (RPF) of the East, Central, and Southern Africa (ECSA) Health Community, which has 10 member countries and several other collaborating countries. In a recent regional meeting, RPF made a call-to-action for AMR advocacy and containment in the region as an urgent priority, with plans now in place for an AMR resolution to be adopted during the next ECSA Regional Health Ministers' Conference.

Assuring the quality, safety, and efficacy of medicines is a critical challenge in developing countries lacking both the regulatory capacity and resources required to protect the public health. *Ensuring the Quality of Medicines in Resource-Limited Countries: An Operational Guide* is a tool that enables national medicines regulatory authorities to evaluate the strengths and weaknesses of existing medicines quality assurance systems and prioritize corrective actions and procurement entities in both the public and private sectors to purchase medicines of good quality. The Guide resulted from the collaborative efforts of USAID partners, WHO, and regulatory officials from four developing countries, with inputs from more than 200 expert reviewers worldwide.

Improving Evidence and Practice in Health Financing

Improvements in health financing in developing countries depend on better understanding of current financing practices and on better evidence about large-scale approaches that work. In collaboration with global partners, including the World Bank, the Organisation for Economic Co-operation and Development (OECD), WHO and Swedish International Development Cooperation Agency (SIDA), USAID developed the National Health Accounts (NHA) methodology to improve global understanding about the level and

dynamics of all public and private spending for health in developing countries. USAID is also working with these partners to develop methodologies for NHA subaccounts to measure total national spending for HIV/AIDS, malaria, child health, and reproductive health. To date, with support from USAID and its partners, more than 100 developing countries have used NHA and disease subaccounts to understand and work to improve health financing.

In Malawi, for example, NHA revealed that despite a large increase in household spending, free-of-charge public services, and increased donor expenditures for health, quality of care and utilization of public services had not improved. The Ministry of Health has used these findings to reinforce the need for new financing mechanisms such as performance-based financing.

In Rwanda, NHA findings were used to inform the country's official strategy for achieving the Millennium Development Goals and to advocate for better donor alignment with national strategic plan goals.

Health insurance and risk-pooling can provide financial protection and improve access and equity. Health insurance can cover large population groups in the formal sector. Community-based health insurance (CBHI) schemes can cover rural populations, affinity groups such as teachers' unions and cooperatives and informal sector workers.

USAID initiated a study to assess the impact of Ghana's national health insurance and to provide critical information on the socioeconomic profile of the insured, changes in health care utilization as a result of insurance, and operational challenges. The findings will inform other countries considering social health insurance. An analysis of survey data in Ghana and Mali indicates that CBHI coverage increased the use of curative care from modern health care providers. CBHI enrollment can increase access to health care and provide protection against the financial risks associated with illness.

Assessing and Improving Health Governance

Strong leadership and governance contribute to reducing health sector corruption and increasing accountability. USAID has developed the new Health Systems Assessment Approach (www.healthsystems2020.org/content/resource/detail/528/), which examines performance in all six core functions as a rapid, comprehensive method for understanding how well health systems perform. By 2007, Angola, Azerbaijan, Benin, Pakistan, and

Yemen had applied this approach to better understand their health system performance and to identify and address areas for improvement. Improved governance contributes to increased utilization of priority health services. USAID supported the development of the Health Governance Conceptual Framework.

Key Partners in Health Systems Strengthening Research and Introduction

Abt Associates
 Academy for Educational Development
 Alliance for Health Systems Research
 Alliance Group (Malawi)
 Bill & Melinda Gates Foundation
 Danida
 GAVI Alliance
 Ghana Health Research Unit of Ghana Health Service
 Global Drug Facility
 Global Fund to Fight AIDS, Tuberculosis and Malaria
 Global Health Workforce Alliance
 Green Light Committee
 Health Metrics Network
 IntraHealth
 Irish Aid
 Macro International, Inc.
 Management Sciences for Health
 Miz-Hasab (Ethiopia)
 Open Society Institute
 Organisation for Economic Co-operation and Development
 President's Emergency Plan for AIDS Relief
 Rwanda National Malaria Control Program
 Stop TB Task Force
 Swedish International Development Cooperation Agency
 The Partnership for Child Health Care, Inc./BASICS
 U.K. Department for International Development
 UNAIDS
 UNFPA
 University Research Co., LLC
 U.S. Department of Health and Human Services/
 U.S. Centers for Disease Control and Prevention
 U.S. Pharmacopeia
 World Bank
 WHO

Addendum I: Core Funding for Targeted Health Issue Strategies¹

Health Issue	Product	FY 2006 Obligated Funds	FY 2007 Obligated Funds	FY 2008 Funding
HIV/AIDS	Vaccines	\$28,710,000	\$28,710,000	\$28,477,000
	Microbicides	\$39,600,000	\$39,600,000	\$44,635,500
	Global Leadership in HIV/AIDS Applied Research and Public Health Evaluation	\$1,750,000	\$3,250,000	\$3,900,000
	Total	\$70,060,000	\$71,560,000	\$77,012,500
Malaria	Vaccines	\$6,200,000	\$7,000,000	\$7,000,000
	New Drugs, Formulations, and Approaches	\$3,200,000	\$3,000,000	\$3,000,000
	Total	\$9,400,000	\$10,000,000	\$10,000,000
Tuberculosis	New Drugs	\$2,400,000	\$3,000,000	\$3,000,000
	Improving Performance of and Access to DOTS ²	\$2,790,000	\$4,662,090	\$5,400,000
	Total	\$5,190,000	\$7,662,090	\$8,400,000
Reproductive Health	Contraceptive Technologies	\$10,500,000	\$13,630,000	\$10,223,000
	Improved Use and Services Delivery	\$14,000,000	\$15,660,000	\$19,450,000
	Total	\$24,500,000	\$29,290,000	\$29,673,000
Maternal and Newborn Health	Healthy Pregnancy and Birth Care Outcomes	\$1,283,000	\$1,634,000	\$1,634,000
	Maternal Mortality Measurement Tools	\$130,000	\$122,000	\$122,000
	New Pregnancy and Birth Interventions and Introduction	\$4,065,000	\$2,700,000	\$2,700,000
	Neonatal Research and Newborn Care Practices	\$1,600,000	\$2,552,000	\$2,552,000
	Total	\$7,078,000	\$7,008,000	\$7,008,000
Nutrition	Vitamin A Deficiency Prevention and Control ³	\$759,000	\$350,000	\$350,000
	Zinc–Diarrhea Therapy and Prevention ⁴	\$755,000	\$270,000	\$120,000
	Iron–Anemia Prevention/Rx Packages	\$376,000	\$380,810	\$380,810
	CMAM (Formerly Community Therapeutic Care)	\$1,100,000	\$1,200,000	\$1,200,000
	Infant and Young Child Feeding Practices	\$0	\$150,000	\$300,000
	Antenatal Multiple Micronutrient Supplementation	\$180,000	\$0	\$0
	Total	\$3,170,600	\$2,350,810	\$2,350,810
Acute Respiratory Infections	Community-Based Pneumonia Treatment	\$650,000	\$638,000	\$638,000
	Reducing Exposure to Indoor Air Pollution	\$70,000	\$0	\$0
	Total	\$720,000	\$638,000	\$638,000
Health Systems Strengthening	Service Delivery	\$862,100	\$2,202,200	\$1,005,280
	Health Workforce	\$896,900	\$578,100	\$622,950
	Information	\$4,176,981	\$3,696,524	\$4,200,000
	Medical Products, Vaccines, and Technologies	\$614,389	\$564,187	\$715,000
	Financing	\$555,000	\$912,000	\$345,000
	Governance ⁵	\$400,000	\$410,000	\$445,000
	Total	\$7,505,370	\$8,363,011	\$7,333,230
TOTAL Funding		\$127,623,970	\$136,871,911	\$142,415,540

¹ This report highlights approximately 80 percent of the total health-related research at USAID.

² Reclassification of the category of research based on the new OP documentation process.

^{3,4} As described in the 2006 HRRD, research findings are currently being introduced into programs.

⁵ The projected FY 2006 funding figures previously published in the 2006 HRRD did not capture all health systems research activities. USAID uses the World Health Organization's internationally recognized framework of six core functions of a health system to guide its research portfolio. This framework builds on the four research products outlined in the 2006 HRRD and uses a more comprehensive list of products in order to capture progress in this area of work more completely.

Addendum 2: Key USAID Global Health Research and Introduction Partners

Abt Associates
Academy for Educational Development
ACCESS
Aeras
AIM Project
Alliance Group (Malawi)
Alliance for Health Systems Research
Alliance for Microbicide Development
BASICS
Becton, Dickinson and Company
Bill & Melinda Gates Foundation
Boston University
Canadian International Development Agency
CAPRISA
Center for Vaccine Development
Concern Worldwide
CONRAD
Constella Futures
CORE Group
Crucell
Danida
Elizabeth Glaser Pediatric AIDS Foundation
European Commission
Extending Service Delivery
Family Health International
Foundation for Innovative New Diagnostics
GAVI Alliance
GenVec, Inc.
Georgetown Institute for Reproductive Health
Ghana Health Research Unit of Ghana Health Service
GlaxoSmithKline, PLC
Global Alliance for TB Drug Development
Global Campaign for Microbicides
Global Drug Facility
Global Fund to Fight AIDS, Tuberculosis and Malaria
Global Health Workforce Alliance
Global HIV/AIDS Vaccine Enterprise
Green Light Committee
Health Metrics Network
Host government ministries of health
Host governments
ICDDR,B (Bangladesh)
International Aid
International AIDS Vaccine Initiative
International Clinical Epidemiology Network
International Confederation of Midwives
International Federation of Obstetricians and Gynecologists
International Food Policy Research Institute/Harvest Plus
International Partnership for Microbicides
International Rescue Committee
International Union Against TB and Lung Disease
International Working Group on Microbicides
IntraHealth
Irish Aid
JHPIEGO
Johns Hopkins University
Kenya Medical Research Institute
Macro International, Inc.
Malaria Research and Training Center
Management Sciences for Health
Medicine for Malaria Venture
Miz-Hasab (Ethiopia)
National Institute of Allergy and Infectious Diseases
National Institutes of Health
Nongovernmental organizations
Office of the U.S. Global AIDS Coordinator
Open Society Institute
ORC/Macro
Organisation for Economic Co-operation and Development
PATH
PATH's Malaria Vaccine Initiative
Pfizer
Population Council
Population Services International
President's Emergency Plan for AIDS Relief
QED Group LLC/Global Health Technical Assistance
Rwanda National Malaria Control Program
Saving Newborn Lives/Save the Children
Schering AG
Schering-Plough
Stop TB Partnership Working Groups
Stop TB Task Force
Swedish International Development Agency
Synergy Project
The Futures Group
The Joint United Nations Programme on HIV/AIDS
The Partnership for Child Health Care, Inc./BASICS
U.K. Department for International Development
United Nations Children's Fund
United Nations Foundation
United Nations Population Fund/UNICEF/UNDP/
World Bank/WHO Special Programme for Research and Training in Tropical Diseases
University del Valle (Guatemala City)
University of Aberdeen (Scotland)
University of Alabama
University of California at Berkeley

University of California at Davis
University of Liverpool (U.K.)
University of Malawi College of Medicine
University of North Carolina at Chapel Hill
University of the Witwatersrand, South Africa
University of Washington
University Research Co., LLC
U.S. Bureau of Census
U.S. Centers for Disease Control and Prevention
U.S. Department of Health and Human Services
U.S. Department of Health and Human Services/Drug
Quality Initiative
U.S. Food and Drug Administration
U.S. Military HIV Research Program
U.S. Naval Medical Research Center
U.S. Pharmacopeia Drug Quality and Information
Valid International
Washington University in St. Louis
Wellcome Trust
World Bank
World Health Organization
World Relief
Wyeth

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