BOLD DELIVERS

Research on Infectious Diseases

Abt ASSOCIATES

BOLD THINKERS DRIVING REAL-WORLD IMPACT

ABT ASSOCIATES has a strong legacy of incorporating rigorous research in our international health projects. We are one of the only organizations working in development that combine skills in in-depth research and program implementation—always striving to link the two for maximum impact. By regularly conducting research, our work is informed by data that helps us continually improve the life-saving programs for which we are responsible.

A health worker examines HIV test results in a clinic in Ivory Coast.

Abt's International Development Division has conducted a number of evaluations, literature reviews, and other research studies on preventing and treating infectious diseases in low- and middle-income countries. These documents cover a variety of topics related to service delivery, financing, and cost effectiveness of interventions for prevention and treatment of HIV/AIDS, malaria, and tuberculosis (TB). This document presents a summary of the main findings from this body of research, grouping studies into two broad categories—service delivery and financing.

Improving Service Delivery for Infectious Diseases

THE PRIVATE SECTOR PROVIDES KEY HIV AND AIDS-RELATED SERVICES IN SEVERAL COUNTRIES, AND THE QUALITY OF PUBLIC AND PRIVATE SERVICES IS OFTEN SIMILAR.

- An analysis of Demographic and Health Survey (DHS) data from 18 countries conducted by the Strengthening Health Outcomes through the Private Sector (SHOPS) project showed that the use of private commercial providers for HIV counseling and testing (HCT) varies substantially by country. In some countries, private providers play a large role in HCT, while they play a small role in HCT in others.

  In most countries, there is a strong positive association between wealth and use of the private sector for services. While use of private providers for HIV testing is generally higher among people from higher wealth quintiles, in some countries a large proportion of those who receive HIV testing in the private sector are from lower wealth quintiles. The analysis also examined service quality in the private sector as measured by adherence to antenatal care (ANC) testing guidelines, which require that women are offered HIV testing during an ANC visit. In terms of this quality indicator, the study identified no statistically significant difference between the public and private sectors (Johnson and Cheng, 2014).

- In **Zambia**, SHOPS examined the quality of private HCT services in the Copperbelt and Luapula provinces. The study found that quality of HCT in the private commercial sector was similar to that of the public and private NGO sectors. The public and NGO sectors receive more HIV prevention training than the private for-profit sector, yet both public and private commercial providers were under-performing in key aspects of HCT.

Counseling often focused on HIV transmission through blood contact, needle exchange, and tattoos. However having multiple sexual partners at the same time is a more common mode of transmission in Zambia. Counselors, whether in the public or private sector, often did not discuss with patients the importance of decreasing their number of partners or disclosing HIV test results to partners as ways to reduce the risk of HIV transmission. These findings suggest that training in HIV prevention counseling should be better adapted to the Zambian context (Levey and Wong, 2014).

INTEGRATION OF HIV CARE WITH OTHER INTERVENTIONS AND TASK SHIFTING ARE PROMISING APPROACHES FOR IMPROVING ACCESS TO SERVICES.

- The Health Finance and Governance (HFG) project created and tested indicators that measured and compared the cost and service efficiencies of different models of integration of HIV and family planning (FP) services in **Zambia**. In the first model, "internal referral," antiretroviral therapy (ART) patients could receive family planning counseling at an ART clinic, but were referred to a FP clinic for FP methods. In the second model, "one-stop shop," the ART clinic offered both FP counseling and limited services.

  Using patient exit interviews, this study found no statistically significant differences between the two models in terms of unit costs per ART patient given FP services, counselor time per ART patient counseled on FP, and percentage of missed opportunities at the ART clinic. One of the main challenges that the study identified in both models is that current ART patient medical records do not include fields for FP counseling or services. Therefore, modifying patient medical records is essential for being able to implement and monitor integration of ART and FP services (Faye et al. 2015).

- Two HFG studies in **Ethiopia** examined treatment outcomes and patient satisfaction associated with task shifting of ART services from higher to lower cadre clinicians, including nurses and health officers. Results of both studies support the use of task shifting as a way to increase access to ART services, especially in settings with limited resources and staff.

  One study compared treatment adherence between facilities that had different levels of task shifting. In facilities with minimal task shifting (n=46), lower cadre clinicians handle routine ART services and free physicians to deal with complex cases. In facilities with maximal task shifting (n=31), lower cadre clinicians handle severe drug reactions and changes in ARV drug regimens in addition to routine ART services. The study found no statistically significant difference in the volume of patients seen per provider.

It also found no significant difference in patient adherence to ART treatment when comparing facilities with different levels of task shifting, suggesting that both lower cadre clinicians and physicians can effectively support ART patients (Johns et al. 2014).

A second study examined quality of services delivered through task shifting from the patient perspective. Collecting data in 21 hospitals and 40 health centers, this cross-sectional study combined 665 patient exit interviews with a time-motion study to assess the time patients spent with providers. This study found that the majority of patients surveyed reported satisfaction with ART services. Patients who received services from lower cadre clinicians were significantly more likely to report satisfaction than those who received services from physicians (odds ratio 0.26, $p<0.01$). According to information provided about medications, friendliness during services, and receiving services in a timely manner, patients were more satisfied with nurses and health workers than with doctors (Asfaw et al. 2014).

RESEARCH ON PATIENT KNOWLEDGE, BEHAVIOR, AND CONTEXT PROVIDES CRITICAL INFORMATION FOR TARGETING INFECTIOUS DISEASE PREVENTION AND TREATMENT SERVICES.

- A study by the Health Policy Initiative in **Vietnam** found that female sexual partners of male people who inject drugs (PWID) often lacked correct knowledge of their partners' HIV status. Injection drug use is a major factor in the spread of HIV in Vietnam, especially among males.

  Using surveys and HIV testing, this study gathered data from 749 male PWIDs and their female sexual partners in Hanoi, Dien Bien, and Ho Chi Minh City. The study found that 53% of male PWID in Hanoi were HIV positive, along with 30% in Dien Bien and 46% in Ho Chi Minh City. The study compared PWID's HIV test results with the PWID's sexual partners' beliefs about their HIV status. Results showed that, among respondents with HIV-positive PWID partners, partner status inquiry was low. 32% of respondents with HIV-positive PWID partners in Dien Bien and 44% in Hanoi and Ho Chi Minh City did not know their partners' status or thought they were HIV negative (Hammett et al. 2015).

- A study in **Madagascar** found that knowledge of malaria was the strongest predictor of ownership of an insecticide-treated bed net. In a survey of 560 households, researchers found that only 47 households owned a bed net. The study examined possible predictors of bed net ownership, including village size, household wealth, household composition, malaria knowledge of respondents, and demographic characteristics of individual respondents. Malaria knowledge was measured through an index of twelve questions on topics including how people become infected with malaria, symptoms of malaria, and how to protect people from malaria.

Multivariate regressions showed that households that included respondents with higher malaria knowledge exhibited an 11.6% likelihood of owning a bed net, whereas households with respondents with lower malaria knowledge had only a 3.4% likelihood of owning a net. This study also revealed a lack of knowledge on specific aspects of malaria. For instance, only 44% of respondents reported bed nets as an effective way to prevent malarial fever (Krezanoski et al. 2014).

- In **Uganda**, a SHOPS study examined patient use of public, NGO, and private commercial facilities for HIV testing and treatment. The study assessed whether patients switch between sectors for treatment or simultaneously rely on providers from different sectors during various stages of HIV treatment. This includes HIV testing, ART initiation, ongoing ART, and treatment of opportunistic infections (OIs). Results showed that patients most often switched sectors in the early phases of HIV diagnosis and treatment, but that there was minimal movement between sectors after patients initiated ART. During ART, 20% of patients used different health sectors at the same time for ART and OI treatment. Most commonly, this involved receiving ART from an NGO and OI treatment from a private commercial facility. Given the weak referral systems, these patients who were seeking care from multiple sectors may not have coordinated care, which can lead to negative health outcomes (Ugaz et al. 2015).

PMI AIRS project staff spraying insecticide on a structure in Zambia.

- A study by the President's Malaria Initiative African Indoor Residual Spraying (PMI AIRS) project examined environmental factors in malaria transmission in **Mali**, using a WHO tube test to measure mosquito resistance to common insecticides in 13 sites. Results showed that mosquitoes at almost all sites were resistant to DDT, deltamethrin, and fenitrothion. A small number of sites presented resistance to several other insecticides. The study called on policymakers to conduct monitoring of insecticide resistance, as it changes quickly, and to make careful evidence-based decisions about which insecticides to use in order to ensure that effective malaria prevention (Cisse et al. 2015).

NEW TECHNOLOGIES SHOW MIXED RESULTS IN ENHANCING EFFICIENCY AND EFFECTIVENESS OF SERVICE DELIVERY.

- A study by the HFG project found that using a smart phone tool to enter supportive supervision data allowed for faster and easier access to this data by the local government area (LGA) and state levels in **Nigeria**. Stakeholders reported that this increased access to data made it easier for them to quickly identify and manage gaps in TB service delivery. Supervisors also reported that this tool reduced their workload through streamlining data entry and reporting, contributing to improved TB service delivery—rates of successful TB treatment increased after introduction of the smartphone tool (Bozeman et al. 2014).

- In **Mali,** a study by the PMI AIRS project found that door-to-door mobilization to prepare households for indoor residual spraying was both more effective and less expensive than a mobile mass messaging campaign using voice and text. Household readiness for spraying and spray coverage was significantly lower in the 3 villages that received mobile messages as compared to 3 villages that received in-person visits from mobilizers. Residents reported that they could easily ignore voice or text messages, whereas it was difficult to ignore individuals visiting their homes. Residents also reported that they did not trust or understand the information on spraying provided through impersonal mobile messages and preferred conversations with mobilizers. Gender also played a role in the use of mobile phones for spraying preparation. Men often had access to mobile phones and were more likely to receive messages, but women were often those in charge of preparing family homes for spraying (Mangam et al. 2016).

- To improve efficiency and safety of spray operations, the PMI AIRS project developed a mobile soak pit for spray operators. Mobile soak pits are portable filters that can be set up anywhere and allow spray teams in remote areas to decontaminate their equipment close to where they are working.

PMI AIRS project staff set up a mobile soak pit in Madagascar.

This is different from the typical model for spray decontamination, in which spray operators return at the end of each day to a central, non-portable "soak pit," which is a large in-ground filter which breaks down insecticides from water used in washing spray equipment.

In tests in **Ethiopia**, **Madagascar**, **Mali**, and **Senegal**, this new technology was shown to increase spray operator productivity, increase spray coverage, reduce commute times, and increase safety. For spray operators working in remote areas, long commutes between central soak pits and rural spray sites take away from working hours. Long commutes also increase the chances that spray operators will be exposed to insecticides as they travel by car in close proximity to equipment before it has been decontaminated (Mitchell et al. 2016).

Sustainable Financing of Care for Infectious Diseases

IN HIV TREATMENT, IHD RESEARCH FOUND MIXED RESULTS IN INTERVENTIONS AIMED AT INCREASING THE COST-EFFECTIVENESS OF ART TREATMENT. MALARIA RESEARCH FOUND THAT SUCCESSFUL CONTROL INTERVENTIONS FREED FACILITY RESOURCES FOR OTHER USES.

- Shifting delivery of ART services from higher level facilities, such as hospitals, to lower level facilities, typically primary health care centers, in two states in **Nigeria** had a mixed impact on costs and utilization. Nigeria piloted a decentralization program in which stable ART patients at hospitals were referred to smaller health care centers for ongoing ART treatment. Patient uptake of decentralized services was low in both states, at only 3% in Cross Rivers (n=398) and 9% in Kaduna (n=528). In Cross Rivers costs per patient increased by 40% among those who used decentralized services, while costs per patient decreased by 29%. Differences in costs likely resulted from differences in staff salaries at hospitals and health centers – in Cross Rivers, health center salaries are higher than hospital salaries, whereas the opposite is true in Kaduna (Johns and Baruwa, 2015).

- The previously mentioned HFG study of task shifting in **Ethiopia** found that task shifting ART services from physicians to lower cadre clinicians such as nurses and health workers did not change service costs. Costs per patient remained approximately $206. These results may be driven by the relative costs of staff time and medications. Staff time, whether lower cadre clinicians or physicians, is a small portion of ART treatment relative to the high costs of drugs themselves. It could also be because task shifting to lower cadre clinicians does not actually reduce overall physician time spent on ART treatment, but rather reallocates physicians to more challenging cases (Johns et al. 2014).

- Two HFG studies in **Zambia** found that successful malaria control interventions contributed to increased availability of facility resources and funding for treating other conditions. A pre-post study of two hospitals found substantial reductions in outpatient visits and hospital admissions for malaria among children under 5 after malaria control interventions were scaled up. Interventions included introduction of artemisinin-based combination therapy (ACT) as the first-line treatment of uncomplicated malaria, a community malaria test-and-treat and education campaign, and distribution of insecticide-treated bed nets (ITNs). In one hospital, the proportion of total hospital spending dedicated to malaria declined from 11% before the scale-up to less than 1% after the scale-up (Comfort et al. 2014a). Another study of 13 health facilities in the same areas of Zambia found that these malaria control interventions correlated with a 50 percent decrease in pediatric blood transfusions and a 68 percent decrease in pediatric malaria outpatient visits (Comfort et al. 2014b). These studies show that malaria control can lead to resource reallocation in service delivery.

IRS Geocoding in Zambia.

SUSTAINABLE FINANCING OF HIV AND AIDS SERVICES REMAINS A CHALLENGE, BUT OPPORTUNITIES EXIST.

- A SHOPS assessment in **Kenya**, **Malawi**, **Namibia**, **Tanzania**, and **Zambia** found that private insurers overestimated the costs of covering people living with HIV (PLHIV), as compared to the results of actuarial assessments. Such actuarial assessments in Kenya and Uganda found that risks associated with covering people living with HIV (PLHIV) have actually decreased as costs for insurers of ART and other HIV and AIDS treatments have fallen. Data showed that coverage of other chronic conditions, such as cancer, was more expensive for insurers than covering HIV and AIDS care.

  The assessment also examined how specific government policies and programs can support private health insurance coverage for PLHIV. For example, Kenya's constitution outlaws discrimination based on health status, and the 2006 National AIDS Control Act states that medical insurance providers cannot discriminate based on HIV status. These provisions have encouraged private insurers to cover PLHIV and HIV and AIDS-related services. Specific policy mechanisms can also lower risks for private health insurers in covering PLHIV. For instance, when private insurers can participate in mandatory social health insurance plans that include all government workers, their pool of beneficiaries expands and their risks associated with covering PLHIV drop. In addition, external financial support, such as private equity firms providing financial backing to reinsurance plans or the Global Fund subsidizing ARVs, can improve the financial viability of private insurers. (Talib and Hatt, 2013).

- Another SHOPS study in **South Africa** investigated contracting out ART services to private providers can enable access to HIV/AIDS services through channeling patients out of overburdened public facilities. This study of Right to Care Health Services (RTCHS) found that contracting out was effective in serving middle income workers whose employer-sponsored insurance could cover costs. Yet in trying to create similar options for low income populations, RTCHS could not identify sources of financing. The government was not able to cover the costs of contracting out without PEPFAR assistance. Concerns also arose related to the continuum of care when transferring patients between public and private facilities (Tayag et al. 2014).

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