The Impact of HIV Scale-Up on Health Systems: A Priority Research Agenda

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Abstract: Although much has been learned about the implementation of HIV prevention, care, and treatment services in resource-limited settings, the broader impact of the rapid scale-up of HIV programs on fragile health systems has only recently been explored. A high-level working group identified priority research questions regarding the impact of HIV scale-up on key elements of health systems: service delivery; management; information, evidence, and strategic planning; medical products, vaccines, and technologies; health financing and payments; leadership and governance; and the behaviors of providers, consumers, and communities. Rigorous multisectoral studies are needed if HIV program expansion to the millions still needing care and treatment is to continue, and if the synergies between vertically funded HIV programs and the health systems of which they are a part are to be maximized to strengthen nations' ability to meet all their health challenges.

Key Words: HIV/AIDS, health systems, research priorities, resource-limited settings

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INTRODUCTION

Recent years have witnessed a 6-fold increase in spending on global HIV programs, a 10-fold rise in the number of people receiving antiretroviral treatment in developing countries, and declines in HIV incidence and mortality in some countries.[1] Although the urgent need to respond to the HIV epidemic has attracted widespread support, this unprecedented expansion of disease-specific health services has also fueled a lively debate regarding the impact of such initiatives on fragile health systems. Critics argue that massive investments in HIV programs are distorting health priorities,[2–5] whereas others suggest that HIV scale-up may generate substantial benefits for the broader health system.[6,7] Although early studies have yielded descriptive information[8,9] and other investigations are underway,[10] recent reviews[11–13]confirm the relative scarcity of relevant data.

The extraordinary investments in HIV programming and the urgency with which scale-up has been addressed offer a remarkable opportunity to obtain empiric answers to these questions. Recognizing the urgency of this issue and the challenges inherent in such multidisciplinary and intersectoral research, the International Center for AIDS Care and Treatment Programs at Columbia University's Mailman School of Public Health convened a high-level meeting with the support of the Rockefeller Foundation. The working group outlined a research agenda prioritizing 2 key areas: questions whose answers will indicate whether and how HIV programs have impacted broader health systems, and questions whose answers will guide efforts to maximize synergies between vertically funded HIV programs and the health systems of which they are a part. The importance of such research and the need to support implementation science while simultaneously sustaining program expansion has been emphasized by the Sydney Declaration[14] of the International AIDS Society, the Venice Statement of the Positive Synergies Collaborative Group,[15] and others.[16]

It is unlikely that the impact of large and complex initiatives such as the effort to scale-up HIV services can be summarized as simply positive or negative. HIV programs are heterogeneous, and their effects are deeply contextual. As others have noted, health systems need both vertical and horizontal programs, working in harmony, to deliver effective, equitable, and affordable health services.[17] Similarly, disease-specific programs generally require a well-functioning health system; this is particularly true of HIV programs, which must deliver services ensuring continuity of care consistent with the chronicity of HIV infection and the multiple needs of those living with HIV.[18]

A "diagonal" approach[19] that attends to both disease-specific and systemic priorities may optimize the expansion of global health initiatives. The Global AIDS Vaccine Initiative, the Global Fund to Fight AIDS, Tuberculosis and Malaria, the United States President's Emergency Plan for AIDS Relief (PEPFAR), and others have recently dedicated significant funds for health systems strengthening,[20] and many HIV/AIDS

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[1]See Appendix.

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programs have moved beyond HIV-specific services to a broader focus on associated conditions such as tuberculosis and malaria,[21] and to provision of key primary health services such as antenatal care, immunizations, and reproductive health services.[22]

To date, HIV programs have reached only one third of those in need of care and treatment, and continued expansion and investment is vital.[23] As efforts to expand the availability, quality, and equity of HIV services continue, the time is right to articulate these priority questions.

HEALTH SYSTEMS TAXONOMY

The World Health Organization (WHO) defines health systems as "all organizations, people, and actions whose primary intent is to promote, restore, or maintain health."[24] WHO's framework includes 6 building blocks: service delivery, organization, and management; health workforce; information, evidence, and strategic planning; medical products, vaccines, and technologies; health financing; and leadership and governance.

We adapted these categories somewhat for the purposes of our deliberations, and drew on the work of Roberts et al[25] to highlight a seventh element: the behaviors of providers, patients, and communities—issues that are critical to the scale-up of HIV prevention, care, and treatment services. Research priorities in each of these 7 categories are outlined below.

SERVICE DELIVERY, ORGANIZATION, AND MANAGEMENT

The introduction of large-scale programs for a chronic communicable disease such as HIV has required significant inputs to enable their success. In many areas, health care facilities providing only acute or episodic services have been transformed—inpatient and outpatient facilities have been renovated and expanded; appointment and defaulter tracking systems have been launched; on-site medical records have been introduced; patient education, counseling, and adherence support services have been added; clinical, pharmacy, and laboratory services have been enhanced; workplace health and safety programs have been created to support site-level staff; and strong linkages have been forged with community-based resources and home-based care programs.

Although there is little doubt that the resources invested in establishing HIV programs have enabled large numbers of HIV-infected adults and children to access continuity care services, the Bellagio working group identified priority questions related to whether these programs have an impact on individuals *without* HIV infection (Box 1).

BOX 1. Service Delivery, Organization, and Management

- What is the impact of HIV scale-up on the utilization and quality of non-HIV clinical services? Has the introduction of HIV services correlated with changes in uptake and/or quality of antenatal care, facility-based deliveries, reproductive health and family-planning services, immunizations, and other health services?
- Can the administrative and outreach systems developed for delivery of chronic HIV care and treatment (including appointment systems, information systems, adherence support services, patient education and counseling, and outreach/defaulter tracing) be adapted for the delivery of other chronic-care services?
- Can the behavioral and biomedical package of care developed for management of HIV disease be adapted for chronic noncommunicable diseases? Has the expansion of home-based care and community-based services had a spillover effect on the management of other diseases?
- What is the impact of HIV scale-up on the quality of non-HIV pharmacy services? Has it correlated with changes in record keeping, prescribing accuracy, error rates and/or patient education, and counseling?
- Has the support provided for laboratory management, tiered laboratory systems, transportation, and quality improvement systems affected non-HIV laboratory services? Has the introduction of point-of-use diagnostics and decentralized laboratory systems influenced the management of non-HIV patients?
- What is the extent of facility renovation, refurbishment, and repair funded by HIV scale-up, and what is the proportion of these resources that are used only for HIV-infected patients?
- Have changes in facility design—including those to improve/expand waiting rooms, enhance privacy and confidentiality, provide access to counseling and support group services, expand medical records storage, and enhance infection control—had an impact on patients without HIV infection?
- Has HIV scale-up had an impact on the delivery of non-HIV health services to vulnerable and/or stigmatized populations such as sex workers, drug users, men who have sex with men, adolescents, and others?
- Has the introduction of HIV-specific services correlated with changes in community-level health outcomes such as maternal mortality, under-5 mortality, and life expectancy?

HEALTH WORKFORCE

In many settings, HIV scale-up has been accompanied by extensive training—often including education, clinical mentoring, and supervision—of a wide range of health care workers, including clinicians, pharmacists, laboratorians, medical records and data entry personnel, program managers, and others. PEPFAR alone supported 3.7 million training encounters between 2004 and 2008.[26] Task shifting and the introduction of new cadres such as lay counselors and peer educators have also characterized HIV scale-up, as has the availability of additional funds to support health workers.[27] In some countries, the availability of higher-paying jobs and/or extra compensation in the form of "top ups" means that health workers providing HIV services may receive larger salaries than their colleagues; they may also have more opportunities for promotion. Although there are anecdotal reports and some well-documented case studies[28] of internal brain drain from non-HIV to HIV programs, no systematic reviews have been conducted. Workshop participants suggested that access to care and treatment for HIV-infected health workers has likely had a profound effect on absenteeism and death, noting that HIV prevalence among health care workers is as high as 20% in some settings.[29] Similarly, HIV scale-up and the increased demand for clinicians have motivated retired nurses to return to the workforce in some countries.[30–32]

Thus, although common wisdom holds that HIV scale-up has decreased the availability of health workers in non-HIV programs, the working group concluded that a clear picture of

BOX 2. Health Workforce

- What are the recent trends in supply of key cadres of health care workers and can these be reasonably linked to HIV scale-up? Does the introduction of HIV programs correlate with health worker shifts within facilities—eg, to the HIV clinic from other posts? Does it correlate with shifts among sectors—eg, from public sector positions to nongovernmental organizations? Is there an impact on health worker shifts between countries due to emigration and/or repatriation?
- What is the impact of HIV scale-up on health worker retention and productivity? Has increased HIV funding had an impact on staff retention? Has access to HIV care and treatment for health workers themselves had an impact on staff retention?
- Are there lessons from the use of task shifting and multidisciplinary teams by HIV programs that can be applied to non-HIV programs? Is task shifting having an impact on access, quality, and/or outcomes of HIV-specific services? On non-HIV services?
- Has the training, supervision, and clinical mentoring provided to clinicians in HIV programs had an impact on the quality of care for non-HIV patients?
- Has the attention to occupational health and safety associated with HIV scale-up (including universal precautions, improved ventilation and medical waste disposal, and provision of postexposure prophylaxis) changed attitudes toward and/or access to services for occupational health and safety?

the overall impact of HIV scale-up on human resources for health has not yet been established. Priority research questions were identified (Box 2).

INFORMATION, EVIDENCE, AND STRATEGIC PLANNING

The introduction and rapid expansion of HIV prevention, care, and treatment initiatives have required significant scale-up of both patient-level and program-level data. At the patient level, health management information systems—including unique identifiers, appointment systems, patient charts, and enhanced documentation of pharmacy utilization and laboratory results—have supported the provision of effective continuity care. At the program level, the monitoring and evaluation systems required to document enrollment, retention, and cohort outcomes have also emphasized the need for synthesis and use of data to enhance services, and have often included the development of electronic databases. HIV programs have also emphasized the importance of setting concrete targets and the critical role of strategic planning at the site, program, and national levels. Although attempts have been made to minimize reporting burdens and to harmonize efforts at the national level following the "Three Ones" approach, initial studies suggest that the sharing of data can and should be improved.[33] The impact of this investment and the achievements in this domain on non-HIV programming requires further inquiry, and priority research questions were identified (Box 3).

MEDICAL PRODUCTS, VACCINES, AND TECHNOLOGIES

The rapid expansion of global HIV/AIDS treatment has prompted governments and donors to strengthen supply chains; renovate and expand pharmacies; train pharmacy staff; and enhance forecasting, stock management, record keeping, and patient counseling. The extent to which these HIV-specific initiatives are integrated within national procurement and supply chain mechanisms is variable, and the impact on non-HIV supply chains is not yet clear.

BOX 3. Information, Evidence, and Strategic Planning

- Has the increasing collection, analysis, and use of HIV-related data at the site level had an impact on similar activities related to non-HIV programs?
- Has the development of increasingly sophisticated national HIV plans (guidelines, targets, and strategic plans) had an impact on planning for non-HIV programs?
- To what extent are the computerized data systems in use for the monitoring and evaluation of HIV programs interoperable? Are the databases "silo" systems that cannot be adapted for non-HIV purposes, or are they interoperable systems that can be used to catalyze broader eHealth applications?
- Are clinic-based data systems developed for HIV-related purposes being utilized for non-HIV patients (eg, systems for appointments, medical records, and monitoring and evaluation)?
- Are mobile data systems developed for HIV-related purposes being utilized for non-HIV patients (eg, cell phone consultations and reporting and telemedicine)?
- HIV scale-up has correlated with increased engagement of civil society in monitoring, evaluation, and target setting for HIV-related programs. Has this had a spillover effect on the involvement of civil society in non-HIV health services or in influencing health priorities and programs for conditions other than HIV?

The expansion of laboratory services has similarly accompanied HIV scale-up. As noted, laboratory infrastructure, management, and referral networks have been strengthened and reorganized to support HIV services. Although anecdotal information suggests that individuals without HIV infection are able to take advantage of these laboratory services, there are no definitive data as to whether the expanded availability and quality of basic tests for anemia, pregnancy, malaria, tuberculosis, and other non–HIV-specific assays have benefited patients without HIV. Similarly, the impact of more sophisticated technologies, such as polymerase chain reaction testing, has not yet been described.

The financing of the expansion of information and communication technologies to support HIV-related health management information systems, distance consultation, and monitoring and evaluation of HIV programs has been noted in multiple contexts and countries. The impact of their introduction on non-HIV services remains to be seen.

Priority research questions addressing these topics were identified (Box 4).

BOX 4. Medical Products, Vaccines, and Technologies

- What is the impact of HIV scale-up on supply chains, procurement, storage, forecasting, and stock management for non-HIV drugs?
- What is the impact of the change in pharmaceutical pricing and patents for HIV drugs on drugs for conditions other than HIV?
- What is the impact of the introduction of new laboratory technologies, such as polymerase chain reaction, on the laboratory system and on services for patients without HIV?
- Are electronic databases and mobile-phone systems developed for HIV programs being used to support non-HIV programs?

HEALTH FINANCING AND PAYMENTS

Financing of HIV program scale-up has been unprecedented. As others have noted, "never has so much international aid been dedicated to global health, let alone to a specific disease."[33] A precise assessment of the impact of HIV-related financing on health systems is not yet available,[34] although experts caution that HIV funding may be "crowding out" other health programs.[5] Similarly, although there is evidence that HIV scale-up has contributed to sharp increases in public sector outlays for health in Africa and other regions,[1,35] there are fewer data on private sector health expenditures in these countries, and the impact of HIV scale-up on total health expenditures is not well documented.

In many countries, HIV care and treatment is available at no cost; co-payments and user fees have been largely eliminated because multiple studies demonstrated that user fees are associated with poorer adherence to antiretroviral therapy and poorer outcomes.[36–39] In other countries, such as Rwanda, HIV scale-up has prompted pilot programs of performance-based payment, health insurance, and other payment models. Although innovations and best practices are beginning to emerge, significant questions remain, and key research questions were identified (Box 5).

BOX 5. Health Financing and Payments

- Has HIV scale-up supported innovative payment models (eg, performance-based financing) that can be used to inform non-HIV care?
- What is the effect of user fees on adherence and outcomes for non-HIV conditions?
- What are optimal models for financing health services that require predictable long-term support? Have HIV programs highlighted any lessons that can be applied to non-HIV services?
- What is the impact of HIV scale-up on financing for non-HIV health services?
- What is the impact of HIV scale-up on total health expenditures?

LEADERSHIP AND GOVERNANCE

The global scale-up of HIV services is the result of an extraordinary advocacy movement, the growing empowerment of civil society, exceptional involvement of patients and affected communities in their own health care, and a unique commitment of resources.[20] In some countries, people living with HIV have formed highly effective advocacy organizations and led groundbreaking movements that have become models for those with other diseases and conditions. The rapid influx of funds, urgent demand for services, and need to effectively pilot, launch, and decentralize HIV prevention, care, and treatment have also strained the capacity of some ministries of health.[40] Priority questions regarding the impact of HIV scale-up on leadership and governance are detailed in Box 6.

PROVIDER, CONSUMER, AND COMMUNITY BEHAVIORS

The nature of HIV infection and its treatment pose specific challenges for the scale-up of care and treatment services. A chronic communicable disease affecting families and individuals throughout the life cycle and requiring high levels of adherence with treatment and retention in care for successful outcomes, HIV necessitates the development of family-focused continuity care and treatment services. HIV prevention services also require ongoing multifactorial interventions, and family-focused approaches maximize some prevention interventions such as prevention of mother-to-child transmission.

HIV programs have prompted the introduction of multidisciplinary teams, accelerated task-shifting initiatives, and catalyzed the use of nonprofessional cadres such as peer educators, expert clients, and lay counselors. Doctors and nurses have expanded their core competencies and adapted prior professional dynamics. In many settings, clinical sites have strengthened linkages to and relationships with community-based organizations. Associations of people living with HIV/AIDS have grown in number and authority, and some communities have been empowered to make specific demands on the health system. HIV scale-up has required health systems to address issues of gender norms, the legal rights of married women and adolescents, and the provision of care to stigmatized populations, including injection drug users, sex workers, men who have sex with men, prisoners, migrants, and others.

Anecdotal reports suggest that the impact of these changes on the nature of and demand for HIV services in some countries has been dramatic; it is not known if non-HIV services have been similarly affected. Priority questions include those in Box 7.

BOX 6. Leadership and Governance

- Has the engagement of civil society in HIV programs had an impact on non-HIV programs?
- Has the financial and technical support provided to decentralize HIV services to the district level had an effect on the management of non-HIV care?
- Have there been changes in the way in which patients' rights (eg, informed consent and privacy) are interpreted and/or protected outside of HIV programs?
- Has there been a change in the public sector regulatory capacity for pharmaceuticals and health technologies?

BOX 7. Provider, Consumer, and Community Behaviors

- Has the inclusion of lay people and patients on care teams influenced the design and delivery of non-HIV programs?
- Can the peer support and multidisciplinary team approach developed for HIV service delivery be adapted to the management of other diseases (diabetes, hypertension, childhood asthma, etc.)?
- To what degree have HIV-related peer or community support organizations influenced the management of or support for people with other diseases?
- Has the scale-up of HIV services had an impact on gender norms with regard to health and health decision making?
- Has the scale-up of HIV services had an impact on the approach to privacy and confidentiality in health care settings?

CONCLUSIONS

Although the scale-up of HIV programs has undoubtedly had an impact on health systems, opinion rather than evidence has dominated the debate. The characteristics of HIV infection and the nature of HIV prevention, care, and treatment services have necessitated changes to various components of health systems, and funding has often been available to implement these changes. Some have lauded these effects as positive and encouraging, whereas others have expressed doubt and trepidation. Ultimately, although each group has strong feelings and deep beliefs, there is a paucity of rigorous evidence to support a negative or positive impact of HIV scale-up on health systems.

The working group outlined a forward-looking research agenda, noting that intersectoral methodology will be required to answer some of these key questions. Those who are closest to the implementation of HIV scale-up may not necessarily have expertise in health systems research methodology, whereas health economists, human resources experts, and others are not always familiar with the key issues and activities of HIV scale-up at ground level. Working together to address these priority questions has the potential to maximize the beneficial impact of HIV scale-up while forging new research partnerships. In addition, although more sophisticated description and analyses of the impact of HIV scale-up on health systems are required, the ultimate goal of this research is to ensure that the design of such programs and the provision of services for major diseases like HIV/AIDS positively influence the health systems of countries and reinforce efforts against all health challenges.

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APPENDIX

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