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Population Health or Individualized Care in the Global AIDS Response: Synergy or Conflict?

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Extraordinary progress has been achieved in confronting the global HIV epidemic. The number of people living with HIV (PLWH) accessing antiretroviral treatment (ART) in low- and middle-income countries rose from 400,000 in 2003 to 17 million in 2015,[1] and an estimated 7.8 million deaths have been averted by the scale-up of ART services.[2] Increased access to prevention and treatment has also led to a 35% drop in new HIV infections since 2000, including a 58% decrease amongst children.[3]

The majority of PLWH accessing ART in low-resource settings live in sub Saharan Africa, a region with some of the world's weakest health systems. Despite austere settings, health worker shortages, dysfunctional supply chains and laboratories, and absent continuity care systems, the HIV response has succeeded beyond expectations.[4] Although this success was built on the use of simple, standardized, and evidence-based approaches to HIV prevention and treatment, new global guidelines support the use of more individualized services.[5] While such a differentiated care strategy has the potential to improve both the quality and efficiency of HIV programs, this can only be accomplished if key elements of the public health approach that has been so successful over the past 20 years are retained.

The Public Health Approach

The *public health approach* was a critical element of successful HIV program scale up. Adapting population health strategies to the context of a chronic illness required innovations, multisectoral partnerships, and systems thinking. This powerful response to the constraints of weak health systems also drew upon lessons from resource-rich countries to avoid *ad hoc* individualized management of HIV treatment.[6] It involved evidence-based guidelines, standardized visit and laboratory assessment schedules, and the use of standardized, co-formulated, once-daily, low-cost, generic first-line ART.[7] Simple treatment algorithms enabled rapid, efficient training of hundreds of thousands of health care workers, task shifting to non-physician clinicians,[8] efficient medication forecasting and procurement,[9] and scale-up of laboratory services.[10]

Despite these successes, much more needs to be done. In order to control the epidemic, UNAIDS has adopted ambitious 90-90-90 targets which aim to identify 90% of individuals

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with HIV, initiate ART for 90% of those diagnosed, and maintain viral suppression in 90% of those on ART.[11] Achieving these will necessitate doubling the number of people on treatment, an imperative that collides with three realities. Firstly, international funding for HIV programs has plateaued, requiring countries to do more with less and to seek efficiencies in HIV programs.[12] Secondly, the growing number of patients has overwhelmed health facilities and workers, increasing crowds and wait times.[13] Thirdly, HIV program data show gaps in quality, including suboptimal retention rates, a fact that will inevitably compromise the 90-90-90 targets.[14][15]

Differentiated Care to the Rescue?

Given this scenario, has the "simple and streamlined" strategy reached the limit of its usefulness? A growing number of experts believe that the time has come for more nuanced program design – a model of *differentiated care*, in which different types of patients receive different packages of HIV services. In this approach, the "what, when, who and how" of HIV services may be different for stable versus unstable patients, newly diagnosed patients versus those with longstanding disease, and adherent versus non-adherent patients, among others. Ideally, this strategy would improve both efficiency and quality, by "down referring" stable patients, decompressing health facilities, moving treatment closer to communities, using diverse health cadres and lay staff, and enhancing patient satisfaction and retention.

Related programmatic innovations include those piloted for stable patients doing well on ART: longer appointment spacing and fast-track medication refills, facility-based adherence clubs, community based drug distribution, and patient-led community antiretroviral groups.[16] To varying extents, these models shift adherence monitoring, symptom review, and drug dispensing away from facility-based health workers and towards community-based outreach workers and expert patients.

Alternate strategies are necessary for patients with advanced HIV disease, those with comorbidity, and those doing poorly on treatment, who often require specialized care, intensive clinical and laboratory monitoring, and treatment at health facilities by highly trained health workers. Further differentiation would be needed for newly diagnosed patients requiring intensive education and counseling, vulnerable populations such as children, adolescents, and pregnant women, and other subpopulations.

While differentiated care is intuitively attractive, its adoption at scale presents important challenges. National guidelines will need to be adjusted to describe the package and schedule of care for each category of patients. Decisions regarding which patient fits into which differentiated care track will require training health care workers to distinguish patients based on stage of HIV disease, response to treatment, viral suppression, prior adherence with clinic visits, co-morbid illnesses, pregnancy status, and psychosocial needs (Table 1). The approach will also require streamlined cross-referral mechanisms with clear criteria and defined systems to ensure smooth transfers from low intensity to high intensity tracks and vice versa.

Differentiated care will also require new systems for drug procurement, distribution, and tracking, and for laboratory specimen collection based on patients' location of care and frequency of visits. Importantly, moving to differentiated care will also necessitate re-shaping national monitoring and evaluation systems to collect information from diverse locations, utilizing novel methods and a diverse workforce.

Although elements of the differentiated care approaches have been successfully piloted in several countries,[17] a large-scale shift to this model may have perils as well as rewards. Risks include disconnection of patients from health facilities, heavy dependence on patient self-management, challenges with drug supplies and laboratory services and incomplete program monitoring.

Finding the Best of Both Worlds

Tailored and highly personalized health interventions have received much attention in recent years, and resource-rich health systems are investing considerable resources pursuing these approaches. Table 2 illustrates a continuum of strategies, from the public health approach at one end, to "precision medicine" at the other. One key distinction is that in both the classic public health approach and the newer differentiated care model, evidence-based guidelines direct clinical and laboratory management for *groups* of people, whereas in individualized care (also known as "personalized medicine") and precision medicine (also known as "genomic medicine") each patient may receive different interventions. It is important to acknowledge inherent tradeoffs, and to avoid caricaturing either the public heath approach as a "one size fits all" strategy or the more individualized approaches as insufficiently evidence-based and too complicated for scale-up. Instead, countries and health systems should recognize key principles such as quality, coverage, and equitable access to health services and develop models most suited to their context.

For the HIV response, it will be critical to assess the processes, outcomes, and costs of the various differentiated care models and to identify those most desirable for scale-up. In reality, differentiated care will only succeed if every effort is taken to adhere to the principles of the public health approach. For each category of patients, a systematic, evidence-based and algorithmic approach is needed, with clear delineation of how, where and by whom the services will be provided. It will also be important to balance increased programmatic complexity with the constraints imposed by fragile health systems, most notably the scarcity of physicians and nurses and the current limits of procurement and laboratory systems. Evaluating both pilot programs and large-scale initiatives will be needed to identify best practices, assess programmatic and economic efficiencies, explore potential unintended consequences, and elicit feedback from patients and communities.

As the global community works to contain the HIV epidemic, taking a close look at how best to deliver services to diverse patients is critical. Concerted efforts are needed to find undiagnosed individuals with HIV and to provide them with access to high quality services, optimize patient outcomes, achieve high patient satisfaction, minimize health system distress, and decrease the cost of care. Differentiated care promises to move the HIV response forward, but retaining the key principles of the public health approach will be

necessary to avoid fragmenting and weakening HIV services, and to build on the hard-won gains.

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Table 1

Assessments required by model of care

Public Health Approach	**Differentiated Care Approach**
Age (adult, adolescent, child, infant)	Age (adult, adolescent, child, infant)
Pregnant vs. breastfeeding vs. neither	Pregnant vs. breastfeeding vs. neither
WHO stage and/or CD4 count	WHO stage and/or CD4 count
	Time since HIV diagnosis (newly diagnosed?)
	Time since ART initiation
	Stable vs. unstable on ART
	History of adherence/retention challenges
	Psychosocial needs
	Co-morbid conditions
	Availability of community-based clinical care
	Availability of community-based ART delivery systems
	Availability of community-based psychosocial support services
	Patient interest in community-based services
	Availability of cross referral mechanisms between low intensity and high intensity care and vice versa

Table 2

Approaches to the Design and Delivery of Health Services

Public health approach	Population-based guidelines/algorithms addressing broad categories of patients (non-pregnant adults, pregnant/breastfeeding adults, infants/children, adolescents, key populations). - Advantages: Standardized, streamlined, evidence-based algorithms enable large-scale training, procurement, laboratory monitoring and task shifting - Disadvantages: Requires relatively frequent clinical monitoring/visits to health facilities; may not be optimal for patients with early HIV or those stably on ART; retention in care remains challenging	**Patient centered care**: Active involvement of patients and families in the design of health services, and decisions about care and treatment. Care responsive to patient needs and preferences.
Differentiated care	Guidelines/algorithms differentiated by sub-categories – above, as well as by disease stage/severity, etc. - Advantages: May enable more patient-centered care, may increase retention in care, may enable more efficient delivery of HIV services - Disadvantages: Requires adaptation of existing training, procurement systems, lab systems, M&E systems. May be more difficult for non-physician clinicians to provide.	
Individualized care (also known as “personalized medicine”)	Treatment, monitoring, adherence support and other services tailored to individuals based on clinical and psychosocial status. - Advantages: May enable highly trained experts to achieve improved clinical outcomes - Disadvantages: Vulnerable to ad hoc prescribing, failure to follow evidence-based guidelines, not suited to large-scale programs or to contexts without adequate numbers of sub-specialists, dependent on highly-trained physicians, likely less cost effective	
Precision medicine (also known as genomic medicine)	Individualized care/personalized medicine that takes patient genetics, environment, and lifestyle data into account. Not available for most diseases, even in resource-rich settings.	