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## Responding to the Human Resource Crisis: Peer Health Workers, Mobile Phones, and HIV Care in Rakai, Uganda

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Dear Editor:

Two challenges to successful antiretroviral therapy (ART) scale-up in resource-limited settings (RLS) are human resource and healthcare infrastructure limitations.<sup>1</sup> We read with interest the modeling study by Bärnighausen *et al.* which describes the complexities of ensuring adequate human resources to treat HIV/AIDS (HRHA).<sup>2</sup> The authors suggest that factors needed to achieve universal ART coverage include “changes in the nature or organization of care,” training health workers with skills specific to the developing world to reduce emigration, and developing systems that decrease the number of traditional HRHA required to treat a fixed number of patients. The Rakai Health Sciences Program (RHSP) PEPFAR-funded ART program has been actively pursuing innovative HIV care strategies that directly address these important points. In 2006, we piloted a novel program utilizing peer health workers (PHW) and mobile phones to monitor patients in a rural ART program in Rakai, Uganda.

In May 2006, the RHSP ART program recruited and trained nineteen PHWs. These PHWs are persons living with HIV themselves and receiving care through the program. Each PHW was assigned approximately 15–20 patients with whom they would typically conduct biweekly home visits. At visits, PHWs documented a review of symptoms (headache, fever, etc.), a missed pills by self-report, and a pill count, along with providing adherence counseling, health education, and social support. Documentation was returned to higher-trained providers for review and triage. PHWs were supplied bikes, identifying t-shirts, and compensation for part-time employment. Over a 6-month pilot period, PHWs completed documentation on 3,642 home visits (approximately 7.5 visits per PHW per week).

Nine PHWs were additionally trained to use mobile phones to send real-time text messages containing clinical and adherence data to higher-trained providers for review and triage. These texts were numeric codes produced by converting home visit data, e.g., yes=1, no=0. PHWs could also place calls to a central toll-free clinic phone with any concerns. Due to limited electrical power, a lead-acid battery system was used to charge phones. All technology used was available in-country. These nine PHWs successfully sent 1,177 text messages

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(approximately 5 per PHW per week) over the pilot period. PHWs also made 101 calls to the central clinic over the study period, mostly for guidance on illnesses, urgent care needs, and concerns about drug side effects.

A Likert scale (1–5, 1=strongly agree, 5=strongly disagree) survey administered to 39 PEPFAR clinical staff (response rate = 100%) found 44% (17/39) strongly agreed and 56% (22/39) agreed that the PHW and mobile phone intervention had improved the overall health of patients; 20% (8/39) strongly agreed and 49% (19/39) agreed it had improved patient adherence. Direct per PHW program startup costs were approximately \$115 USD with monthly maintenance costs approximately \$15 USD. The mobile phone intervention per PHW startup costs were an additional \$100 USD with monthly maintenance costs of approximately \$10 USD.

We found that a simple and inexpensive clinical and adherence monitoring intervention leveraging PHWs empowered with mobile phones could be successfully implemented in a rural RLS. PHWs are currently an underutilized resource which may provide one solution to increasing HRHA.<sup>3</sup> As the numbers of potential PHWs are inherently related to the prevalence of HIV, these individuals represent a flexible and sustainable work force that is unlikely to emigrate and able to remain proportional in size to the epidemic. This PHW work force can concentrate its efforts on monitoring and supporting patients on ART, while the limited number of more highly trained health workers (e.g., nurses and clinical and medical officers) can focus their time on more clinically demanding tasks. Further operations research is needed to better understand PHW effects on HIV care outcomes, which responsibilities are appropriate to task-shift to PHWs, determine acceptable training and evaluation standards, assess cost-effectiveness, and evaluate the sustainability of PHW-based programs.

A unique aspect to our PHW program was the use of a mobile phone intervention as a simple support strategy. The mobile phones allowed us to use local technology to improve communications between PHWs and higher-level providers in a rural setting with poor transport infrastructure. Mobile phone coverage has rapidly expanded in Africa and other RLSs over the past several years, providing opportunities such as this one to creatively use this tool to improve health care by optimizing the way care is organized and delivered.<sup>4–6</sup>

Addressing the HRHA limitations will require a multifaceted and sustained approach. A valuable and vital component to this approach involves people living with HIV themselves. Interventions utilizing PHWs and mobile phone technology may offer one practical strategy for expanding and improving HIV care in environments with limited health workers and infrastructure.

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## References

1. Kober K, Van Damme W. Scaling up access to antiretroviral treatment in southern Africa: who will do the job? *Lancet* 2004;364(9428):103–107. [PubMed: 15234864]
2. Barnighausen T, Bloom DE, Humair S. Human Resources for treating HIV/AIDS: Needs, capacities, and gaps. *AIDS Patient Care STDS* 2007;21:799–812. [PubMed: 17944556]
3. World Health Organization. Scaling up HIV/AIDS care: Service delivery and human resource perspectives. Geneva: WHO; 2004.
4. Kaplan WA. Can the ubiquitous power of mobile phones be used to improve health outcomes in developing countries? *Global Health* 2006;2:9. [PubMed: 16719925]

5. Vodafone. Africa: The impact of mobile phones. Vodafone Policy Paper Series, 2005. [Last accessed February 14, 2008].  
[www.vodafone.com/etc/medialib/attachments/cr\\_downloads.par.78351.file.date/GPP\\_SIM\\_paper\\_3.pdf](http://www.vodafone.com/etc/medialib/attachments/cr_downloads.par.78351.file.date/GPP_SIM_paper_3.pdf)
6. Lester RT, Gelmon L, Plummer FA. Cell phones: Tightening the communication gap in resource-limited antiretroviral programmes? *AIDS* 2006;20:2242–2244. [PubMed: 17086071]