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Point-of-care CD4 testing is economically feasible for HIV care in resource-limited areas

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A new point-of-care test to measure CD4 T-cells, the prime indicator of HIV disease progression, can expedite the process leading from HIV diagnosis to antiretroviral therapy (ART) and improve clinical outcomes. Now a study by Massachusetts General Hospital (MGH) investigators, working in collaboration with colleagues in Mozambique and South Africa, indicates that routine use of point-of-care CD4 testing at the time of HIV diagnosis could be cost effective in countries where health care and other resources are severely limited. Their analysis is being published in the public-access journal, *PLOS Medicine*.

"In severely resource-limited settings, too many people learn that they have HIV but then never initiate care," explains Emily Hyle, MD, MGH Division of Infectious Diseases, lead author of the *PLOS Medicine* paper. "Point-of-care CD4 tests can help more people reach care. But it is critical to evaluate the implementation of any technology more expensive than current care to be sure the investment is a wise one. Our mathematical model, based on the situation in Mozambique, found that point-of-care CD4 testing at the time of HIV diagnosis was very cost effective, as long as patients then have access to ART."

In most regions of sub-Saharan Africa, when an individual is diagnosed with HIV the standard procedure is to send blood samples to an external laboratory for CD4 testing. Patients must then return to the clinic to learn their test results, which determine whether they meet local

standards to receive ART, and additional visits are often required to educate patients on the procedures necessary for successful treatment. Patients may have limited ability to travel back and forth to clinics that are far from their home communities and require taking a day off from work, so many fail to return after initial diagnosis and never receive the care they need. A point-of-care test can reveal an individual's CD4 result the same day as the original diagnosis, allowing expedited initiation of ART for those who meet local standards.

Conducted in collaboration with the Clinton Health Access Initiative, the MGH-led study used an established mathematical model of the natural history of HIV infection – including outcomes related to diagnosis and treatment initiation – to simulate adoption of point-of-care CD4 testing at an HIV testing and counseling clinic in Mozambique. Previous studies in that country, some conducted by co-authors of the current report, indicated that the availability of point-of-care CD testing improved patients' linkage to continued care but did not evaluate the costs associated with the test itself and with the initiation of ART.

The current analysis revealed that the information quickly provided by point-of-care CD4 would allow more patients to receive treatment sooner than if laboratory testing was used, resulting in almost one full year of additional life expectancy. With a cost-per-year-of-life-saved of $500 – less than Mozambique's per-capita GDP of $570 – point-of-care testing meets standards to be considered "very cost effective."

The authors note that, since their model used the least favorable estimates for the accuracy and costs of the point-of-care test, the actual cost effectiveness could be even greater. They also examined scenarios reflecting situations in other sub-Saharan countries, some with less stringent standards for ART eligibility and others with reduced access to care. The model indicated that point-of-care testing would have the greatest clinical impact and be most cost effective in areas with fewer

opportunities for patients to reach care if they had not initiated care at the time of their initial diagnosis.

"Many types of point-of-care testing are of value in resource-limited settings, especially those with limited capacity for convenient or frequent clinic visits. The rapid turnaround provided by point-of-care CD4 testing can substantially improve clinical outcomes and be cost-effective," says Rochelle Walensky, MD, MPH, MGH Infectious Disease, senior author of the report. "Further studies are needed to investigate point-of-care CD4 testing for monitoring of patients who have started on ART in order to determine whether treatment is effective or should be changed to other, more expensive options."

Provided by Massachusetts General Hospital