

WHAT'S NEW IN INFANT DIAGNOSIS

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In 2014, only 50% of all HIV-exposed infants were tested by the second month of age.

Innovative approaches such as use of assays at the point-of care and adding virological testing at birth could speed up identification and ART initiation.

Operational research to fully inform how to implement such innovations remains critical.

Mortality in the first year of life is very high among untreated infants infected with HIV, therefore early infant diagnosis (EID), prompt return of results and rapid initiation of treatment are essential.^{1,2}

- HIV infection in infants is only definitively confirmed with virological testing using nucleic acid testing (DNA-PCR) NAT technologies due to the persistence of maternal HIV antibody up to 18 months of age.^{3,4}
- Delays in obtaining results and further losses in the testing-to-treatment cascade still occur, so that only 30%⁵ of perinatally infected infants are effectively linked to services and started on ART in a timely manner.
- Innovative approaches such as the use of assays at point-of-care and adding NAT at birth can speed up identification and ART initiation.^{6,7,8}

Diagnosing HIV earlier

- Due to recent cost reduction for NAT assays and the expansion of EID programmes, alternative testing approaches that maximize uptake, retention and timely treatment initiation can be considered.⁹
- There is insufficient evidence to recommend universal inclusion of NAT at birth, however, **there are expected benefits to this approach which provides an additional opportunity for testing and enables earlier identification of infected infants.**
- **The addition of NAT at birth can be considered where feasible, but only in parallel with efforts to strengthen and expand existing EID testing approaches (see Box 1).**

Box 1 Adding NAT at birth to the existing EID strategy

As EID programmes are further scaled up, every effort should be made to improve uptake of NAT at 4–6 weeks, strengthen retention along the testing-to-treatment cascade, ensure confirmation of NAT positive results with a second sample and ensure that infants who test negative by NAT are retained in care until a final diagnosis is made.

To add NAT at birth, effective linkage to maternal HIV screening at the time of delivery should be ensured and the following steps taken:

- collection of data on performance and feasibility of birth testing during implementation;
- improvement of uptake and retention in the testing-to-treatment cascade;
- active tracking of infants with negative NAT at birth to ensure that they return at six weeks for retesting and cotrimoxazole initiation, and
- retesting of infants who test positive at birth with collection of a second specimen as soon as possible. ART should be started immediately after the first positive test and can be stopped if the second specimen tests negative.

Testing closer to the point of care

RDTs for HIV serology

Rapid diagnostic tests (RDTs) with performance comparable to that of traditional laboratory-based serological assays are commercially available and widely used in clinic or community settings with minimal infrastructure.

- WHO 2013 Consolidated guidelines on the use of antiretrovirals recommended the use of serological assays to diagnose HIV in children older than 18 months, to ascertain exposure in young infants and children below 18 months of age and to rule out established infection after 9 months in HIV-exposed infants who are well.¹⁰



Photo: WHO/ Petterik Wiggers

- Children who are started on ART early are unlikely to develop an antibody response to the virus and may falsely test HIV-negative using a serological assay. **Antibody testing should not be used to confirm or rule out infection in children who are already receiving ART.**^{11,12,13}
- The use of RDTs has a potentially high risk of missing HIV-exposed infants older than four months of age. For this reason, **testing of mothers is the best way to ascertain exposure and it should be prioritized whenever possible.**
- RDTs at nine months are a reliable serological test to exclude established HIV infection. However, infants who are still breastfeeding and therefore remain at risk for HIV acquisition will require an age-appropriate testing strategy at the end of the breastfeeding period to definitively exclude HIV infection and determine final HIV status.
- Use of RDTs for HIV diagnosis in children older than 18 months based on national testing algorithm remains appropriate.
- Targeted operational research is needed to address existing knowledge gaps including: how to ensure quality control, how to confirm an initial HIV NAT-detectable test result, when to start ART after a positive point-of-care test and how to ensure that these results are captured in the national EID databases.
- Point-of-care EID is expected to complement and enhance conventional testing approaches by offering a flexible and faster testing approach that could be implemented by non-laboratory staff.¹⁴
- Decentralization of ART or strengthening of referral systems for ART initiation will be of critical importance to ensure that the reduction in the turnaround time for results translates into impact on infant outcomes.

Research gaps

- Impact of adding virological testing at birth on the successful initiation of newborn ART, infant outcomes and uptake of virological testing at six weeks.
- Feasibility testing at six weeks for those that test negative at birth and acceptability of virological testing at birth in different prevalence settings and epidemic contexts.
- Field evaluations of commercially available point-of-care technologies to confirm accuracy of results and the placement of this technology within national programmes.
- Impact of using point-of-care EID on patient management, treatment and infant outcomes.

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