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NOTE

Evaluation of Oral Fluid Enzyme Immunoassay for Confirmation of a Positive Rapid Human Immunodeficiency Virus Test Result[▽]

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The CDC recommends that a reactive rapid human immunodeficiency virus (HIV) test be confirmed with an approved supplemental test; the performance of an intermediate enzyme immunoassay (EIA) is optional. In support of this recommendation, it was found that of 1,431 reactive rapid HIV test results, 2 (0.1%) had false-negative oral fluid Western blot results and both had false-negative EIA results.

Until 2002 in the United States, all tests for human immunodeficiency virus (HIV) infection were conducted in laboratories and the results were reported within several days to 2 weeks. Beginning in 2003, rapid HIV tests waived under the Clinical Laboratory Improvement Amendments of 1988 became available. The rapid tests can be performed with finger-stick whole-blood or oral fluid specimens in nonclinical settings, and the results (negative or preliminary positive) are available within an hour. Negative rapid test results may be reported without further testing. However, preliminary positive rapid test results must be confirmed in a laboratory with a supplemental test (e.g., a Western blot [WB] test) (2, 3). WB results from serum specimens are more accurate than WB results from oral fluid specimens, but because phlebotomy is not always feasible in nonclinical settings, some HIV testing programs use oral fluid for WB confirmation of rapid tests (4) (OraSure HIV type 1 [HIV-1] WB kit package insert; OraSure, Inc., Bethlehem, PA). Before 2007, the CDC recommended that a laboratory-based enzyme immunoassay (EIA) and a WB test be performed when oral fluid specimens were submitted for confirmation of positive rapid tests. In 2007, the CDC changed this recommendation because of the impending withdrawal of the only Food and Drug Administration (FDA)-approved oral fluid EIA and because postmarketing surveillance data identified several instances in which the oral fluid EIA was negative in persons whose rapid tests and oral fluid or serum WB were positive (1, 2). To evaluate the additional diagnostic usefulness of an oral fluid EIA to confirm preliminary positive rapid test results, the CDC examined the EIA and WB results for oral fluid specimens from persons confirmed to be HIV infected by serum WB.

Study participants were persons with known HIV infection who had not taken antiretroviral treatment during the past 3 months. During the period from March 2006 to August 2007, 1,436 participants, all confirmed to be HIV infected by serum WB, were enrolled at clinics in six cities (Atlanta, GA; Baltimore, MD; Chicago, IL; Denver, CO; Louisville, KY; and Philadelphia, PA). Participants provided finger-stick whole-blood and oral fluid specimens, which were tested by the OraQuick Advance Rapid HIV-1/2 antibody test (OraSure, Inc., Bethlehem, PA) at the study site. Additional oral fluid specimens were collected using an OraSure HIV-1 oral specimen collection device and tested with the Vironostika HIV-1 Microelisa system EIA (bioMérieux, Marcy-l'Etoile, France) and the OraSure HIV-1 WB. The oral fluid EIA was not conducted for 429 specimens because of the unavailability of test kits due to a manufacturer shortage. Serum specimens were collected using standard BD Vacutainer tubes (Becton, Dickinson and Company, Franklin Lakes, NJ) and tested with the Genetic Systems HIV-1/HIV-2 Plus O EIA and HIV-1 WB (Bio-Rad, Redmond, WA).

Specimens from 5 of the 1,436 participants were excluded from analysis: two specimens were suspected of having an error in identification labeling, and three oral fluid specimens had insufficient volume for confirmatory testing. All whole-blood (n = 1,431) and oral fluid (n = 1,429) specimens tested positive using the OraQuick rapid test. All serum specimens (n = 1,431) tested positive by serum WB. Of the 1,431 oral fluid specimens tested by oral fluid WB, 1,423 (99.4%) were positive, six (0.4%) were indeterminate, and two (0.1%) were negative. Oral fluid EIAs were performed on 994 of the 1,423 specimens that had positive oral fluid WB results, and all 994 oral fluid EIAs were reactive. Of the six oral fluid specimens with indeterminate WB results, five of six (83.3%) were positive by oral fluid EIA. Of the two oral fluid WB-negative specimens, neither was positive by oral fluid EIA.

Data from this study indicate that oral fluid WB tests were positive in 99.4% of specimens from persons who were known to be HIV infected. However, specimens from approximately 0.1% of HIV-infected persons had false-negative oral fluid WB results, and both of these specimens also had false-negative

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oral fluid EIA results. Specimens from six (0.4%) HIV-infected persons had indeterminate oral fluid WB results, and one of these specimens had false-negative results for oral fluid EIA. Current guidelines require additional confirmatory testing using a blood specimen for any persons with a positive rapid test and a negative or indeterminate oral fluid WB (3). For these persons, even if there is a positive oral fluid EIA result, they will still need a follow-up WB.

Postmarketing surveillance conducted in 2003 to monitor the performance of the OraQuick test indicated that some HIV-infected persons with preliminary positive rapid test results had false-negative oral fluid EIA results (2). In addition, the only FDA-approved oral fluid EIA was withdrawn from the market (1). The results of this study support current CDC recommendations that all preliminary positive rapid test results be confirmed with an additional approved supplemental test for HIV, such as WB or an immunofluorescence assay, and that performing an intermediate EIA is optional (2, 3). The CDC further recommends that if WB confirmatory testing of an oral fluid specimen produces a negative or an indeterminate result, confirmatory testing should be repeated with a blood specimen because of its greater sensitivity (2, 3).

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