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The Importance of Point-of-Care Tests for HCV and HBV in the Implementation of WHO Strategy of Viral Hepatitis Elimination by 2030

Jean-Michel Pawlotsky, MD,PhD [1] [2]

National Reference Center for Viral Hepatitis B, C and D, Department of Virology, Hôpital Henri Mondor, Université Paris-Est, Créteil, France; [1] INSERM U955, Créteil, France[2]

Q. What are the challenges of the World Health Organization's (WHO) global goal to eliminate viral hepatitis as a public health threat by 2030?

Chronic infections by hepatitis B virus (HBV) or hepatitis C virus (HCV) affect 250 and 71 million people worldwide, respectively. They lead to chronic hepatitis, cirrhosis, decompensation of cirrhosis and/or hepatocellular carcinoma. The annual death rate due to chronic viral hepatitis has been estimated to be more than 1.3 million. The availability of an HBV vaccine, of potent anti-HBV drugs that efficiently control viral replication when administered lifelong, and of new anti-HCV drug combinations yielding very high rates of infection cure prompted the World Health Organization (WHO) to set up the global goal to eliminate viral hepatitis as a public health threat by 2030[1]. Among the specific targets of elimination, raising coverage of HBV and HCV diagnosis from less than 5% in 2015 to 90% in 2030 and increasing treatment of eligible patients from less than 1% to 80% appear as particularly challenging.

Q. Why is raising coverage of HBV and HCV diagnosis so challenging?

Chronic viral hepatitis is generally asymptomatic until advanced liver disease develops. Thus, up to approximately 80% of infected patients are unaware of their infection and related liver disease[2]. In low- to middle-income areas, the vast majority of HBV and HCV infections has not been diagnosed. As a result, access to care and antiviral therapy are denied to a large proportion of patients, likely to develop severe complications and transmit infection. Thus, broad-scale HBV and HCV screening is required, based on local epidemiology, innovative screening and diagnostic methods, and resources.

Q. How can we define Point-of-care tests? What are their main characteristics?

Point-of-care (POC) testing is defined as testing performed close to or near the patient, i.e. where healthcare is provided and outside of traditional centralized biology laboratories[3]. POC tests can use whole blood, serum or plasma collected by venous puncture. However, their main interest is the use of alternative matrices, such as fingerstick capillary whole blood or oral fluid. Rapid diagnostic tests (RDTs) capture antigens (e.g., hepatitis B surface antigen, HBsAg) or antibodies (e.g. anti-HCV antibodies) on a solid surface and then attach molecules to them to detect their presence by the naked eye or a dedicated reader[3]. The main advantage of RDTs is the rapid test procedure, which generates a result in generally less than 20 minutes.

Q. Which POC tests can be used for HBV screening?

Several RDTs exist for HBsAg detection[3]. A recent meta-analysis of 30 studies performed between 1996 and 2015 in 23,176 individuals showed overall pooled sensitivity and specificity of HBsAg RDTs of 90% (95% confidence interval [CI]: 89%-91%) and 99% (95%CI: 99%-99%), respectively[4]. The WHO recommends using a serological assay (in either RDT or laboratory-based immunoassay format) that meets minimum quality, safety and performance standards with

regard to both analytical and clinical sensitivity and specificity to detect HBsAg[5]. RDTs for other serological markers of HBV infection warrant assessment of their diagnostic performance.

Q. Which POC tests can be used for HCV screening?

The utility of anti-HCV RDTs depends on their sensitivity, specificity, accuracy, and predictive values, which vary with the disease prevalence and across different populations[3]. A recent meta-analysis of 47 studies including 90,008 samples revealed a global pooled sensitivity in whole blood collected by venous puncture or fingerstick of 98% (95%CI: 97%-98%). The global pooled specificity was 98% (95%CI: 98%-98%). Sensitivity and specificity with oral fluid as a matrix were 94% (95%CI: 93%-96%) and 100% (95%CI: 99%-100%), respectively[6]. Screening strategies for HCV infection should be defined according to the local epidemiology of HCV infection. In this context, RDTs can be used instead of classical enzyme immunoassays to facilitate anti-HCV antibody screening and improve access to care. [5 7]

Q. Are POC tests available for HBV DNA or HCV RNA detection?

No POC test for HBV DNA is available, but POC tests (or more precisely "near-care" tests) have been developed for confirmation of HCV infection, i.e. detection of HCV RNA, in patients with detectable anti-HCV antibodies. One of these assays can detect and quantify HCV RNA from 100 µL of capillary whole blood in an individual cartridge within 60 minutes with excellent performance[8]. Such assays should ideally be used for reflex HCV RNA testing in the framework of a "test-and-treat" approach.

Q. How can POC tests be used to achieve the goal of elimination of viral hepatitis as a public health threat by 2030?

POC tests offer substantial benefits for the management of patients with chronic viral hepatitis, by shortening the time to results and by making the test available at the bedside or at remote care centers. New matrix specimens, such as oral fluid or fingerstick capillary whole blood, represent promising alternatives to venous puncture. Their use has been recommended for HBV and HCV screening in recent international guidelines, including those from the European Association for the Study of the Liver (EASL), and from the WHO, with the aim to contribute to the endeavor of eliminating viral hepatitis as a major public health threat by 2030 [5 7]. Studies have shown the feasibility and cost-effectiveness of such approaches in resource-limited settings, where prospective studies are needed to establish decision algorithms aimed at guiding appropriate interventions. The combination of technological advances and innovative strategies for testing and linkage to care is now required to achieve the goal to eliminate viral hepatitis as a public health threat by 2030.

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