

## DIAGNOSTIC ACCURACY OF ASSAYS USING FINGER-STICK CAPILLARY AND DRIED BLOOD SPOT SAMPLES FOR DETERMINATION OF HEPATITIS C RNA DETECTION: A SYSTEMATIC REVIEW AND META-ANALYSIS

Catlett B<sup>1,3</sup>, Hajarizadeh B<sup>1</sup>, Cunningham E<sup>1</sup>, Wolfson-Stofko B<sup>4</sup>, Wheeler A<sup>1</sup>, Khandaker-Hussain B<sup>2</sup>, Feld J<sup>4</sup>, Martró E<sup>5,7</sup>, Chevaliez S<sup>6</sup>, Pawlowsky JM<sup>6</sup>, Cunningham P<sup>1,3</sup>, Dore GJ<sup>1</sup>, Applegate TA<sup>1</sup>, Grebely J<sup>1</sup>

<sup>1</sup> *The Kirby Institute, UNSW Sydney, Sydney*

<sup>2</sup> *Macquarie University, Sydney*

<sup>3</sup> *St Vincent's Centre for Applied Medical Research, Sydney*

<sup>4</sup> *Viral Hepatitis Care Network, University Health Network, Toronto, Canada*

<sup>5</sup> *Microbiology Department, Laboratori Clínic Metropolitana Nord, Hospital Universitari Germans Trias i Pujol, Institut d'Investigació Germans Trias i Pujol (IGTP), Badalona (Barcelona), Spain*

<sup>6</sup> *French National Reference Centre for viral hepatitis B, C and Delta, Department of Virology, Hôpital Henri Mondor, Université Paris-Est, Créteil*

<sup>7</sup> *Group 27, Biomedical Research Networking Centre in Epidemiology and Public Health (CIBERESP), Instituto de Salud Carlos III, Madrid, Spain*

**Background:** Dried-bloodspot (DBS) and fingerstick point-of-care (POC) HCV RNA testing increases uptake of HCV testing and linkage to care. This systematic review evaluated the diagnostic accuracy (including sensitivity and specificity) of DBS and point-of-care testing to detect HCV RNA.

**Methods:** Searches were conducted using bibliographic databases and conference abstracts and data was screened and extracted in Covidence. Heterogeneity of outcome measures was assessed using a bivariate mixed-effects regression analysis. A meta-analysis was conducted in Stata (v14.2) to pool the estimates of odds ratios (based on heterogeneity). Risk of bias was assessed using the QUADAS-2 critical appraisal tool.

**Results:** We reviewed 241 studies and extracted data from fifty-one eligible records (including n=30 DBS and n=8 FPOC). When comparing DBS samples to venous blood samples; pooled diagnostic accuracy measures were as follows, sensitivity and specificity for the detection of HCV RNA was 97% (95%CI:94%-98%) and 100% (95%CI:98%-100%). The sensitivity and specificity for quantification of HCV RNA was 98% (95%CI:94%-99%) and 100% (95%CI:89%-100%) respectively. When comparing finger-stick capillary samples to venous blood samples sensitivity and specificity for detection of HCV infection was 99% (95%CI:97%-100%) and 100% (95%CI:96%-100%). Whilst the sensitivity and specificity for quantification of HCV RNA was 100% (95%CI:84%-100%) and 100% (95%CI:81%-100%) respectively. All four comparisons had a summary receiver operating characteristic (area under curve) of 1.00 ±0.001. The proportion of finger-stick capillary samples with an invalid result among POC testing was 8% (95%CI: 4%-12%).

**Conclusion:** Overall, good diagnostic accuracy was observed across assays that detect HCV RNA using finger-stick and DBS sample types providing further proof of clinical utility. However, the relatively high proportion of invalid results among finger-stick capillary samples is concerning and requires further research to determine best practice for sample collection and instrument operator training.

**Disclosure of Interest Statement:** JG has received research grants from Cepheid and Hologic. EM has received research grants from Abbott and Cepheid. TA has received travel grants and travel support from Abbott Diagnostics and travel grants from Cepheid.