DETECTION OF DENGUE VIRUS USING A FIELD-DEPLOYABLE PCR SYSTEM: EVALUATION ON HUMAN SERUM SAMPLES IN INDONESIA

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Abstract. Dengue remains an important public health problem in Indonesia. Rapid diagnosis of dengue infection is critical in disease management and control. A pan-dengue virus (DENV) RT-insulated isothermal (ii)PCR assay method, which is a field-deployable system, was evaluated in detection of DENV isolates and human serum samples collected in Indonesia in comparison with a DENV reference multiplex quantitative (q)RT-PCR assay system and a DENV NS1 antigen rapid test. RT-iiPCR and reference qRT-PCR showed comparable sensitivity in detecting DENV isolates of all four serotypes. Compared to composite results of serum samples (two out of the three methods giving the same result, *ie* 90 DENV positives and 69 DENV negatives), sensitivity, specificity and accuracy of the pan DENV RT-iiPCR assay was 100% [95% confidence interval (CI): 97-100], 100% (95% CI: 96-100) and 100% (95% CI: 98-100), respectively, reference multiplex qRT-PCR assay 98% (95% CI: 94-100), 98% (95% CI: 94-100) and 98% (95% CI: 95-100), respectively, and DENV NS1 antigen rapid test 89% (95% CI: 82-96), 81% (95% CI: 72-91) and 85% (95% CI: 80-91), respectively. Thus, this field-deployable battery-operated pan-DENV RT-iiPCR system should serve as an important tool to facilitate diagnosis of dengue infection in rural and remote communities of Indonesia and other developing countries.

Keywords: dengue virus, human serum, point-of-need detection, RT-insulated isothermal PCR

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