Oxford Screening of CSF And Respiratory Samples ('OSCAR'): Pilot study into next generation sequencing (NGS) for identification of viruses from clinical laboratory samples

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Table: Benefits and challenges associated with use of metagenomic approaches (next generation sequencing (NGS)) in diagnosis of viral infection.

Benefits of NGS approach to viral diagnostics	Challenges in implementing NGS approach to viral diagnostics
• Offers an unbiased approach to identification of a wide range of pathogens (1-5); • Accelerates the speed of testing (6, 7); • Detects novel agents that may cause or contribute to pathology in humans (1, 8, 9) and animals (10, 11); • Identifies drug resistance at the same time as diagnosis (2, 7, 12, 13); • Identifies and tracks transmission (14, 15); • Provides rapid diagnosis of viral infection that can facilitate timely and targeted treatment (e.g. for influenza (16, 17)); • Contributes to anti-microbial stewardship by reducing unnecessary administration of empiric broad-spectrum antibiotics (18, 19). • Drives prompt notification and infection control interventions for high risk organisms (e.g. MERS-CoV, Ebola (20)). • Enhances diagnostics in immunocompromised patients where traditional methods may overlook mixed infections and/or fail to acknowledge pathogenicity of low-virulence organisms (4, 21, 22).	• Substantial potential contribution of irrelevant contaminants or bystander organisms (23); • Potential environmental or experimental contamination; • Substantial contribution of human reads to the overall output; • Potential requirement for different sample preparation and handling for: (i) different sample types (24), (ii) DNA vs RNA organisms, (iii) single stranded vs double stranded organisms; • Requirement for bioinformatic support and development of algorithms to assist with analysis and interpretation of data; • Reduced sensitivity compared to traditional diagnostic approaches (25) (may not detect low copy numbers of organisms); • Lack of 'gold-standard' reference for comparison; • High economic cost (5).

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