Impact of introducing respiratory metagenomic (RMg) sequencing with multiprofessional team interpretation and advice on antimicrobial stewardship (AMS) outcomes over adult and paediatric intensive care (ICU) areas

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Introduction
RMg utilises rapid nanopore sequencing to identify a comprehensive respiratory pathogen profile earlier than conventional testing(1). RMg sequencing was introduced at University Hospital Southampton NHS Foundation Trust (UHS) in December 2024 as part of a UK pilot implementation project(2). To understand and deliver recommendations into clinical practice, multidisciplinary team (MDT) interpretation and advice was implemented.

Objectives
To assess the outcome of RMg sequencing combined with MDT interpretation on AMS outcomes in adult and paediatric critical care.

Methods
An MDT (healthcare scientist, microbiologist, pharmacist, virologist) reviewed RMg results twice a week to interpret, discuss and communicate findings in February and March 2025. Patients from all ICU areas (general, paediatric, cardiac, neurology) at UHS were eligible for inclusion. Patients were referred for RMg if: they were a new ICU admission for lower respiratory tract infection; or they exhibited a new deterioration in markers of respiratory function; or there were no organisms identified by conventional methods or concern that an organism had not been detected. The MDT determined implications for patient care and findings were disseminated to clinical teams by multiple routes with an immediate focus on those that were time critical. AMS decisions were stratified into pre-agreed outcomes (Table 1).

Results
Sixty-four respiratory samples from 62 patients were sequenced and discussed. The majority of samples 36/64 (56%) were from general adult ICU followed by paediatric ICU 10/64 (16%). Most samples were endotracheal aspirates 41/64 (64%), with the remainder being sputum 14/64 (22%), bronchoalveolar lavage 7/64 (11%) and pleural fluid 2/64 (3%). In 50/64 (78%) cases the MDT outcome impacted clinical care including: assurance of current treatment 35/64 (55%); change to antimicrobial prescription 8/64 (12%) and other predetermined outcomes (Table 1). Antimicrobial (AM) therapy was optimised in 15/64 (23%) of cases. Of these, in 7/64 (11%) cases the RMg sequencing identified unexpected pathogens resulting in a significant change to treatment or investigation focus.

Table 1: AMS outcomes

AMS Outcome	**Number**	**%**
Continuation of current regime (results support current plan/reassurance)	35	55
AM prescription changed based on RMg (length/backup)	8	12
AM stopped: reduction in number or all AM	4	6
AM regime changed resulting in broader spectrum AM therapy (escalation)	2	3
AM regime changed resulting in narrower spectrum AM therapy (de-escalation)	1	2
Positive outcome on clinical care - Total	*50*	*78*
RMg result did not impact current treatment (inc. run failure)	14	22

Conclusions
RMg sequencing, interpretation and discussion in MDT allowed for full utilisation of RMg results in supporting AMS decisions for patient care. The scientist's role in interpreting the raw metagenomic results was vital to allow for treatment decisions to be made. In over two thirds of cases there was reassurance of current therapy or changes to therapy made, giving confidence to the MDT review model.

References

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