



Point of Care Respiratory Viral Testing (POCT): A novel service to target appropriate antimicrobial prescription and improve antibiotic stewardship

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Introduction

Respiratory infection, predominantly due to viral pathogens, poses a huge burden on the NHS especially during winter pressures. An earlier definitive diagnosis should allow more rapid clinical decision-making on key aspects of care, including hospital admission (versus discharge), antibiotic use, and infection control/prevention of nosocomial infection. We hypothesised that use of POCT would improve the quality of service provided in our frontline departments - enhancing patient care by guiding the early management plan, as well as improving bed flow and infection control within the Trust, and reducing morbidity associated with empirical antibiotic prescription. We are the first hospital in the UK to implement this into routine clinical practice, using a panel testing for an extensive range of respiratory viruses.

Aims

To investigate whether initiation of a POCT service in Emergency Department (ED) and Acute Admissions Unit (AAU) in a UK district hospital setting would result in

1. Avoidance of unnecessary antibiotic use and improved antimicrobial stewardship
2. Early safe discharge (in appropriate cases)

Methods

Patients presenting with suspected respiratory viral symptoms between 15th January and 1st May 2018 underwent POCT (BioFire FilmArray, Biomerieux Inc.). The FilmArray technology (Figure 1) involves a simple methodology, allowing the test to be undertaken quickly: within 2-3 minutes after nasopharyngeal sampling using a viral swab, with results then available after only 43 minutes.

Figure 1a

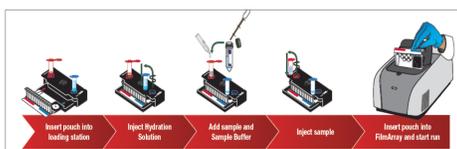
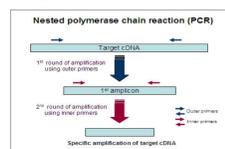


Figure 1b



35 nurses across the hospital ED and AAU were trained in sample processing.

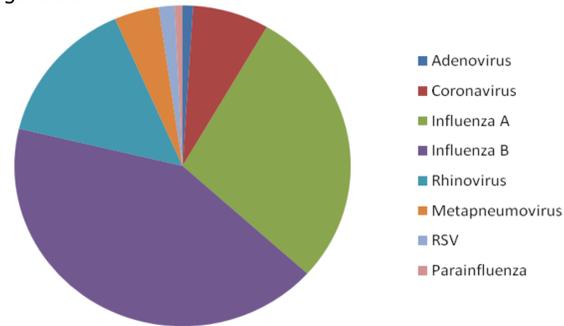
An algorithm (Figure 2) was developed to incorporate the findings from POCT into clinical decision making.

Figure 2

Results 1

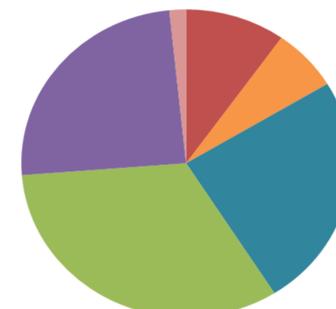
1. 901 patients underwent POCT testing. 507 tested positive for a respiratory virus.

Figure 3a



All patients

Figure 3b

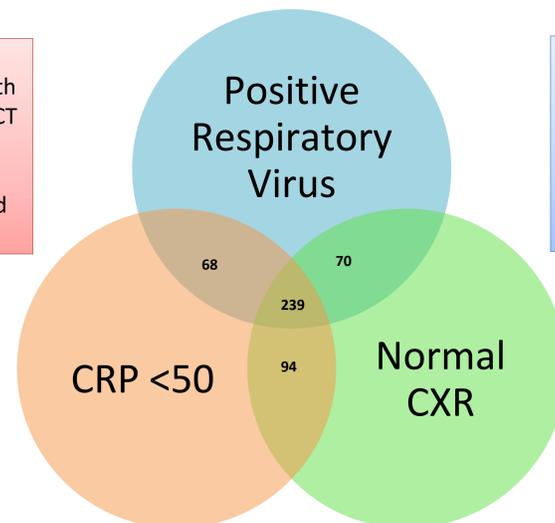


COPD or Asthma patients

2. POCT findings were evaluated in combination with other key clinical indices, as illustrated below (Figure 4):

239 patients attended ED with

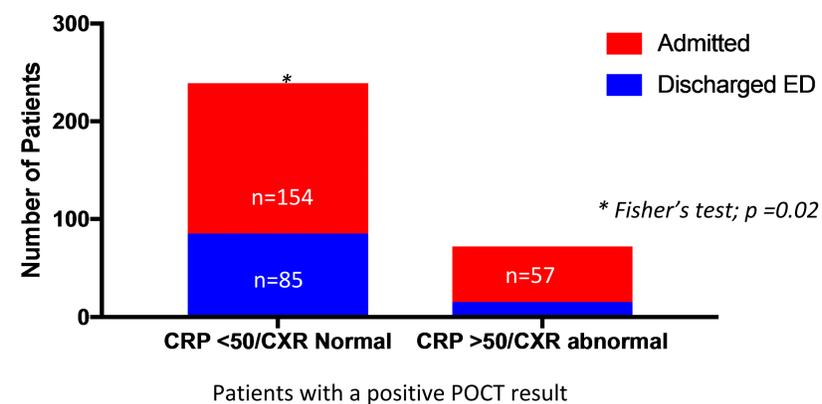
- positive POCT result
- CRP < 50
- CXR reported normal



72 patients attended ED with

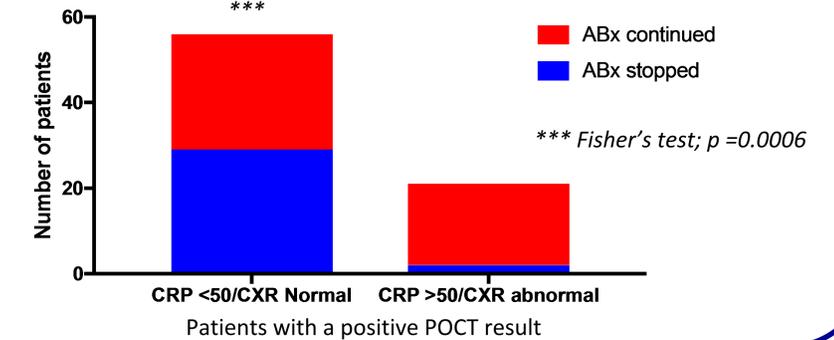
- positive POCT result
- CRP ≥ 50
- CXR reported abnormal

3. A significant proportion of the total patients were discharged from ED, hence not requiring admission, where a positive POCT in combination with normal CXR and CRP < 50 was used in the decision making process.



Results 2

4. In 52% of patients, antibiotics (Abx) were stopped once the POCT results were obtained in conjunction with a normal CXR and CRP < 50. Abx were continued in 90% of patients where the CXR and CRP were evaluated as abnormal.



Conclusion & Discussion

1. POCT results available at time of evaluation of the patients in the acute setting allow the attending physicians in ED or the acute ward to combine this information with other clinical metrics – hence this may permit **more informed and rapid clinical decision-making**, likely to improve the patient journey. This will also facilitate improved antimicrobial stewardship.
2. Viral infection was identified in a high proportion of cases where it was considered. The use of alternative POCT panels, which focus solely on influenza, would have been unable to provide a positive viral diagnosis in almost 50% of such cases.
3. Clinical judgement will always be required in individual patient decisions regarding antibiotic avoidance and early discharge - integration of POCT into a multifaceted assessment tool can help to rapidly identify a lower risk cohort in which these options may be considered.

We highlight that this service is first of its kind to be led by a Respiratory team but it is the close working and collaborative efforts of teams across Pathology, Microbiology and Acute Medical/Emergency services that has led to successful implementation.

Future direction

- Development of an integrated care plan document, to optimise clinical record keeping, highlight agreed pathways (incorporating POCT results) and facilitate audit
- Education to ensure earlier use of POCT in ED and AAU and more consistent use of POCT out-of-hours and also guidance on decision making around discharge and AMS.
- A randomised clinical trial to focus on testing in the community with particular attention to patients with exacerbations of COPD.
- Formal health-economic analyses to evaluate the financial impact and potential benefits from POCT use in ED and AAU as well as the community setting.

References

1. World Health Organization. Fact sheet 310: the top 10 causes of death. <http://www.who.int/en/news-room/fact-sheets/detail/the-top-10-causes-of-death> (accessed on June 6 2018)
2. Brendish NJ, Malachira AK, Armstrong L, Houghton R, Aitken S, Nyimbili E, Ewings S, Lillie PJ, Clark TW Routine molecular point-of-care testing for respiratory viruses in adults presenting to hospital with acute respiratory illness (resPOC): a pragmatic, open-label, randomised controlled trial. *Lancet Respir Med* 2017; May;5(5): 401-411