Editorial



# Routine molecular point-of-care testing for respiratory viruses in adults presenting to hospital with acute respiratory illness

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*Comment on:* Brendish NJ, Malachira AK, Armstrong L, *et al.* 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;5:401-11.

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The implementation of infectious disease Point-of-Care (ID-POCT) diagnostics into the clinical environment lags behind the implementation of Point-of-Care diagnostics in other fields of medicine, especially in the field of clinical chemistry, where for example blood pressure and blood sugar POCT diagnostics are relatively common (1,2). In fact, the problems associated with the implementation of ID-POCT are numerous and currently include among others: a lack of reimbursement of costs by insurers, incomplete acceptance by physicians of the actual value of ID-POCT, and issues related to introducing ID-POCT into existing infectious disease clinical diagnostic work practices, e.g., coupling ID-POCT to existing laboratory information management systems, the establishment of new quality control and quality assurance schemes, training staff to perform non-routine manipulations, introducing new reporting procedures, etc.) (3-6). Additionally, although many existing and new ID-POCT devices are (becoming) available for clinicians to use, many of these have been/are being developed with a focus on adapting current state-of-the-art technologies to the medical environment, instead of focusing on the actual clinical need and then developing/adapting technologies to meet these actual needs (in terms of costs, ease-of-use, time-to-result, etc.). Performing research into the effect of ID-POCT, by for example measuring the impact of the use of ID-POCT in the clinical environment using parameters such as reduction in unnecessary antibiotic prescribing, shortening the length of hospital stay and rationalizing the use of isolation facilities, is one way of providing tangible evidence of the advantages, or disadvantages, of implementing ID-POCT into clinical environments. A recent study by Brendish *et al.* provides more evidence for the debate surrounding the implementation of ID-POCT into emergency departments and acute medical units (7,8).

Brendish *et al.* established a pragmatic, parallel-group, open-label, randomised controlled trial and enrolled 720 adults presenting at an Acute Medical Unit and Emergency Department at a single United Kingdom study centre. Adults were recruited if they presented within 24 hours of onset of acute respiratory illness and/or a fever of >37.5 ℃ and their duration of illness was ≤7 days. Patients were randomly assigned, in a 1:1 ratio, into two groups, with one group receiving routine clinical care and the second group receiving a diagnosis based on a molecular Point-of-Care test (POCT). The final distribution of adults per group was 358 adults in the routine care group and 362 adults in the POCT group. The ID-POCT used in the study was the Film Array system, which generates a result in approximately 1 hour (http://www.biomerieux-diagnostics.com/filmarrayr-respiratory-panel) (9). This system is one of many currently available ID-POCT devices (10) and has previously been tested in several different medical scenarios (11-13).

The primary outcome of the study was the proportion of patients who received antibiotics while hospitalised (up to 30 days). Also, several secondary outcomes were identified, including duration of antibiotics, proportion of patients

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receiving single doses or brief courses of antibiotics, length of stay, etc. The primary outcome result indicated that 301 adults (84%) assigned to the POCT group received antibiotics compared with 294 (83%) adults assigned to the routine care group (95% CI, –4.9 to 6.0; P=0.84). A non-statistically significant result therefore. Interestingly, however, 50 of the 301 (17%) adults in the POCT group who were treated with antibiotics received single doses or brief courses of antibiotics (<48 h), compared with 26 of the 294 (9%) adults in the control group (95% CI, 2.5–13.1; P=0.0047). However, the mean duration of antibiotics did not differ between the groups [7.2 days (SD 5.1) in the POCT group *vs.* 7.7 days (4.9)] and no differences in adverse outcomes was found between the groups [77 (21%) in the POCT group *vs.* 88 (25%) in the control group]. The fact that the mean duration of antibiotics did not differ between the groups, despite adults in the POCT group being treated with single or brief courses of antibiotics, was assigned to differences in the use of antibiotics in different clinical groups, specifically between the pneumonia group (prolonged antibiotic prescribing not affected by POCT) and exacerbations of airway disease (single and brief courses of antibiotics given).

One of the main conclusions of the publication was that 'routine use of molecular POCT for respiratory viruses did not reduce the proportion of patients treated with antibiotics', which was attributed to the fact that 'many patients were prescribed antibiotics before the POCT result became available'. However, it should be noted that this finding does not necessarily mean that an ID-POCT device offering a more rapid time-to-result would be more successful in reducing antibiotic prescribing practices as clinicians may simply be convinced that the risk of not prescribing an antibiotic in the presence of a bacterial infection (possibly below the limit of detection of the ID-POCT device used) may outweigh the risk (side-effects of the antibiotic) to a patient that is not actually suffering from a bacterial infection. Relevant here is a recent publication by Klein *et al.*, who concluded that '*interventions to reduce inappropriate (antibiotic) prescribing should emphasize the non-negligible possibility of serious side effects.*' (14).

The Brendish *et al.* publication utilized a randomized controlled trial to investigate the impact of ID-POCT diagnosis on adults presenting with acute respiratory illness or fever. Perhaps utilizing ID-POCT within a standardized framework of a multivariate model of respiratory tract infection, for example including cough, wheezing, age >60 years of age, current prevalence of respiratory tract infection within that particular geographical location etc. (15), would have helped in reducing the amount of antibiotics being prescribed (at least for infections caused by influenza).

One limitation of the study in a general sense is the fact that only adults >18 years of age and attending emergency departments or acute medical units, were involved in the study, whereas a majority of cases of respiratory tract infection and antibiotic prescribing tends to occur in children and/or in the primary care setting (http://ecdc.europa.eu/en/publications/Publications/antimicrobial-consumption-europe-surveillance-2011.pdf) (16,17). However, the potential effect and problems associated with ID-POCT in the primary care setting have already been investigated in several publications (18-20). Another limitation of the study (requiring a long term and geographically broad approach) is the fact that the effect of ID-POCT on antibiotic prescribing in relation to a reduction / increase in antibiotic resistance within the clinical settings was not performed. Though such studies may require long term prospective and/or retrospective approaches, the demonstration of a (positive) effect on the use of ID-POCT for prescribing antibiotics in respiratory infections in, for example, adults presenting at emergency departments or acute medical units would provide valuable evidence for the added value and cost savings (at patient, medical institute and societal level) associated with implementing ID-POCT.

In conclusion, Brendish *et al.* published an interesting study which provides further evidence as to the potential advantages (single doses or brief courses of antibiotics) of implementing ID-POCT within the medical environment. However, their results also add to a growing collection of data indicating that the successful implementation of ID-POCT is dependent on multivariate factors, and not only on the availability of an ID-POCT apparatus within the clinical environment *per se*. Further, although a reduction in antibiotic prescribing is currently seen as one of the main 'drivers' for the adoption of ID-POCT, and a reduced length of hospital stay has financial value with respect to the implementation of ID-POCT and the health of the patient, two of the major hurdles to the actual implementation of ID-POCT remain: (I) difficulties with reimbursement by insurers and/or national health services for the use of such devices (costs); and (II) the willingness of clinicians to accept that they should alter their clinical decision-making practices and antibiotic prescribing habits based on the results of an ID-POCT assay (trusting the sensitivity,

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specificity, accuracy, precision etc. of ID-POCT devices).

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## Footnote

*Conflicts of Interest:* The author has no conflicts of interest to declare.

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