Editorials

Point-of-care testing in general practice:

just what the doctor ordered?

In this time where fast, efficient, and personalised care has become increasingly important, it is not surprising that point-of-care tests (POCTs) are becoming ever more popular. A wide range and growing number of POCTs are now available to GPs. The term POCT is frequently used and many different descriptions of a POCT exist, which sometimes leads to misconceptions and confusion. With a multidisciplinary international panel of POCT experts consisting of family practitioners, laboratory specialists, policymakers, researchers, and manufacturers, we recently performed a modified e-Delphi procedure to reach consensus on a widely supported and recognised international definition of a POCT in family practice: a point-of-care test in family practice is a test to support clinical decision making, which is performed by a qualified member of the practice staff nearby the patient and on any part of the patient's body or its derivatives, during or very close to the time of consultation, to help the patient and physician to decide upon the best-suited approach, and of which the results should be known at the time of the clinical decision making.[1]

GPS' WISHES AND CONCERNS

POCTs have many potential benefits, for example, saving patients' and physicians' time, optimising management, reducing referrals to secondary care and healthcare costs, improving patient satisfaction, and better adherence to treatment. An international survey among 2770 GPs in the UK, Australia, Belgium, the Netherlands, and the US has shown that GPs would like to use more laboratory POCTs. They specifically want POCTs to help them diagnose acute conditions, such as infections (C-reactive protein [CRP], chlamydia, gonorrhoea), acute cardiac disease (troponin, B-type natriuretic peptide), pulmonary embolism and deep-vein thrombosis (D-dimer), and some chronic conditions (for example, HbA1c, haemoglobin).[2,3] However, GPs also expressed reservations towards increasing access to new POCTs. They are concerned about test accuracy, over-reliance on tests, the use of diagnostics without a proper indication, and a lack of skills to safely use and interpret these diagnostics.[4,5] We believe that these concerns are justified and we will describe why we think that more point of care does not necessarily mean better care.

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POCT EVALUATION

Although GPs may wish to use laboratory POCTs for these acute conditions, most of these POCTs are not evaluated sufficiently or are currently unfit for clinical practice. As an example we recently showed that, despite wide clinical interest in POCTs for acute cardiopulmonary conditions, there were only seven prospective studies evaluating relevant patient outcomes for promising laboratory POCTs (troponin, D-dimer, H-FABP, and BNP) in a general practice population, with only very few studies evaluating outcomes beyond clinical performance assessment.[6]

In a previous editorial in the *BJGP*, Thompson *et al* rightly pointed out that it is important to structurally evaluate the evidence behind new (point-of-care) diagnostic tests. In doing so it is not only important to evaluate the evidence that a test has been investigated in primary care, but also that the test has been shown to make a difference to patient outcomes, is useful in clinical practice, and is cost-effective.[7] The Horizon Scan reports are very useful in evaluating new POCTs. These independent reports, funded by the National Institute for Health Research (some of which were published by Plüddemann *et al* in the Clinical Intelligence section of the *BJGP*), summarise why the technology is important, provide an overview of the currently available evidence, and assess whether it could be adopted in the NHS, and, if so, what the requirements are for the delivery of the technology into practice.

Recently, the Oxford Diagnostic Evidence Cooperative group systematically analysed all 40 diagnostic Horizon Scan reports on POCTs of recent years.[8] This systematic review, extracting data from 500 primary studies, showed that only very few POCT evaluations seem to follow the expected evaluation sequence of analytical performance, clinical performance, clinical effectiveness, comparative clinical effectiveness, cost-effectiveness, and broader impact. It strikingly shows that most POCTs undergo clinical performance assessment (71%), but very few progress to evaluation of their broader impact or cost-effectiveness. Only 18% of all studies evaluated clinical effectiveness of the POCT and only 18% of all Horizon Scan reports included evidence for all evaluation components. Notably, the median time to completion of the evaluation cycle from analytical performance to broader impact was 9 years, showing that the proper evaluation of rapid tests is anything but rapid.[8]

FROM ANALYTIC ACCURACY TO BROADER IMPACT

The only Horizon Scan report that included evidence from analytic accuracy to broader impact and generally followed the expected evaluation sequence was on CRP POCT.[8] This POCT has been widely introduced in Dutch general practice and more than half of UK GPs would like to use this POCT as well.[2] CRP appears to check all boxes for successful implementation of a new POCT, as follows:

- there is a medical need for such a test and social awareness (reducing antibiotic prescriptions in the light of antibiotic resistance);
- there is a simple, robust, and reliable CRP POCT available;
- the test is proven effective in reducing the number of antibiotic prescriptions;
- e-learning training modules were developed and made available; and
- the translation was made to clinical practice, where the test was adopted by Dutch GPs.

However, even in the case of the CRP POCT there are some problems after implementation in routine care, such as excessive and non-evidence-based use of the POCT.

Exact figures are lacking, but GPs also use CRP POCT for conditions such as appendicitis and in children, against the advice of current GP guidelines. A Dutch observational study investigating the effects of implementation of the CRP POCT

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among 40 GPs in nine general practices, in 2012 and 2013, showed that GPs did not use or interpret the POCT according to the guidelines in the majority of patients.[9] Non-evidence-based POCT use was also observed in Scandinavia, where the POCT was already widely implemented before prospective studies on clinical effectiveness were performed.[10]

POCTs are especially vulnerable to excessive and non-evidence-based use, as the proximity and speed of POCTs may prompt physicians to use them. Diagnostic performance of POCTs should be evaluated in a specific primary care population for specific indications. In practice, GPs should then only use these POCTs in the same population and for the same indications for which the POCT is proven effective, because expanding the range of indications can negatively influence the diagnostic performance of a POCT.

IMPLEMENTATION IN ROUTINE CLINICAL PRACTICE

Even after POCTs have undergone the full evaluation cycle from analytical performance to broader impact, the use of POCTs should be evaluated after implementation in routine clinical practice. Attention should be paid not only to non-evidence-based test use, but also to pre-analytical errors, misinterpretation, and non-adequate documentation of the test results. It is vital that GPs follow the proper training on how and when to accurately use POCTs, how to interpret and chart the results, and how and why quality control is performed. As there are many GPs with busy schedules and limited resources, it may be challenging to train all GPs and practice staff. Online e-learning modules supplemented by short face-to-face user instructions by manufacturers or local laboratories may be a good solution for this problem.

When using POCTs, a quality management system should be implemented, wherein aspects such as the following are addressed:

- responsibility and accountability;
- adequate training and certification, including basic health and safety issues and standard operating procedures; and
- appropriate internal quality control and external quality assurance.

Connectivity between POCT data management software and the electronic patient information system could aid GPs in correct documentation of the test results.[11] Cooperation with medical laboratories and manufacturers is important to support GPs with the correct implementation of POCTs and device maintenance.

CONCLUSION

Although more POCTs, with potential benefits, are available to GPs nowadays, GPs' concerns about the use of these POCTs are justified. GPs should remain critical about what tests to order, as most POCTs have not been evaluated sufficiently. Only few POCTs have been evaluated with regards to clinical effectiveness or broader impact on patient outcomes, and some POCTs even appear to have been implemented in routine care without completing these essential evaluation stages. Critical appraisal of new POCTs is essential to facilitate implementation. Also, after implementation in routine clinical practice, the use and effect of POCTs should be evaluated and well-considered quality management systems should be implemented. By doing so we can work towards professional POCT use in general practice. Only then can we be sure that more point of care means better care.

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