Diagnostics in GP services

Why this research is was needed?

Diagnostic tests and their results are integral to clinical decision-making. In the UK NHS, GP practices have traditionally had limited direct access to many such tests. Instead, a common model is for GPs to refer patients for blood, tissue or imaging tests to the local hospital, or more recently, to commercially run diagnostic test centres. This may lead to waits for appointments and availability of test results, and involves travel for the patient. If GP practices could undertake more diagnostic tests themselves, this might enable faster and earlier diagnosis of common conditions and avoid unnecessary referrals and inconvenience for patients. It may reduce overall NHS costs, and lower costs for patients and possibly a reduction in numbers of missed appointments.

More tests are potentially usable in these settings because of improvements in technology (e.g. greater portability and lower equipment costs), economics (e.g. the potential to reduce NHS costs by reducing secondary care referrals) and social drivers (e.g. capability of workforce to use the technology and interpret results). Research was needed to find out what technologies are used in primary care in the UK and elsewhere, and how these technologies might be used in the UK.

What we found from NIHR studies

A horizon scanning programme of research funded by NIHR at Oxford University (Pluddemann and Mant, 2015) has produced lists of potentially cost effective technologies in GP services [1,2]:

1. point-of-care tests for blood D-Dimer and HbA1C levels and urine albumin-creatinine ratio;
2. no-contact infrared thermometers for children;
3. transcutaneous measurement of jaundice in newborn infants;
4. dermoscopes;
5. spirometers;
6. single channel ECGs to check for heart arrhythmias (such as atrial fibrillation);
7. chlamydia self-swabs;
8. devices to collect clean-catch urine specimens in the elderly.

There are also new diagnostic technologies which are unlikely to be cost-effective in NHS primary-care in the foreseeable future: the electronic nose; the electronic stethoscope; hand-held nerve conduction devices to detect carpal tunnel syndrome; and point-of-care blood tests to check for thyroid disease, high cholesterol and hepatitis C (which are all better done at the hospital laboratory). Self-testing by people taking warfarin is effective for selected patients but may not be cost-effective for the NHS.

Individual reports are available from:

https://www.oxford.dec.nihr.ac.uk/reports-and-resources/horizon-scanning-reports

An evidence synthesis is recently completed and focussed on the logistics of diagnostic modalities in primary care (excluding self-testing); diagnostic ultrasound services; and diagnostic pathways for the assessment of breathlessness [3].

The team produced a new framework for assessing the potential for service implementation, which may be of practical use for commissioners of primary care services:

STEPUP Evidence Map

Human Resources	
SKILLS: Skill mix Extended roles Inappropriate Test Ordering Accuracy Errors Delay in Diagnosis Quality Assurance	**T**RAINING: Training Needs Training in using equipment Training in interpretation Training Costs Duration
Logistics	
EQUIPMENT: Equipment for modality Equipment for analysis Consumable costs Maintenance	**P**REMISES: Cost of Premises Space for Equipment Space for Consumables Space for Staff Space for Patients/Waiting Areas etcetera Health & Safety Risk Assessment
Communications and Relationships	
USER PERSPECTIVE: Waiting Times Acceptability Repeat Procedures.	**P**RIMARY-SECONDARY INTERFACE: Referrals Changes to Diagnosis Pathways Changes to Management Pathways Health Service Utilisation Relationships between staff Specialist Support Attitudes of Secondary Providers General Management

This framework was developed and used to examine 13 primary care diagnostic topics (audiology; cardiac services; diabetic services; endoscopy; genetic testing; laboratory tests; magnetic resonance imaging; point of care testing; radiology/X-ray; respiratory tests; and ultrasound). The key results are:

The detailed summary of evidence is available in the report (tables 8-25).
https://www.journalslibrary.nihr.ac.uk/hsdr/hsdr04350#/abstract

An example of a technology that has been widely available for some time is a simple test to diagnose and monitor lung conditions. Spirometry equipment has frequently figured in GP practices, alongside other requisite equipment such as ECGs. It is similarly benefiting from the move to miniaturisation as well as from demand for end-user friendly devices. However, there are moderate barriers to effective use because the need to train staff to interpret and act correctly upon spirometry readings, and the more detailed review of the place of this technology in the pathway of care for breathlessness gives only cautious support for the likely benefits to services and patients.

Topic area	Human resources		Logistics		Communications and relationships		
					User perspective		
	Skills	Training	Equipment	Premises	Clinician	Patient	Primary–secondary interface
Audiology	○	○	○	○	⊕	⊕	○
Pneumatic otoscopy	○	⊕	⊕	Ø	○	Ø	Ø
Tympanometry	⊕	⊕	⊕	Ø	○	⊕	○
Cardiac services	○	⊕	⊕	Ø	⊕	⊕	⊕
BNP	⊕	⊕	⊕	Ø	⊕	⊕	○
ECG	⊕	⊕	⊕	Ø	⊕	⊕	⊕
Echocardiography	○	○	⊕	⊕	⊕	⊕	○
Diabetic services	⊕	⊕	⊕	Ø	⊕	⊕	⊕
Endoscopy	⊗	○	⊗	⊗	Ø	⊗	○
Genetic testing	⊗	○	⊕	Ø	○	⊕	○
Magnetic resonance imaging	○	○	⊗	⊗	Ø	Ø	○
POC testing	○	○	⊕	Ø	○	⊕	○
C-reactive protein	⊕	⊕	⊕	Ø	⊕	⊕	○
Radiology/X-ray	○	⊕	○	○	⊕	⊕	○
Respiratory tests	⊕	⊕	⊕	Ø	⊕	⊕	○
Pulse oximetry	⊕	⊕	⊕	Ø	⊕	⊕	○
Spirometry	○	⊕	⊕	⊕	⊕	○	⊕
Ultrasound	○	⊕	⊕	⊕	⊕	⊕	⊕

Ø, insufficient evidence; ⊗, high degree of implementation difficulty; ○, moderate degree of implementation difficulty; ⊕, low degree of implementation difficulty; BNP, B-type natriuretic peptide; ECG, electrocardiogram.

https://www.journalslibrary.nihr.ac.uk/hsdr/hsdr04350#/abstract

In the review of service pathways and diagnostic technologies for diagnosing breathlessness, seven papers which include rigorous designs such as RCTs, found evidence that additional services in the community including mobile clinics and community clinics can be a useful means of differentiating between patients who have no significant respiratory problems or cardiac disease and may be managed in community services, and those who may need referral to a specialist. Around a third to a quarter of patients may have no abnormalities detected on assessment- so it is important to find out if there is a lower threshold for investigation in primary care, or if this means primary care assessment has avoided unnecessary referral to secondary care. Similarly, the provision of open access diagnostic services in secondary care may reduce the referral of patients with no abnormality to specialists and/or may reduce the numbers of patients misdiagnosed. The findings regarding spirometry use in GP surgeries suggest a limited impact on diagnostic decision-making, and there is conflicting evidence regarding whether referrals may increase or decrease as a result of spirometry use in primary care. This may be linked to the reported limited quality and accuracy of much spirometry carried out in the community.

How can GP services be improved using this research?

The example of spirometry serves to show that assessing the utility, costs and benefits of a diagnostic service, the "fit" with workforce capability, patient acceptability, and with the pathway of care in order to fully assess the overall benefit to the NHS.

The STEPUP framework, and evidence from the underpinning reviews can be used by commissioners in considering the implementation issues of these technologies.

REFERENCES:

1 Pluddemann A and Mant D (2015) Diagnostic technologies for primary health care: A Report on the output from PGfAR Grant 0407-10347: Development and implementation of new diagnostic processes and technologies in primary care June 2015.

2 Chambers D, Booth A, Baxter SK, Johnson M, Dickinson KC, Goyder EC. Evidence for models of diagnostic service provision in the community: literature mapping exercise and focused rapid reviews. *Health Serv Deliv Res* 2017; in press. https://www.journalslibrary.nihr.ac.uk/hsdr/hsdr04350/#/abstract

3 Mant D. PGfAR Grant 0407-10347: Development and implementation of new diagnostic processes and technologies in primary care.

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