Pharmacist managed point of care testing / near patient testing services: a rapid review of the evidence

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Intended Audience:
- Chief Pharmaceutical Officer, Welsh Assembly Government.
- Chief Pharmacists, Health Boards.
- All Wales Prescribing Advisory Group.

Purpose and Summary of Document:
To review the published literature on pharmacist managed point of care testing services to inform the evidence base for NHS commissioned services.

Publication/Distribution:
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- Chief Pharmacists, Health Boards.
- All Wales Prescribing Advisory Group.
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1 Introduction

Point of care testing (POCT) has many definitions but is traditionally described as ‘laboratory diagnostics performed at or near the site where clinical care is delivered’. POCT has emerged over recent years for a range of clinical conditions, delivered in a number of different settings by various healthcare professionals. It has enabled the development of specialised clinics within hospital and primary care settings such as hospital bedside POCT services, community pharmacy services and clinical services delivered in supermarkets and patient’s homes. POCT has also empowered patients to self-manage their diagnostic testing and perform testing at home themselves.

The value of using pharmacists for therapeutic monitoring has been recognised for over 15 years. Studies have been undertaken investigating the role of pharmacists in providing POCT for long term chronic conditions such as asthma, chronic obstructive pulmonary disease, diabetes, coronary heart disease and heart failure and acute conditions such as H. Pylori.

As the burden of chronic disease grows and new advances in medicines to treat these diseases emerge there is an increased potential for pharmacists to provide services to patients using POCT.

2 Purpose

The literature review identifies the evidence base for providing pharmacist managed services using point of care testing methods across a range of therapeutic areas and in various clinical settings.

3 Method

Existing and ongoing studies were identified through a literature search. For critical appraisal, papers were assessed for methodological quality using the Critical Appraisal Skills Programme (CASP) appraisal tool.

3.1 Search strategy

A search was performed to identify major papers on published evidence between 2000 – 2011. A focus on studies conducted in the UK only was considered too narrow so the search was expanded to include studies undertaken globally. Only studies published in the English language were included.

The databases Medline, EMBASE, HMIC, TRIP, and Cochrane were systematically searched. Professional and authoritative sites such as the Royal Pharmaceutical Society were also searched. The Pharmaceutical Journal and the Point of Care Journal were hand trawled to provide further evidence.
3.2 Inclusion and exclusion criteria

Studies were included if they focused on community pharmacy provision of point of care services. Studies were excluded if they focused on use and effectiveness of point of care testing devices.

4 Results

There are a number of published documents reporting examples across the UK describing pharmacist POCT clinics in community and hospital settings for range of therapeutic areas.\textsuperscript{4,6,7} Such examples are showcased as good practice and are not fully evaluated in terms of patient outcomes.

The studies critically appraised to inform this review fall into 4 broad categories:

- literature reviews,
- lipid management services,
- anticoagulant management services and
- diabetes management services.

These are presented as a series of evidence tables according to category in appendices 1-4.

4.1 Literature reviews and review articles

Four published literature reviews were identified in the search.\textsuperscript{8-11}

The Cochrane review identified literature from January 1966 to March 1999.\textsuperscript{8} It assessed the pharmacist role in outpatient services in general including POCT. Findings indicate that due to poorly defined interventions, lack of cost assessments and poor patient outcome data generalisability of the studies reviewed is uncertain making it difficult to draw any meaningful conclusions. The authors indicated that more research is needed. The authors concluded that in general there was evidence to support the expanded role of pharmacists in providing patient counselling and physician education irrespective to service being delivered.

Gutierres et al published a review in 2004 on the role and impact on treatment of POCT in the delivery of pharmaceutical care.\textsuperscript{9} This review identified two studies, both undertaken in USA, involving community pharmacies. One study focussed on POCT testing for patients with diabetes (Asheville project), the other for patients with hyperlipideamia (ImPACT). Gutierres et al concluded that the impact of POCT on pharmaceutical care was not fully evaluated and therefore the use of POCT to improve pharmaceutical care cannot be made.

Two further review articles were identified examining the evidence for pharmacy POCT.\textsuperscript{12,13} Conclusion of the reviews indicate that evidence of patient outcomes using pharmacist led POCT is limited and benefits reported
such as ease of performance, rapid measurement and convenience for patients are balanced against errors arising from the use of POCT devices.

Lopez et al and Hargraves et al published reviews in 2004 and 2005 assessing the role of POCT for blood pressure monitoring and pharmacy practice and a specialist pharmacist heart failure service respectively.\textsuperscript{10,11} Both reviews indicated that there was limited data and evidence to draw any robust conclusions.

4.2 Pharmacist managed lipid services

Seven published articles identified the role of the pharmacist in the management of hyperlipidaemia.\textsuperscript{13-19}

Five of the seven studies were conducted in the USA,\textsuperscript{14-17,19} one in Canada,\textsuperscript{13} and the other in Australia.\textsuperscript{18} One study reviewed community pharmacy,\textsuperscript{13} four studies were based in a hospital or hospital outpatient service,\textsuperscript{14,17-19} and two in a Veterans Affairs Medical Centre.\textsuperscript{15,16}

Those studies conducted in the USA were focused in achieving patient cholesterol levels in accordance with the National Cholesterol Education Programme (NECP) goals. NECP goals are defined as fasting LDL less than 100mg/dl, <100mg/dl for established CVD or diabetes, <130mg/dl having 2 or more risk factors and <160mg/dl having zero or one risk factor.

Tsuyuki et al reported in 2002 a randomised control trial of over 600 patients.\textsuperscript{12} The study investigated the effect of a community pharmacy intervention on cholesterol risk management. The trial was terminated early due to evidence of benefit.

A number of studies reported an improvement in cholesterol results but the findings did not reach statistical significance.\textsuperscript{4-19} These were smaller studies than the RCT which may give rise to the difference in results observed.

In conclusion the authors found pharmacist managed services feasible, effective and satisfactory but improvements in patient outcomes were not statistically proven. Where patient satisfaction was tested patients found the pharmacy managed lipid services to be very satisfactory and GPs found it to be satisfactory.

4.3 Pharmacist managed anticoagulant monitoring services

Eight published papers reported pharmacist assisted anticoagulant monitoring services through different models of care.\textsuperscript{20-27} Three studies were conducted in Australia,\textsuperscript{13,24,26} one in Canada,\textsuperscript{25} one in USA,\textsuperscript{27} and three in the UK.\textsuperscript{20-22}

Four of the eight studies were conducted in community pharmacies,\textsuperscript{20,21,23,24} three in a hospital,\textsuperscript{22,25,27} and one an outreach service from the hospital using community pharmacies as facilitators.\textsuperscript{26}
The studies undertaken in community pharmacies were reported to be safe and effective but difficult to quantify in terms of clinical outcomes. Patients found using a community pharmacist satisfactory.

One study undertaken in the hospital service reported no difference in international normalised ratio (INR) measures between the pharmacist managed group and the group accessing usual care.\textsuperscript{25} The study reported the pharmacist managed group of patients needed to access the GP less frequently than the physician group. It also concluded that the pharmacist led anticoagulant service proved to be more expensive than using traditional physician managed care.

Another hospital study also found no significant difference in INR measures and hospital admissions between groups of patients managed by a pharmacist or a GP.\textsuperscript{21} Another study indicated no difference in effectiveness of a pharmacist led anticoagulant service compared to that of a junior doctor.\textsuperscript{22}

The study involving using a pharmacist in an outreach service model reported it being too early to interpret results.\textsuperscript{26}

4.4 Pharmacist managed diabetes services

Only two studies reported pharmacist POCT interventions for patients with diabetes.\textsuperscript{28,29} One study was conducted in the UK,\textsuperscript{28} the other in Australia.\textsuperscript{29} Both studies involved over 200 patients drawn from community pharmacies sites located over a broad geographical area.

Both studies reported a range of measures including a reduction in mean HbA1c. One study reported a non significant change and the other a statistically significant result.\textsuperscript{29} One study reported that patients were satisfied with the service\textsuperscript{28} another reported a non-significant improvement in quality of life scores.\textsuperscript{29}

5 CONCLUSION

There is a lack of consistent good quality evidence to evaluate the impact of pharmacist led and managed point of care testing services.

A Drugs and Therapeutics Bulletin published in 2009 reviewed the evidence of efficacy and safety of patient self-monitoring of their warfarin therapy.\textsuperscript{30} A number of key issues were reported:

- there are an increasing number of patients being treated with anticoagulants and there is a need for safe and effective monitoring of their therapy,
- patients find self-monitoring acceptable and cost effective but clinical benefits are overestimated and patient’s clinical outcomes are not necessarily improved,
- self-monitoring is generally more costly to the NHS,
- the location of INR testing was reported to have an impact where patients attending hospital-managed INR clinics spent more time in the INR therapeutic range than those in community or non-specialised settings, and
- generally the need for further robust rigorous evaluations of pharmaceutical / pharmacist led POCT services based on the evaluation of patient outcomes was indicated.

The results from a small number of observational studies conducted over a range of settings and models of care for differing therapeutic areas provide support for the role of pharmacist in providing point of care services. Patients and other healthcare professionals found pharmacy POCT services feasible, acceptable and satisfactory. Clinical improvements reported tended to be not significant. This may be due partially to the small patient numbers in each study. This makes it difficult to draw robust conclusions from the evaluations undertaken.

One of the larger RCTs conducted in community pharmacies reported early termination of the study due to the benefit of effectiveness. This indicates that in this particular scenario (community pharmacy led cholesterol risk management services using POCT testing) the improvement to patient outcomes were proven.\textsuperscript{13}

Few studies reported on cost effectiveness and those that did suggested pharmacist managed POCT services are more expensive than traditional physician managed services with little proven benefit in patient outcomes.

Generally the evidence suggests that pharmacist led POCT clinics are no less effective than traditional physician run clinics or those operated by GPs. Pharmacist led clinics tend to be more costly. Pharmacy POCT clinics based in hospital tended to achieve greater therapeutic improvements but was least favourable to patients. There is a potential to support the expanded role of pharmacists in providing POCT for patients but the evidence to support improved patient outcomes is limited.
6 References


### Evidence table - Literature reviews / review articles

#### Literature reviews / review articles

<table>
<thead>
<tr>
<th>Author</th>
<th>Intervention</th>
<th>Results/ Comments</th>
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</table>
- Errors include misinterpretation of biological variables, environmental conditions (e.g. temperature) calibration and other factors.  
- Can cost up to 10 times more than traditional laboratory tests due to low volumes of testing.  
- Pharmacy led POCT services should be assessed that the service fits the needs of the environment.  
- Economical, clinical and regulatory issues should be addresses before POCT testing in pharmacy turns into a real advantage to patients and healthcare systems as a whole. |
| Beney J, Bero LA, Bond C. Expanding the roles of outpatient pharmacists: effects on health services utilisation, costs, and patient outcomes. *Cochrane Database Syst Rev.* Issue 3, 2003. 10.1002/14651858.CD000336. (Cochrane review) | To examine the effect of expanding outpatient pharmacists' roles on health services utilisation, costs, and patient outcomes Search 1966 to 1999 global | Twenty-five studies were included involving more than 40 pharmacists and 16,000 patients  
- one study reported scheduled service utilisation was slightly increased and hospital admissions and emergency room admissions were decreased  
- six studies reported that pharmacist services decreased  
  o the use of non-scheduled health services,  
  o the number of specialty physician visits or  
  o the number and costs of drugs  
- 10 studies reported improvements in the patient condition but no change in quality of life  
- one study reported that the pharmacist was less successful than by physician counsellors in decreasing inappropriate prescribing  
- one study measuring patient outcomes showed no a difference in patients' quality of life  
- all studies demonstrated that pharmacist interventions produced the intended effects on physicians prescribing practices  
'Only two studies compared pharmacist services with other health professional services and had some bias and did not allow us to draw conclusions. Other studies supported the expanded roles of pharmacists in patient counselling and physician education.  
Doubts about generalisability, poorly defined interventions and lack of cost assessments and patient outcome data indicate that more research is needed.' |
<table>
<thead>
<tr>
<th>Author</th>
<th>Intervention</th>
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</table>
| Gutierrez SL, Welty TE.      | Literature review on the perspective of POCT testing, impact on treatment and role in delivery of pharmaceutical care. | Point of care testing focused on improvements to pharmaceutical care USA – based on two main studies 1. Asheville project. North Carolina- 12 community pharmacies providing POC testing for patients with diabetes 194 patients (1996 to present).  
  - Patients experienced significant declines in HbA1c and significant increases in HDL cholesterol compared to baseline, 63% patients reached NCEP goals.  
  2. ImPACT – 26 community based pharmacies providing POC testing for lipid management to improve compliance with therapy and achieve NCEP goal (31 month programme 1996-1999) |
| Lopez LM, Taylor JR.         | Literature review of POCT blood pressure monitoring and role in pharmacy practice | Limited evidence but devices are best suited for screening and monitoring only.                                                                                                                                       |
| Hargraves TL, Bennett AA,    | Literature review on specialist heart failure pharmacist services.          | Six studies evaluating outpatient pharmacy services for heart failure. All published prior to 2000 Outpatient services attached to hospital, two studies used single or multiple home visits.  
  Specialist ambulatory care pharmacy services have not been well defined or evaluated in the literature. Limited randomised controlled data exists |
<p>| Brien JE.                   |                                                                               |                                                                                                                                                                                                                 |</p>
<table>
<thead>
<tr>
<th>Author</th>
<th>Intervention</th>
<th>Results/ Comments</th>
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<tbody>
<tr>
<td>St John A.</td>
<td>Review article examining the evidence for POCT in 4 areas; patient self-monitoring, in the community (particularly in pharmacies), in General Practice and in Critical Care (including A and E)</td>
<td>In all 4 areas reviewed except pharmacy RCTs have been performed comparing POCT to traditional laboratory testing. The adoption of POCT testing is often insufficient to achieve benefit. Patient outcomes using pharmacist led POCT is limited and studies conducted in the UK and other countries report feasibility rather than health outcomes. Peterson showed no difference between groups although reduction in cholesterol in intervention. Other studies indicate reduction in cholesterol and increased compliance with therapy. Larger studies with greater sample sizes for longer periods of time is required to prove effectiveness in pharmacy</td>
</tr>
<tr>
<td>Author</td>
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<tr>
<td>Tsuyuki RT et al.</td>
<td>RCT of effect of community pharmacy intervention on cholesterol risk management (SCRIP). Intervention group received follow up visits at 2, 4, 8 and 12 weeks by face or telephone. 12 week follow up was in person. Intervention group had risk factor advice and education, measurement of total cholesterol using POCT Accutrend GC and results discussed and refer to physician if needed.</td>
<td>344 intervention group 331 usual care group</td>
</tr>
<tr>
<td>Bozovich M, Rubina CM, Edmunds J.</td>
<td>Pharmacist led lipid clinic according to protocol - Dose titration - Drug change - Drug addition 30 mins clinic every 4 -6 weeks for 6 months – traditional laboratory testing</td>
<td>Yes 101 patients as controls randomly selected</td>
</tr>
<tr>
<td>Author</td>
<td>Intervention</td>
<td>Controls</td>
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<tr>
<td><strong>15</strong> Collins C et al. Patient and provider satisfaction with a pharmacist-managed lipid clinic in a Veterans Affairs medical center. <em>Am J Health Syst Pharm</em> 2006; 63: 1723-27.</td>
<td>Evaluation of patient satisfaction of pharmacist managed <strong>lipid clinic</strong> by electronic questionnaire. Clinic telephone based with occasional face to face at patients request – traditional laboratory testing. Pharmacist prescribes, monitors and provides healthcare and lifestyle advice.</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>16</strong> Dolder NM, Dolder CR. Comparison of a pharmacist-managed lipid clinic: In-person versus telephone. <em>J Am Pharm Assoc</em> 2010; 50: 375-8.</td>
<td>2 year retrospective analysis, year 1 face to face pharmacist managed <strong>lipid clinic</strong> changed to telephone clinic in year 2 78 face to face 79 phone clinic</td>
<td>USA Veterans Affairs Medical Centre, Salisbury, N Carolina. 157 patients</td>
</tr>
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### Lipid management

<table>
<thead>
<tr>
<th>Author</th>
<th>Intervention</th>
<th>Controls</th>
<th>Population</th>
<th>Objective/ measure</th>
<th>Results</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 Gerrald KR et al.</td>
<td>Evaluation of a pharmacist-managed lipid clinic that uses point-of-care lipid testing. <em>Journal of Clinical Lipidology</em> 2010; 4: 120-</td>
<td>None</td>
<td>USA</td>
<td>Change in the proportion of patients who achieved LDL cholesterol goal according to NCEP</td>
<td>82.9% of patients achieved LDL cholesterol goal compared to 55.3% at baseline (p&lt;0.0001)</td>
<td>Pharmacist managed lipid clinics should be considered as a method for improving lipid management. Unclear whether point of care testing is better than standard laboratory testing.</td>
</tr>
<tr>
<td>18 Peterson GM, et al.</td>
<td>Impact of pharmacist-conducted home visits on the outcomes of lipid-lowering drug therapy. <em>J Clin Pharm Ther.</em> 2004; 29: 23-30</td>
<td>39 intervention, 42 control</td>
<td>Australia, Tasmania</td>
<td>Total cholesterol after 6 months. Evaluation of patient and GP satisfaction.</td>
<td>Statistically significant reduction in cholesterol levels (4.9 – 0.7 to 4.4 –0.6 p&lt;0.005) in intervention group compared to control group. No significant difference in total baseline cholesterol between groups. GP (n=16) 50% were satisfied Patients (n=34) 84% were very satisfied</td>
<td>A pharmacist led education and monitoring intervention improved the outcomes of lipid lowering therapy. Sensitivity of the Accutrend GC limited by minimum measurable level being 3.88 mmol / L needed to achieve levels below 4</td>
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<tr>
<td>Author</td>
<td>Intervention</td>
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<td>Population</td>
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<tr>
<td>Traywick Till LT, Voris J, Bourne Horst J.</td>
<td>Random analysis of a sample of patients records for patients taking <strong>lipid lowering</strong> therapy over a 6 month period.</td>
<td>41 usual care 47 clinical pharmacist care</td>
<td>USA Hospital setting, Columbia South Carolina.</td>
<td>To assess if there was a significant difference between cholesterol reduction in the 2 groups.</td>
<td>Significant difference in mean reduction in LDL cholesterol 18.5% v 6.55 (p=0.049) in pharmacist managed patients v patients usual care</td>
<td>Magnitude in reduction was directly related to the number of clinical pharmacy visits.</td>
</tr>
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*NECP goals <100mg/dl for established CVD or diabetes, <130ml/dl having 2 or more risk factors and <160mg/dl having zero or one risk factor*
## Evidence table - Anti-coagulant management

### Anticoagulant management

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<tr>
<th>Author</th>
<th>Intervention</th>
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<th>Population</th>
<th>Objective / measure</th>
<th>Results</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>20Coleman B et al. An evaluation of the safety and acceptability of an anticoagulation clinic in a community pharmacy setting – a pilot study. <em>The Pharmaceutical Journal</em> 2004;273: 822-4.</td>
<td>Patient questionnaire about pharmacist led anticoagulant clinic using Coaguchek</td>
<td>None</td>
<td>UK Community pharmacy North London 22 patients</td>
<td>Patient satisfaction Proportion of INR results within 0.5 units of target</td>
<td>Response rate 84% n=16 - patients satisfaction was high Proportion of INR results within 0.5 units of target was as least as good as that at the hospital</td>
<td>The new service was safe and effective based on limited data</td>
</tr>
<tr>
<td>21Holden K, Holden J. A comparative study of pharmacist and GP management of anticoagulation therapy following deviation from the target international normalised ration. <em>International Journal of Pharmacy Practice</em>. 2001:9(suppl):R24.</td>
<td>Retrospective audit of patients notes accessing two services, pharmacist led anticoagulant service held in the community or GP managed anticoagulant service</td>
<td>None</td>
<td>UK Darlington 51 patients</td>
<td>Deviation from prescribed INR range Time taken for patients to be managed back into INR range</td>
<td>Proportion of time spent outside prescribed INR range and mean duration of deviation outside prescribed INR lower in pharmacist managed group but not significant</td>
<td>Pharmacists manage patients who deviate from prescribed INR at least as effectively as GPs</td>
</tr>
</tbody>
</table>
## Anticoagulant management

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<tr>
<th>Author</th>
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<th>Objective / measure</th>
<th>Results</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 Holden K, Harris L, Prescott R. Effectiveness of inpatient oral anticoagulation management comparison of pharmacists with junior medical staff. Int J Pharm Pract 2003:11:R60.</td>
<td>Prospective assessment to compare effectiveness of inpatient oral anticoagulation therapy by pharmacists and junior medical staff (3 months)</td>
<td>44 junior doctor managed 114 pharmacist managed</td>
<td>UK Darlington Acute Hospital NHS Trust 158 patients</td>
<td>Proportion of INR results in range, interval between tests</td>
<td>Lower frequency of tests in pharmacist group  No difference between groups in for median INR achieved p=0.137 &amp; proportion of INR results in range</td>
<td>No difference between junior doctors and pharmacists in achieving INR results and in range. No loss of clinical quality when pharmacists manage patients.</td>
</tr>
<tr>
<td>23 Jackson SL et al. Point-of-care monitoring of anticoagulant therapy by rural community pharmacists: description of successful outcomes. Australian J Rural Health 2004; 12:197-200.</td>
<td><strong>Pharmacist assisted anticoagulant monitoring</strong> using CoaguChek S  Pharmacist takes POC test, provides result, educates patient on non compliance and lifestyle advice and refers to GP if not in therapeutic range</td>
<td>None</td>
<td>Australia Rural community pharmacies in Tasmania 3 patient case studies</td>
<td>To demonstrate how pharmacists can assist GPs in managing anticoagulant patients in a rural setting through POC testing</td>
<td>Description of 3 case studies</td>
<td>POC testing in rural and remote Australia as the potential to improve the prescribing rates of drugs for AF and minimise risk of strokes. Can also improve safety of use of warfarin</td>
</tr>
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## Anticoagulant management

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<tr>
<th>Author</th>
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</tr>
</thead>
<tbody>
<tr>
<td>24. Jackson SL et al. Improving the outcomes of anticoagulation in rural Australia: an evaluation of pharmacist-assisted monitoring of warfarin therapy. <em>J Clin Pharm Ther</em> 2005; 30: 345-53.</td>
<td>16 rural pharmacies using CoaguChek S performed total of 518 INR tests for anticoagulant monitoring– sample of 120 tests were evaluated against results from standard laboratory. Patient and pharmacist questionnaire undertaken to evaluate satisfaction</td>
<td>none</td>
<td>Australia</td>
<td>Rural community pharmacy setting in Tasmania 137 patients over 3 months</td>
<td>Whether rural pharmacist involvement in managing patients on warfarin has the potential top lead to safer and more effective anticoagulation. Satisfaction of a pharmacist anticoagulant monitoring service</td>
<td>76% of POCT INRs within 10% of the laboratory readings (84.5% within 0.5 INR units). Pharmacy based INR significantly correlated with the lab INR values ($r=0.88$, $p&lt;0.0001$). Response rate patients 45%($n=62$), pharmacists 68% ($n=15$). 96% patients were satisfied, 64% preferred pharmacy, 50% found testing convenient and beneficial</td>
</tr>
<tr>
<td>25. Lalonde L et al. Is long-term pharmacist-managed anticoagulation service efficient? A pragmatic randomized controlled trial. <em>Am Heart J.</em> 2008; 156:148-54.</td>
<td>RCT, Pharmacist Managed Anticoagulant Service v physician follow up for 6 months. Pharmacist reviewed medical history, advise on treatment, initiate warfarin according to protocol, check lab results and follow up.</td>
<td>122 patients managed by physician, 128 by pharmacist</td>
<td>Canada</td>
<td>Hospital setting in Montreal 250 patients</td>
<td>The percentage of patient time within the exact and extended INR target range</td>
<td>Percent of time in INR ranges, number of INR tests and complications in both groups similar Pharmacist managed patients saw their GP significantly less frequently 5.1 v 6.7 visits per year CI -3.1 to -0.1</td>
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### Anticoagulant management

<table>
<thead>
<tr>
<th>Author</th>
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<th>Setting and population</th>
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<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stafford L et al.</td>
<td>Accredited pharmacist to undertake 2-3 home visits 8-10 days post discharge facilitated by community pharmacist. Study protocol to test redesigned healthcare system.</td>
<td>120 intervention 120 control</td>
<td>Australia Tasmania Ambulatory pharmacist care from hospital facilitated by community pharmacist 240 patients 8 hospital sites and 5 pharmacies as facilitators</td>
<td>Proportion of patients experiencing major bleed in 90 days post discharge. Combined major bleed and thromboembolic events, death, cessation of warfarin, INR control at 8 days and unplanned readmission to hospital (any cause)</td>
<td>Too early to interpret results</td>
<td></td>
</tr>
<tr>
<td>Thompson AN et al.</td>
<td>Patient satisfaction survey plus service audit of service data</td>
<td>No control all patients included</td>
<td>USA Medical University of South Carolina. 145 patients</td>
<td>Number of emergency admissions and hospitalisations Percent of time in INR therapeutic range for 6 months pre and post POCT</td>
<td>Survey response rate 59% (n=86). POCT was preferred over venipuncture for 95% of patients. No significant difference in emergency admissions, hospitalisations, percent of time in INR therapeutic range</td>
<td>Reasons for preference more face to face interaction, less waiting time, less pain, less blood needed and quicker results.</td>
</tr>
</tbody>
</table>
## Evidence table - Diabetes management

### Author


### Intervention

6 month study where patients had HbA1c tests carried out by community pharmacy – 3 visits using DCA 2000+ machine.

6 month duration *diabetes service* to patients with Type 2 diabetes consisting of assessment, management and review over 4 visits. Support for self-monitoring of blood glucose, education, adherence support, reminder checks. Control pharmacists assessed patients at 0 and 6 months.

### Controls

N/A

Intervention group = 28 community pharmacies

149 patients control = 28 community pharmacies

4 states, New South Wales, Victoria, Western Australia

Community pharmacy

### Population

UK

217 patients across 5 community pharmacies (3 in Swansea)

289 Type 2 diabetes patients drawn from 56 community pharmacies mixture of rural and urban

### Objective / measure

- Improvement in diabetic care
- Acceptability of service to patients and healthcare providers

### Results

Mean HbA1c test result reduced from 8% to 7.7% after third visit. Improvement but not statistically significant. 95% patients satisfied or very satisfied with service

Significant reduction in mean blood glucose level and mean HbA1c - 0.97% (-0.8-1.14) in intervention group compared to -0.27% (-1.01,-0.39) control

Mean blood glucose level decreased from 9.4 to 8.5 mmol/l (p<0.01)

Non significant reduction in mean systolic and diastolic blood pressure

Improved quality of life scores ED5D

### Comments

'Difficult to pinpoint the most effective elements that contributed to overall glycaemic control...it is possible that the increased contact with the pharmacists contributed to the observed improvements.'