

International Series: Adherence

# Medication adherence and community pharmacy: a review of education, policy and research in England

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Received (first version): 30-Apr-2010

Accepted: 28-May-2010

## ABSTRACT\*

**Objective:** The objective of this narrative review was to identify and describe the current policy, education and research related to community pharmacy and medication adherence in England.

**Methods:** Medline, Embase, International Pharmaceutical Abstracts and Pharmline were used to search for relevant research articles. Current policy documents were identified via the websites of the Department of Health in England, the Royal Pharmaceutical Society of Great Britain, the National Pharmacy Association, the Pharmaceutical Services Negotiating Committee and NHS Employers. All pharmacy schools in England were contacted to obtain information about the adherence-related courses they provide to undergraduate and postgraduate pharmacy students.

**Results:** National policies and guidelines in England are conducive to an increasing role for community pharmacists to support patients with medication adherence. Many pharmacy schools cover the issue of adherence in their undergraduate and postgraduate courses. Research in this area has tested the effectiveness of pharmacists providing adherence support in the form of compliance aids, education, involvement in discharge planning, and tailored interventions.

**Conclusion:** In community pharmacy in England, current policy and funding arrangements suggest there is great scope for pharmacists to support patients with medication adherence. Further

research is necessary to identify the most useful, cost-effective and sustainable approach in practice.

**Keywords:** Medication Adherence. Pharmacists. Education, Pharmacy. United Kingdom.

## CUMPLIMIENTO DE MEDICACIÓN Y FARMACIA COMUNITARIA: REVISIÓN DE LA EDUCACIÓN, POLÍTICA E INVESTIGACIÓN EN INGLATERRA

### RESUMEN

**Objetivo:** El objetivo de esta revisión narrativa fue identificar y describir la política, educación e investigación actuales relacionadas con la farmacia comunitaria y el cumplimiento de la medicación en Inglaterra.

**Métodos:** Se utilizaron Medline, Embase, International Pharmaceutical Abstracts y Pharmline para buscar artículos de investigación relevantes. Se identificaron los documentos políticos actuales a través de la página web del Departamento de Salud de Inglaterra, de la Royal Pharmaceutical Society de Gran Bretaña, de la Asociación Nacional de Farmacia, del Pharmaceutical Services Negotiating Committee y del NHS Employers. Se contactó con todas las facultades de farmacia en Inglaterra para obtener información sobre los cursos relacionados con el cumplimiento que proporcionaban a estudiantes de pre- y post-grad.

**Resultados:** Las políticas nacionales y las guías en Inglaterra son conducentes a un mayor papel de los farmacéuticos comunitarios en el apoyo al cumplimiento de la medicación en pacientes. Muchas facultades de farmacia cubren la materia de cumplimiento de la medicación en sus cursos de pre- y post-grad. La investigación en esta área ha probado la efectividad de los farmacéuticos proporcionando apoyo al cumplimiento de la medicación a través de dispositivos de ayuda al cumplimiento, educación, participación en los planes al alta, y en intervenciones específicas. **Conclusión:** En la farmacia comunitaria en Inglaterra, la política y las condiciones de financiación actuales sugieren que hay un gran interés por los farmacéuticos en apoyar a los pacientes en su cumplimiento con la medicación. Se necesita más investigación para identificar los abordajes más útiles, costo-efectivos y sostenibles en la práctica.

**Palabras clave:** Adherencia a la medicación. Farmacéuticos. Educación farmacéutica. Reino Unido.

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## INTRODUCTION

The World Health Organisation (WHO) referred to non-adherence as “a worldwide problem of striking magnitude” and improving adherence to medication has become a priority for health care researchers and policy makers.<sup>1</sup> Researchers suggest that 30-50% of patients do not take their medication for chronic conditions as prescribed.<sup>2,3</sup>

The cost of non-adherence to patients is a missed opportunity for treatment gain and, if their condition worsens, a possible decline in their quality of life. Costs also arise from the perspective of the health care system; the cost of unused or unwanted medications exceeds GBP100 million annually.<sup>4</sup> Furthermore, the increased likelihood of hospitalisations and complications as a result of non-adherence can also increase costs.<sup>5,6</sup>

In England, the community pharmacist has an increasingly important role to play in improving adherence and this is supported by current health policy. A recent White Paper (government policy document) from the Department of Health (DH) in England, called “Pharmacy in England – building on strengths, delivering the future”, sets out an innovative agenda for improving patient care by building on the existing strengths of community pharmacy to deliver further improvements in pharmacy services, such as support with medication adherence.<sup>4</sup>

A recent survey, commissioned by the DH, found that 75% of people report to have visited a community pharmacy for health-related reasons within the last 6 months<sup>7</sup> so pharmacists are well placed in the community to support patients with their medication use. According to an analysis of the Royal Pharmaceutical Society of Great Britain register in 2009, there were 38,051 registered pharmacists in England.<sup>8</sup> Other figures show there are 10,475 community pharmacy premises in England.<sup>9</sup> Community pharmacists work independently or as part of a multiple pharmacy group but all are independent contractors to the publicly funded National Health Service (NHS).

The aim of this narrative review is to describe the policy, education and research related to community pharmacy and medication adherence in England. The objectives are: 1) To report on the undergraduate and postgraduate education about medication adherence in pharmacy schools in England; 2) To describe national policies and guidelines in England related to medication non-adherence and the role of the community pharmacist; and 3) To identify and evaluate research related to the development and evaluation of community pharmacy adherence services in England.

## METHODS

To identify relevant policy documents, hand searches were performed of the websites of the Department of Health (England), the Royal Pharmaceutical Society of Great Britain (RPSGB), the National Pharmacy Association (NPA), the Pharmaceutical Services Negotiating Committee (PSNC) and NHS Employers (NHSE).

All pharmacy schools in England were contacted via email to obtain information about the adherence related education they provide to their undergraduate and postgraduate pharmacy students. Respondents were asked whether or not they provided adherence-related courses or lectures and, if so, to give details in an open-ended section.

Research articles related to community pharmacy adherence services in England published in the last 10 years were identified using the following databases: Medline, Embase; International Pharmaceutical Abstracts and Pharmline. We used the keywords [compliance or adherence], and [pharmacy or pharmacist] and [England or UK]. We also searched the reference lists of relevant papers in order to identify any additional studies.

## RESULTS

### Education

Thirteen of the 21 pharmacy-teaching institutions in England responded. All pharmacy educational institutions in England offer a 4 year undergraduate Master of Pharmacy (MPharm) degree which is currently accredited by the Royal Pharmaceutical Society of Great Britain (RPSGB). On successful completion of the MPharm degree, students have to undertake a year of pre-registration training in an approved hospital or community pharmacy (or a split placement with six months spent in industry and six months in a hospital) before they can register as a pharmacist with the RPSGB. Some institutions also offer postgraduate pharmacy courses (Diploma and MSc) and short courses/modules for pharmacy technicians.

Table 1 provides an overview of the current undergraduate and postgraduate education regarding medication adherence at each of these institutions. All institutions reported that they cover the concept of medication adherence in their undergraduate curriculum. Teaching and learning methods include lectures, practicals and workshops. The postgraduate and pharmacy technician courses also cover the topic of medication adherence.

### Policy

National guidelines on medication adherence:

In January 2009, the National Institute for Health and Clinical Excellence (NICE) published a clinical guideline called “Medicines adherence: involving patients in decisions about prescribed medicines and supporting adherence”.<sup>10</sup> NICE is an independent organisation responsible for making recommendations about the treatment and care of

people with specific diseases and conditions in the NHS in England and Wales.

The NICE medicines adherence guidelines are based on a review of the relevant evidence and recommendations are provided on how health care professionals (HCPs) can help patients make informed decisions about their medicines and how they can support patients to adhere to their prescribed treatment. NICE recommends three key ways in which this can be achieved: involving patients in decisions about their treatment, supporting adherence and reviewing medicines.

Firstly, the recommendation, "Involving patients in decisions about their treatment", is designed to help HCPs increase their understanding of the patients' perspective regarding their treatment and to provide information about the condition and possible treatments.

The second recommendation, "Supporting adherence", calls on HCPs to support adherence by assessing patients' adherence at appropriate times during the process of prescribing, dispensing and reviewing medicines. The aim is to identify when patients need additional information and support. HCPs should also consider whether further support or interventions are needed to help patients use their medicines most effectively. NICE guidelines emphasise how different approaches are needed depending on whether the non-adherence is intentional (related to beliefs, concerns, side effects etc) or unintentional (usually caused by practical problems). This is important because previous research has shown the underlying causes of these two types of non-adherence to be very different.<sup>11-13</sup>

The third recommendation, "Reviewing medicines", calls on HCPs to perform a regular review of a patient's experience, needs and use of their medicines over time. The guidelines also highlight the need for improved communication between different health care professionals involved in a patient's care, to maximise continuity of care and consistency of information provided.

National policy and programmes specific to community pharmacy:

The NICE guidelines are relevant for all HCPs involved in prescribing, dispensing and reviewing of medicines. To highlight the relevance for pharmacists, the Royal Pharmaceutical Society of Great Britain (RPSGB) published a reference sheet for pharmacists based on the NICE clinical guidelines.<sup>14</sup> The pharmacy checklist that forms part of the two-page RPSGB reference sheet is shown in Table 2. The checklist highlights opportunities that pharmacists have to implement the guidelines at different steps of the prescribing, dispensing and reviewing process.

The recent government White Paper, "Pharmacy in England: building on strengths – delivering the future", discussed ways in which community pharmacists can provide services to support people's adherence to medicines.<sup>4</sup> Medicines Use Review (MURs) and Repeat Dispensing are cited as key opportunities for community pharmacists to

intervene in supporting patients with the safe and effective use of their medicines. The community pharmacy contractual framework in England was revised in April 2005 to allow pharmacists to be reimbursed for these additional "advanced" and "enhanced" services.<sup>15</sup> The new framework has three different levels of services:

- Essential services: these must be provided by all contractors, e.g. dispensing and medicines waste disposal.
- Advanced services: these can be provided by all pharmacy contractors who have the necessary accreditation requirements (related to either the pharmacist or the pharmacy premises), e.g. MURs.
- Enhanced services: these are commissioned by primary care trusts to meet specific local healthcare needs, e.g. disease-specific medicines management, smoking cessation services.

The Medicines Use Review service is a structured meeting between an accredited pharmacist and a patient, to identify any problems a patient may be experiencing with their medicines and, where necessary, to provide information and support to improve the patient's knowledge, understanding and use of their prescribed medicines. Research has been done to assess the uptake of MURs by community pharmacists<sup>16</sup> and pharmacists' attitudes towards performing them<sup>17</sup>, but no studies have yet evaluated whether MURs improve adherence to medication. The Department of Health recognises that this is an important priority for further research.<sup>4</sup>

The repeat dispensing scheme allows patients to receive up to a 12 month supply of their prescribed medicines directly from their community pharmacy. Where this was previously done via the patient's general practitioner (GP), this now gives pharmacists the opportunity to check on how a patient is experiencing their medicines and whether they need further support with adhering to their treatment recommendations.

The pharmacy White Paper also highlights the potential to provide additional adherence support when patients are starting a new prescription for a long term condition, such as hypertension or high cholesterol. Furthermore, Primary Care Trusts (PCTs), the local National Health Service organisations responsible for planning and funding primary care services, are also able to commission extra adherence services from community pharmacists to address issues specific to their local population.<sup>15</sup> Information on the extent to which these services are actually commissioned in practice is hard to identify. However, a recently launched initiative, called "Motivation for Medicines adherence service (M4M)", from an organisation called NPC Plus is an example of how pharmacists can deliver and be reimbursed for these services in practice.<sup>18</sup> M4M provides the resources that a Primary Care Trust needs to commission a pharmacy adherence service that is customised to their local area. The training in therapeutics and adherence support they provide is designed to

prepare community pharmacists to deliver planned, structured M4M consultations with patients that will improve medication adherence. NPC Plus is a collaboration between the National Prescribing Centre and Keele University in England.

The scope of pharmacy involvement in supporting medicines adherence is likely to widen as the pharmacy white paper stated "The Government considers further work is needed to strengthen the commissioning of services to support adherence to medicines and will therefore take forward, in partnership with interested parties, discussions on appropriate measures".<sup>4</sup>

### Research

From the literature search, adherence research studies in community pharmacy in England were related to either: a) compliance aids, b) patient education, c) community pharmacy involvement in discharge planning or d) patient-tailored interventions. Table 3 provides a summary of the eight studies identified (reported in nine research articles).

#### Compliance aids:

Multicompartment compliance aids (MCA) are issued to patients to make it easier for them to take their medication and improve adherence. The aids are divided into 7 days and each day is divided into four or more sections representing dosing times. Medication is dispensed into the correct corresponding compartments. In the UK, the available compliance aids vary in size and structure; some being disposable and others being reusable.<sup>19</sup> Some devices have multiple medicines in one compartment whereas others have only single medicines in each compartment.

Three studies have addressed the use of compliance aids in England, the first consisted of a pharmacist (n=123) and patient survey (n=61) assessing how MCA are used in primary care<sup>20</sup>, the second was a survey of the use of MCA in secondary care in the UK and their transfer to primary care<sup>19</sup> and the third was an exploratory controlled matched study to assess the effects of introducing MCA in frail elderly patients in one area of England.<sup>21</sup> The results below focus on the use of MCA in community pharmacy settings.

The primary care survey by Nunney and Raynor, conducted in one area of England, found that an average of 11 patients per pharmacy were receiving their medicines in MCAs.<sup>20</sup> When these findings are extrapolated to the UK population this suggested that over 100,000 patients living in their own homes have medicines dispensed in MCAs. Processes for dispensing in MCA and the amount of patient contact varied between pharmacies.<sup>20</sup> Pharmacists reported that general practitioners (GPs) and hospital staff were the most likely to initiate a request for an MCA, followed by carers and social service staff, with pharmacists being the least likely. Half the pharmacists reported that they would then visit the patient to assess the appropriateness of an MCA but the other half would not. Further to this, many patients had little contact with the GP or

pharmacist with the majority of patients having their medication ordered by the pharmacist and nearly half having it delivered to their home by a person other than a healthcare professional.

The effectiveness of MCA in increasing adherence has been studied very little in England. None of the three MCA studies reviewed here included a direct measure of adherence. In the survey by Nunney and Raynor, the research pharmacist carried out a subjective assessment and suggested that 29 out of 61 patients would be able to cope well or reasonably well without an MCA. Twenty two percent of patients said they would be able to take their medication if it was dispensed in conventional containers and 18% said they had difficulty using the device. In the controlled matched study by Ryan-Woolley and Rees, medication wastage was reduced from 18.1% pre study to 1% 12 months after a change from conventional packaging to an MCA.<sup>21</sup> However, data on wastage was not available for the control group. This may reflect the fact that it is easier to monitor medication in an MCA. A quarter of patients surveyed by Nunney and Raynor reported that the MCA allowed them to see if they had forgotten a dose.

However, despite a lack of evidence on effectiveness, GPs, pharmacists and patients have all expressed positive views of multicompartment compliance aids. In the study by Ryan-Woolley and Rees, half the GPs interviewed (n=4) attributed the MCA to improved communication with patients during consultations. The pharmacists (n=2) indicated an increased level of professional satisfaction as a direct consequence of supplying the MCA. All intervention group patients (n=31) stated that they found it easy to remember to take their prescribed medication at the correct time as a result of the MCA. In the survey by Nunney and Raynor over 90% (n=52) of patients said that the MCA was much better than ordinary bottles.<sup>20</sup>

Remuneration issues were raised in all three studies. Nunney and Raynor found the majority of pharmacists requested 7 day prescriptions in order to get remuneration for dispensing in MCA.<sup>20</sup> Only one third of hospital pharmacists initiating MCA stated that they knew the local funding arrangements for MCAs once patients were living back in the community.<sup>19</sup> The most commonly reported method of funding was the use of 7 day prescriptions, followed by dispensing fees for MCA, followed by the patients themselves. Pharmacists supplying MCA in the controlled trial expressed concerns about additional time and costs associated with supplying MCA.<sup>21</sup>

#### Education:

Little research in England has evaluated educational interventions alone by community pharmacists. A before and after study, in three areas of England, evaluated a community pharmacist intervention to increase adherence to effective use of emollients in children with eczema.<sup>22</sup> Adherence was found to increase after the intervention but this result was not tested for statistical significance. There was a small statistical

difference in one of the clinical outcomes measured (itch and irritability). However, convenience sampling was used in a very specific population group and the results are not generalisable.

#### Community pharmacy involvement in discharge:

Data regarding the effectiveness of community pharmacy involvement in discharge in England is also limited. One intervention included community pharmacy domiciliary visits as part of a pharmacy discharge plan.<sup>23</sup> The intervention had no effect on any of the study outcomes including re-admission to hospital, number of deaths, attendance at appointments, general well being, satisfaction with the service and knowledge and adherence to prescribed medication. However, the community pharmacy service was only one part of the intervention and data were not captured on what pharmacists actually did at the visits.

#### Tailored interventions:

Three studies, reported in four papers, have evaluated the effect of patient tailored interventions on adherence and all have shown positive outcomes.<sup>24-27</sup> In these studies, pharmacists assessed the patients' adherence related problems and tailored the action they took according to the patient's responses. Blenkinsopp et al carried out a randomised controlled trial for patients with hypertension.<sup>24</sup> Following the patient tailored adherence intervention, there were statistically significant increases in blood pressure control, self reported adherence and prescription refill amongst the intervention group when compared to the control group. Raynor et al carried out a before and after study for elderly patients and found that after the tailored adherence intervention the number of patients with medication related problems and the number of patients who reported non-adherence significantly fell.<sup>25</sup> The intervention was also found to result in projected savings in costs per patient per year. Clifford et al carried out a randomised controlled trial of a tailored adherence intervention for patients starting new medication for a chronic condition and found that both medication-related problems and self reported non-adherence were significantly lower in the intervention than the control group.<sup>26</sup> An economic analysis was also included and the intervention was found to be cost effective compared to usual care.<sup>27</sup>

## DISCUSSION

The aim of this narrative review was to describe the policy, education and research related to community pharmacy and medication adherence in England. The results show that there are national policies which support the role of community pharmacists in activities that facilitate adherence to medication. Furthermore, reports from educational institutions show that this important topic is covered during the training of undergraduate pharmacy students. Research evidence shows that a range of community pharmacy-related interventions have been developed to improve medication adherence, but there is still limited evidence on the

effectiveness and cost-effectiveness of these approaches.

Taken together, the NICE guidelines on medication adherence<sup>10</sup> and the Department of Health White Paper on the future of pharmacy<sup>4</sup>, shows that the policy context is highly conducive to community pharmacists in England adopting roles to support patients with their medication use, for example, via Medicines Use Reviews (MURs) and repeat dispensing. Furthermore, there is an increasing opportunity for more effective working relationships between community pharmacists and other primary care services which could lead to an enhanced ability to influence medication adherence. In 2010, NHS Employers, the British Medical Association's General Practitioners Committee (GPC) and the Pharmaceutical Services Negotiating Committee (PSNC) developed and published two guides to support general practitioners and community pharmacists in finding new ways of working together.<sup>28,29</sup> Improved collaborative relationships are likely to increase the likelihood of delivering effective services to support patients with their medication adherence – e.g. better communication and consistency of information and advice about prescribed medicines.

In terms of educating pharmacists about adherence, all of the educational institutions who responded reported that they cover the topic of adherence/compliance in their undergraduate curriculum. A range of teaching methods were reported to be used, including lectures, workshops and practicals. Two institutions reported using a health psychologist to teach this component, which points to a growing multi-disciplinary nature of teaching and learning activities in pharmacy practice in England. As several institutions did not respond and this was only a brief self-report survey, further investigation is needed to examine whether pharmacy education is commensurate with the new roles that are available for community pharmacists to provide medication adherence-related support. For new services to be successful, it is crucial to ensure that pharmacists feel competent and skilled in delivering them. Pharmacy education needs to provide pharmacists with an understanding of the often complex issues underlying patients' reasons for non-adherence.<sup>3</sup>

In England, research to evaluate the effectiveness of community pharmacists' efforts to support patients with adherence is relatively limited. There is a specific lack of studies investigating the effectiveness of compliance aids on improving adherence, although this is a commonly used intervention in practice. Interventions that are grounded in theory and tailored to the patient have been shown to improve adherence and be cost-effective and they may be the way forward. However, further research is needed to evaluate these interventions on a larger scale and with a longer follow up period.

## CONCLUSIONS

Non-adherence to medication is a substantial problem which has consequences for patients and the health care system. Services to improve medication adherence have the potential to improve patients' health and quality of life and to reduce health care costs. In England, community pharmacy policy and funding arrangements show that there is

great scope for pharmacists to support patients with medication adherence. Further research is necessary to identify which approach is the most successful, cost-effective and sustainable.

## CONFLICT OF INTEREST

No conflicts of interest to report.

## References

1. World Health Organisation. Adherence to long-term therapies: evidence for action. 2003. Available from: <http://apps.who.int/medicinedocs/en/d/Js4883e/5.html> (last accessed 18th April 2010).
2. Haynes RB, Ackloo E, Sahota N, McDonald HP, Yao X. Interventions for enhancing medication adherence. *Cochrane Database Syst Rev*. 2008 Apr 16;(2):CD000011.
3. Horne R, Barber N, Weinman J, Elliott RA, Morgan M, Cribb A. Concordance, adherence and compliance in medicine taking: a scoping exercise. London: NHS National Co-ordinating Center for Service Delivery and Organisation, 2006.
4. Department of Health. Pharmacy in England: building on strengths – delivering the future. London: Department of Health, 2008. Available from: <http://www.official-documents.gov.uk/document/cm73/7341/7341.pdf> (last accessed 20th April 2010).
5. Elliott RA, Barber N, Horne R. Cost-effectiveness of adherence-enhancing interventions: a quality assessment of the evidence. *Ann Pharmacother*. 2005;39(3):508-515.
6. Cantrell CR, Eaddy MT, Shah MB, Regan TS, Sokol MC. Methods for evaluating patient adherence to antidepressant therapy: a real-world comparison of adherence and economic outcomes. *Med Care*. 2006;44(4):300-303.
7. Central Office of Information on behalf of the Department of Health. Community Pharmacy Use: Quantitative and Qualitative Research. Department of Health, 2008. Available from: [http://www.dh.gov.uk/prod\\_consum\\_dh/groups/dh\\_digitalassets/@dh/@en/documents/digitalasset/dh\\_083870.pdf](http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_083870.pdf) (last accessed 22nd April 2010).
8. Seston L, Hassell K. Briefing Paper: RPSGB Register Analysis 2009. Available from: <http://www.rpsgb.org.uk/pdfs/rpsbreganalysis09.pdf> (last accessed 29th April 2010).
9. National Pharmacy Association. Fast facts on pharmacy. Available from: <http://www.npa.co.uk/Representing-you/Media-centre/Fast-facts-on-pharmacy/> (accessed 29th April 2010).
10. National Institute for Health and Clinical Excellence. Medicines adherence: involving patients in decisions about prescribed medicines and supporting adherence. 2009. Available from: <http://www.nice.org.uk/CG76> (accessed 20th April 2010).
11. Clifford S, Barber N, Horne R. Understanding different beliefs held by adherers, unintentional non-adherers and intentional non-adherers: the application of the necessity-concerns framework. *J Psychosom Res*. 2008;30(1):17-23.
12. Wroe AL. Intentional and unintentional nonadherence: a study of decision making. *J Behav Med*. 2002;25(4):355-372.
13. Wroe AL, Thomas MG. Intentional and unintentional nonadherence in patients prescribed HAART treatment regimens. *Psychol Health Med* 2003;8(4):453-463.
14. Royal Pharmaceutical Society of Great Britain. NICE Clinical Guideline 76: Medicines Adherence – Quick reference sheet for pharmacists, 2009. Available from: <http://www.rpsgb.org.uk/pdfs/NICEmedsadhimplementguid.pdf> (accessed 29th April 2010).
15. Bellingham C. What the new contract has in store. *Pharmaceutical Journal*. 2004; 273: 385. Available from: [http://www.pharmj.com/pdf/contract/pj\\_20040918\\_contract.pdf](http://www.pharmj.com/pdf/contract/pj_20040918_contract.pdf) (accessed 14th May 2010).
16. Bradley F, Wagner AC, Elvey R, Noyce PR, Ashcroft DM. Determinants of the uptake of medicines use reviews (MURs) by community pharmacies in England: a multi-method study. *Health Policy*. 2008;88(2-3):258-68.
17. Latif A, Boardman H. Community pharmacists' attitudes towards medicines use reviews and factors affecting the number performed. *Pharm World Sci*. 2008;30(5):536-543.
18. NPC Plus. An introduction to the Motivation for Medicines adherence service. Available from: <http://www.keele.ac.uk/pharmacy/npcplus/m4m/An%20introduction%20to%20the%20Motivation%20for%20Medicines%20adherence%20service%20ELECTRONIC%20VERSION.pdf> (accessed 27th May 2010).
19. Green CF, McCloskey S. UK survey of the provision of multicompartiment compliance aids and medicines reminder charts on discharge from hospital. *Int J Pharm Pract*. 2005;13:85-89.
20. Nunney JM, Raynor DKT. How are multi-compartment compliance aids used in Primary Care? *Pharm J*. 2001;267:784-789.
21. Ryan-Woolley BM, Rees JA. Initializing concordance in frail elderly patients via a medicines organiser. *Ann Pharmacother*. 2005;39:834-839.
22. Carr A, Patel R, Jones M, Suleman A. A Pilot Study of a community pharmacist intervention to promote the effective use of emollients in childhood eczema. *Pharm J*. 2007;278:319-322.
23. Nazareth I, Burton A, Shulman S, Smith P, Haines A, Timberall, H. A pharmacy discharge plan for hospitalised elderly patients-a randomised controlled trial. *Age Aging*. 2001;30:33-40.
24. Blenkinsopp A, Phelan M, Bourne J, Dakhil N. Extended adherence support by community pharmacists for patients with hypertension: a randomised controlled trial. *Int J Pharm Pract*. 2000;8:165-175.

25. Raynor AK, Nicolson M, Nunney J, Petty D, Vail A, Davies L. The development and evaluation of an extended support programme by community pharmacists for elderly patients at home. *Int J Pharm Pract*. 2000;8:157-164.
26. Clifford S, Barber, N, Elliot R, Hartley E, Horne R. Patient-centred advice is effective in improving adherence to medicines. *Pharm World Sci*. 2006;28(3):165-170.
27. Elliot R, Barber N, Clifford S, Horne R, Hartley E. The cost effectiveness of a telephone-based pharmacy advisory service to improve adherence to newly prescribed medicines. *Pharm World Sci*. 2008;30(1):17-23.
28. NHS Employers (2010a) The community pharmacy – a guide for general practitioners and practice staff. Available from: [http://www.nhsemployers.org/Aboutus/Publications/Documents/Community\\_Pharmacy\\_Guide\\_for\\_GPs.pdf](http://www.nhsemployers.org/Aboutus/Publications/Documents/Community_Pharmacy_Guide_for_GPs.pdf) (last accessed 23rd April 2010).
29. NHS Employers (2010b) The GP practice – a guide for community pharmacists and pharmacy staff. Available from: [http://www.nhsemployers.org/Aboutus/Publications/Documents/Guide\\_to\\_general\\_practice\\_0410.pdf](http://www.nhsemployers.org/Aboutus/Publications/Documents/Guide_to_general_practice_0410.pdf) (last accessed 23rd April 2010).
30. Horne R. The nature, determinants and effects of medication beliefs in chronic illness [PhD thesis]. University of London, 1997.
31. Larson LN, MacKeigan LD. Further validation of an instrument to measure patient satisfaction with pharmacy services. *J Pharm Market Manage*. 1994;8:124-139.
32. MacKeigan LD, Larson LN. Development and validation of an instrument to measure patient satisfaction with pharmacy services. *Med Care*. 1989;27:522-136.
33. Morisky DE, Green LW, Levine DM. Concurrent and predictive validity of a self-reported measure of medication adherence. *Med Care*. 1986;24:67-74.
34. Horne R, Weinman J. Patients' beliefs about medicines and their role in adherence to treatment in chronic physical illness. *J Psychosom Res*. 1999;47(6):555-567.

University	Undergraduate (MPharm)	Postgraduate/other
Aston Pharmacy School, Aston University	Concepts of adherence taught in workshops in years 2, 3 and 4.	Concepts of adherence are taught in lectures on the Diploma in Clinical Pharmacy and the Prescribing certificate.
Department of Pharmacy and Pharmacology at the University of Bath	Five lectures during year 2 on intentional/unintentional non-adherence, use of compliance aids and concordance.	Topics: concordance; teaching communication and consultation skills; involving patients in decisions about their medicines.
Bradford School of Pharmacy, University of Bradford	Lecture and workshop in year 3 on medication adherence.	Not covered.
School of Pharmacy and Biomolecular Sciences, University of Brighton	Two lectures in year 1, delivered by a health psychologist. Lecture 1: Why people don't take their medicines as prescribed? What are the physical and psychological factors? How do illness beliefs relate to treatment beliefs? What beliefs do people have about medications? Lecture 2: How to measure adherence and how to improve a patient's adherence. Consultation skills practicals: sessions are introduced using non-adherence as an example of why the consultation process is important.	Prescribing course: a 3 hour session on adherence.
Leicester School of Pharmacy, DeMontfort University	Discussion of adherence is integrated throughout all four years. E.g. problem-based learning sessions on responding to symptoms and sessions on Medicines Use Review (MUR).	Diploma in Clinical Pharmacy: the discussion of adherence is included in one of the modules. Prescribing course: the discussion of adherence is included in sessions related to training to deliver Medicines Use Review.
The School of Pharmacy, University of London	Two lectures in years 2 and 4, delivered by a health psychologist that cover the following issues: definitions of adherence, compliance and concordance; understanding why patients are non-adherent to prescribed medicines; identifying ways in which community pharmacists can improve medication adherence.	MSc in Clinical Pharmacy, International Practice and Policy (for international pharmacy students): a 3 hour workshop on adherence is delivered (covering the same issues as the undergraduate lectures).
Department of Pharmacy, King's College London	Lectures and consultation skills workshops in years 1, 2 and 3 which use a consultation framework based on the "perceptions and practicalities" model by Rob Horne. <sup>3</sup> Simulated patients are used to support this teaching.	Short course on self-management in diabetes using a patient-centred model of care. Consists of theory and practical sessions.
School of Pharmacy and Pharmaceutical Sciences, University of Manchester	Two lectures in year 1 on adherence and six lectures in year 2 related to self-care. Hospital visits and care-planning exercises in years 3 and 4 also explore aspects of adherence.	Diploma in Clinical and Health Services Pharmacy: half day session on lay perspectives of adherence.
School of Pharmacy, University of Nottingham	One lecture on adherence in year 2 during the professional skills course. Also, mentioned throughout clinical teaching and features in the community and hospital visit workbooks. An Objective Structured Clinical Examination (OSCE), using video clips of pharmacist-patient scenarios regarding adherence, is used for assessment.	Not applicable to the postgraduate courses.
School of Pharmacy and Biomedical Sciences, University of Portsmouth	Year 1: introduction of the concepts of compliance, concordance and adherence. Year 2: development of the above through communication and counselling studies. Year 3: medicines adherence covered in both primary and secondary care lectures. Year 4: further development in modules covering preparation for professional practice and therapeutics. In some years, MPharm projects may include adherence as a feature of study.	Foundation degree in Medicines Management (for technicians): several sessions on medication adherence.
School of Pharmacy and Biomedical Sciences, University of Central Lancashire	Communication skills lecture on adherence/compliance/concordance in years 1 and 2. Lectures and workshops in year 3 in the Therapeutics & Prescribing module. Lectures in year 4 in the Clinical Pharmacy & Pharmaceutical Care module and Cancer Management and Therapy module.	Diploma in Clinical Pharmacy Practice: adherence covered as a topic of discussion.



University	Undergraduate (MPharm)	Postgraduate/other
University of Reading	Lectures in years 1 and 2 on adherence, compliance, concordance. In year 3, adherence is covered under the ethics course and a module on "Social Pharmacy" which examines reasons behind decisions that patients make about their medication. Also covered in sessions on risk management in year 4.	Not at present.
University of Wolverhampton	The theory of adherence is introduced in year 1 and then built on in year 2 where the issue of adherence, compliance and concordance are covered in more depth. Practicals also allow students to counsel patients from an adherence perspective.	Not at present (no postgraduate provision yet as this is a new School of Pharmacy in England).

<ul style="list-style-type: none"> <li>• Adapt your consultation style to each patient's needs.</li> <li>• Establish the level of involvement the patient wants in decisions about treatment with medicines; encourage and support patients, families and carers to keep an up-to-date list of prescription and non-prescription medicines, and allergies or adverse reactions.</li> <li>• Establish the patient's perspective by asking what he/she knows and believes about a medicine. Discuss the aim of the treatment and any concerns they may have before prescribing and when reviewing.</li> <li>• Provide information, check understanding and reinforce information; signpost to sources of reliable information and support.</li> <li>• Routinely assess adherence in a non-judgmental way; use pharmacy patient medication records (PMRs) and return of unused medicines to identify non-adherence and patients needing support.</li> <li>• Tailor any intervention to increase adherence (information, discussion or practical) to the patient's specific needs.</li> <li>• Enquire about adherence during medicines use review (MUR) and medicines reconciliation.</li> <li>• Ensure that information arising during the prescribing, dispensing or reviewing of a patient's medicines is communicated both to patients and other healthcare providers involved in the patient's care.</li> <li>• Ensure that patient confidentiality is not breached.</li> </ul>
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Table 3. A summary of studies from England involving community pharmacy and adherence interventions or devices.

Authors and date	Aims	Pharmacy Service/Intervention	Methods	Main measures	Outcomes/main findings
Green & McCloskey (2005) <sup>19</sup>	To describe and characterise the provision of multicompart ment compliance aids and medicine reminder charts in UK hospitals; to investigate the transfer of information about these between secondary and primary care and to investigate methods of remuneration for MCA supply in primary care	MCAs	<ul style="list-style-type: none"> <li>• Survey</li> <li>• 160 dispensary managers at acute hospitals</li> </ul>	<ul style="list-style-type: none"> <li>• Community pharmacy related questions included funding for MCAs and communication between the hospital and community pharmacist</li> </ul>	<ul style="list-style-type: none"> <li>• Funding for MCA by community pharmacists was reported to be unknown (61%), 7 day prescriptions (28.4%), MCA fees (9%), the patient (2%)</li> <li>• Information about the MCA was reported to be communicated to the patient's community pharmacist by 66 (49.2%) hospitals; of these, various methods of communicating this information included telephone call (52%), fax (45%), letter for patient to take to community pharmacy (17%), letter mailed directly to community pharmacy (14%)</li> </ul>
Nunney & Raynor (2001) <sup>20</sup>	To assess the scale of dispensing in compliance aids to patients at home, how community pharmacists provide this service and whether patients' needs are met	MCAs	<ul style="list-style-type: none"> <li>• Survey</li> <li>• 123 community pharmacists in Leeds, England</li> <li>• 56 patients currently using compliance aids</li> </ul>	<ul style="list-style-type: none"> <li>• Self-completion questionnaire to all pharmacists in the Leeds Health Authority</li> <li>• Administered questionnaire to 10 pharmacists who provide MCAs</li> <li>• Administered questionnaire to all patients from the 10 selected pharmacies</li> </ul>	<ul style="list-style-type: none"> <li>• 95 (77%) of all pharmacists used MCAs</li> <li>• General practitioners and hospital staff were the main initiators of requests for an MCA</li> <li>• 10 (18%) patients had difficulty using the MCA device</li> <li>• 52 (93%) patients thought the MCA was better than conventional containers</li> <li>• 22 (39%) of patients thought they would be able to remember to take their medicines if still in conventional containers</li> </ul>
Ryan-Woolley & Rees (2005) <sup>21</sup>	To assess medication wastage using a "medicines organiser (MO)"	MCAs	<ul style="list-style-type: none"> <li>• Exploratory controlled-matched study</li> <li>• 62 sheltered housing residents aged 60 or over in the North West of England</li> <li>• Intervention group: received MO</li> <li>• Control group: standard packaging</li> </ul>	<ul style="list-style-type: none"> <li>• Wastage patterns of any unused medicines returned to community pharmacists by the study participants up to 12 months follow-up</li> </ul>	<ul style="list-style-type: none"> <li>• Intervention group wastage reduced from 18.1% baseline to 1% at 12 months (no statistical significance reported)</li> <li>• No data available for control group participants as they did not return any unused medicines to the pharmacist.</li> </ul>

Table 3. A summary of studies from England involving community pharmacy and adherence interventions or devices.

Authors and date	Aims	Pharmacy Service/Intervention	Methods	Main measures	Outcomes/main findings
Carr et al. (2007) <sup>22</sup>	To determine the effectiveness of a community pharmacist intervention to promote effective use of emollients in children with atopic eczema	Education	<ul style="list-style-type: none"> <li>• Before and after study</li> <li>• 50 children aged 1 – 7 with eczema</li> </ul>	<ul style="list-style-type: none"> <li>• Telephone-administered questionnaire</li> <li>• Primary outcome: current severity of the symptoms (itch, irritability, sleep disturbance and skin appearance)</li> </ul>	<ul style="list-style-type: none"> <li>• Increase in correct application of creams (significance not reported)</li> <li>• Small significant reduction in itch (p=0.001) and irritability (p=0.006) but little reduction in sleep deprivation (p=0.44) or skin appearance (p=0.09)</li> </ul>
Nazareth et al. (2001) <sup>23</sup>	To investigate the effectiveness of a pharmacy discharge plan in elderly hospitalised patients	Community pharmacy involvement in discharge	<ul style="list-style-type: none"> <li>• Randomised controlled trial</li> <li>• 362 patients aged 75 or over on 4 or more medicines who had been discharged from hospital (181 patients in the intervention group and 181 in the control group)</li> </ul>	<ul style="list-style-type: none"> <li>• Primary outcome: readmission to hospital</li> <li>• Secondary outcomes included adherence, assessed via a semi-structured interview.</li> <li>• Other secondary outcomes: number of deaths, attendance at hospital outpatient clinics and general practice, global patient well-being, satisfaction with the service, knowledge about medication</li> </ul>	<ul style="list-style-type: none"> <li>• No significant differences between the intervention and control groups in readmission to hospital at 3 months (39% vs. 39.2%, respectively, difference = 0.18 (95%CI: -10.6 to 10.2) or 6 months (27.9% vs. 28.4%, respectively, difference = 0.54 (95%CI: -11 to 9.9%))</li> <li>• No significant difference in mean (SD) adherence scores between intervention and control group patients at 3 months [0.75 (0.3) vs. 0.75 (0.28), respectively] or 6 months [0.78 (0.3) vs. 0.78 (0.3), respectively]</li> </ul>
Blenkinsopp et al. (2000) <sup>24</sup>	To assess the effect of a patient-centred intervention by community pharmacists on adherence to treatment for hypertension	Tailored intervention	<ul style="list-style-type: none"> <li>• Randomised controlled trial</li> <li>• 20 community pharmacy sites (11 intervention and 9 controls) in one health authority in England</li> <li>• 180 patients with hypertension (101 intervention and 79 control)</li> </ul>	<ul style="list-style-type: none"> <li>• Blood pressure (BP) control</li> <li>• Self-reported adherence, measured using a modified version of the Medication Adherence Report Scale (MARS).<sup>30</sup></li> <li>• Patient satisfaction with pharmaceutical services, based on an adapted version of a scale developed in the United States by MacKeigan and Larson.<sup>31,32</sup></li> </ul>	<ul style="list-style-type: none"> <li>• For patients whose BP was uncontrolled prior to the study (n=28 in intervention group and n=35 in the control group), intervention group patients were more likely to have improved control at follow up than control group patients: 10 (35.7%) vs. 6 (17.1%), respectively (p &lt;0.05)</li> <li>• Self reported adherence was significantly higher in the intervention group compared to control group; 62.9% vs. 50%, respectively (p &lt;0.05)</li> <li>• An increased level of satisfaction with pharmacy services was reported by intervention patients regarding the “explanation” and “consideration” aspects of their pharmacist’s intervention</li> </ul>

Table 3. A summary of studies from England involving community pharmacy and adherence interventions or devices.

Authors and date	Aims	Pharmacy Service/Intervention	Methods	Main measures	Outcomes/main findings
Raynor et al. (2000) <sup>25</sup>	To develop and evaluate an adherence support service by community pharmacists for elderly patients living at home	Tailored intervention	<ul style="list-style-type: none"> <li>• Before and after study</li> <li>• 6 community pharmacists in the city of Leeds, England</li> <li>• 143 patients aged 65 or over, prescribed 4 or more medicines and living alone</li> </ul>	<ul style="list-style-type: none"> <li>• Number of prescribed regular medicines</li> <li>• Knowledge of purpose of medicines</li> <li>• Number and nature of medicine-related problems</li> <li>• Self-reported adherence measured using items developed by Horne<sup>30</sup> and Morisky.<sup>33</sup></li> <li>• Cost of medication</li> </ul>	<ul style="list-style-type: none"> <li>• A significant reduction in the number of patients who reported one or more medicine-related problems at follow-up from 94% to 58% (P&lt;0.001)</li> <li>• The proportion of patients responding “rarely” or “never” to the five statements about non-adherence increased from 62% to 86% (p&lt;0.001)</li> <li>• The number of patients with medication related problems was significantly reduced and self reported adherence significantly increased. The cost of medication fell more than the cost of the pharmacist providing the service</li> </ul>
Clifford et al. (2006) <sup>26</sup>	To assess the effect of pharmacists giving advice to meet patients' needs after starting a new medicine for a chronic condition	Tailored intervention	<ul style="list-style-type: none"> <li>• Randomised controlled trial</li> <li>• 500 patients</li> <li>• Patients aged 75 or over with a first prescription for a medication for stroke, cardiovascular disease, asthma, diabetes or arthritis</li> </ul>	<ul style="list-style-type: none"> <li>• Primary outcome: self-reported adherence (defined as missing at least one dose of the new medicine within the last 7 days)</li> <li>• Secondary outcomes included: number of medicine-related problems and beliefs about the medicine (the latter assessed using the Beliefs about Medicines Questionnaire)<sup>34</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Non-adherence was significantly lower in the intervention group (9%) compared to the control (16%), p=0.032</li> <li>• Medication related problems were significantly lower in the intervention group (23%) compared to the control group (34%), p=0.021</li> <li>• Beliefs about medicines were more positive in the intervention group patients compared to control; mean scores 5 vs. 3.5, respectively (p=0.007)</li> </ul>
Elliott et al. (2008) <sup>27</sup>	To assess the cost-effectiveness of pharmacists giving advice via telephone to patients receiving a new medicine for a chronic condition	Tailored intervention	As per the Clifford et al study above	<ul style="list-style-type: none"> <li>• Outcome measures as per the Clifford et al study above</li> <li>• NHS resource use data (NHS contact, pharmacist training and time) were collected for each patient 6 weeks after the intervention (unit costs for 2004/5 were used).</li> <li>• Incremental cost effectiveness ratios (ICERS) were generated</li> </ul>	<ul style="list-style-type: none"> <li>• The intervention was cost effective compared to the control group</li> <li>• Mean total patient costs at follow-up (median, range) were intervention group: GBP187.7 (40.6, 4.2-2484.3); control group: GBP282.8 (42, 0-3804), p&lt;0.0001</li> </ul>

Key: MO = Medicines Organiser, MCA = Multicompartment Compliance Aid

# NEWS RELEASE

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