


Medication compliance aids unpackaged: A national survey

Sharmila Walters¹  | Mollika Chakravorty¹ | Sophie McLachlan¹ |
Jessica Odone¹ | Jennifer M. Stevenson^{2,3} | John Minshull⁴ | Rebekah Schiff¹

¹Department of Ageing and Health, Guy's and St Thomas' NHS Foundation Trust, London, UK

²Institute of Pharmaceutical Science, King's College London, London, UK

³Pharmacy Department, Guy's and St. Thomas' NHS Foundation Trust, London, UK

⁴London Medicines Information Service, Northwick Park Hospital, Harrow, UK

Correspondence

Dr Rebekah Schiff, Department of Ageing and Health, Guy's and St Thomas' NHS Foundation Trust, Westminster Bridge Road, London, SE1 7EH, UK.

Email: rebekah.schiff@gstt.nhs.uk

Aims: Sixty-four million pharmacy-filled multicompartiment medication compliance aids (MCAs) are dispensed by pharmacies in England each year. Despite the widespread use of MCAs and evidence that their use may be associated with harm there is no national consensus regarding MCA provision by acute hospital Trusts in England. The aim was to determine current practice for initiation and supply of MCAs in acute hospital Trusts in England and the potential consequences for patients and hospitals.

Methods: A 26-item survey was distributed to all acute hospital Trusts in England. The questionnaire covered: policy, initiation, supply and review of MCAs; alternatives offered; and pharmacy staffing and capacity related to MCAs.

Results: Seventy-two out of 138 (52%) Trusts responded to the survey: 70 Trusts responded regarding policy for MCA provision, with 60 (86%) having a policy regarding this; 33/55 (60%) that supplied MCAs on discharge supplied a different prescription length for MCA vs. non-MCA prescriptions; 49/55 (89%) Trusts provided only 1 brand of MCA; 47/55 (85%) MCA-supplying Trusts identified frequent difficulties with MCAs and 13/55 (24%) reported employing staff specifically to complete MCAs; and 30/35 (86%) MCA-initiating Trusts had an assessment process for initiation, with care agency request reportedly the most common reason for initiation.

Conclusion: There is a lack of a national approach to MCA provision and initiation by acute hospital Trusts in England. This leads to significant variation in care and has the potential to put MCA users at an increased risk of medication-related harm.

KEYWORDS

adherence, clinical pharmacology, clinical pharmacology, geriatric medicine, geriatrics, medication safety

TERMS

Medication compliance aids refer to any intervention that is designed to support adherence to medicines. This includes multicompartiment compliance aids, which are devices that separate out medicines based on the day and time of day they should be taken. Many colloquial

There is no Principal Investigator for this paper as no interventions were performed with human subjects and no substances were administered.

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2022 The Authors. *British Journal of Clinical Pharmacology* published by John Wiley & Sons Ltd on behalf of British Pharmacological Society.

names are used for multicompartiment compliance aids e.g. Doseette, Nomad or Venalink. Often derived from the manufacturers' names, these terms are used interchangeably; however, they are not synonymous. Each of these devices present medicines in a slightly different way. Monitored dosage systems, commonly used in residential facilities, are also a type of multicompartiment compliance aid.

Throughout this paper, multicompartiment medication compliance aids will be referred to as medication compliance aids.

Medicines reconciliation: "the process of identifying an accurate list of a person's current medicines and comparing them with the current list in use, recognising any discrepancies, and documenting any changes, thereby resulting in a complete list of medicines, accurately communicated."¹

1 | INTRODUCTION

Pharmacy filled multicompartiment medication compliance aids (MCAs) are frequently utilised in the medical care of older adults. An estimated 64 million MCAs are dispensed by pharmacies in England each year² as a method of *reasonable adjustment*, where, under the Equality Act 2010, organisations such as the NHS must ensure that their services are accessible to those with disabilities.³ MCAs are used with the aim of improving medication adherence,^{4,5} supporting medicine administration⁶ and acting as a visual reminder for patients to take their medication.⁷

Despite the widespread use of MCAs, there is little evidence from well-designed trials of patient benefit, with studies showing that they may neither improve patient adherence,⁸ nor support safe administration of medications in care homes.⁹ In addition, there is growing evidence that the use of MCAs may lead to medication-related harm (MRH),¹⁰ increased likelihood of inappropriate prescribing and medication errors,^{11,12} and a reduction in patient and carer understanding of medicines.¹³ Many are single use plastic, thereby adding to the environmental burden of healthcare.

Hospital admissions are a common time for medication change, with only 1 in 10 older adults discharged from hospital on the same medications that they were on when admitted.¹⁴ Transitions of care such as these are acknowledged as high-risk situations for patients, where MRH and inadequate communication may occur.¹⁵

Little is known as to how the healthcare system in England manages the complexity of dealing with the safe and timely supply of MCAs during these transitions of care. Furthermore, the drivers of initiation of MCAs, workload associated with them, and the presence of MCA assessments within hospital Trusts is so far under investigated.

It is no longer advised that MCAs are used first line for management of medication nonadherence¹³; however, there are no clear guidelines on when and for whom MCAs should be used, how a patient should be assessed for 1, or what a patient should be provided with on discharge from hospital.

This work seeks to determine current practice for initiation and supply of MCAs in acute hospital Trusts in England and potential consequences for patients and hospitals.

What is already known about this subject

- Medication compliance aids (MCAs) are widely used, although their use has little evidence of patient benefit.
- Hospitals frequently do not have a formalised assessment process for initiating MCAs.
- The variation in provision and drivers of initiation of MCAs, in addition to the workload associated with them is so far under investigated.

What this study adds

- There is a lack of a national approach for the provision and initiation of MCAs in England by hospitals.
- Care agency request is ranked as the most common reason for MCA initiation.
- There are many difficulties reported frequently by hospital pharmacies with regards to supplying MCAs.

2 | METHOD

This is a cross-sectional study.

A questionnaire consisting of 4 sections and 26 questions was developed by the authors—a group of doctors and pharmacists. This group included a Consultant Geriatrician, Clinical Academic Pharmacist, Senior Pharmacist and Clinical Fellows. The questionnaire was created with Adobe Acrobat and distributed via email.

Key themes of the questionnaire included: policy and initiation of MCAs; supply of MCAs; alternative methods of assisting adherence; staffing and capacity related to MCAs; and reconciliation and review of MCAs.

Demographic information was collected, including the name of the hospital, Trust and region, and the role of the member of staff completing the survey. The majority of items were closed questions, with the addition of free-text comment boxes to enable participants to include additional information.

The questionnaire was distributed by the NHS Specialist Pharmacy Service Medicines Information to chief pharmacists at all 144 acute Trusts in England. Nonresponders were subsequently contacted via telephone and a follow-up email. Data collection was completed between 31 May and 7 October 2019. Responses were completed electronically and emailed back to the researchers. One response per hospital was counted. If multiple responses were received from the same Trust, the most complete questionnaire was used or if this did not distinguish these responses, the response from the most senior author, in the following hierarchy, was used:

- Chief pharmacist
- Pharmacist

- Pharmacy technician
- Other staff including medical or management

No patient-related or identifiable data were collected at any stage. All responses from the hospital Trusts were kept confidential. The study did not require NHS Research Ethics Committee approval as per the Health Research Authority decision tool.¹⁶

Quantitative data were analysed using Microsoft Excel, and themes were elicited from free-text comments.

3 | RESULTS

Responses were received from 72 acute hospital Trusts (72/138, 52%) that provided adult services in England. The questionnaire was sent to 144 Trusts; however, during the process of data collection, several Trusts merged. There were 138 Trusts in total by the end of data collection. Seven Trusts provided >1 response. Only 1 response per Trust was included in the data.

There was good representation across all regions. Response rate is shown in Appendix A. Mental health and Community Trusts were not included.

The majority of responses were completed by clinical pharmacists, followed by chief pharmacists and pharmacy technicians (43, 18 and 15% respectively).

Fifty-five Trusts (76%) dispensed MCAs. The pharmacy departments of these Trusts employed a median of 110 staff (range 10–600) and almost a quarter (13/55, 24%) reported employing staff specifically to complete MCAs.

3.1 | Hospital trusts that supplied MCAs

a. Policy for MCA provision

Seventy hospitals responded regarding whether their Trust had a policy for the provision of MCAs, with 60 (86%) reporting that they did have a policy.

b. Initiation and supply of MCAs

Patients admitted using an MCA would have an MCA supplied on discharge, if appropriate, in all MCA-supplying Trusts. Thirty-five of these Trusts (35/55, 64%) routinely initiated MCAs on discharge for patients who did not previously use 1, 13 (24%) would only initiate on discharge under exceptional circumstances, and 7/55 (13%) did not initiate.

With regards to outpatients, 6/55 (11%) Trusts initiated MCAs on request by the clinical team. Three of 55 (6%) supplied a new MCA for patients already on 1 if medication changes were made.

Trusts were asked whether there were situations other than the above in which they supplied MCAs. Themes elicited from the free

text comments regarding these circumstances were that MCAs were supplied following assessment by the medication compliance team or per an established protocol, if the patient was discharged to a care home, or only for specific conditions (namely tuberculosis and HIV). Associated quotes are shown in Appendix B.

MCA-supplying Trusts were asked what their procedure was for communicating of medication changes in the situations where they did not dispense MCAs, for example at outpatient clinics. The majority reported that they would contact the patient's usual pharmacy or ask the patient or relative to go to their GP. Some Trusts used other procedures. Free text responses and themes derived from these comments are detailed in Figure 1 and Appendix C. Only 1 Trust reported they had no process in place for this situation for inpatients; however, 28/53 (53%) had no process for outpatients.

Twenty-three of 35 (66%) Trusts that initiated MCAs reported it was mandatory to record the reason for initiation, with 30/35 (86%) having an assessment process for initiation.

MCA-initiating Trusts were asked to rank the reasons for initiation of an MCA from most to least common. The reason most frequently chosen as Rank 1 (i.e. most common reason for initiation) was the request of a care agency, followed by request of a pharmacist or clinician for reasonable adjustment. Additionally, the least common reason for initiation was patient request. These results are represented in Figure 2.¹

c. Length of prescription

The duration of prescriptions dispensed varied, with the majority (33/55, 60%) supplying a different length of prescription for patients using an MCA compared to those without an MCA. Most Trusts provided a shorter prescription if the person was discharged with an MCA. For MCA prescriptions, the majority of Trusts (40/55, 73%) dispensed short prescriptions of 7 days. This contrasted with the duration of non-MCA prescriptions, of which 44/55 (80%) provided a 14- or 28-day prescription. Only 7 of the 40 Trusts that routinely supplied 7-day MCA prescriptions also routinely supplied 7-day non-MCA prescriptions.

d. Brand of MCA

Forty-nine of 55 (89%) Trusts provided only 1 brand of MCA. A maximum of 4 brands was provided by 1 responding Trust. Only 1 out of 55 Trusts had a policy to provide the same brand of MCA as previously used by the patient. Twenty of 55 (36%) Trusts did not have a policy pertaining to this, with most responses (34/55 [64%]) stating that it was not feasible to provide the patient with the same brand of MCA with which they were admitted.

¹Agency request: the request of an operator of a care agency (e.g. the policy of a care agency). Pharmacy adjustment: pharmacists' changes to medications / suggestions regarding starting an MCA. Clinician adjustment: clinical doctors' changes to medications / suggestions regarding starting an MCA. Carer request: MCA initiation requested by an informal carer. Other: includes requests by others involved in a patient's healthcare such as Allied Health Professions (e.g. Occupational Therapists).

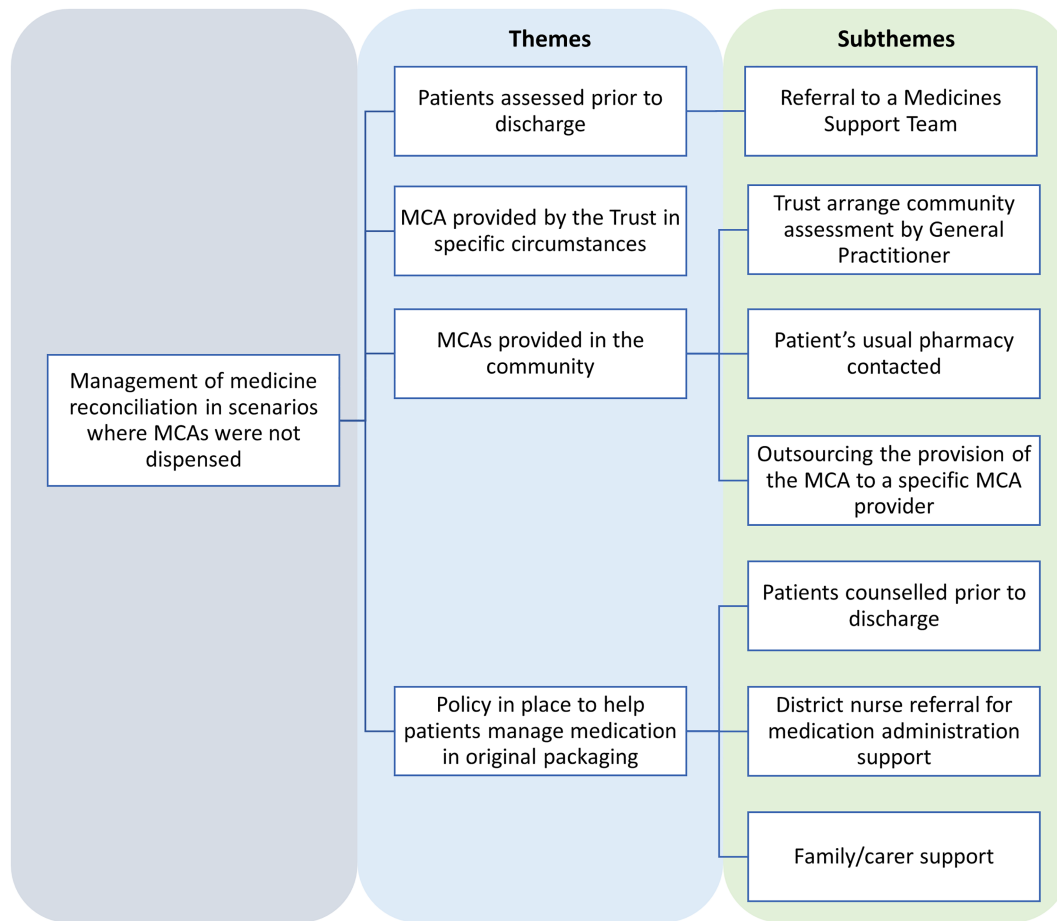


FIGURE 1 Themes elicited from free-text comments regarding the other methods of medicine reconciliation when medication compliance aids (MCAs) were not dispensed

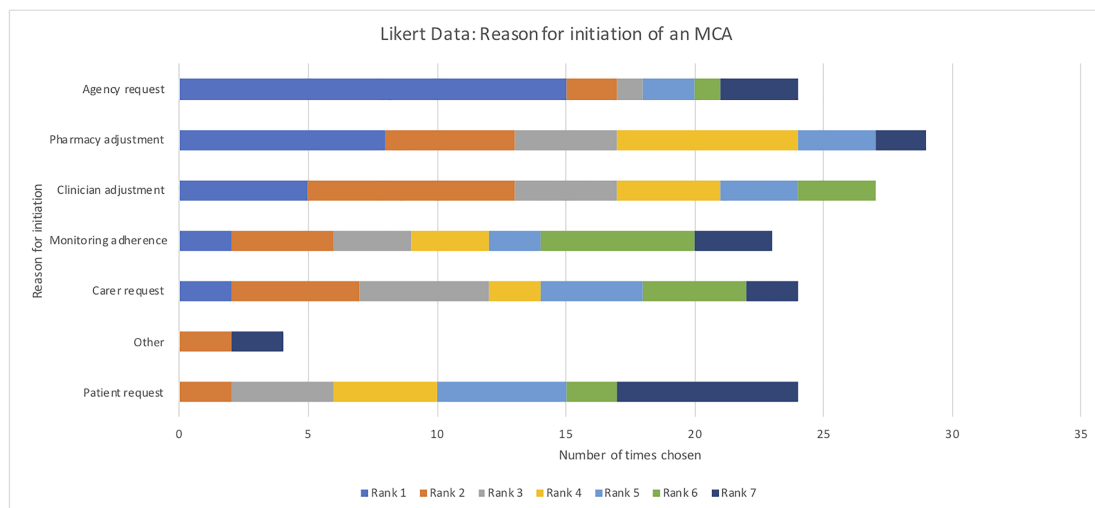


FIGURE 2 Reason for initiating a medication compliance aid (MCA). Rank 1: Most common reason for initiation; Rank 7: Least common reason for initiation

e. Time to prepare the MCA

The median time to prepare an MCA (i.e., dispense medications into the aid and check it prior to delivery to the patient) was 60 minutes (range 10–200 min). The median time from prescription receipt in pharmacy to MCA arrival on ward was 139 minutes but this ranged from 1 to 24 hours.

f. Problems with MCA

Forty-seven of (85%) MCA-supplying Trusts reported that, at least once a week, they encountered the problem that not all medication could be dispensed into an MCA. Similarly, on at least a weekly basis, 34/55 (62%) felt preparation of MCAs delayed discharges and 33/55 (60%) reported that changes were made to the discharge prescription after the MCA had been prepared. twenty-six of 55 (47%) pharmacies felt that discharge prescriptions could not be completed on the day of receiving the order at least weekly. A summary of the difficulties faced by pharmacies is illustrated in Figure 3.

g. Alternative methods to aid compliance

Alternative methods to aid compliance included prompting charts and alternative packaging. Fifty-four of 55 Trusts (98%) that supplied MCAs had access to alternative methods and 10/13 (77%) non-MCA supplying Trusts that responded regarding alternatives had access to alternative methods. 24/55 (44%) Trusts that supplied MCAs provided prompting charts, 14/55 (25%) provided alternative packaging of

tablets, 6/55 (11%) provided additional aids for accessing tablets and 1/55 (2%) provided reminder texts in addition to using an MCA. Other alternative measures to improve adherence documented in free text boxes included clear labelling (such as large print and colour coding), medications passports, medicines support services and patient counselling.

h. Review of MCAs

The overriding pharmacy perception was there were infrequent reviews of the suitability of patients' MCAs during inpatient and outpatient visits (Figure 4). Pharmacy perception was also that all health care professionals, including medical teams, were infrequently reviewing the appropriateness of MCAs.

Multiple reasons were identified for stopping patients' MCAs. Most often alternative methods of adjustment were given by pharmacists (31%) and least frequently patients requested to stop their MCA (13%). Other common reasons included that the medications were simplified so an MCA was no longer necessary (30%).

3.2 | Hospital Trusts that did not supply MCAs

a. Procedure for supplying discharge meds

When Trusts did not supply MCAs, there was no consistent approach to medication supply for patients who usually used an MCA. Most commonly Trusts had set up systems to alert community pharmacies

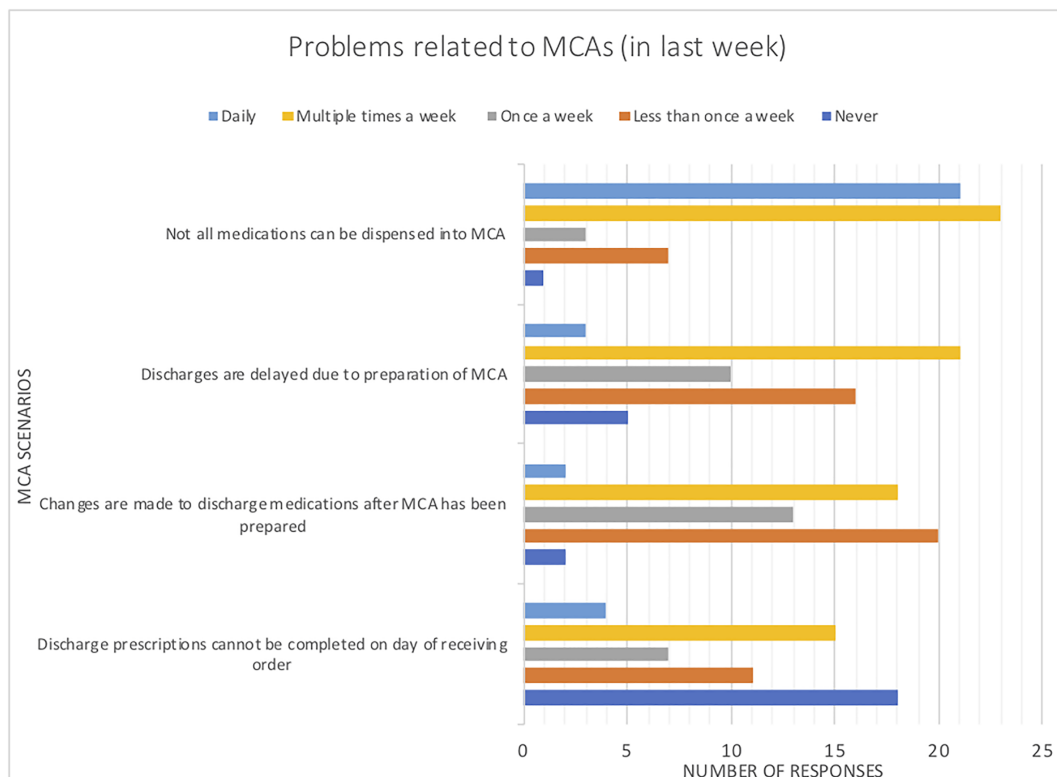


FIGURE 3 Medication compliance aid (MCA)-related problems on discharge

Pharmacy perception on how often reviews of MCAs are completed

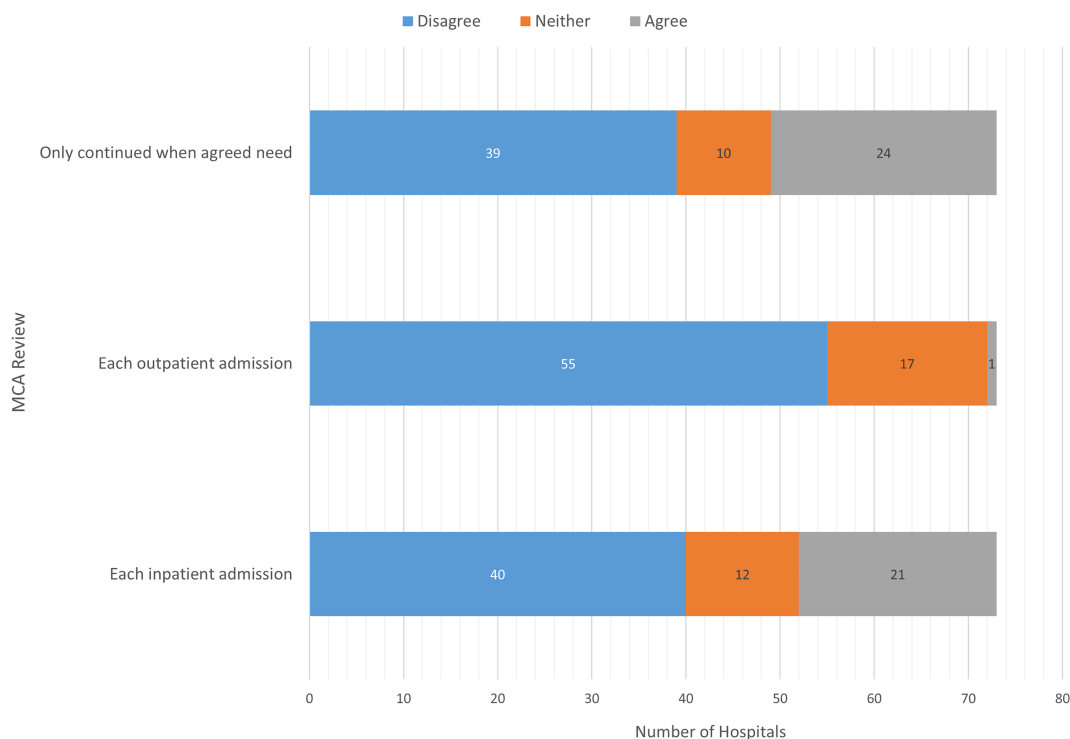


FIGURE 4 Pharmacy perception on how often reviews of medication compliance aids (MCAs) are completed

to supply the discharge medications in the MCA. Others asked the patient or relative to go to the GP, provided FP10 (NHS prescription) forms to the patient, outsourced the MCA to other sources or relied on the family or carers to support the patient with taking their medication from original packaging. Quotes related to these responses are shown in Appendix D.

b. Reasons MCAs were not supplied

The 17 Trusts that did not supply MCAs provided free-text responses of their reasons for this, with issues with staff resource and space most commonly identified. Some Trusts also responded that dispensing an MCA may encourage the use of MCAs in patients for whom it was inappropriate. Themes elicited regarding reasons why MCAs were not supplied are shown in Table 1, with quotes from the responding Trusts shown in Appendix E.

TABLE 1 Frequency table of themes regarding reasons that Trusts do not provide medication compliance aids (MCAs)

Themes	Number of responses
Lack of staff/space	8
Wastage/inefficiencies	4
Outsourced	3
As per local/national guidance	2
Other	
No outpatient dispensary	1
Supply mainly topical medications or those with varying doses	1
Dispensing of MCAs seen to encourage use of MCAs in patients in whom it is not appropriate	1

4 | DISCUSSION

This national survey evaluated the current practice for the initiation and supply of MCAs in acute hospital Trusts in England. It identified the lack of a consistent approach to MCAs in England and highlights areas where some of the most vulnerable patient groups are being disadvantaged. MRH accounts for an estimated 5% of hospital admissions^{17,18} and costs the NHS approximately £400 million annually.¹⁹

Our findings identify practices that are likely to lead to an increased risk of MRH at the transitions between tertiary, secondary and primary care for MCA users.

A survey carried out in 2005 on MCA initiation and provision in the UK found that 71.3% of acute hospital Trusts reported that they were able to initiate MCAs, and that of the hospitals that supplied MCAs, only 19.4% had formal methods of targeting which patients should receive.^{1,20} Fourteen years later, our results suggest a change: fewer Trusts initiate MCAs, possibly as a result of a higher proportion

of Trusts having a policy for MCA provision than at the time of the previous survey. Furthermore, our results show that the majority of Trusts that initiate MCAs do have an assessment process for doing so. The disparity between this previous research and our results may reflect the growing evidence regarding the potential harms of MCAs, national policies discouraging their use in certain situations,⁵ and importance of having a formalised policy regarding the provision and initiation of an MCA.

We found that the most common reason for initiation of an MCA was at the request of a care agency. Free-text responses also showed that some care agencies will only accept the patient if their medication is supplied within an MCA. Care agency request as a main driver for MCA use has been shown in previous research, with acknowledgement that this may be because “carers are not permitted to issue medications to patients (as their company policy)”²¹ and that home care workers are required to “have the necessary knowledge and skills” to provide medicines support,²² which may not be available. One Trust commented that some care homes also require the patients to be discharged with an MCA. Ongoing research is required to further characterise the reasons for initiation of MCAs, and to elucidate why care agencies and some care homes request MCAs, given that commissioners discourage their use and the evidence of their benefit is lacking.

Notably, patient request was most frequently reported as the least common reason for initiation, highlighting a worrying trend in the literature that patient choice and informed consent are often not prioritised prior to starting an MCA.^{2,23} Hereafter, it is imperative that research looks into patients' and carers' views on MCAs and the alternatives available to them, in order to bring patient autonomy back to the forefront of aiding medication compliance.

Another key finding is that a significantly shorter supply of medications is often given on discharge for those patients with MCAs compared to those without. The Pharmaceutical Services Negotiating Committee advises that short 7-day prescriptions should only be issued to patients where clinically necessary, in line with the Equality Act 2010.²⁴ A supply with a length as little as 7 days was seen in just under 3/4 of the MCA-supplying Trusts that responded. This requires prompt communication with the GP and pharmacy to ensure that there is no disruption in medication supply and that patients do not revert to their prehospitalisation MCAs. Previous research has found that only around half of hospitals that initiate MCAs report actively communicating information about them to primary care,²⁰ which then leaves an often vulnerable group of patients and their carers little time to organise new MCAs before the short supply expires.

Despite the limited evidence of the benefit of MCAs, there is a huge amount of time and resource spent on these devices. In this study, the time to complete an MCA was significant, and the majority of Trusts reported that the process was associated with problems. Trusts supplying MCAs felt that these delayed discharges on a weekly basis. A delay in discharge connected with the use of MCAs could be linked to the issues that were identified in this survey, including that changes were frequently made to prescriptions for medications to take home after the MCA had been prepared and that supply of these

prescriptions could often not be completed on the day of receiving the order. Although it has previously been identified that provision of a new MCA may delay discharge,²⁵ in the wider literature MCAs have not been generally acknowledged or investigated as 1 of the many key reasons for delayed discharge in older adults.^{26–28} The potential link between supply of an MCA and delayed discharge requires further investigation and may also represent an area for pathway improvement.

There are disparities in care depending on which Trust a patient is discharged from; the patient may be discharged with no medication or a variety of lengths of medication, and the MCA may not be a brand with which they are familiar. This lack of a consistent approach to the handling by acute Trusts of MCAs is likely to lead to confusion for patients and carers on discharge when the patient receives medical care at multiple Trusts.

5 | LIMITATIONS

The questionnaire was sent to acute Trust pharmacies only (i.e. other health care professionals such as doctors, nurses and allied health professionals were not surveyed). This was because pharmacies make up the medication aids and are therefore key to the provision of MCAs. This does, however, mean that, while our results may reflect a key aspect of MCA provision in acute hospital Trusts, they may not elucidate the whole picture. For example, a reason for initiation is frequently not readily available to pharmacy staff; in over 1/4 of responding Trusts, it was not mandatory to document the reason for initiation. This means that the data regarding who initiates an MCA may principally reflect pharmacy perception of the issue. This study has therefore been further limited by how few data are collected routinely by Trusts on their supply and review of MCAs. Furthermore only 1 response from each Trust's pharmacy department was included in the results, with the most senior author chosen. It is worth acknowledging that others in the department may have reported different experiences and perceptions of MCAs, especially those within multisite Trusts.

Just over half of acute hospital Trusts in England responded to the questionnaire. Nonresponder bias could have affected our results; those Trusts without an MCA policy or formalised initiation process may have been less likely to respond.

This survey was carried out with hospital Trusts and did not study community services. A study of MCA provision in the community in England has been carried out recently²¹ and thus our results, while only capturing hospital services, add to existing knowledge. In addition, our survey has only included Trusts in England, and practice might vary in other parts of the UK.

6 | CONCLUSION

There is a lack of a national approach to MCA provision and initiation by acute hospital Trusts in England. This leads to significant variations

in practice and has the potential to put MCA users at an increased risk of medication related harm. The impact on the NHS is far-reaching, with potential increased costs associated with workload, the management of MRH, and delayed discharges. A national evidence-based approach to the use and provision MCAs with increased emphasis on patient choice is required.

ACKNOWLEDGEMENT

None.

COMPETING INTERESTS

None.

CONTRIBUTORS

- Rebekah Schiff had the idea for the study
- Mollika Chakravorty, Rebekah Schiff, Jennifer Stevenson and John Minshull designed and distributed the questionnaire
- Sharmila Walters, Mollika Chakravorty, Sophie McLachlan and Jessica Odone collected and analysed the data
- Sharmila Walters wrote the first draft of the paper and all other authors helped with revisions to create the final paper

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID

Sharmila Walters  <https://orcid.org/0000-0002-7059-1251>

REFERENCES

1. Recommendations|Medicines optimisation: the safe and effective use of medicines to enable the best possible outcomes|Guidance|NICE. 2015. <https://www.nice.org.uk/guidance/ng5>
2. Yeung A. North East & North Cumbria Medicines Adherence Support Project. 2019. <https://www.ahsn-nenc.org.uk/wp-content/uploads/2019/02/AHSN-Adherence-Support-Final-Report-January-2019.pdf>
3. Pharmacy and people with learning disabilities: making reasonable adjustments to services - GOV.UK. Accessed September 4, 2021. <https://www.gov.uk/government/publications/pharmacy-and-people-with-learning-disabilities/pharmacy-and-people-with-learning-disabilities-making-reasonable-adjustments-to-services>
4. NICE. Guidance|Medicines adherence: involving patients in decisions about prescribed medicines and supporting adherence|Guidance|NICE. 2009. Accessed January 29, 2021. <https://www.nice.org.uk/guidance/cg76/chapter/1-Guidance>
5. Care Quality Commission. Multi-compartment compliance aids (MCAs) in adult social care|Care Quality Commission. 2020. Accessed February 1, 2021. <https://www.cqc.org.uk/guidance-providers/adult-social-care/multi-compartment-compliance-aids-mcas-adult-social-care>
6. Alldred DP, Standage C, Fletcher O, et al. The influence of formulation and medicine delivery system on medication administration errors in care homes for older people. *BMJ Qual Saf.* 2011;20(5):397-401. doi:10.1136/bmjqs.2010.046318
7. Compliance aids: an elephant in the room - The Pharmaceutical Journal. Accessed September 4, 2021. <https://pharmaceutical-journal.com/article/ld/compliance-aids-an-elephant-in-the-room>
8. Choudhry NK, Krumme AA, Ercole PM, et al. Effect of reminder devices on medication adherence: The REMIND randomized clinical trial. *JAMA Intern Med.* 2017;177(5):624-631. doi:10.1001/jamainternmed.2016.9627
9. Barber ND, Alldred DP, Raynor DK, et al. Care homes' use of medicines study: Prevalence, causes and potential harm of medication errors in care homes for older people. *Qual Saf Health Care.* 2009; 18(5):341-346. doi:10.1136/qshc.2009.034231
10. Stevenson JM. Predicting the risk of post-discharge medication related harm in older adults. 2017. https://kclpure.kcl.ac.uk/portal/files/83192454/2017_Stevenson_Jennifer_Mary_1165853_ethesis.pdf
11. Midlöv P, Bahrani L, Seyfali M, Höglund P, Rickhag E, Eriksson T. The effect of medication reconciliation in elderly patients at hospital discharge. *Int J Clin Pharmacol.* 2012;34:113-119. doi:10.1007/s11096-011-9599-6
12. Counter D, Stewart D, MacLeod J, McLay JS. Multicompartment compliance aids in the community: the prevalence of potentially inappropriate medications. *Br J Clin Pharmacol.* 2017;83(7):1515-1520. doi:10.1111/bcp.13220
13. Royal Pharmaceutical Society. Improving patient outcomes - The better use of multi-compartment compliance aids. 2013. <https://www.rpharms.com/Portals/0/RPS%20document%20library/Open%20access/Support/toolkit/rps-mca-july-2013.pdf>
14. Mansur N, Weiss A, Beloosesky Y. Relationship of in-hospital medication modifications of elderly patients to postdischarge medications, adherence, and mortality. *Ann Pharmacother.* 2008;42(6):783-789. doi:10.1345/aph.1L070
15. World Health Organisation. Medication Without Harm WHO Global Patient Safety Challenge. 2017. Accessed October 14, 2021. <https://www.who.int/initiatives/medication-without-harm>
16. Medical Research Council. Do I need NHS Ethics approval? <http://www.hra-decisiontools.org.uk/ethics/index.html> (accessed 19 May 2021).
17. Pirmohamed M, James S, Meakin S, et al. Adverse drug reactions as cause of admission to hospital: Prospective analysis of 18 820 patients. *Br Med J.* 2004;329:15-19. doi:10.1136/bmj.329.7456.15
18. Einaron TR. Drug-Related Hospital Admissions. *Ann Pharmacother.* 1993;(7-8):27-840. doi:10.1177/106002809302700702
19. Parekh N, Ali K, Stevenson JM, et al. Incidence and cost of medication harm in older adults following hospital discharge: a multicentre prospective study in the UK. *Br J Clin Pharmacol.* 2018;84:1789-1797. doi:10.1111/bcp.13613
20. Green CF, McCloskey S. UK survey of the provision of multicompartment compliance aids and medicines reminder charts on discharge from hospital. *Int J Pharm Pract.* 2005;13:85-90. doi:10.1211/0022357055812
21. Shenoy R, Scott S, Bhattacharya D. Quantifying and characterising multi-compartment compliance aid provision. *Res Social Adm Pharm.* 2020;16(4):560-567. doi:10.1016/j.sapharm.2019.07.015
22. Care Quality Commission. Managing medicines: home care providers|Care Quality Commission. 2021. Accessed March 9, 2021. <https://www.cqc.org.uk/guidance-providers/adult-social-care/managing-medicines-home-care-providers>
23. Brown SHM, Hafeez U, Abdelhafiz AH. Use of multicompartment compliance aids for elderly patients: Patient viewpoints and hospital length of stay. *Postgrad Med.* 2010;122(4):186-191. doi:10.3810/pgm.2010.07.2185
24. Pharmaceutical Services Negotiating Committee. Disability Discrimination Act 1995; Equality Act 2010; and Multi-compartment compliance aids. 2016. <https://psnc.org.uk/wp-content/uploads/2016/01/PSNC-Briefing-001.16-Equality-Act-2010.pdf>
25. Taunton & Somerset NHS Foundation Trust. Ensuring appropriate use of monitored dosage systems: reducing unnecessary pharmacy workload|Local practice|NICE. 2016. <https://www.nice.org.uk/>

media/default/About/Who-we-are/Local%20Practice/14_0002-ProposedQP-Monitored-dosage-systems.pdf

26. Bryan K. Policies for reducing delayed discharge from hospital. *Br Med Bull.* 2010;95:33-46. doi:[10.1093/bmb/ldq020](https://doi.org/10.1093/bmb/ldq020)
27. Victor CR, Healy J, Thomas A, Seargeant J. Older patients and delayed discharge from hospital. *Health Soc Care Community.* 2000;8(6):443-452. doi:[10.1046/j.1365-2524.2000.00270.x](https://doi.org/10.1046/j.1365-2524.2000.00270.x)
28. Lim S, Doshi V, Castasus B, Lim JK, Mamun K. Factors Causing Delay in Discharge of Elderly Patients in an Acute Care Hospital. *Ann Acad Med Singapore.* 2006;35(1):27-32.

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

How to cite this article: Walters S, Chakravorty M, McLachlan S, et al. Medication compliance aids unpackaged: A national survey. *Br J Clin Pharmacol.* 2022;88(10):4595-4606. doi:[10.1111/bcp.15386](https://doi.org/10.1111/bcp.15386)

APPENDIX A.

Demographics of responses with response rate (%)

Name of region	Number of responses per region	Total number of acute trusts per region	% response rate
Health Education North East	6	7	85.7%
Health Education North West	13	27	48.1%
Health Education East Midlands	5	8	62.5%
Health Education Yorkshire and the Humber	6	14	42.9%
Health Education West Midlands	5	12	41.7%
Health Education East of England	7	14	50.0%
Health Education Kent, Surrey and Sussex	6	11	54.5%
Health Education North Central and East London	4	9	44.4%
Health Education North West London	3	4	75.0%
Health Education South London	5	7	71.4%
Health Education Thames Valley	1	4	25.0%
Health Education Wessex	3	8	37.5%
Health Education South West	8	13	61.5%
TOTAL	72	138	52.2%

APPENDIX B.

Hospital Trusts that supplied medication compliance aids (MCAs): Sample of free-text comments regarding the other situations in which MCAs are supplied by acute hospital Trusts

- “If a patient did not have an MCA before their admission but it was clear that they needed 1, we would speak to their pharmacy to set a new MCA up with them and supply 7 days on discharge. However, this is not common practice.”
- “Mon–Fri 9–3 pm MCA is outsourced to Boots Pharmacy. MCA outside of these times is facilitated by hospital pharmacy”
- “Locally LIMOS [Lewisham Integrated Medicines Optimisation Service] within Lewisham assess patients’ needs and ability to self-administer/use an MCA and may recommend initiating an MCA on discharge.”
- “At discharge after assessment by ward pharmacist only, according to strict criteria.”
- “We only initiate new compliance aids for patients who have been assessed and trained to self-administer the MCA on the ward before discharge. We would not initiate an MCA on discharge.”
- “Some care homes will not take patients unless the medication is supplied in a Dosette. Similarly, some carers companies will only arrange carer visits if medication is in a Dosette so their staff can give the medication.”
- “Only supply TB [tuberculosis] outpatients for improved compliance of TB medications.”
- “We issue a reusable Dosette box to the HIV clinic to allow them to fill a separate tray for antivirals for noncompliant patients.”

APPENDIX C.

Hospital Trusts that supplied medication compliance aids (MCAs): Sample of free-text comments regarding the other ways that Trusts managed medicine reconciliation in situations where they did not dispense MCAs

- “Always supply [an MCA] if changes to medication. If no changes, we contact the patients usual supplying pharmacy.”
 - “99–100% (around 40 MCAs per week) of prescriptions requiring an MCA are sent to an external provider to supply under a pilot scheme.”
 - “Someone, usually nurses, would arrange for a community assessment, likely by a GP.”
 - “District nurse referral made for administration if needed. Otherwise family/carers to support from original packs.”
 - “Referred to medicines support team for assessment.”
 - “Counsel the patient on the new medication. If medications are stopped, we double check whether the patient can identify the tablet which has been stopped and assess whether they can manage the new changes. This only occurs on the very rare occasion.”
 - “Supplied for specific medication such as chemotherapy regimens if these are complex and patient may need the extra support.”
 - “For care homes with nursing we supply new and changed items only in boxes and bottles. For community care beds (intermediate care) we supply in boxes and bottles even if the patient was using a compliance aid prior to transfer to the community care bed.”
-

APPENDIX D.

Hospital Trusts that did not supply MCAs: Sample of quotes regarding procedures/pathways utilised to reconcile changes to patients' medicines for patients who usually use an MCA

- “Liaise with GP where appropriate.”
 - “Outsourced service to a community pharmacy (SLA [service level agreement]).”
 - “A dedicated local pharmacy prescribing same day MDS [monitored dosage system] devices.”
 - “If an MDS is needed we outsource to a contracted company and inform the patients regular chemist by way of a letter to inform them of the changes for the next trays.”
 - “Hospital pharmacy liaises with supplying pharmacy.”
 - “Hospital provides FP10 prescription.”
 - “If patient has social package of care that matches their medication timings, we supply original packs and the carers are expected to administer.”
 - “If the patient or relative is able to administer from original packs we expect them to do so.”
 - “Use standard packaging with family support.”
 - “Request sent to outpatient pharmacy (located in hospital) to supply MCA. If outpatient pharmacy do not have capacity (max 5× trays per day) hospital pharmacy staff/ward staff to contact patients GP and usual community pharmacy to arrange.”
-

APPENDIX E.

Qualitative analysis: reasons that Trusts do not provide medication compliance aids (MCAs)

Themes	No:	Quotes
Lack of staff/space	8	<ul style="list-style-type: none"> • “Issues with staff resource and space within pharmacy department to fulfil Medibox requirements” • “No resource to provide the trays” • “In 2018/19 we sourced over a 1000 MDS [monitored dosage system] devices on discharge and if we did this in house will require a dedicated pharmacist and technician to support backfill” • “Opportunity costs: where we produce a tray, in the same time 60 items can be dispensed. Turnaround times for TTOs [take-out forms] affected in the system” • “Cost and time. We do not have the capacity to deal with the number of MDS requests that come through in house” • “Lack of space to make them up. Do not have capacity to fill these: Lack of resource/staffing, workload capacity, lack of capacity, lack of space” • “Not resourced to do so” • “Capacity and environment”
Wastage/inefficiencies	4	<ul style="list-style-type: none"> • “A 2-week supply will result in waste as our broken original packs cannot be reconciled by JAC [electronic prescribing system] and our robot governance issues: Unlicensed medicines status once opened, stability” • “Process also relies on regular review which cannot be completed within an hospital setting” • “Wastage, inefficiencies—often last-minute changes to medication on discharge, having to redo MCA.” • “Seen to promote and encourage use of MCAS in patients on whom it is not appropriate—creating additional workload.”
Outsourced	3	<ul style="list-style-type: none"> • “Outsourced service due to volume of Medibox [monitored dosage system] requests (caring agencies will only administer medicines from a blister pack).” • “Our ‘outsourced’ pilot model has worked well to date where MDS supplies are produced the same day.” • “Therefore, we outsource to a community pharmacy.”

(Continues)



Themes	No:	Quotes
Other	3	<ul style="list-style-type: none">• “No mechanism to coordinate our supply with GP prescriptions post supply”• “Those that do require MCAs are arranged via GP.”• “We do not dispense outpatient prescriptions in house, and don't have an outpatient dispensary. The decision was also based on the wide variety of compliance aids/MCAs available. It was not felt to be in the patient's best interests to change device and potentially cause confusion.”
As per local/national guidance	2	<ul style="list-style-type: none">• “Service level agreement with local CCGs [clinical commissioning groups]”• “As trusts seek to do away with MDS dispensing in Berkshire, it goes against the tide to bring them in house.”