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Research

Considerations for using the 'brown bag' strategy to reconcile medications during routine outpatient office visits

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ABSTRACT

Background Among medication reconciliation studies, varying methods are used to determine which medications patients are actually taking. One recommended approach is to ask patients to ''brown bag'' their medications for routine office visits.

Aims To determine if 'brown bag' practices performed during routine office visits improve the accuracy of provider-documented medication lists.

Methods This cross-sectional pilot study was conducted in a university affiliated community geriatric clinic. Forty-six cognitively intact elders who managed their own medications enrolled. Participants self-selected into two groups: 'brown-baggers' (BBs) and 'non-brown-baggers' (NBBs). Three medication lists were compared for each patient: provider-documented in patient's chart (chart list); researcher-generated by post-appointment semi-structured interview (point-of-care [POC] list); post-appointment semi-structured telephone interview (telephone list, reference standard). Accuracy of chart and POC lists were compared with reference lists among BBs and NBBs.

Results Thirty-three (72%) patients brought some of their medications to scheduled appointments (BBs); of these, 39% bagged all of their medications. Excluding route as a variable, 35% of provider-documented chart lists were complete; only 6.5% were accurate. Some 76% of chart-documented medication lists contained inclusion, omission and/or dosing instruction discrepancies, with no differences between BBs and NBBs. However, POC lists obtained using a semi-structured interview included fewer inclusion and omission discrepancies among BBs than NBBs (42% v 77%, $P = 0.05$). In subset analyses by medication type, over-the-counter (OTC) medication documentation was more accurate among BBs than NBBs. Overall, chart lists contained two to three times more discrepancies than lists generated at POC.

Conclusion Most BBs do not bag all their medications for office visits. Chart list accuracy is no better among BBs than NBBs, although patients who 'brown bag' their medications for office visits may prompt providers to conduct a more thorough medication history. Lists generated by semi-structured interviewing, regardless of BB status, are more accurate than chart lists. Findings challenge benefits of the 'brown bag' unless coupled with in-depth questioning and processes for transferring information to chart lists.

Keywords: brown bag, geriatric, medication, outpatient, reconciliation

How this fits in with quality in primary care

What do we know?
Medication reconciliation is a complex process without a clear 'gold standard'. Yet medication reconciliation is a priority for numerous patient safety initiatives. Clinicians often recommend that patients 'brown bag' their medications for office visits. Yet the goal of a 'brown bag medication review' is to engage patients and providers in discussing and reconciling medications, which is a complex task to achieve in a busy clinic setting.

What does this paper add?
Generic 'brown bag' requests incorporated into routine office visits do not achieve their intended aim – to improve provider-documented medication lists. However, they may serve as a prompt for providers to conduct a medication review. Medication histories generated by semi-structured interviewing, regardless of 'brown bag' status, may improve accuracy, particularly for OTC medications. Future quality improvement efforts should focus on developing medication review protocols that include patient-centered interviewing approaches, as well as more efficient methods to communicate and incorporate medication updates into patients' medical records.

Introduction

Several organisations promote accurate and complete medication reconciliation as patient safety initiatives, including the World Health Organization (WHO)[1] and the Joint Commission.[2] The Joint Commission requires that all health systems 'accurately and completely reconcile medications across the continuum of care' to improve transitions of care and avoid adverse drug events. Medication reconciliation is widely defined as the process of identifying a patient's most accurate list of medications and, ideally, having a way in which to translate updated medication information so that patients and all of their providers utilise the same list. Errors include incomplete or inaccurate dosing information (medication name, dose, route, or frequency) and inclusion or omission discrepancies.[3–5] Although a recent systematic review found that medication reconciliation prevents unintended medication discrepancies, the impact of many medication reconciliation efforts to improve patient safety remains uncertain.[6,7] There remain gaps in the literature and a critical need for ongoing research to identify the most effective ways to reduce medication errors. The majority of related research has focused on hospitalised patients.[7–10]

Very few research studies have been conducted exclusively in outpatient settings. Although they have yielded important findings, they underscore the need for a clearer understanding of the factors that affect medication reconciliation.[11–15] One such study found that educating the healthcare team regarding the importance of medication reconciliation reduced discrepancies in prescription medication documentation from 89% to 49%.[12] A similar study improved completeness of individual medications from 10% to 62%.[13] Patient education and empowerment has also been found to improve completeness (20% to 50%) and accuracy (12% to 29%) of medication lists.[14] However, these studies are limited by use of varied methods to determine what medications patients are taking, e.g. patient recall, pharmacy records, home visits, 'updated' medication lists, medication containers ('brown bag' review), phone interviews, or any combination thereof, which can compromise validity. For example, 'brown bag' studies found that less than a third of subjects actually complied with requests to bring medications to their appointments, even when prompted.[12,14] It is unclear if reconciliation outcomes among those who did bring in their medications were directly related to the 'brown bag' practice. Consequently, there is no gold standard for identifying what medications patients are actually taking. Further research in outpatient medication reconciliation is of utmost importance, especially as evidence mounts regarding the prevalence and high cost associated with outpatient medication errors.[16–18]

This study focuses on the 'brown bag' intervention, introduced in the 1980s by pharmacists as a way to review what patients were actually taking.[19] It is now common for physicians to ask patients to bring their medications in for scheduled appointments to facilitate medication reconciliation between what patients are taking and what is recorded in the chart.[20] In a survey of patients that brought medications to office visits, 76% had discrepancies between what they reported taking and the medication lists documented in their charts.[15] Discrepancies increased with patient age and number of providers prescribing medications. Another study found that nearly half of medication lists based on clinic 'brown bag' reviews contained incomplete listings, using home visits as the reference.[21] The authors concluded that 'brown bag' reviews

should include patient instructions and structured interviews. However, neither of these studies included a comparison group of patients who did not bring in medications, so it remains unclear whether 'brown bagging' actually improves provider documentation in patients' medical records. Furthermore, in a busy clinic setting, patients who 'brown bag' their medications for office visits may not engage with their providers to reconcile medication lists, which was the original objective of the 'brown bag review.'

We examined whether the provider-recorded medication lists of patients who brown bag their medications are more accurate compared with 'non-brown baggers' (NBBs). Abbreviated findings were published in a letter to the editor,[22] while this manuscript provides full methodology, subset analyses for prescription and OTC medications, and mean number of discrepancies per medication list. In addition, we discuss relevance to clinical practice and highlight opportunities for quality improvement.

Methods

Study design

This was a cross-sectional pilot study of elderly patients at a mid-Michigan primary care clinic during three-months in 2011 to examine the effect of 'brown bagging' medications on the accuracy of charted medication lists compared with prompted patient reports (including a post-appointment phone interview used as the reference standard). The institutional review boards of Michigan State University and Sparrow Health Systems approved the study.

Setting

The study site was a single community based, academic-affiliated geriatrics clinic in an urban community that had 6871 clinic visits in 2011. The clinic policy is to provide routine office visit reminder calls during which staff provides a generic request for patients to 'brown bag' their medications for their appointments, i.e. bring their medication containers. Providers were aware that researchers were conducting a study about medication management, however, they were not informed of study details in order to limit influence on their usual practice style. This study was conducted prior to implementation of an electronic medical record (EMR).

Subjects

Eligible individuals were aged 65 years or older who presented for primary care services during the study period. Exclusion criteria included a score of under 25 on Mini-Mental State Exam (MMSE)[23] or a history of dementia, inability to communicate via phone, non-English speaking, and receiving assistance with medication management, e.g. use of pharmacy pre-loaded medication cassettes or family assistance. Subjects were classified into two groups based on whether or not they brought medications to their appointment: patients who brought in at least one medication (brown-baggers, BBs), and patients who did not bring in any medications (non-brown-baggers, NBBs). Patients who brought in just one medication were not distinguished from those who brought in all of their medications. Further classifying patients into partial versus complete BBs was outside the scope of this study. Patients who brought in 'updated' medication lists, but did not bring their medication containers were considered NBBs.

Potential patients were informed about the study during routine appointment reminder calls, during which staff asked patients to bring their medications to their appointment. Staff described the study and asked if patients would be willing to participate (Figure 1, Step 1). If the patient agreed, they were asked to meet with a researcher immediately following their upcoming office visit for an interview, as well as a follow-up phone interview within 1 week of their appointment. While it is possible that inviting patients to participate in a medication management study could have influenced them to bring their medications to the index appointment, this potential bias was minimised in two ways: maintaining standard clinic policy, which is to request that all patients 'brown bag' their medications for all office visits (regardless of study participation); and obtaining consent to participate in the study after the index appointment was completed.

Data collection

A study investigator met with potential subjects, applied exclusion criteria, provided a brief study overview, and obtained informed consent (Figure 1, Steps 2–3). Consenting subjects classified themselves as BB or NBB groups as described (Figure 1, Step 4). Baseline data collected via chart review included: age, sex, major comorbidities, primary care physician, number of clinic visits in the past year, and hospitalisations within the previous 60 days. Investigators also documented whether patients brought their medications or 'updated' medication list to the appointment, whether they felt the provider reviewed their

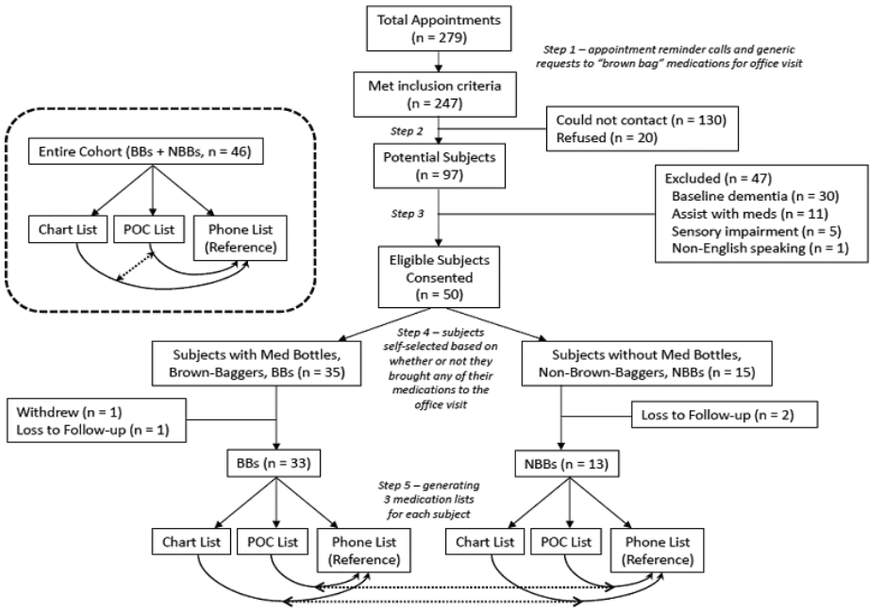

Figure 1 Flow diagram of subject enrollment and study comparisons. Accuracy of chart lists and POC lists were determined by comparison with phone lists (curved arrows). Comparisons of chart and POC list accuracy between BBs and NBBs are indicated by dashed lines with open arrows. Among the entire cohort, comparison between chart and POC list accuracy is indicated by dashed line with closed arrows (inset)

medications during the appointment, and if they had been prescribed medications by other specialists.

The investigators then generated three medication lists for each subject: a chart list documented by the provider during the office visit; a point of care (POC) list, developed by researchers immediately after patients' appointments using a semi-structured 'prompted' interview guide; and a phone list, using the same interview guide during a one-week follow-up phone call to patients (Figure 1, Step 5).

The interview guide included a series of questions similar to those used to develop a best possible medication history (BPMH)[1] such as patient recall, review of medication packages as able (BBs only), review of 'wallet reminder cards' (as able), review of provider-documented medication lists (chart list), medications prescribed by other providers (including samples), ongoing use of non-oral medications such as inhalants and creams, and OTC medications, including herbals and supplements.

The phone list was used as the reference standard (in lieu of a 'gold standard' which has not yet been defined in the literature), based on the assumption that a higher likelihood of accuracy exists when patients have all of their medication containers visibly in front of them. This process could only be accomplished for NBBs (and similarly BBs) during a post-appointment phone call. During the follow-up phone call, patients were asked to collect their medication containers and read off the name, dose, frequency, and route of each medication taken in the past week (and to clarify deviations from label instructions). Chart and POC lists were then compared against this list (reference standard) to determine levels of accuracy (Figure 1).

Types of discrepancies

Rates of medication list completeness, correctness and accuracy were defined according to Nassaralla *et al.*[13] A list was considered complete if each entry included all four components: medication name, dose, route, and frequency (Figure 2).

Lists were defined as correct if each entry was free of inclusion, omission, and dosing discrepancies. Inclusion discrepancies refer to recorded medications that patients were no longer taking; omission discrepancies refer to absence of medications in the record that patients reported taking; dosing discrepancies refer to inaccuracies in dose and/or frequency instructions (Figure 2). Accuracy was defined as medication lists that were both complete and correct.

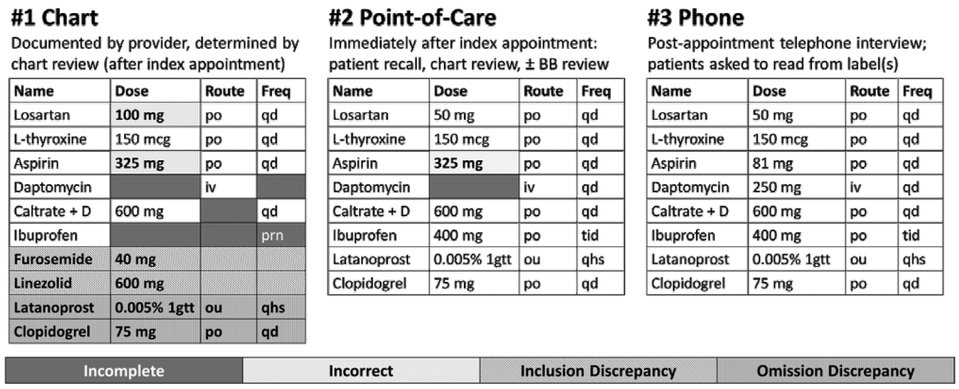

Figure 2 Illustration of the three medication lists used to determine discrepancies. Chart lists were assessed for incompleteness (missing data). Accuracy of chart lists and POC lists were determined by comparison with phone lists (reference standard). Incomplete entries within chart lists are indicated by gray shading. Incorrect entries within chart lists and POC lists are indicated by dotted shading. Inclusion discrepancies within chart lists and POC lists are indicated by diagonal line shading. Omission discrepancies within chart lists and POC lists are indicated by vertical line shading

Variables

Explanatory variables included demographic data, health variables (obtained by chart review), and factors associated with inclusion and/or omission discrepancies. Response variables included completeness of charted medication lists, presence of discrepancies, and average number of inclusion and/or omission discrepancies per medication list.

Chart and POC medication lists for BBs and NBBs were compared for presence and magnitude of discrepancies, using phone medication lists as the reference standard (Figure 1). In a subset analysis, discrepancies among prescription and OTC medications were analysed separately. Finally, discrepancy rates between chart versus phone list and POC versus phone list were compared (Figure 1, inset).

Data analysis

Sample size for this pilot study was determined based on feasibility, effort and cost, rather than on a priori differences to be found in order to test specific hypotheses. Descriptive statistics were calculated for demographic and clinical characteristics. Univariate statistics including Fisher's exact test and *t*-tests were performed to compare proportions and mean differences between BBs and NBBs. Linear regression analyses were done to evaluate factors associated with number of chart and POC discrepancies separately. Type I error of 0.05 was used to determine statistical significance. Analyses were performed using Stata version 11.2 (StataCorp, College Station, TX).

Results

Of the 247 patients meeting initial eligibility criteria, 117 were contacted, 20 refused to participate, and 47 were excluded. Some 50 eligible subjects consented to participate; one withdrew (BB) and three were lost to follow-up (one BB and two NBBs). The final cohort included 46 cognitively intact elders who managed their own medications (47% participation).

Subjects had a mean age of 79.8 years and 67% were women (Table 1). Subjects reported taking an average of 9.9 medications, of which 5.7 were prescription drugs (Table 1). Of the 46 subjects, 33 (72%) brought at least one of their medications to their office visit (BBs). Demographic information was no different between the two groups.

Two-thirds of subjects reported prescriptions from multiple physicians. Among BBs, only 39% brought all medications they reported taking. All BBs self-reported that their physician reviewed their medications during the office visit, although significantly fewer NBBs (62%) reported the same ($P = 0.001$, Table 1). Nearly half of the subjects reported that the provider made changes to their medication regimen (Table 1), and changes were more likely among BBs than NBBs (58% v 23%, respectively, $P = 0.05$).

Completeness

Excluding 'route' as a variable, only 35% of recorded medication lists were complete (30% BBs v 46% NBBs, $P = 0.18$). All lists contained ≥ 1 medication with missing data (not shown). Among the 445

Table 1 Baseline characteristics of study cohort.

Demographic	Cohort ($n = 46$)	BBs ($n = 33$)	NBBs ($n = 13$)	*P*-value
Age, mean ± SD	79.8 ±6.8	80.5 ±6.2	78.1 ±8.2	0.28
Female, *n* (%)	31 (67.4)	21 (63.6)	10 (76.9)	0.50
Number reported medications, mean ± SD	9.9 (±4.0)	10.0 (±4.0)	9.5 (±4.0)	0.71
Prescription	5.7 (±2.9)	5.7 (±2.9)	5.7 (±2.9)	0.97
Over-the-counter	4.2 (±2.6)	4.3 (±2.7)	3.8 (±2.6)	0.60
Brought medication list to appointment, *n* (%)	21 (45.7)	11 (33.3)	10 (76.9)	0.01
Provider reviewed medications, *n* (%)	41 (89.1)	33 (100.0)	8 (61.5)	< 0.01
Mid-level provided care, *n* (%)	13 (28.3)	9 (27.3)	4 (30.8)	> 0.99
Provider adjusted medication(s), *n* (%)	22 (47.8)	19 (57.6)	3 (23.1)	0.05
Added medication, *n* (%)	14 (30.4)	11 (33.3)	3 (23.1)	0.72
Removed medication, *n* (%)	6 (13.0)	6 (18.2)	0 (0.0)	0.16
Changed dose, *n* (%)	5 (10.9)	4 (12.1)	1 (7.7)	> 0.99
Multiple changes, *n* (%)	8 (17.4)	7 (21.2)	1 (7.7)	0.41
Hospitalised past 60 days, *n* (%)	2 (4.3)	1 (3.0)	1 (7.7)	0.49
Emergency department past 60 days, *n* (%)	3 (6.5)	3 (9.1)	0 (0.0)	0.55
Number outpatient visits past year, mean ± SD	6.3 ± 2.5	6.2 (±2.3)	6.5 (±2.9)	0.72
MMSE score, mean ± SD	28.1 ± 1.5	28.0 (±1.7)	28.3 (±1.0)	0.50
Uses pill reminder box, *n* (%)	30 (65.2)	20 (60.6)	10 (76.9)	0.49
Other physician(s) prescribe medications, *n* (%)	31 (67.4)	25 (75.8)	6 (46.2)	0.08
Number additional prescribers, mean ± SD	1.1 (±1.1)	1.1 (±1.6)	1.1 (±1.6)	0.97
Lives in own home, *n* (%)	36 (78.3)	26 (78.8)	10 (76.9)	0.91
Comorbidities[a] *n* (%)	46 (100)	33 (100)	13 (100)	1.00

BBs = brown baggers
NBBs = non-brown baggers
SD = standard deviation
MMSE = Mini-Mental State Exam
[a] Comorbidities = there were no significant differences in comorbidities between BBs and NBBs (including: coronary artery disease, hypertension, hyperlipidemia, atrial fibrillation, diabetes, chronic obstructive pulmonary disease, osteoarthritis, depression and hypothyroidism).

individually chart-documented medications, 84.3% contained complete entries for drug name, dose and frequency, with no differences between BBs and NBBs. Reasons for incompleteness included lack of route (94%), dose (14%) and frequency (6.3%), with no differences between BBs and NBB (Table 2).

Correctness – inclusion, omission and dosing discrepancies

Only 6.5% of chart medication lists were correct, with no differences between BBs and NBBs. Among all subjects, 15% of chart lists contained inclusion discrepancies, 28% contained omission discrepancies and 33% contained both inclusion and omission dis-

Table 2 Accuracy of medication lists: presence of inclusion, omission, and dosing instruction discrepancies

	Chart vs Phone (Reference)				POC vs Phone (Reference)			
	Cohort $n = 46$	BBs $n = 33$	NBBs $n = 13$	*P*-value	Cohort $n = 46$	BBs $n = 33$	NBBs $n = 13$	*P*-value
Correct medication list *n* (%)[a]	3 (6.5)	2 (6.1)	1 (7.7)	>0.99	14 (30.4)	12 (36.4)	2 (15.4)	0.33
Reason incorrect, *n* (%)								
No errors of inclusion or omission	11 (23.9)	8 (24.2)	3 (23.1)	0.91	22 (47.8)	19 (57.6)	3 (23.1)	0.05
Error(s) of inclusion present	7 (15.2)	6 (18.2)	1 (7.7)		3 (6.5)	1 (3.0)	2 (15.4)	
Error(s) of omission present	13 (28.3)	9 (27.3)	4 (30.8)		14 (30.4)	10 (30.3)	4 (30.8)	
Error(s) of inclusion & omission present	15 (32.6)	10 (30.3)	5 (38.5)		7 (15.2)	3 (9.1)	4 (30.8)	
Incorrect dose	5 (10.9)	4 (12.1)	1 (7.7)	0.60	7 (15.2)	4 (12.1)	3 (23.1)	0.76
Incorrect frequency	12 (26.1)	9 (27.3)	3 (23.1)		9 (19.6)	7 (21.1)	2 (15.4)	
Incorrect dose & frequency	18 (39.1)	14 (42.4)	4 (30.8)		3 (6.5)	2 (6.1)	1 (7.7)	
Subset analysis of prescription medications								
Reason incorrect, *n* (%)								
No errors of inclusion or omission	24 (52.2)	18 (54.5)	6 (46.2)	0.95	37 (80.4)	27 (81.8)	10 (76.9)	0.87
Error(s) of inclusion present	12 (26.1)	8 (24.2)	4 (30.8)		4 (8.7)	3 (9.1)	1 (7.7)	
Error(s) of omission present	7 (15.2)	5 (15.2)	2 (15.4)		4 (8.7)	2 (6.1)	2 (15.4)	
Error(s) of inclusion & omission present	3 (6.5)	2 (6.1)	1 (7.7)		1 (2.2)	1 (3.0)	0 (0.0)	
Subset analysis of OTC medications								
Reason incorrect, *n* (%)								
No errors of inclusion or omission	0	0	0	0.73	0	0	0	0.01
Error(s) of inclusion present	0	0	0		0	0	0	
Error(s) of omission present	31 (67.4)	23 (69.7)	8 (61.5)		37 (80.4)	30 (90.9)	7 (53.8)	
Error(s) of inclusion & omission present	15 (32.6)	10 (30.3)	5 (38.5)		9 (19.6)	3 (9.1)	6 (46.2)	

POC = Point-of-care
BBs = brown baggers
NBBs = non-brown baggers
OTC = Over-the-counter
[a] No errors of inclusion, omission, dose, or frequency (excluding route as a variable)

crepancies (Table 2). Another 76% of chart lists contained discrepancies in dosing and/or frequency instructions.

BBs versus NBBs

Medication lists generated by semi-structured interview at POC, including 'brown bag' review for BBs, contained fewer inclusion and omission discrepancies among BBs (42%) than NBBs (77%), using phone lists as the reference standard ($P = 0.05$, Table 2). However, this difference was not observed in the subset analysis of prescription medications only. In the OTC subset, all subjects had discrepancies in both chart and POC lists. The proportion of patients with inclusion and omission discrepancies of OTC medications was significantly different between BBs and NBBs in the POC medication lists ($P = 0.01$), but not for the chart lists. The proportion of BBs that had both inclusion and omission discrepancies was lower than among NBBs in the POC lists (9% v 46%, respectively, Table 2).

Chart versus POC for entire cohort

Among the 46 subjects, medication lists generated at POC with prompted questioning contained 2.5 times fewer inclusion and omission discrepancies compared with chart lists ($P = 0.29$, Figure 3). In the subset analysis of prescription drugs only, POC lists contained three times fewer discrepancies than chart lists ($P = 0.26$, Figure 3).

After controlling for patient age and gender, number of chart medications ($\beta = 0.27$, $P < 0.01$) was the only factor associated with chart discrepancies. Specifically, for every four medications recorded in a patient's chart, at least one additional inclusion or omission discrepancy existed.

Discussion

Among elderly patients who 'brown bag' their medications for outpatient primary care visits, most do not bring all medications they report taking. Thus clinicians should not assume that the 'brown bag' is complete. Many older adults bring an 'updated' medication list to their office visits, a practice that is more common among NBBs than BBs, possibly in lieu of bringing their medication containers. Both resources – medication containers (for BBs) and personal medication lists (both groups) – were used by researchers within the context of the semi-structured medication interview to develop a robust medication list for study participants. Despite this, chart documented medication lists were no more accurate among BBs than NBBs. However, unlike NBBs, all BBs did report having had a comprehensive medication review, which suggests that the value of the brown bag strategy – as it is currently practiced in a busy clinical setting – is that presence of medication containers in the exam room may prompt providers to conduct a medication history and engage patients in shared decision making. Furthermore, patients that 'brown bag' their medications for appointments may work with their providers to discontinue medications, particularly if they are burdened by polypharmacy.

Another theme that emerged from our research is that discrepancies in medication lists may be influenced more by how the list was obtained (chart review versus semi-structured interview at POC or during a post-appointment phone call), rather than whether or not patients brought their medications with them to their appointments. Medication lists generated by in-depth interviewing at POC were more accurate among BBs, a difference seemingly related to documentation of OTC medications, as the difference disappears when prescription medications were examined separately. Point-of-care lists contained 2.5 times fewer

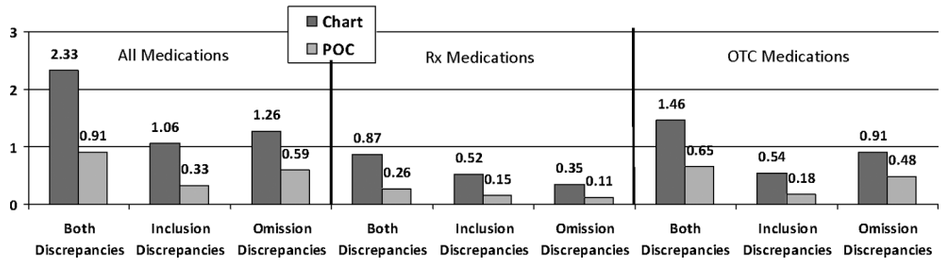

Figure 3 Mean number of discrepancies per medication list. Discrepancy magnitude: among the entire cohort of 46 patients, the mean number of medication discrepancies per list (chart and POC lists reported separately). Left: all medications. Centre: prescription medications only. Right: OTC medications only. Inclusion/omission discrepancies were two to three times greater in chart lists than POC lists. While not statistically significant, these discrepancies may be clinically significant for high-risk medications

inclusion and omission discrepancies than chart lists. Although not statistically significant, likely due to the small sample size, the authors believe this substantial difference to be of clinical importance.

It remains uncertain why 'brown bag' data available at POC was not reflected accurately in chart lists, although it may be due to generic bagging instructions provided to patients. Although brown bag requests are common practice among geriatric clinics and widely endorsed by nurses, pharmacists and clinicians,[20,24–26] there are no standardised request instructions, leading to wide variation in clinical practice. Studies assessing 'brown bag' interventions reflect this heterogeneity, with some asking patients to 'bring all of your medications' and others prompting specific medications, including non-oral medication, OTCs, and herbals.[27–30] Thus, stating that a 'brown bag' review was performed indicates little about its validity. We intentionally provided vague instructions 'to bring all of your medications to your appointment', because this is common practice and resulted in a reasonable sample of NBBs. Another theory for the errors in chart records, despite generating POC and phone lists, is that providers do not have effective and/or efficient processes for transferring reconciled medication information in patients' medical records.

Our sample represents a cognitively intact group of community dwelling elders that has frequent contact with their primary care team and other specialty providers. They take an average of nearly ten medications daily, and are thus vulnerable to the potential consequences of poly-pharmacy, including medication-specific side effects, falls, and functional and cognitive decline.[20] The average number of OTC medications used (including supplements) was high, confirming other studies that report nearly three-quarters of elders use dietary supplements with nearly one-third using three or more.[31] Frequent changes to medication regimens were reported, indicating that providers are making changes to patients' medications without complete information about what their patients are actually taking.

Study limitations include a small sample size and single-site design, which limits generalisability of results. Furthermore, only 39% of BBs brought in all medications that they reported taking; the remaining 61% were actually 'partial' BBs. Patients who brought in just one medication were not distinguished from those who brought in all of their medications. Researchers acknowledge that including a second control group of 'partial' BBs may have impacted results, but the total cohort was too small to separate subjects into three groups (complete v partial v non-BBs). The authors recommend this classification scheme for future studies in order to tease out the impact of bringing in some versus all medications.

In-depth questioning was done at POC and during phone calls, but not during the appointment reminder call. Among BBs, having even some of the medication bottles present may have affected recollection of all medication dosing instructions, although no differences in dosing discrepancies existed between the groups. Furthermore, there is no 'gold standard' for reconciling medications, and our choice to use a prompted telephone interview as our reference standard must be weighed against other methods used to obtain a best possible medication history. Despite these limitations, our study highlights weaknesses in the generic 'brown bag' requests made by primary care offices, unless it is used to prompt clinicians to take medication history, which ideally should include in-depth questioning and processes for transferring information to chart lists. Ultimately, such a process was the original intent of a pharmacists' 'brown bag medication review'.

Unfortunately, medication management is complex and time consuming, and 'brown bag' reviews are often performed in conjunction with a pharmacist.[28] A comprehensive 'brown bag' medication review among elderly patients can take 90 minutes to complete.[30] In addition to the time-intensive nature of comprehensive 'brown bag' medication reviews, there is limited evidence of their clinical benefit, aside from reducing medication burden. Yet this outcome may be welcomed by patients affected by the 'burden' of polypharmacy. Unfortunately, and despite current health technology, managing complex medication lists remains one of the biggest challenges in healthcare today.

Conclusion

This study suggests that generic 'brown bag' instructions made by primary care clinics may not achieve their desired effect of improving accuracy of provider-documented medication lists. Instead, 'brown bag' requests should be coupled with structured patient interviews to elicit more accurate medication lists. Thereafter, quality improvement efforts should seek processes to systematically incorporate reconciled medication lists into patients' medical records.

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CONFLICTS OF INTEREST

None.

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