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## Unnecessary Complexity of Home Medication Regimens among Seniors

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### Abstract

**Objective**—To determine whether seniors consolidate their home medications or if there is evidence of unnecessary regimen complexity.

**Methods**—Face-to-face interviews were conducted with 200 community-dwelling seniors > 70 years in their homes. Subjects demonstrated how they took their medications in a typical day and the number of times a day patients would take medications was calculated. A pharmacist and physician blinded to patient characteristics examined medication regimens and determined the fewest number of times a day they could be taken by subjects.

**Results**—Home medication regimens could be simplified for 85 (42.5%) subjects. Of those subjects not optimally consolidating their medications, 53 (26.5%) could have had the number of times a day medications were taken reduced by one time per day; 32 (16.0%) reduced by two times or more. The three most common causes of overcomplexity were (1) misunderstanding medication instructions, (2) concern over drug absorption (i.e. before meals), and (3) perceived drug-drug interactions.

**Conclusion**—Almost half of seniors had medication regimens that were unnecessarily complicated and could be simplified. This lack of consolidation potentially impedes medication adherence.

**Practice Implications**—Health care providers should ask patients to explicitly detail when medication consumption occurs in the home.

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## Keywords

Provider-Patient communication; Medication Adherence; Older Adults; Geriatrics

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## 1. INTRODUCTION

It is well established that patients frequently misunderstand medication instructions and take medications incorrectly [1–7]. Seniors and people with multiple chronic comorbidities are at greatest risk for unintentional medication errors and adverse events [8]. While an average adult fills 9 prescriptions yearly, seniors fill an annual average of 20 prescriptions [9]. As the number of medications increase so does regimen complexity, making it difficult for seniors to reconcile and find a straightforward daily medication schedule. The complexity of a medication regimen can be defined by the number of medications (polypharmacy) and the number of times per day or “doses” that the patient takes a medication (multiple dosing schedules) [10].

From a conceptual model, multiple factors may impact the complexity of medication regimens. Health providers (e.g. prescribing physicians, nurses) may provide instructions on individual medications – “take at night” or “take after dinner” – that may be interpreted differently by patients. Pharmacists may add warning or food-intake labels to medication bottles which may not be fully understood by patients [5, 11]. Patients may have beliefs that medications may lose their efficacy if taken together. When patients are moved from health care settings (e.g. hospital to home), medications may be added without any information on how to incorporate into the current regimen. If patients switch pharmacies, different labels or directions may be placed on the bottles [12, 13]. These human and system factors potentially will unnecessarily complicate medication regimens.

These complicated drug regimens raise the risk for adverse drug events and errors [14]. The Institute of Medicine report, *Preventing Medication Errors* suggests 1.5 million preventable adverse drug events occur annually, with a third occurring in outpatient settings at an estimated cost of \$1 billion [15].

Medication adherence is generally defined as the extent to which patients take medications as prescribed by their health care providers [16]. Studies have shown that one out of every four seniors were non-adherent to their medications [17, 18]. With increasing regimen complexity, medication adherence is difficult for many older adults. Health care professionals have long been taught that adherence improves dramatically as prescribed dose frequency decreases [19, 20]. Multiple studies have shown that the frequency of a medication directly impacts whether patients will be compliant (e.g. patients are more likely to comply with twice daily regimen than a three times a day regimen) [17–20]. In one study, adherence improved from 59.0% on a three-time daily regimen to 83.6% on a once-daily regimen [20]. It has been proposed that the single most important action that health care providers can take to improve compliance is to select medications that permit the lowest daily prescribed dose frequency [16].

Consolidating medications into regimens with the lowest frequency is a step in ensuring compliance, although patients may have difficulty doing so. Due to inadequate health literacy, impaired cognition, and misunderstanding of medication instructions, patients may not always have adequate skills to consolidate their complex medication regimens [21–27]. Wolf et al gave 464 adults, ages 55–74 years, a hypothetical 7-drug medication regimen and asked them to demonstrate how and when they would take the medications in a 24-hour period. While the regimen could be consolidated into 4 dosing episodes per day, participants chose an average of 6 times (SD, 1.8 times; range, 3–14 times) in 24 hours to take the 7 drugs [27]. With hypothetical regimens, people frequently did not consolidate medications. While overcomplicating prescription regimens has clear implications for sustained adherence, this has been less studied among patients with their actual medications. The aim of the present study was to investigate seniors' dosing of their actual medications in the home. We sought to better understand whether seniors consolidated their medications and what patient beliefs influenced medication regimen complexity.

## 2. METHODS

### 2.1 Recruitment of Subjects

The Institutional Review Board of Northwestern University Feinberg School of Medicine approved this study. Research staff recruited consecutive community-dwelling seniors aged 70 and older who were hospitalized to the acute medicine services at Northwestern Memorial Hospital. This project was part of a larger study to determine the frequency of low cognition at hospital discharge and the changes in cognition that occur one month following hospitalization among community dwelling seniors. It was found that many seniors have low cognition at hospital discharge which improves one month post hospital discharge [28]. Subjects were excluded if they were (1) blind or had a severe vision problem that could not be corrected with glasses (due to testing of cognition including vision-dependent tests), (2) unable to consent to their own procedures while hospitalized, (3) admitted for cognition issues (4) reliant on a caregiver 8 hours or greater per day [since we wanted to assess patients completing their own home medication regimens], or (5) living outside of a 60 mile radius of the hospital [due to logistics]. Subjects were also excluded if they had documented cognitive loss in the past medical history of their admission history and physical, specifically history of mild cognitive impairment, cognitive disorder, dementia, Alzheimer's disease, vascular dementia, or memory loss. Research staff obtained written informed consent from subjects within 24 hours prior to hospital discharge and set up home visit dates. Demographic information collection and cognitive testing was performed prior to hospital discharge. Subjects did not receive compensation for their participation.

### 2.2 Interviews

A research nurse contacted subjects, one month after hospital discharge, and confirmed the home visit to conduct the interview which lasted between 30–45 minutes. One month was chosen as it was expected that subjects would have developed a routine schedule for taking their medications by that time. At the visit, the research nurse asked subjects "Can you walk me through a day in your life of how you take your medications? Let's start with when you first wake up." The study nurse asked the subject to demonstrate how they took their

medications in a normal day. The subject then gave open ended responses and pantomimed their daily routine of where medications were stored and the reasons for the locations. The nurse documented where the medications were stored and whether or not a pill box was used, prompting as necessary for the exact times of medication consumption and why the subjects chose to take the dose at each time. A pill box was defined as a container with dividers that was used to organize pills outside of the original pill bottle. This information was compared to the discharge instructions and any differences were noted. All responses were recorded verbatim.

### 2.3 Data Preparation and Coding

Following the data collection, research staff entered each subject's home medication regimen (medication name, dose, and frequency) into a database. Medications that were taken as needed medications (PRN) were listed as the times taken in a day (i.e. subject took a medication occasionally nightly for sleep was listed as nightly). The research staff then calculated the number of times medications were taken in a 24 hour period for each subject. Medication regimens were then copied from the database into a separate file that showed the medication name, dose, and frequency. The file was then given to two health care professionals (a pharmacist and a physician) blinded to the actual use of the subject who would act as coders.

Coders were asked to determine the fewest number of times a day that a patient could take the regimen. Prior to starting, the two coders met and decided on rules specifically for which medications (1) had to be taken in relation to food (e.g. insulin), (2) had to be taken at a specific time (e.g. atorvastatin could be taken at anytime) [27], and (3) could not be taken together. The coders were also not allowed to consolidate by alternating short acting with long acting preparations (e.g. substituting once daily metoprolol succinate for twice daily metoprolol tartrate). A third healthcare professional served as a tie-break where discrepant responses occurred.

### 2.4 Data Analysis

The primary outcome of interest was the difference between the actual and the health care professional recommended number of times per day that subjects would take a medication. Statistical analysis was performed with the SPSS Statistics 17.0 (SPSS Inc., Chicago, IL) to determine frequencies of this outcome.

For the analysis of qualitative data, responses from open-ended questions on why subjects chose to take medications at independent times were distributed to two coders. The two coders used the inductive approach of latent content and constant comparative analysis on the detailed interview notes to organize the content into operational categories. Multiple coders are often used in the development of such categorical systems to control for the subjective bias each coder brings to the analytic process. The two coders independently reviewed the interview notes to familiarize themselves with the data, initially identifying individual focal and then overarching themes that emerged from agency responses. The coders then convened to compare and compile findings and create a preliminary list of categories and major themes. They met repeatedly to discuss the identified themes,

alternating group meetings with independent review of the field notes, until consensus was obtained and both coders believed that saturation of themes had been reached. The coders then returned to the data independently to assess the exhaustiveness and adequacy of the created system. Any discrepancies were resolved through discussion. There were no cases in which the coders were unable to reach consensus.

### 3. RESULTS

#### 3.1 Sample Characteristics

Of the 763 eligible seniors, 486 refused participation and we recruited 277 subjects. Of those recruited, 73 participants withdrew during the month between tests and 4 died resulting in 200 participants completing both the day of discharge and one month post-discharge testing. The mean age of subjects was 79.6 years (range 70–100 yrs, SD 6.4) with 58% female. Subjects identified themselves as 37.5% married, 36% widowed, and 54.0% living alone. On education, the largest group of subjects (36.0%) had some college or were college graduates while 27.5% had attended graduate school. The average number of medications per subject was 8.68 (range 1–19). (Table 1)

#### 3.2 Unnecessary Medication Overcomplexity

Compared to the health care professional recommendations, 43.5% (85) seniors were over-complicating their medication regimens. Of those seniors who were not consolidating their medications, 26.5% (53) could have reduced the frequency by 1 fewer dosing time per day, 13.0% (26) by 2 times, and 3.0% (6) by 3 times. Medication regimen inter-rater reliability between the pharmacist and physician ( $\kappa$ ) was 0.85.

#### 3.3 Subject Responses for Causes of Unnecessary Medication Overcomplexity

Coders examined 117 subject responses related to why medications were not consolidated, organized in five main categories. Only two subjects stated that the regimen was per their physicians instructions. The most common cause of over-complicating regimens was perceived concern over drug absorption in relation to meals (46.1%,  $n=59$ ). Many participants stated that a specific medication needed to be taken immediately before, while consuming, or immediately after a meal. There was no pharmacological basis for these perceived subject recommendations. The second most common cause 33.5% (43), was misunderstanding medication instructions (e.g. two medications could be taken at the same time but the subject misinterpreted to take one at night [7PM] and the other before bedtime [10PM]). Of the misunderstanding instructions category, the largest culprit medications were the statin-class medications (51.2%, 22). One hundred subjects in total were taking statins and of those, 10 of 44 using simvastatin and 10 of 45 using atorvastatin could have consolidated these medications within their regimens. Perceptions of drug-drug interactions accounted for 10.1% (13) of the responses. Two responses did not fit the above categories and were considered as the category - other.

#### 3.4 Medication Pill Box Utilization and Medication Overcomplexity

Pill boxes were used by 99 (49.5%) of the subjects interviewed. Medications were directly taken from pill bottles for 114 (57.0%) of the subjects interviewed. Four subjects (2.0%)

used paper cups. There was no statistical significance between pill box usage and unnecessary overcomplexity ( $p=0.623$ ).

### 3.5 Medication Changes at Hospital Discharge and Medication Complexity

At Hospital Discharge, 152 (76%) subjects had medication changes of which 128 (64.0%) had at least one new medication added. Of those experiencing new medications additions, 90(45.0%) subjects had a long-term medication added (e.g. atenolol) that would be expected to be present 30 days post-discharge when the home interview occurred. One month post-hospitalization, the addition of new medications and changes to current medications did not significantly correlate with unnecessary medication complexity.

## 4. DISCUSSION and CONCLUSION

### 4.1 Discussion

This study is the first to our knowledge to examine the unnecessary overcomplexity of medication regimens among seniors in actual use. Almost half of the seniors had home medication regimens that were unnecessarily overcomplicated. This lack of consolidation has many implications and potentially impedes medication adherence.

Understanding why this unnecessary medication overcomplexity occurs is important. In looking at the reasons that subjects gave for overcomplicating their regimens, almost all could be easily rectified by an astute physician. We also encountered multiple seniors who changed their lifestyles to accommodate taking medications as they believed their physicians wanted them to. Several seniors waited till a precise time before leaving their home so they could take their medication as required. With medications ordered for evening or nightly, patients would take a medication at 8PM and then again at 11PM, staying awake or waking up specifically to take a medication. In almost every situation, we found that the prescribed medications did not need to dictate the patients' life and could be much less disruptive. Instead of patients changing for medication regimens, medication regimens can be easily changed to help patients.

To accomplish this, health care professionals need to be aware of how patients are taking their medications. Currently, most providers ask for names, doses, and number of times a day a medication is taken (e.g. metoprolol 25mg twice daily). To help patients simplify medication regimens, health care providers should ask patients to explicitly detail the number of times medication consumption occurs in the home. In our study we used the informative question "Walk me through your day – when are you taking your medicines." This is a statement that can easily be incorporated into an outpatient visit as a means of obtaining a medication history. In learning how the patient takes their medications, a perceptive physician can pick up on patient misinformation and easily consolidate the medications through education. Another option would be to partner with pharmacists in reducing medication regimen complexity. In hospital-based studies, pharmacists reviewed medication lists and made recommendations to treating physicians to successfully reduce medication complexity on hospital discharge [32, 33]. Ultimately, consolidating the

medication regimen may make a huge impact in the patients' daily lives and improve their satisfaction.

Our study had several limitations. During the patient interviews, we did not inquire about the concept of pill burden or the amount of duress experienced by taking a large number of pills taken at one time. A patient who has ten daily meds could potentially take all pills at once, thus avoiding over-complexity. While some patients currently do this, other patients may prefer to split their consumption in the day to decrease the numbers of pills taken at one time. Future studies are needed on how much pill burden affects medication over-complexity. Other limitations of this study were that we did not ascertain the extent to which the patients actually felt inconvenienced by their regimens or how adherent they were to their regimens. During the home nurse interviews, research nurses took notes of subject responses for the reasons behind their medical complexity. A more precise measure would have been to record these conversations and code directly. Of the 763 eligible for the study, we recruited 277 patients which could be considered a relatively low recruitment rate and a limitation. The study population was elderly with potential concerns about losing independence, nursing home placement, and may have been reluctant to have strangers enter their home. Further studies are needed to understand the potential impact of low recruitment on home-based medication adherence studies.

## 4.2 Conclusion

In conclusion, unnecessary complexity of medication regimens is prominent among seniors. With the increased number of doses, this complexity has the potential to affect adherence which also would affect patient's health. Many of the reasons behind the patient-driven overcomplexity come from misunderstanding medication instructions. Health care professionals can easily rectify unnecessary overcomplexity by asking patients to walk through their day of how they take their medications. Focused patient education can then rectify the complexity. This simple conversation with patients on how they take medications could have life changing implications for many patients.

## 4.3 Practice Implications

Health care professionals should ask patients to explicitly detail the number of times medication consumption occurs in the home. In our study we used the informative question, "Walk me through your day – when are you taking your medicines." to obtain medication histories.

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## REFERENCES

1. Lindquist LA, Pollack J, Go L, Jain N, Friesema E, Baker DW. Relationship of Health Literacy to Intentional and Unintentional Non-Adherence of Hospital Discharge Medications. *Journal of General Internal Medicine*. 2012 Feb.



2. Wolf MS, Davis TC, Shrank W, et al. To err is human, patient misinterpretations of prescriptions drug dosage instructions. *Patient Educ Couns*. 2007; 67:293–300. [PubMed: 17587533]
3. Cameron KA, Ross EL, Clayman ML, Bergeron AR, Federman AD, Bailey SC, Davis TC, Wolf MS. Measuring patients' self-efficacy in understanding and using prescription medication. *Patient Education & Counseling*. 2010 Sep; 80(3):372–376. [PubMed: 20650594]
4. Davis TC, Federman AD, Bass PF, Jackson RH, Middlebrooks M, Parker RM, Wolf MS. Improving patient understanding of prescription drug label instructions. *Journal of General Internal Medicine*. 2009 Jan; 24(1):57–62. [PubMed: 18979142]
5. Wolf MS, Davis TC, Bass PF, et al. Misunderstanding prescription drug warning labels among patients with low literacy. *Am J Health Syst Pharm*. 2006; 63:1048–1055. [PubMed: 16709891]
6. Davis TC, Wolf MS, Bass PF, et al. Low literacy impairs comprehension of prescription drug warning labels. *J Gen Intern Med*. 2006; 21:847–851. [PubMed: 16881945]
7. Gandhi TKBH, Cook EF, Puopolo AL, Haas JS, Brennan TA, Bates DW. Drug Complications in Outpatients. *J Gen Intern Med*. 2000; 15:149–154. [PubMed: 10718894]
8. Ellenbecker CHFS, Verney S. Nurses' Observations and Experiences of Problems and Adverse Effects of Medication Management in Home Care. *Geriatric Nursing*. 2004; 25(3):164–170. [PubMed: 15197376]
9. Cohen, SB. Sample Design of the 1996 Medical Expenditure Panel Survey Household Component. Rockville, Md: Agency for Healthcare Research and Quality; 1997. MEPS Methodology Report no.
10. Muir AJ, Sanders LL, Wilkinson WE, Schmadler K. Reducing Medication Regimen Complexity. *J Gen Intern Med*. 2001 Feb; 16(2):77–82. [PubMed: 11251757]
11. Davis TC, Wolf MS, Bass PF 3rd, Middlebrooks M, Kennen E, Baker DW, Bennett CL, Durazo-Arvizu R, Bocchini A, Savory S, Parker RM. Low literacy impairs comprehension of prescription drug warning labels. *Journal of General Internal Medicine*. 2006 Aug; 21(8):847–851. [PubMed: 16881945]
12. Shrank WH, Agnew-Blais J, Choudhry NK, Wolf MS, Kesselheim AS, Avorn J, Shekelle P. The variability and quality of medication container labels. *Archives of Internal Medicine*. 2007 Sep 10; 167(16):1760–1765. [PubMed: 17846395]
13. Wolf MS, Shrank WH, Choudry N, et al. Variability of pharmacy interpretations of physician prescriptions. *Med Care*. 2009; 47:370–373. [PubMed: 19194338]
14. Gray SLMJ, Blough DK. Adverse drug events in elderly patients receiving home health services following hospital discharge. *Ann Pharmacother*. 1999; 33:1147–1153. [PubMed: 10573310]
15. Aspden, P.; Wolcott, J.; Bootman, L., et al. Preventing Medication Errors. Institute of Medicine. , editor. Washington DC: National Academies Press; 2006.
16. Delamater AM. Improving patient adherence. *Clin Diabetes*. 2006; 24:71–77.
17. Lindquist LA, Pollack J, Go L, Jain N, Friesema E, Baker DW. Relationship of Health Literacy to Intentional and Unintentional Non-Adherence of Hospital Discharge Medications. *Journal of General Internal Medicine*. 2012 Feb.
18. Eisen SA, Miller DK, Woodward RS, Spitznagel E, Przybeck TR. The Effect of Prescribed Daily Dose Frequency on Patient Medication Compliance. *Arch Intern Med*. 1990; 150(9):1881–1884. [PubMed: 2102668]
19. Claxton AJ, Cramer J, Pierce C. A Systematic Review of the Associations Between Dose Regimens and Medication Compliance. *Clin Ther*. 2001; 23:1296–1310. [PubMed: 11558866]
20. Llor C, Bayona C, Hernández S, Moragas A, Miravittles M. Comparison of adherence between twice- and thrice-daily regimens of oral amoxicillin/clavulanic acid. *Respirology*. 2012 May; 17(4):687–692. [PubMed: 22390206]
21. Baker DW, Gazmararian JA, Sudano J, Patterson M. The association between age and health literacy among elderly persons. *Journals of Gerontology Series B Psychological Sciences & Social Sciences*. 2000; 55(6)
22. Insel K, Morrow D, Brewer B, Figueredo A. Executive function, working memory, and medication adherence among older adults. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*. 2006; 61(2):102–107.



23. Tilvis RS, Kahonen-Vare MH, Jolkkonen J, et al. Predictors of cognitive decline and mortality of aged people over a 10-year period. *J Gerontol A Biol Sci Med Sci*. 2004; 59(3):268–274. [PubMed: 15031312]
24. Starr J, McGurn B, Whiteman M, et al. Life long changes in cognitive ability are associated with prescribed medications in old age. *Int J Geriatr Psychiatry*. 2004; 19(4):327–332. [PubMed: 15065225]
25. Davis TC, Federman AD, Bass PF 3rd, Jackson RH, Middlebrooks M, Parker RM, Wolf MS. Improving patient understanding of prescription drug label instructions. *Journal of General Internal Medicine*. 2009 Jan; 24(1):57–62. [PubMed: 18979142]
26. Gellad WF, Grenard JL, Marcum ZA. A Systematic Review of Barriers to Medication Adherence in the Elderly: Looking Beyond Cost and Regimen Complexity. *Am J Geriatr Pharm*. Feb; 2011 9(1):11–23.
27. Wolf MS, Curtis LM, Waite K, Bailey SC, Hedlund LA, Davis TC, Shrank WH, Parker RM, Wood AJ. Helping patients simplify and safely use complex prescription regimens. *Archives of Internal Medicine*. 2011 Feb 28; 171(4):300–305. [PubMed: 21357804]
28. Lindquist LA, Go L, Fleisher J, Jain N, Baker DW. Improvements in Cognition following Hospital Discharge of Community Dwelling Seniors. *Journal of General Internal Medicine*. Jul.2011
29. Confirmed with National Cholesterol Education Program (NCEP) Panelist NJ Stone. Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) final report. *Circulation*. 2002 Dec 17; 106(25):3143–3421. [PubMed: 12485966]
30. Wolf MS, Davis TC, Curtis LM, Webb JA, Bailey SC, Shrank WH, Lindquist L, Ruo B, Bocchini MV, Parker RM, Wood AJ. Effect of standardized, patient-centered label instructions to improve comprehension of prescription drug use. *Medical Care*. 2011 Jan; 49(1):96–100. [PubMed: 21150800]
31. Wolf MS, Curtis LM, Waite K, Bailey SC, Hedlund LA, Davis TC, Shrank WH, Parker RM, Wood AJ. Helping patients simplify and safely use complex prescription regimens. *Archives of Internal Medicine*. 2011 Feb 28; 171(4):300–305. [PubMed: 21357804]
32. Elliot RA, O'Callaghan C, Paul E, George J. Impact of an intervention to reduce medication regimen complexity for older hospital inpatients. *Int J Clin. Pharm*. 2013 Apr 35.(2):217–224. [PubMed: 23212732]
33. Stange D, Kriston L, von-Wolff A, Baehr M, Dartsch DC Reducing cardiovascular medication complexity in a German university hospital: effects of a structured pharmaceutical management intervention on adherence. *Journal of Managed Care Pharmacy*. 2013 Jun; 19(5):396–407. [PubMed: 23697477]

**Table 1**

## Characteristics of Study Participants (N = 200)

Mean Age	79.6 years
Female	116 (58.0%)
Race	
-White	69.4% (134)
-African American	24.4% (47)
-Asian	2.6% (5)
-Hispanic	2.6% (5)
-Other	1.0% (2)
Low Cognition *	27 (13.5%)
Functional Abilities at Home Visit	
- Uses telephone independently	198 (99.0%)
- Prepares own meals	162 (81.0%)
- Walking (alone/cane/walker)	195 (97.5%)
- Drives or uses public transportation	141 (70.5%)
- Manages own finances	176 (88.0%)
- Bathing independently	173 (86.5%)
Marital Status	
-Married or in a Partnership	75 (37.5%)
-Widowed/ Divorced	72 (36.0%)
- Single not Widowed or Divorced	53 (26.5%)
Education	
Less than High School Graduate	28 (14.0%)
High School Graduate	44 (22.0%)
Some or College Graduate	72 (36.0%)
Graduate School Participation	56 (28.0%)

\* Mini Mental Status Exam < 25 for high school educated subjects and <18 for subjects with less than high school education