Inappropriate Medication in a National Sample of US Elderly Patients Receiving Home Health Care

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BACKGROUND: With substantial morbidity and functional impairment, older patients receiving home health care are especially susceptible to the adverse effects of unsafe or ineffective medications. Home health agencies' medication review and reconciliation services, however, provide an added mechanism of medication safety that could offset this risk.

OBJECTIVE: To estimate the prevalence of potentially inappropriate medications (PIMs) among current elderly home health patients in the US.

DESIGN: Cross-sectional analysis using data from the 2007 National Home and Hospice Care Survey.

SUBJECTS: 3,124 home health patients 65 years of age or older on at least one medication.

MAIN MEASURES: Prevalence and classification of PIM use and the association between PIM use and patient and home health agency characteristics.

KEY RESULTS: In 2007, 38% (95% CI: 36–41) of elderly home health patients were taking at least one PIM. Polypharmacy was associated with an increased risk of PIM use; admission to home health care from a nursing home or other sub-acute facility (compared to admission from the community) and a payment source other than Medicare or Medicaid were associated with a decreased risk of PIM use.

CONCLUSIONS: The prevalence of PIM use in older home health patients is high despite potential mechanisms for improved safety. Policies to improve the review and reconciliation processes within home health agencies and to improve physician-home health clinician collaboration are likely needed to lower the prevalence of PIM use in older home health patients.

KEY WORDS: potentially inappropriate medication; Home health; Beers list.

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Home health care has become an increasingly important sector in caring for older Americans, serving 9.1% of Medicare fee-for-service beneficiaries in 2008.¹ Home health

patients typically suffer from multiple medical conditions and have greater functional impairment compared with the general community-dwelling population.²

Because home health patients frequently take multiple medications and potentially have multiple physician prescribers, they may be more susceptible to ineffective or unsafe medication practices. Expert consensus panels have defined potentially inappropriate medications (PIMs) as medications that generally should be avoided among patients 65 years or older either because they are ineffective or because associated adverse effects outweigh potential benefits and a safer alternative exists.^{3, 4} Recent studies examining the prevalence of PIM use in various medical settings in the US have found that at least one PIM was prescribed in 8–13% of ambulatory visits,^{5, 6} 50% of nursing home residents,⁷ and 17% of emergency department visits.⁸

PIM use among elderly home health patients in the US remains unknown. However, one might suspect that their use in this setting is lower than in others because one of the key domains of home health care is medication review and reconciliation services.⁹ Thus, home health agencies could provide an added safety mechanism and contribute to a lower PIM use among home health patients than among elderly patients in ambulatory settings.

The present study used data from the 2007 National Home and Hospice Care Survey (NHHCS), the most recent nationally representative epidemiological survey of home health patients. Based on an expert panel-generated list known as the 2002 Beers List,⁴ we assessed the prevalence of PIMs among elderly home health patients in the US. We also examined associations between PIM use and patient, home health stay, and home health agency characteristics.

METHODS

Data

The NHHCS is a survey of US home health and hospice agencies that are certified by Medicare and/or Medicaid or licensed by a state to provide home health and/or hospice services, and currently serve or recently served home health and/or hospice patients.¹⁰ Data collected through the patient health module provide a nationally representative sample of current home health patients, defined as patients who were on the rolls of the agency as of midnight of the day immediately before the agency interview. In 2007, NHHCS collected medication data of sampled patients for the first time in the survey's history.

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The 2007 NHHCS had a stratified, two-stage probability design. In the first stage, agencies were stratified by type (home health, hospice, or mixed) and geographic location, and randomly selected within strata. In the second stage, up to ten current home health patients or hospice discharges, or a combination of the two in mixed-type agencies were randomly selected within each agency. The NHHCS patient health module had an overall unweighted response rate of 66% (weighted: 55%).

Data were collected through in-person interviews with designated home health staffs familiar with the selected patients who examined patient medical records, administrative records, and medication administration records to answer questions. No patients, families, or friends were interviewed. For each current home health patient, the interviewer collected the names (brand or generic) of up to 25 medications the patient was currently taking, including all standing, routine, or as-needed medications. This information is typically based on an on-going account of medications taken by the patient and maintained as part of the home health medical records. All medications were coded in terms of their generic component(s) and therapeutic classifications using Lexicon Plus® by Cerner Multum, Inc.¹¹ Information on drug dosage, strength, route, and frequency of administration was not available.

For the purpose of this analysis, we define current home health patients at risk for PIM use as patients who were 65 years or older at the time of the interview and who had at least one medication reported by the informant and recorded by the NHHCS interviewer (n=3,124). Of all current elderly home health patients, 3.1% had no current medications and were excluded from our analysis.

Potentially Inappropriate Medication Use

We defined PIMs according to the 2002 Beers List.⁴ According to the expert panel that developed the list, PIMs are medications that should generally be avoided in patients 65 years or older regardless of drug dosage or patient medical conditions. These medications are further categorized as having potential adverse outcomes of “high severity” or “low severity.”⁴ We excluded medications that are potentially inappropriate only when taken at specific dosages or for specific durations because dosage or duration information was not available in the NHHCS. Because home health diagnoses may not represent a comprehensive list of co-morbid conditions, our estimates also did not include medications that should be avoided in older adults with certain medical conditions. Table 1 provides the medications and medication groups we considered in this analysis.

Patient, Home Health Stay, and Agency Characteristics

Patient demographic characteristics included age (65–74, 75–84, and 85+), gender, race/ethnicity (minority vs non-Hispanic white), marital status/living arrangement (married or living with partner vs otherwise), and whether the patient had a primary caregiver other than the home health agency. Home health stay characteristics included primary source of pay-

Table 1. Potentially Inappropriate Medication for Elderly Persons

Drugs by class	2002 Beers List	
	High severity	Low severity
<i>Anabolic steroids</i>		
Methyltestosterone	×	
<i>Anorexiants</i>	×	
<i>Antiadrenergics, centrally or peripherally acting</i>		
Guanethidine	×	
Methyldopa and methyldopa-hydrochlorothiazide	×	
Clonidine		×
Guanadrel	×	
Cyclandelate		×
Doxazosin		×
Isoxsuprine		×
<i>Antiarrhythmics</i>		
Amiodarone	×	
Disopyramide	×	
<i>Anticholinergic antiemetics</i>		
Trimethobenzamide	×	
<i>Anticholinergic antispasmodics</i>		
Dicyclomine	×	
Hyoscyamine	×	
Propantheline	×	
Belladonna alkaloids	×	
Clidinium-Chlordiazepoxide	×	
<i>Antihistamines</i>		
Chlorpheniramine	×	
Diphenhydramine	×	
Hydroxyzine	×	
Cyproheptadine	×	
Tripelennamine	×	
Dexchlorpheniramine	×	
<i>Barbiturates</i>	×	
<i>CNS stimulants</i>		
Amphetamines (except methylphenidate)	×	
<i>Ergot derivative</i>		
Ergot mesyloids		×
<i>Estrogens</i>		
Estrogens (oral only)		×
<i>H₂ Antagonists</i>		
Cimetidine		×
<i>Laxatives</i>		
Mineral oil	×	
<i>Long acting benzodiazepine</i>		
Chlordiazepoxide	×	
Diazepam	×	
Flurazepam	×	
Quazepam	×	
Halazepam	×	
Clorazepate	×	
<i>Loop diuretics</i>		
Ethacrynic acid		×
<i>Miscellaneous anxiolytics</i>		
Meprobamate	×	
<i>Narcotics</i>		
Meperidine	×	
Pentazocine	×	
Propoxyphene		×
<i>NSAIDs</i>		
Indomethacin	×	
Ketorolac	×	
<i>Phenothiazine antiemetics</i>		
Promethazine	×	
<i>Phenothiazine antipsychotics</i>		
Mesoridazine	×	
Thioridazine	×	
<i>Platelet aggregation inhibitors</i>		
Ticlopidine	×	
Dipyridamole (short-acting)		×

Table 1. (continued)

Drugs by class	2002 Beers List	
	High severity	Low severity
<i>Skeletal muscle relaxants</i>		
Orphenadrine	×	
Methocarbamol	×	
Carisoprodol	×	
Chlorzoxazone	×	
Metaxalone	×	
Cyclobenzaprine	×	
<i>Sulfonylureas</i>		
Chlorpropamide	×	
<i>Tricyclic antidepressants</i>		
Amitriptyline	×	
Doxepin	×	
<i>Urinary anti-infectives</i>		
Nitrofurantoin	×	

Note: Thyroid desiccated is considered potentially inappropriate according to the 2002 Beers List, but was excluded from the list because of the inability to distinguish it from synthetic (L-thyroxine) formulations

ment (Medicare; Medicaid; private insurance including long-term care insurance, or other government insurance including Tricare, VA, CHAMPVA, and workers' compensation; self-pay/no charge), setting prior to home health care [community, hospital/emergency room (ER)/rehabilitation facility, or nursing home/skilled nursing facility/other sub-acute settings], total number of current medications (≤ 7 , 8–10, 11–14, or ≥ 15), the presence of assessed pain at the most recent home health visit, and an indicator of diagnosed depression based on the occurrence of at least one of the following International Classification of Disease, 9th Revision (ICD-9-CM) codes in any of the current primary and secondary home health diagnosis fields: 296.2, 296.3, 311, and 300.4.

Home health agency characteristics included ownership status (for profit vs private not-for-profit or government), whether the agency belonged to a chain, and whether the agency provided home health care only (vs both home health and hospice care). We also included indicators of whether the agency was located in a metropolitan area (an urban core area with a population of at least 50,000), micropolitan area (an urban core area with a population of at least 10,000 but less than 50,000), or neither.

Statistical Analysis

Prevalence of PIM use among current home health patients was estimated by taking into account the complex sampling design of the NHHCS, and weighted to reflect probabilities of sample selection and non-response.

To examine associations between patient, home health stay, and agency characteristics and the probability of PIM use, we estimated a multivariate mixed effects logistic model with random effects specified at the agency level. We first included, as predictors, all patient and home health stay characteristics. We then added home health agency characteristics. All analyses were conducted using STATA version 11.0 (STATA Corp., College Station, TX). This

study was granted exempt status by the Weill Cornell Medical College Institutional Review Board.

RESULTS

Patient, Home Health Stay, and Agency Characteristics

Estimated mean characteristics pertaining to the study population are shown in Table 2. On average, elderly home health patients were taking 11 medications, with 21% taking 15 or

Table 2. Patient, Home Health Stay, and Home Health Agency Characteristics Among Current Elderly Home Health Patients with At Least One Medication, 2007

Characteristics	% of patients
Patient characteristics	
Age, years	
65–74	25
75–84	43
85+	32
Gender	
Female	68
Male	32
Race/ethnicity	
White	75
Non-white	25
Marital status	
Married or living with partner	39
Widowed, divorced/separated, or never married	61
Having a primary caregiver outside agency	
Yes	84
No	16
Home health stay characteristics	
Number of medications	
1–7	28
8–10	27
11–14	24
15+	21
Pain assessed at last home health visit	
Yes	47
No	53
Depression among current home health diagnoses	
Yes	7
No	93
Primary payer of home health stay	
Medicare (fee-for-service or managed care)	74
Medicaid	13
Private/long-term care/government insurance	11
Self-pay/no charge	2
Setting prior to home health care	
Community	49
Hospital/ER/rehab facility	44
Nursing home/SNF/other sub-acute settings	8
Agency characteristics	
Ownership	
For profit	55
Not-for-profit/government	45
Agency belongs to a chain	
Yes	27
No	73
Mixed agency (vs home health only)	
Yes	22
No	79
Geographic location	
Metropolitan	81
Micropolitan	11
Neither	8

more. Slightly fewer than half had documented pain at the most recent home health visit. The vast majority (74%) of the home health stays were paid for by Medicare, with Medicaid and private/long-term care/other government insurance paying for 13% and 11%, respectively. Almost half of all current patients were in the community prior to admission to home health care; a slightly lower proportion (44%) was discharged from a hospital, ER, or rehabilitation facility; nursing homes and other sub-acute settings accounted for 8% of all current stays in terms of admission source.

Prevalence of Potentially Inappropriate Medication

Among elderly home health patients currently on at least one medication, 38% (95% CI: 36–41) had at least one PIM, corresponding to an estimated 374,021 (95% CI: 347,569, 401,154) patients nationwide; 26% (95% CI: 23–29) had at least one PIM with potential adverse outcomes of high severity, corresponding to an estimated 252,557 (95% CI: 227,855, 278,911) patients nationwide (Table 3).

A few therapeutic classes of medications accounted for a high proportion of PIMs found in this population. Within each class, one or two medications dominated the PIM use. Leading therapeutic classes include narcotics (taken by 9% of the population and dominated by propoxyphene), antiadrenergics (7%, with clonidine accounting for 5%), antihistamines (6%, with diphenhydramine and hydroxyzine accounting for 3% and 2%, respectively), antiarrhythmics (5% and dominated by amiodarone), tricyclic antidepressants (4%, with amitriptyline accounting for 3%), and skeletal muscle relaxants (4%, with cyclobenzaprine accounting for 2%). Four of the top-ten therapeutic classes accounting for PIMs were central nervous system (CNS) agents.

Predictors of Potentially Inappropriate Medication

In the multivariate analysis, we found that the odds of a PIM increased when patients were on more medications (Table 4). Taking 8–10 medications at a time was associated with an OR of 2.23 (95% CI: 1.70–3.32) compared with 7 or fewer medications; taking 15 or more medications was associated with an OR of 6.19 (95% CI: 4.67–8.20).

Private or other government (non-Medicare or Medicaid) health insurance was associated with an OR of 0.63 (95% CI: 0.43–0.92) for PIM use relative to Medicare as the primary payer. Self-pay/no charge as the payment source was associated with an OR of 0.52 (95% CI: 0.29–0.92) compared with Medicare. Compared with patients admitted into home health care from the community, those who were admitted from a nursing home/SNF/other sub-acute setting had an OR of 0.71 (95% CI: 0.52–0.98), holding constant other covariates including number of medications. Admission from a hospital/ER/rehabilitation facility was not associated with an increase or decrease in the risk of PIM use.

In the second model where we added agency characteristics as potential predictors, none of the added variables predicted the probability of PIM in a statistically significant way, nor did results pertaining to the patient and home health stay characteristics change qualitatively.

Table 3. Prevalence of Potentially Inappropriate Medication Among Elderly Home Health Patients by Therapeutic Classes, 2002 Beers List

	Prevalence (%)	95% CI (%)	
		Lower bound	Upper bound
Potentially inappropriate medication	38	36	41
High severity	26	23	29
Low severity	18	16	20
Therapeutic categories			
Narcotics	9	8	11
Meperidine	0	0	0
Pentazocine	0	0	0
Propoxyphene	9	8	11
Antiadrenergics, centrally or peripherally acting	7	6	9
Methyldopa and methyldopa-hydrochlorothiazide	0	0	1
Clonidine	5	4	7
Doxazosin	1	1	2
Antihistamines	6	5	8
Chlorpheniramine	1	0	1
Diphenhydramine	3	2	5
Hydroxyzine	2	1	3
Cyproheptadine	0	0	1
Dexchlorpheniramine	0	0	0
Antiarrhythmics	5	3	6
Amiodarone	5	3	6
Disopyramide	0	0	0
Tricyclic antidepressants	4	3	6
Amitriptyline	3	2	4
Doxepin	1	1	2
Skeletal muscle relaxants	4	3	5
Orphenadrine	0	0	0
Methocarbamol	0	0	1
Carisoprodol	1	1	2
Chlorzoxazone	0	0	0
Metaxalone	1	0	2
Cyclobenzaprine	2	1	2
Others*	13	11	15

Note: the sum of percentages accounted for by all therapeutic classes does not equal the overall prevalence of PIM because patients may be taking multiple PIMs; PIMs on the 2002 Beers List that did not have any users in the NHHCS sample were not shown in the table; 0 indicates less than 0.1 but greater than 0.0

**Including phenothiazine antiemetics, long acting benzodiazepines, urinary anti-infectives, estrogens, platelet aggregation inhibitors, barbiturates, anticholinergic antispasmodics, NSAIDs, laxatives, H2 antagonists, anorexiant, misc anxiolytics, phenothiazines, antipsychotics, anticholinergics, antiemetics, loop diuretics, anabolic steroids, and CNS stimulants*

DISCUSSION

In this study, we found that close to 40% of the US home health patient population 65 years or older, or about 374,000 patients, were prescribed at least one medication considered potentially inappropriate. This prevalence is three times as high as that found among ambulatory visits^{5, 6} and about twice as high as that found among elderly outpatients at two large outpatient centers utilizing electronic health records.¹² Our estimated prevalence is also double the rate found in previous studies of elderly patients admitted to single home health agencies in the US^{13, 14} and of home care patients in eight European countries.¹⁵

Table 4. Adjusted Odds Ratios of PIM Associated with Patient, Home Health Stay, and Home Health Agency Characteristics

Predictors	OR	95% CI	OR	95% CI
Patient characteristics				
Age, years				
65–74	1.00	(Reference)	1.00	(Reference)
75–84	0.84	(0.67–1.05)	0.84	(0.68–1.06)
85+	0.81	(0.63–1.03)	0.81	(0.64–1.03)
Gender				
Female	1.19	(0.97–1.46)	1.19	(0.97–1.46)
Male	1.00	(Reference)	1.00	(Reference)
Race/ethnicity				
Non-white	1.05	(0.82–1.34)	1.04	(0.81–1.34)
White	1.00	(Reference)	1.00	(Reference)
Marital status				
Married or living with partner	0.88	(0.71–1.07)	0.88	(0.72–1.08)
Widowed, divorced/separated, or never married	1.00	(Reference)	1.00	(Reference)
Having a primary caregiver outside agency				
Yes	1.07	(0.83–1.38)	1.07	(0.83–1.37)
No	1.00	(Reference)	1.00	(Reference)
Home health stay characteristics				
Number of medications				
1–7	1.00	(Reference)	1.00	(Reference)
8–10	2.23	(1.70–3.32)	2.24	(1.70–2.94)
11–14	2.54	(1.94–3.32)	2.54	(1.94–3.32)
15+	6.19	(4.67–8.20)	6.20	(4.68–8.22)
Pain assessed at last home health visit				
Yes	1.11	(0.92–1.33)	1.10	(0.92–1.33)
No	1.00	(Reference)	1.00	(Reference)
Depression as a current home health diagnosis				
Yes	0.88	(0.64–1.20)	0.87	(0.64–1.20)
No	1.00	(Reference)	1.00	(Reference)
Primary payor of home health stay				
Medicare (fee-for-service or managed care)	1.00	(Reference)	1.00	(Reference)
Medicaid	0.87	(0.65–1.16)	0.87	(0.64–1.16)
Private/long-term care/other government insurance	0.63	(0.43–0.92)	0.65	(0.44–0.94)
Self-pay/no charge	0.52	(0.29–0.92)	0.53	(0.3–0.94)
Setting prior to home health care				
Community	1.00	(Reference)	1.00	(Reference)
Hospital/ER/rehab facility	1.00	(0.82–1.21)	1.01	(0.83–1.23)
Nursing home/SNF/other sub-acute settings	0.71	(0.52–0.98)	0.72	(0.52–1.00)
Agency characteristics				
Ownership				
For profit			1.09	(0.87–1.38)
Not-for-profit/government			1.00	(Reference)
Agency belongs to a chain				
Yes			1.07	(0.84–1.36)
No			1.00	(Reference)
Mixed agency (vs home health only)				
Yes			0.96	(0.77–1.20)
No			1.00	(Reference)
Geographic location				
Metropolitan			1.00	(Reference)
Micro-politan			1.07	(0.84–1.36)
Neither			1.10	(0.85–1.41)

OR = Odds ratio; CI = confidence interval; ER = emergency room; SNF = skilled nursing facility

Consistent with previous studies, a small number of medications accounted for a large and clinically significant share of PIM use. In some cases, PIMs on the Beers list may be prescribed because there are few equivalent alternatives. For example, amiodarone, prescribed to 4% of our study population, is considered a PIM, but may be appropriate in some patients because there are few clinically equivalent alternatives. However, there are safe alternatives for many other medications on the Beers list such as diphenhydramine, amitriptyline, and propoxyphene. The high prevalence of propoxyphene use in our sample is particularly worrisome because safety concerns about this drug already existed at the time these data were collected (2007), leading to its subsequent withdrawal from the US market in late 2010.

Not surprisingly, polypharmacy was a strong predictor of PIM use. Patients on multiple medications have more opportunities for a PIM and are more likely to have multiple comorbid conditions, recent hospitalizations, and multiple physicians—all reasons why PIMs may be prescribed.

The association between having a payment source other than Medicare or Medicaid and fewer PIMs is less clear. Medicare coverage is restricted to skilled home health care. Elderly patients whose home health care was covered by sources other than Medicare were likely in need of long-term, chronic care and/or assistance with Activities of Daily Living and Instrumental Activities of Daily Living by a non-skilled provider such as a home health aide. In fact, our data indicated that Medicare was associated with a greater likelihood of having received skilled nursing and therapy visits, but a lower likelihood for home health aide visits (data not shown). Thus, patients with Medicare as the primary payor may be more acutely ill than patients whose care was paid by other means, and therefore at a greater risk for PIM use.

Another interesting finding is that being admitted into home health care from a nursing home, SNF, or other sub-acute setting (8% of the population) was associated with a 30% reduction in the odds of PIM use compared with admission from the community. Protocols of medication review and reconciliation in these sub-acute settings may have contributed to the difference. In addition, clinicians in these settings may be more aware of the safety concerns of PIMs.

Several challenges unique to home health care contributed to the high prevalence of PIM use in this population. Home health patients are mostly experiencing transitions between care settings. They often have multiple prescribers who are not necessarily their regular physicians. Most home health patients receive a limited number of home visits, leaving home health providers a narrow time window to identify PIMs and communicate with physicians to resolve issues. A limited number of studies provided evidence that communication between home health clinicians and physicians is generally poor: one-quarter of the issues that prompted calls to physicians were not resolved within 24 h;¹⁶ primary care physicians and home health clinicians they collaborate with were largely dissatisfied with many aspects of communication and collaboration, and neither felt in control of home care decision making.¹⁷ Thus, high PIM use among elderly home health patients partly reflects the need for improved provider coordination during care transitions. A recent study reported on a multi-component initiative at a single agency to improve home health clinicians' communication with physicians in several clinical areas, one of which is reporting adverse effects of

medications that put patients at risk of falls.¹⁸ One tool utilized in the initiative is reference cards that help home health clinicians collect key information in preparation for the communication and provide sample scenarios and/or scripts for effective communication.

On the other hand, targeted efforts to improve the quality and safety of medication therapies in the home health setting are likely required to reduce the rate of PIM use. These efforts can take advantage of the process-based home health quality measurement and improvement initiative led by the Center for Medicare and Medicaid Services.⁹ This new initiative includes measures related to identification of medication issues and timely physician contact by home health agencies. Another important initiative, the Home Health Quality Improvement National Campaign, provides participating agencies medication management tools including a PIM list.¹⁹

Quality measures and tools for home health agencies will only be effective if physicians are properly educated in the risks of PIMs and if they have incentives and tools to collaborate with home health clinicians to address medication issues. Broader health care payment and delivery system reform may be useful. Examples of these efforts include accountable care organizations where physicians and home health agencies are collectively accountable for the care of patients and implementation of inter-operable electronic medical records that support inter-setting communication and collaboration.

Our study has several limitations. Our findings underestimate the prevalence of PIM among elderly home health patients because the NHHCS data did not allow us to identify PIMs conditional on dosage or duration, or drug-drug/drug-disease interaction. While our estimate of PIM use based on the Beers List provides a useful indicator of prescription quality, the Beers List does not include a number of medications that are commonly associated with serious adverse events (e.g., warfarin, insulin, and digoxin).²⁰ In addition, medications contraindicated by the Beers List may be appropriate and safe for a small proportion of patients. Although the 2007 NHHCS collected data on patient emergent care and hospitalization since admission to home care, we were not able to assess the extent to which PIM use had led to these adverse events. Patients surveyed in NHHCS had been in home care, and therefore “at risk” for these adverse events, for varying lengths of time. The data also did not allow us to ascertain the chronology of PIM use and occurrence of an adverse event. Given that inappropriate and unsafe medication practice goes far beyond the Beers list, it is important that medication review and management be tailored to the needs of individual patients in addition to implementation of prescription guidelines based on expert panel findings.

The use of PIM is highly prevalent in the US elderly home health population—a population at heightened risk given their clinical complexity and frailty—but one that should have an extra level of medication review. Home health clinicians are in a unique position to identify PIM use and other medication issues and to intervene by acting as intermediaries between patients and prescribing physicians. Our findings suggest that home health agencies are not fulfilling this potential. Initiatives to improve quality measures for home health care may address the problem of identifying PIMs, but there must be parallel efforts to improve communication between home health clinicians and physicians. Promising solutions include templates to assist nurses in conducting brief phone calls with physi-

cians, sharing information through information technology and health information exchanges, and shared accountability models at the institutional level, such as accountable care organizations. These mechanisms could help home health agencies, physicians, and other providers become more effective partners for patient safety.

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