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INAPPROPRIATE MEDICATION USE IN AN ELDERLY NURSING HOME POPULATION

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INAPPROPRIATE MEDICATION USE
IN AN ELDERLY NURSING HOME POPULATION

BY
JYOTSNA DHALL

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE
MASTER OF SCIENCE
IN
APPLIED PHARMACEUTICAL SCIENCES

UNIVERSITY OF RHODE ISLAND

2000

MASTER OF SCIENCE THESIS
OF
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ABSTRACT

Objective: This study was designed to study the inappropriate medication utilization in patients aged 65 years or older residing in a long term care facility; to examine patterns in the use of inappropriate medications during the stay in the facility; and to determine predictors of inappropriate medication use.

Design: Retrospective, cross-sectional study

Methods: We used the Systematic Assessment of Geriatric Drug Use via Epidemiology (SAGE) database that includes data from all Medicaid/Medicare certified nursing homes located in 5 US states. We examined data collected with the federally mandated Minimum Data Set along with the sociodemographic, clinical and treatment information during the period October 1995 to September 1996 (n = 44,562).

Measurements: Inappropriate medication was defined according to Beers' criteria. Use of inappropriate medication was determined at admission and at ninety days. We calculated incidence of discontinuation, initiation, and continuance of these medications over the ninety-day period in the nursing home. A logistic regression model provided estimates of Odds Ratio (OR) for the predictors of inappropriate use of drugs.

Results: Thirt-three percent of the residents were receiving at least one inappropriate medication on admission to the long term care facility. Of the 29,082 remaining in long term care facility ninety days after admission, 16% on an inappropriate medication at admission had the medication discontinued, while 18% of non-users at admission initiated an inappropriate agent during the 90 days, a net result of 39% using an inappropriate agent at 90 days. The number of medications taken by the

patient, race, age and level of cognitive impairment were found to be associated with the use of inappropriate medications.

Discussion: Overall use of inappropriate medication increased significantly during the first 90 days of residence in a long term care facility. Inappropriate use of long acting benzodiazepines and analgesics was of particular concern. These findings highlight the need for careful patient medication regimen assessment and medication prescribing upon long term care admission.

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This is the beginning of the end. The end of a journey at the University of Rhode Island. A journey I am glad I made because of the knowledge I gained and the people I met.

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PREFACE

This work has been prepared in accordance with the format for thesis preparation, as outlined in section 11-3 of the Graduate Manual of the University of Rhode Island.

Contained within is a body of work divided in two sections.

Included within Section I is the thesis, containing the findings of the research which comprise this thesis.

Section II is comprised of an appendix containing SAS programs

Section III contain the Minimum Data Set (MDS), a comprehensive instrument designed to assess resident health status and functional levels.

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SECTION I

Inappropriate medication use in an elderly nursing home population

ABSTRACT

Objective: This study was designed to study the inappropriate medication utilization in patients aged 65 years or older residing in a long term care facility; to examine patterns in the use of inappropriate medications during stay in the facility; and to determine predictors of inappropriate medication use.

Design: Retrospective, cross-sectional study

Methods: We used the Systematic Assessment of Geriatric Drug Use via Epidemiology (SAGE) database that includes data from all Medicaid/Medicare certified nursing homes located in 5 US states. We examined data collected with the federally mandated Minimum Data Set along with the sociodemographic, clinical and treatment information during the period October 1995 to September 1996 (n = 44,562).

Measurements: Inappropriate medication was defined according to Beers' criteria. Prescribing of inappropriate medication was determined at admission and at ninety days. We calculated incidence of discontinuation, initiation, and continuance of these medications over the ninety-day period in the nursing home. A logistic regression model provided estimates of Odds Ratio (OR) for the predictors of inappropriate prescribing.

Results: Fifty-two percent of the residents were receiving inappropriate medication on admission to the long term care facility. Of the 29,082 remaining in long term care facility ninety days after admission, 8% on an inappropriate medication at admission had the medication discontinued, while 23% of non-users at admission initiated an inappropriate agent during the 90 days, a net result of 51% using an inappropriate agent at 90 days. The number of medications taken by the patient, race, age and level

of cognitive impairment were found to be associated with the prescribing of inappropriate medications.

Discussion: Overall prescribing of inappropriate medication increased significantly during the first 90 days of residence in a long term care facility. Inappropriate prescribing of long acting benzodiazepines and analgesics was of particular concern. These findings highlight the need for careful patient medication regimen assessment and medication prescribing upon long term care admission.

INTRODUCTION

Individuals who are 65 years of age or older now constitute 11% of the total United States population. By 2030, more than 64 million people will be over age 65, constituting 21% of the population [1]. Of patients aged 85 years and older, 20% are living in long term care (LTC) facilities [2]. With the aging of the population and changes in the American family, nursing homes have taken on an increasingly prominent role in the medical care of disabled older people [3]. In 1990, approximately 1.56 million people over age 65 resided in the 15,600 long term care nursing facilities in the United States (a rate of 53.3/1000 elders) [4]. The increasing importance of long term care has been realized due to changes in the delivery of health care services.

Medicare and Medicaid were enacted in 1965. Prior to this, there were essentially no federal standards governing nursing home care. By the early 1980s, problems in the quality of nursing home care arose. Reacting to this, the Health Care Financing Administration (HCFA) prepared draft guidelines for nursing home regulation. In late 1983, Congress asked the Institute of Medicine (IOM) to conduct a two-year study and make recommendations for improving the quality of care in nursing facilities; a summary of this report was published in 1986 [5]. Finally, continuing problems of inadequate care and ineffective regulation lead the United States Congress to pass the Nursing Home Reform Amendments as part of the Omnibus Budget Reconciliation Act (OBRA) of 1987. It produced an extensive set of reforms in nursing home care. Regulations promulgated as a result of the act included new requirements on quality of care, resident assessments, care planning and the use

of neuroleptic drugs. Many reviews such as the licensure of facilities, inspection of care, ombudsman programs and government regulations of various kinds also evolved to improve the quality of nursing home care. As a result of these legislative initiatives, nursing home care in skilled and intermediate care facilities became the major publicly subsidized form of long term care for the functionally impaired elderly [5].

Elderly nursing home residents tend to utilize more medications than any other group and the utilization of drugs in this setting has come under increased scrutiny [3]. Due to social, psychological and physiological factors, the elderly utilize more medication than younger people and may suffer more adverse effects from medication use. They are often prescribed an average of four to eight medications per day [6].

One of the major problems in the elderly concerning medications is the use of inappropriate drugs. An inappropriate drug (or intervention) is considered as one, which offers greater risk than benefit taking into consideration its adverse effects. Usually, the drug (or intervention) might have an existing safer alternative or that a preferable (usually newer) medication might be available [7]. Since some of the drugs might be appropriate under patient specific conditions, inappropriate use should be referred to as 'potentially inappropriate' use. A review of literature on appropriateness of prescriptions revealed that between 7% to 51% of psychoactives, 22% to 90% of anti-infectives, and 33% to 71% of GI drugs were prescribed inappropriately to the elderly [8]. Inappropriate prescribing prevalence could vary from 7.5% in office based practice to 40% in nursing homes [9]. Many factors contribute to prescribing of inappropriate drugs in nursing homes. A study carried out by Gupta et al on Louisiana's 19,932 ICF (Intermediate Care Facility) beneficiaries revealed that the

number of physicians, number of pharmacies used and the number of drugs prescribed were the factors responsible for higher inappropriate medication use [10].

In 1991, Beers et al. developed explicit criteria that defined the use of inappropriate medications for the elderly. These criteria were developed by a consensus of internationally recognized experts in geriatric medicine for the elderly population residing in nursing facilities. They were later updated in 1997 [7, 11]. Beers high severity drugs have been included in the recent HCFA interpretive guidelines for nursing facilities effective July 1, 1999, in the category of unnecessary drugs while the low severity drugs are a part of the drug therapy review process conducted by a consultant pharmacist every month [12]. HCFA utilizes these guidelines as well as nursing facility survey procedures to guide surveyors inspecting nursing facilities in monitoring compliance with regulations. The Beers criteria have been extensively used by researchers to study the prevalence of inappropriate medication use among the elderly population [10, 13] [14, 15] [16, 17] [18, 19].

Most of these studies focussed on the percentage use but none of them had looked at the pattern of use during the stay in the nursing home. This study was designed to examine the rates of initiation, discontinuation, and continuance of inappropriate medication using the Beers criteria during the first 90 days of stay in the nursing facility for patients aged 65 years of age or older. The study also identified sociodemographic characteristics and predictors of inappropriate medication use.

METHODS

Data source

We used the Systematic Assessment of Geriatric drug use via Epidemiology (SAGE) database for the study. Briefly, SAGE is a population-based, multi-linked database that includes computerized data collected as part of the HCFA's Multistate, Nursing Home Case-mix and Quality Demonstration Project. This database includes patient information collected with the minimum data set (MDS), drug prescription data, organizational data on nursing home providers and Medicare claims data. Since 1992, nursing home staff in all Medicare and Medicaid facilities of five states (Kansas, Maine, Mississippi, New York, and South Dakota) have evaluated patients using the Resident Assessment Instrument, which includes a more than 350-item Minimum Data Set (MDS). This is a comprehensive instrument designed to assess resident health status and functional levels [20].

MDS Data - The MDS includes sociodemographic information, numerous clinical items ranging from the degree of functional dependence to cognitive functioning, and all clinical diagnoses. It also includes an extensive array of signs, symptoms, syndromes, and treatments being provided to the resident [20, 21]. In addition to the MDS data, nursing staff recorded up to 18 different medications received by each resident during the assessment. Drug information included brand and/or generic name, dosage, route, and frequency of administration [22-24]. Drugs were coded according to the National Drug Coding (NDC) system and the MediSpan® system was used to translate these NDC codes into usable therapeutic class and sub-class information [24].

The SAGE database has been described in detail elsewhere [22-24]. It has been previously documented that the SAGE database has excellent validity, and the database has proved a useful and reliable tool for pharmacoepidemiologic research [21] [25] [26].

Sample

We identified 44,562 people admitted to the 1492 nursing homes in five states (Kansas, Maine, Mississippi, New York, and South Dakota) during October 1995 and September 1996 and who were greater than 65 years of age. All the nursing homes completed a nursing home assessment for each resident within 14 days of admission, 30 days later and quarterly thereafter. For the baseline evaluation, we chose 44,562 people who had an initial assessment at admission. Of these 44,562 people, we identified 29,082 people who had a follow up assessment done at 90 days.

Outcome

The concepts of appropriateness and appropriateness criteria have often been used in geriatric practice or health services research. There are several definitions of appropriateness defined by most clinicians and health service researchers [27]. For the purpose of this study, the following definition of appropriateness within the risk benefit concept was used, "The use of a drug (or any intervention) is inappropriate when its potential risk outweighed its potential benefits".

In 1991, Beers et al operationalized the definition when he published the first list of explicit criteria identifying inappropriate medications in nursing home residents [7]. In 1997, the criteria were updated and expanded. The new criteria revisited the old criteria, included new products and incorporated new information available in the

scientific literature and also assigned a relative rating of severity to each criteria. These criteria defined medications that should generally be avoided in the elderly, doses or frequencies of administrations that should generally not be exceeded, and medications that should be avoided in older persons known to have any of the several comorbidities. Each of the criteria was also assigned a severity rating. Severity was defined conceptually as combinations of both the likelihood that an adverse outcome would occur and the clinical significance of that outcome should it occur.

For the purpose of this study, inappropriate medications for elderly patients constituted a subset of the Beers updated criteria (Table 1. Final Criteria: Independent of Diagnoses) [11]. Forty-three inappropriate medications that apply to the Beers final criteria were selected. These were categorized into therapeutic classes based on the Beers criteria and the Medispan coding. For this study, a resident was labeled as having received an inappropriate medication if they had used one or more of the drugs mentioned in the Beers criteria.

Outcome measures for this study included baseline evaluation of inappropriate medication use. This gave the percentage use of drugs at admission to the nursing facility. For the 29,082 people who had a 90-day assessment, the incidence of discontinuation and initiation of each of the inappropriate medications was calculated. Discontinuation referred to those who took the drug at baseline but discontinued the drug during their first 90 days of stay in long term care (LTC) facility. Initiation referred to those who did not take the drug at baseline but initiated the drug during first 90 days of stay in LTC facility.

Clinical measures

For the purpose of logistic modeling, two clinical measures were used. To assess the degree of cognitive impairment, the Cognitive Performance Scale (CPS) was used [28]. CPS is a well-validated scale with scores ranging from 0 (intact cognition) to 6 (severe dementia). CPS scores correlate well with the Mini-Mental State Examination (MMSE) and have been shown to be suitable for outcomes research [28] [29]. Each resident was categorized as having no or minimal cognitive impairment (CPS 0 or 1; MMSE equivalent is 24 and 23), moderate cognitive impairment (CPS 2, 3 or 4; MMSE equivalent is 17, 13 and 6), or severe cognitive impairment (CPS 5 or 6; MMSE equivalent is 3 and 2) [29] [28].

The Activities of Daily Living (ADL) scale was used to assess resident's dependency in the areas of eating, dressing, toileting, bathing, locomotion, transferring, and incontinence [30]. The ADL score ranged from mild (ADL score 0 or 1), moderate (ADL score 2 or 3), or severe (ADL score 4 or 5) dependence.

Analysis

Descriptive analyses were carried out using Statistical Analysis Software (SAS Ver 6.12). For the baseline evaluation, % inappropriate medication use was determined for the 44,562 residents who had an admission assessment. To calculate the discontinuation and initiation rates for the 43 different medications taken by the 29,082 residents during the 90-day period, cross tabulations between the usage of these medications at admission and at 90 days were designed.

Using a logistic model, we evaluated the relation between demographic and clinical variables and the use of drugs during the 90 days of stay in the nursing home.

Missing data were also modeled and it accounted for less than 1% in the model. Odds Ratio and 95% Confidence Intervals were estimated from the model.

RESULTS

Out of 44,562 nursing home residents, 22,234 were receiving potentially inappropriate medication on admission to a long term care facility. The top five frequently prescribed medications included digoxin (in doses > 0.125mg, 22.1%), iron supplements (in doses > 325 mg of ferrous sulphate, 10.3%), propoxyphene (10.1%), lorazepam (4.9%) and temazepam (2.7%). (Refer to Table1) Among the high severity medications, digoxin (in doses > 0.125mg) was most frequently prescribed. Thirty-three percent of the inappropriate medications were of high severity. Inappropriate use of antianxiety agents including the long acting benzodiazepines was noted in 9.3% of the residents. This category included lorazepam, alprazolam, oxazepam, triazolam, diazepam, chlordiazepoxide and meprobamate. Prescribed cardiovascular agents (disopyramide, digoxin, dipyridamole, methyl dopa and reserpine) deemed inappropriate was about 23.4%.

Table 2 presents the demographic and clinical characteristics of the residents evaluated after 90 days in the long term care facility. The female population was more than two times larger than the male population. About 80% of the sample under study was 75 or more years of age. Whites were a majority while the black population was about 7%. Seventy-seven percent of the residents under study were admitted from the hospital, while about 13% were admitted from the home.

A review of the clinical characteristics indicated that about 51% of the population had moderate dependency in the areas of eating, dressing, toileting,

bathing, locomotion, transferring, and incontinence, while 33% had severe dependency. A majority of the residents had either minimal or moderate level of cognitive impairment. Residents with minimal or no cognition formed about 11% of the study population.

The pattern of use of inappropriate medication during the 90 days is presented in Table 3 in the form of discontinuation and initiation. For example, there were 2701 users at admission of propoxyphene. After ninety days, 636 (23.6%) residents discontinued its use. Out of the 26,381 non-users of propoxyphene, during the 90 day period, 1345 patients were prescribed a new propoxyphene prescription.

The discontinuation rates show that out of the 43 different drugs, the inappropriate drugs that were discontinued the most included promethazine (56.2%), meperidine (54.8%) and dexchlorpheniramine (54.6%). Of the 43 different Beers drugs, propoxyphene, lorazepam, amitryptiline and combinations, digoxin (in doses > 0.125mg) and iron supplements were used most frequently at admission. But, on average, 17% of these drugs were discontinued during the first 90 days. For example, of the 6490 residents on digoxin at admission, 6218 residents were still on the drug after 90 days. Thus, very few people taking inappropriate drugs at admission tended to discontinue the drug during their initial period of stay in the nursing home.

Overall, initiation of inappropriate drugs was found to be high (about 23%). The top five drugs initiated the most were propoxyphene (5.1%), iron supplements (5%), digoxin (3.4%), lorazepam (2.8%), and hydroxyzine(1.6%). Central nervous system drugs (including anti-anxiety agents, antidepressants, and hypnotics) and

analgesics were the two therapeutic categories with overall high initiation rates of 8.8% and 5.8% respectively.

Table 4 presents the results for the logistic regression analysis of our data. Females were 1.2 times more likely than males to be prescribed an inappropriate drug after controlling for race, age, number of medications taken and clinical status (95% confidence interval [CI], 1.1-1.2). It was found that as the number of medications taken by resident increased, the likelihood of being prescribed an inappropriate medication also increased. Residents on nine or more medications were 6 times more likely than those on one to three medications to be taking an inappropriate drug after other factors were controlled (95% confidence interval [CI], 5.5-6.4). Patients admitted from hospitals were more likely to be prescribed an inappropriate medication than those admitted from a private home, nursing home or other facility.

It was also observed that patients who had severe dementia were less likely to be taking an inappropriate medication as compared to those who had no cognitive impairment (odds ratio OR, 0.7; 95% CI, 0.6-0.8). Age was also an important predictor of inappropriate medication. The likelihood of receiving an inappropriate medication increased as the age increased from 65 years to 85 years. Residents with 85 or more years of age were 1.4 times more likely to be receiving an inappropriate medication than those who were 65-74 years of age (95% confidence interval [CI], 1.3-1.5). Resident dependencies in the activities of daily living were not found to be an important predictor of the use of inappropriate medication.

Thus, the risk of receiving an inappropriate medication were higher for those people who were 85+ years of age, white, female, admitted from the hospital, having good cognitive ability and had received a higher number of medications.

DISCUSSION

Using a population-based sample of nursing home residents in five states for a one-year period, we found that prescribing of inappropriate medication had been significantly higher during the first 90 days of residence in a long term care facility than prior to admission. Inappropriate prescribing of long acting benzodiazepines, analgesics and cardiovascular agents was of particular concern. Several studies involving the elderly population have also obtained similar results [9, 10, 15]. We used data of long term care facilities in five different states: Newyork, Kansas, Maine, Mississippi, and South Dakota. Due to heterogeneity of the group, it seems appropriate to generalize the results of the study to the older population residing in nursing homes.

Many factors contribute to prescribing of inappropriate drugs in nursing homes. Infrequent physician visits and lack of formal training for health care professionals in long term care are contributing factors [10]. Low discontinuation rates of inappropriate medication show that nursing facilities need to focus on a careful patient medication regimen assessment and medication prescribing upon long term care admission. The pattern of discontinuation and initiation of inappropriate drugs suggests that a regular review of prescribed therapy is essential, allowing the unnecessary drugs to be reevaluated and potentially discontinued.

We found most of the people admitted from the hospital were receiving inappropriate medications. One reason for this might be that these residents were already on the drugs when they were admitted and drug therapy was not changed during their hospitalization. Polypharmacy has been shown in various studies to

influence patient susceptibility to adverse drug reactions [31]. Our study was consistent with this finding. The number of drugs prescribed served as a surrogate for polypharmacy. We also found that the very old population took a large number of inappropriate drugs. It may be that older residents had more illness and more severe conditions but it can also indicate that physicians tend to be less cautious in prescribing to the older persons.

Some of the limitations of our study included the possibility of an incomplete listing of drugs for residents receiving more than 18 drugs and the possibility of inaccurate reporting of drug use. For example, people with atrial fibrillation needing higher doses ($>0.125\text{mg}$) of digoxin could be reported as inappropriately prescribed although higher doses of 0.25 mg might be required to maintain a therapeutic drug concentration and rate lowering cardiac effect. Another possibility of inaccurate reporting might be that drug data were collected along with the Minimum Data Set (MDS) assessments 14 days after patient admission, after 30 day and quarterly thereafter. Therefore, information on short-term use medications may not be collected if the prescription was ordered beyond 7-15 days from the MDS administration.

The MDS data has been questioned as far as clinical measures and functional outcomes are concerned [32, 33]. However, we used clinical measures previously validated to be reliable and accurate [21, 29, 30, 34-36]. In addition to the issue of accuracy and validity, there are methodological problems inherent in the use of a cross sectional design. For example, we do not have patient data preceding the initial MDS assessment but we do know the reason for nursing home admission, and whether the

patient was previously living at home, in another nursing facility, or discharged from the hospital.

The Beers criteria have been widely used by researchers as well as regulatory accreditation groups and clinicians, as an indicator of quality prescribing in the elderly population. However, it must be realized that in a limited number of patient specific cases, some of the medications on this list may be appropriately prescribed. We used the new updated criteria for the study. Infact, this is one of the first studies using the new updated criteria. Most of the studies have used the original criteria that were developed in 1991 [3, 10, 14, 15, 17]. Some medications on the list of inappropriate drugs developed as part of the old criteria may pose a greater risk and cause more harm than others. The new criteria aided in classifying inappropriate drugs into high severity and low severity depending on the problems that might arise because of its use. Beers high severity drugs have now been included in the recent HCFA interpretive guidelines for nursing facilities effective July 1,1999. Future research into the validation of the criteria is also essential with the advent of new drugs, therapies and treatments.

Although this study was cross sectional, it should aid health care providers and policy makers in understanding some of the contributory factors for inappropriate prescribing. The SAGE (Systematic Assessment of Geriatric Drug Use via Epidemiology) database offers an excellent tool for conducting research on the nursing home population. Further studies are needed to explore the patient diagnoses and outcomes associated with inappropriate prescribing to better understand the nature of the problem. Some studies have shown that geographic variation and the type of

doctor are also important determinants of prescribing inappropriate drugs [10]. These factors were beyond the scope of our study.

The nursing home industry is often blamed for not providing optimum care to its residents. Thus, it becomes essential to provide sufficient knowledge to the health care providers about the inappropriate drugs and their adverse effects and efficient mechanisms for reviewing medication use and offering advice to reduce risk.

Table 1. The use of inappropriate medication for individuals aged 65 years and older on admission to a long term care facility during Oct 1995 to June 1996, using the Beers criteria*

Therapeutic Categories	Inappropriate medication*	High Severity Medication*	% receiving medication* at admission(n=44,562)
Analgesics	Propoxyphene	No	10.1
	Indomethacin	No	0.6
	Phenylbutazone	No	0.0
	Pentazocine	Yes	0.1
	Meperidine	Yes	0.6
Gastrointestinal agents			
Antispasmodic agents	Dicyclomine	Yes	0.2
	Hyoscyamine	Yes	0.2
	Propantheline	Yes	0.0
	Belladonna alkaloids	Yes	0.1
Antiemetics	Trimethobenzamide	No	0.3
Muscle Relaxants	Methocarbamol	No	0.2
	Carisoprodol	No	0.1
	Chlorzoxazone	No	0.1
	Metaxalone	No	0.0
	Cyclobenzaprine	No	0.3
Urinary Antispasmodics	Oxybutynin	No	1.4
Central Nervous System Drugs			
Antianxiety agents	Lorazepam†	No	0.1
	Oxazepam†	No	0
	Alprazolam†	No	0.1
	Diazepam	Yes	1.0
	Chlordiazepoxide and comb.	Yes	0.3
	Meprobamate	Yes	0.2
Antidepressants	Amitriptyline and comb.	Yes	2.5
	Doxepin	Yes	0.8
Hypnotics	Flurazepam	Yes	0.3
	Triazolam†	No	0.1
	Temazepam†	No	1.2
	Zolpidem†	No	1.0

(Contd..)

Table 1. The use of inappropriate medication for individuals aged 65 years and older on admission to a long term care facility during Oct 1995 to June 1996, using the Beers criteria*			
Therapeutic Categories	Inappropriate medication*	High Severity Medication*	% receiving medication* at admission (n=44,562)
Cardiovascular agents	Disopyramide	Yes	0.2
	Digoxin†	Yes	5.2
	Dipyridamole	No	1.1
Antihypertensive agents	Methyldopa	Yes	0.5
	Reserpine	No	0.6
Antidiabetic agent	Chlorpropamide	Yes	0.2
Antihistaminic agents	Chlorpheniramine	No	0.4
	Diphenhydramine	No	2.5
	Hydroxyzine	No	1.7
	Cyproheptadine	No	0.4
	Promethazine	No	1.0
	Triplennamine	No	0.0
	Dexchlorpheniramine	No	0.0
Hematological agents	Iron Supplements†	No	5.1
Anti Platelet Agents	Ticlopidine	Yes	0.0

*as defined by Beers [Beers, M. H. (1997). "Explicit criteria for determining potentially inappropriate medication use by the elderly. An update." Arch Intern Med 157(14): 1531-6.]

†Dose limits apply

Table 2. Demographic and clinical characteristics of residents aged 65 years and older residing in the nursing facility for 90 days during Oct 1995 to June 1996	
Characteristics	% of residents n=29082
Gender :	
Female	68.7
Male	31.2
Age :	
65-74	17.7
75-84	40.9
85 +	41.2
Race :	
American Indian/ Alaska Native	2.0
Asian/Pacific Islander	0.8
Black, not of Hispanic origin	6.8
Hispanic	1.6
White, not of Hispanic origin	84.1
Admitted from :	
Home	13.4
Nursing Home	3.8
Hospital	77.0
Other	5.6
Activities of daily living scale ‡ :	
0 – 1 (Mild)	7.5
2 – 3 (Moderate)	51.5
4 – 5 (Severe)	33.9
Cognitive Performance Scale § :	
0 – 1 (Minimal)	41.6
2 – 4 (Moderate)	46.3
4 – 6 (Severe)	11.5

*as defined by Beers [Beers, M. H. (1997). "Explicit criteria for determining potentially inappropriate medication use by the elderly. An update." Arch Intern Med 157(14): 1531-6.]

‡ Summary score for the Activities of Daily living as measured on the ADL scale

§ Cognitive Performance Scale (CPS) as measured on the Fries and Morris CPS Index

Table 3 - Incidence of Discontinuation and Initiation of inappropriate drugs during transition from ambulatory to LTC (long term care) facility during the first 90 days of stay in LTC facility for patients aged 65 years or older.					
Therapeutic Categories	Beers Drugs*	DISCONTINUATION ‡		INITIATION §	
		Users at admission(n)	% Users who discontinued	Non-Users at admission(n)	% Non users who initiated
Analgesics	Propoxyphene	2701	23.6	26381	5.1
	Indomethacin	157	39.5	28925	0.5
	Phenylbutazone	0	0	29082	0
	Pentazocine	19	31.6	29063	0
	Meperidine	104	54.8	28978	0.3
Gastrointestinal agents					
Antispasmodic agents	Dicyclomine	50	22	29032	0.1
	Hyoscyamine	58	18.9	29024	0.1
	Propantheline	12	25	29070	0
	Belladonna alkaloids	32	28.1	29050	0.1
Antiemetics	Trimethobenzamide	58	46.6	29024	0.4
Muscle Relaxants	Methocarbamol	59	35.6	29023	0.1
	Carisoprodol	25	48	29057	0.1
	Chlorzoxazone	13	38.5	29069	0
	Metaxalone	1	0	29081	0
	Cyclobenzaprine	68	36.8	29014	0.1
Urinary Antispasmodics	Oxybutynin	442	14.3	28640	0.6

(Contd...)

Table 3 - Incidence of Discontinuation and Initiation of inappropriate drugs during transition from ambulatory to LTC (long term care) facility during the first 90 days of stay in LTC facility for patients aged 65 years or older.					
Therapeutic Categories	Beers Drugs*	DISCONTINUATION ‡		INITIATION §	
		Users at admission(n)	% Users who discontinued	Non-Users at admission(n)	% Non users who initiated
Central Nervous System Drugs					
Antianxiety agents	Lorazepam	31	29	29051	0.03
	Oxazepam	2	100	29080	0.01
	Alprazolam	28	35.7	29054	0.09
	Diazepam	243	22.2	28839	0.4
	Chlordiazepoxide and comb.	73	31.5	29009	0.1
	Meprobamate	62	46.8	29020	0.2
Antidepressants	Amitriptyline and comb.	725	21.2	28357	1.4
	Doxepin	218	15.14	28864	0.5
Hypnotics	Flurazepam	46	43.5	29036	0.1
	Temazepam	307	29.9	28775	0.7
	Zolpidem	220	30.9	28862	0.7
	Triazolam	34	35.3	29048	0.1

(Contd...)

Table 3 - Incidence of Discontinuation and Initiation of inappropriate drugs during transition from ambulatory to LTC (long term care) facility during the first 90 days of stay in LTC facility for patients aged 65 years or older.

Therapeutic Categories	Beers Drugs*	DISCONTINUATION ‡		INITIATION §	
		Users at admission(n)	% Users who discontinued	Non-Users at admission(n)	% Non users who initiated
Cardiovascular agents	Disopyramide	60	13.3	29022	0
	Digoxin	1487	13.7	27595	1.4
	Dipyridamole	312	14.4	28770	0.3
Antihypertensive agents	Methyldopa	158	17.1	28924	0.1
	Reserpine	169	31.4	28913	0.2
Antidiabetic agent	Chlorpropamide	68	22.1	29014	0.1
Antihistaminic agents	Chlorpheniramine	131	51.2	28951	0.6
	Diphenhydramine	678	39.4	28404	2.3
	Hydroxyzine	492	33.54	28590	1.6
	Cyproheptadine	98	36.7	28984	0.5
	Promethazine	178	56.2	28904	0.7
	Triplennamine	1	0	29081	0
	Dexchlorpheniramine	11	54.6	29071	0
Hematological agents	Iron Supplements	1521	12	27561	3
Anti Platelet Agents	Ticlopidine	0	0	29082	0

*as defined by Beers [Beers, M. H. (1997). "Explicit criteria for determining potentially inappropriate medication use by the elderly. An update." Arch Intern Med 157(14): 1531-6.]

‡ Discontinuation - refers to those who took the drug at baseline but discontinued the drug during first 90 days of stay in LTC facility

§ Initiation - refers to those who did not take the drug at baseline but initiated the drug during first 90 days of stay in LTC facility

Table 4 - Logistic Regression Model for determining predictors of inappropriate medication prescribing, using Beers criteria* for residents aged 65 years or older after 90 days of stay in nursing home		
Predictor Variables	Crude Odds Ratio	Adjusted Odds Ratio (95% C.I.)
Age		
65 - 74 (referrent)		1.0
75 - 84	1.0	1 (0.9-1.0)
85 +	0.9	0.9 (0.9-1.0)
Race		
White (referrent)		1.0
Black	0.6	0.7 (0.6-0.8)
Other	0.7	0.7 (0.7-0.9)
Gender		
Male (referrent)		1.0
Female	1.2	1.2 (1.1-1.2)
Admitted from		
Hospital	1.3	1.2 (1.1-1.3)
Other (referrent)		1.0
No. of Total Medications Taken		
1-3 (referrent)		1.0
4-5	1.4	1.7 (1.6-1.9)
6-8	2.2	2.4 (2.2-2.6)
9 +	2.1	3.5 (3.2-3.8)
Cognitive Performance Scale		
Intact/Mild (referrent)		1.0
Moderate	0.6	0.7 (0.6-0.7)
Severe	0.5	0.6 (0.5-0.6)
Activities of daily living scale		
Mild limitations (referrent)		1.0
Moderate limitations	1.4	1.3 (1.1-1.4)
Dependent	1.1	1.2 (1.1-1.3)

*as defined by Beers [Beers, M. H. (1997). "Explicit criteria for determining potentially inappropriate medication use by the elderly. An update." Arch Intern Med 157(14): 1531-6.]

‡ Summary score for the Activities of Daily living as measured on the ADL scale

§ Cognitive Performance Scale (CPS) as measured on the Fries and Morris CPS Index

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SECTION II

APPENDIX

PROGRAM 1

PURPOSE : This program lists the drugs corresponding to the Medispan drug coding.

```
options obs=max fmtsearch=(work library std_anal.hcfafmts std_anal.mrh_fmts
std_anal.mmarfcmx);
```

```
%let alllist = dmpers dmdate nd; ;
```

```
data tmp1sd;
```

```
set sagea.sd (in=a keep=&alllist);
```

```
if '01-Jan-1996'd<=dmdate<='31-dec-1996'd;
```

```
data tmp1ny;
```

```
set sagea.ny (in=a keep=&alllist);
```

```
if '01-Jan-1996'd<=dmdate<='31-dec-1996'd;
```

```
data tmp1ms;
```

```
set sagea.ms (in=a keep=&alllist);
```

```
if '01-Jan-1996'd<=dmdate<='31-dec-1996'd;
```

```
data tmp1me;
```

```
set sagea.me(in=a keep=&alllist);
```

```
if '01-Jan-1996'd<=dmdate<='31-dec-1996'd;
```

```
data tmp1ks;
```

```
set sagea.ks(in=a keep=&alllist);
```

```
if '01-Jan-1996'd<=dmdate<='31-dec-1996'd;
```

```
data tmp1; set tmp1sd tmp1ny tmp1ms tmp1me tmp1ks;
```

```

vartmp1='  ';

* Preparation for using MEDISPAN codes;

%let mdsa = nd01mds nd02mds nd03mds nd04mds nd05mds nd06mds
          nd07mds nd08mds nd09mds nd10mds nd11mds nd12mds
          nd13mds nd14mds nd15mds nd16mds nd17mds nd18mds;

%let dsc=nd01dsc nd02dsc nd03dsc nd04dsc nd05dsc nd06dsc
        nd07dsc nd08dsc nd09dsc nd10dsc nd11dsc nd12dsc
        nd13dsc nd14dsc nd15dsc nd16dsc nd17dsc nd18dsc;

array ndmds {18} &mdsa;

array ndsc {18} &dsc;

array ndtwo {18} ndtwo01-ndtwo18;

array ndfour {18} ndfour01-ndfour18;

array ndsix {18} ndsix01-ndsix18;

array ndeig {18} ndeig01-ndeig18;

do i=1 to 18;

    ndtwo{i} = int(ndmds{i}/100000000);

    ndfour{i} = int(ndmds{i}/1000000);

    ndsix{i} = int(ndmds{i}/10000);

end;

acode=0; bcode=0; ccode=0; dcode=0;

ecode=0; fcode=0; gcode=0; hcode=0; icode=0;

jcode=0; kcode=0; lcode=0; mcode=0; ncode=0;

ocode=0; pcode=0; qcode=0;

```

```
DO i = 1 TO 18;
  desc=ndsc{i};
  if ndtwo{i} = 65 or ndtwo{i}=66 or ndtwo{i}=49 or
    ndtwo{i} = 75 or ndtwo{i}=50 or ndtwo{i}=54 or ndtwo{i}=60 or
    ndtwo{i} = 57 or ndtwo{i}=58 or ndtwo{i}=35 or ndtwo{i}=31 or
    ndtwo{i} = 32 or ndtwo{i}=36 or ndtwo{i}=27 or ndtwo{i}=41 or
    ndtwo{i} = 82 or ndtwo{i}=85 then output;
end;
PROC SORT DATA = tmp1 NODUPKEYS; BY desc;
PROC PRINT DATA = tmp1;
ID;
VAR vartmp1 desc;
RUN;
Endsas;
```

PROGRAM 2

PURPOSE : This program gives the list of inappropriate drugs, with dosage considerations according to Beers criteria.

```
options obs=max fmtsearch=(work library std_anal.hcfafmts std_anal.mrh_fmfs
std_anal.mmarfcmx);

%let alllist = dmpers dmdate nd: IDFROM MXID0 MXID1 MXDATE0 MXDATE1
IDGENDR IDRACE IDAGE NCXXCNT DX: PHADLA MDMDSKA CTBLADR
CTCTHIN PHCPS BKASSRB DMATYPE;

data tmp1sd;

set sagea.sd (in=a keep=&alllist);

if '01-Oct-1995'd<=dmdate<='31-dec-1996'd;

state="SD";

data tmp1sd; set tmp1sd;

if idage>=65;

data tmp1ny;

set sagea.ny (in=a keep=&alllist);

if '01-Oct-1995'd<=dmdate<='31-dec-1996'd;

data tmp1ny; set tmp1ny;

if idage>=65;

state="NY";

data tmp1ms;

set sagea.ms (in=a keep=&alllist);

if '01-Oct-1995'd<=dmdate<='31-dec-1996'd;
```

```

state="MS";
data tmp1ms; set tmp1ms;
if idage>=65;
data tmp1me;
set sagea.me(in=a keep=&alllist);
if '01-Oct-1995'd<=dmdate<='31-dec-1996'd;
data tmp1me; set tmp1me;
if idage>=65;
state="ME";
data tmp1ks;
set sagea.ks(in=a keep=&alllist);
if '01-Oct-1995'd<=dmdate<='31-dec-1996'd;
data tmp1ks; set tmp1ks;
if idage>=65;
state="KS";
data local.anal; set tmp1sd tmp1ny tmp1ms tmp1me tmp1ks;
*** define the drug groups;
data tmp; set local.anal;
* Preparation for using MEDISPAN codes;
%let dsc=nd01dsc nd02dsc nd03dsc nd04dsc nd05dsc nd06dsc
      nd07dsc nd08dsc nd09dsc nd10dsc nd11dsc nd12dsc
      nd13dsc nd14dsc nd15dsc nd16dsc nd17dsc nd18dsc;
%let prn=nd01prn nd02prn nd03prn nd04prn nd05prn nd06prn

```

```

nd07prm nd08prm nd09prm nd10prm nd11prm nd12prm
nd13prm nd14prm nd15prm nd16prm nd17prm nd18prm;
%let frq=nd01frq nd02frq nd03frq nd04frq nd05frq nd06frq
nd07frq nd08frq nd09frq nd10frq nd11frq nd12frq
nd13frq nd14frq nd15frq nd16frq nd17frq nd18frq;
array ndsc {18} &dsc;
array ndprm {18} &prm;
array ndfrq {18} &frq;
DO i = 1 TO 18;
    desc=substr(ndsc{i},1,35);
    prm=ndprm{i};
    frq=ndfrq{i};
    if desc^=" " then output;
end;
keep dmpers dmdate desc frq prm;
PROC SORT DATA = tmp; BY desc;
filename ina 'be_dr.txt';
data drrecode; infile ina;
input @1 drugcod 2. @3 maxdose 7.3 @10 dose 7.3 @17 unit $1. @18 desc $35.;
proc sort data=drrecode; by desc;
data LOCAL.DRUGS; merge tmp(in=in1) drrecode(in=in2); by desc;
if in1 & in2;
array drug propo indom phenyb penta meper dicyc

```

hyoscy propa bella trimet metho cariso oxybut
chlor meta cyclo flura lora oxaze alpraz
temaz zolpi tria diaz chlord mepro amitry
doxe diphen diso digo dipyr methyd rese chlopro
chlphen diphy hydro cypro prom trip dexch iron ticlo ;

do over drug;

drug=0; end;

if drugcod=01 then propo=1; if drugcod=02 then indom=1;

if drugcod=03 then phenyb=1; if drugcod=04 then penta=1;

if drugcod=05 then meper=1; if drugcod=06 then dicyc=1;

if drugcod=07 then hyoscy=1; if drugcod=08 then propa=1;

if drugcod=09 then bella=1; if drugcod=10 then trimet=1;

if drugcod=11 then metho=1; if drugcod=12 then cariso=1;

if drugcod=13 then oxybut=1; if drugcod=14 then chlor=1;

if drugcod=15 then meta=1; if drugcod=16 then cyclo=1;

if drugcod=17 then flura=1; if drugcod=18 then lora=1;

if drugcod=19 then oxaze=1; if drugcod=20 then alpraz=1;

if drugcod=21 then temaz=1; if drugcod=22 then zolpi=1;

if drugcod=23 then tria=1; if drugcod=24 then diaz=1;

if drugcod=25 then chlord=1; if drugcod=26 then mepro=1;

if drugcod=27 then amitry=1; if drugcod=28 then doxe=1;

if drugcod=29 then diphen=1; if drugcod=31 then diso=1;

if drugcod=32 then digo=1; if drugcod=33 then dipyr=1;

if drugcod=34 then methyd=1; if drugcod=35 then rese=1;
if drugcod=36 then chlopro=1; if drugcod=37 then chlphen=1;
if drugcod=38 then diphy=1; if drugcod=39 then hydro=1;
if drugcod=40 then cypro=1; if drugcod=41 then prom=1;
if drugcod=42 then trip=1; if drugcod=43 then dexch=1;
if drugcod=44 then iron=1; if drugcod=45 then ticlo=1;
newfrq=.;
if frq='1D' or frq='6W' then newfrq=1;
if frq='2D' then newfrq=2;
if frq='3D' or frq='8H' then newfrq=3;
if frq='4D' or frq='6H' then newfrq=4;
if frq='5D' then newfrq=5;
if frq='6D' or frq='4H' then newfrq=6;
if frq='QO' then newfrq=1/2;
if frq='1W' then newfrq=1/7;
if frq='2W' then newfrq=2/7;
if frq='3W' then newfrq=3/7;
if frq='4W' then newfrq=4/7;
if frq='5W' then newfrq=5/7;
if frq='1M' then newfrq=1/30;
if frq='2M' then newfrq=2/30;
if frq='1H' or frq='C ' then newfrq=24;
if frq='2H' then newfrq=12;


```

if frq='3H' then newfrq=8;
if frq='PR' and prn=99 then newfrq=.;
if frq='PR' then do;
    newfrq=prn/7; end;
daily=newfrq*dose;
if drugcod=18 and daily>=maxdose then lora=1;
if drugcod=19 and daily>=maxdose then oxaze=1;
if drugcod=20 and daily>=maxdose then alpraz=1;
if drugcod=21 and daily>=maxdose then temaz=1;
if drugcod=22 and daily>=maxdose then zolpi=1;
if drugcod=23 and daily>=maxdose then tria=1;
if drugcod=32 and daily>maxdose then digo=1;
if drugcod=44 and daily>=maxdose then iron=1;
proc freq data=local.drugs;
tables frq prn dose daily;
where drugcod=18;
proc freq data=local.drugs;
tables frq prn dose daily;
where drugcod=19;
proc freq data=local.drugs;
tables frq prn dose daily;
where drugcod=20;
proc freq data=local.drugs;

```

```

tables frq prn dose daily;
where drugcod=21;
proc freq data=local.drugs;
tables frq prn dose daily;
where drugcod=22;
proc freq data=local.drugs;
tables frq prn dose daily;
where drugcod=23;
proc freq data=local.drugs;
tables frq prn dose daily;
where drugcod=32;
proc freq data=local.drugs;
tables frq prn dose daily;
where drugcod=44;
proc freq data=local.drugs;
tables propo indom phenyb penta meper dicyc
      hyoscy propa bella trimet metho cariso oxybut
      chlor meta cyclo flura lora oxaze alpraz
      temaz zolpi tria diaz chlord mepro amitry
      doxe diphen diso digo dipyr methyd rese chlopro
      chlphen diphy hydro cypro prom trip dexch iron ticlo ;
Endsas;

```

PROGRAM 3

PURPOSE: This program tabulates the inappropriate drugs taken at baseline and at 90 days.

```
options obs=max fmtsearch=(work library std_anal.hcfafmts std_anal.mrh_fmts
std_anal.mmarfcmx);
```

```
** run crefile1.sas first;
```

```
** create a file that contains the date of the admitting assessment;
```

```
proc sort data=local.anal; by dmpers dmdate;
```

```
** define the first assessment;
```

```
data first second;
```

```
    set local.anal; by dmpers;
```

```
    if first.dmpers then output first;
```

```
    else output second;
```

```
** limit it to the first assessment in this window;
```

```
** to allow for follow-up;
```

```
data first; set first;
```

```
if '01-Oct-1995'd<=dmdate<='30-Sep-1996'd;
```

```
if dmtype=2;
```

```
if state="NY" and (ncxxcnt=. or ncxxcnt=0) then delete;
```

```
data second; set second;
```

```
keep dmpers dmdate state ncxxcnt;
```

```
data tmpfirst; set first;
```

```
frstdat=dmdate; keep dmpers frstdat dmdate;
```

```

proc sort data=tmpfirst; by dmpers;

proc sort data=second; by dmpers;

** need to define no follow-up assessment in 30days;

data fu nofu; merge tmpfirst(in=in1) second(in=in2); by dmpers;

if in1 & in2 then output fu;

if in1 & ^in2 then output nofu;

data fu; set fu;

fu30=0; ** no followup in first 30 days;

fu90=0; ** no followup in first 90 days;

ckdays=intck('days',frstdat,dmdate);

if 1<=ckdays<=30 then fu30=1;

if 1<=ckdays<=90 then fu90=1;

nofu=0; badny=0;

if state="NY" and dmdate>='01-OCT-1995'd and (ncxxcnt=. or ncxxcnt=0)

then badny=1;

proc sort data=fu; by dmpers;

proc contents data=fu;

proc means noprint data=fu; by dmpers;

var nofu fu30 fu90 badny;

output out=xfu sum=nofu fu30 fu90 badny;

proc contents data=xfu;

data nofu; set nofu; nofu=1; fu30=0; fu90=0;

```

```

data xfu; set xfu nofu;

if fu30>1 then fu30=1;

if fu90>1 then fu90=1;

if badny>1 then badny=1;

keep fu30 fu90 nofu badny dmpers;

proc freq; tables nofu fu30*badny fu90*badny;

proc sort data=xfu; by dmpers;

proc sort data=first; by dmpers;

data first; merge first(in=in1) xfu(in=in2); by dmpers; if in1;

proc freq data=first; tables nofu fu30*badny fu90*badny;

** need to attach drugs at admit to "first" dataset;

proc sort data=local.drugs; by dmpers dmdate;

data tmp; set local.drugs;

proc print data=tmp(obs=15);

id dmpers dmdate;

var propo indom phenyb penta meper dicyc hyoscy propa bella trimet metho cariso
oxybut chlor meta cyclo flura lora oxaze alpraz temaz zolpi tria diaz chlord mepro
amitry

doxe diphen diso digo dipyr methyd rese chlopro chlphen diphy hydro cypro prom trip
dexch iron ticlo ;

proc means noprint data=local.drugs; by dmpers dmdate;

```

```

var propo indom phenyb penta meper dicyc hyoscy propa bella trimet metho cariso
oxybut chlor meta cyclo flura lora oxaze alpraz temaz zolpi tria diaz chlord mepro
amitry

doxe diphen diso digo dipyr methyd rese chlopro chlphen diphy hydro cypro prom trip
dexch iron ticlo ;

output out=dr sum= var propo indom phenyb penta meper dicyc hyoscy propa bella
trimet metho cariso oxybut chlor meta cyclo flura lora oxaze alpraz temaz zolpi tria
diaz chlord mepro amitry doxe diphen diso digo dipyr methyd rese chlopro chlphen
diphy hydro cypro prom trip dexch iron ticlo ;

proc print data=dr(obs=15);

id dmpers dmdate;

var var propo indom phenyb penta meper dicyc hyoscy propa bella trimet metho
cariso oxybut chlor meta cyclo flura lora oxaze alpraz temaz zolpi tria diaz chlord
mepro amitry

doxe diphen diso digo dipyr methyd rese chlopro chlphen diphy hydro cypro prom trip
dexch iron ticlo ;

data dr; set dr;

array fix var propo indom phenyb penta meper dicyc hyoscy propa bella trimet metho
cariso oxybut chlor meta cyclo flura lora oxaze alpraz temaz zolpi tria diaz chlord
mepro amitry doxe diphen diso digo dipyr methyd rese chlopro chlphen diphy hydro
cypro prom trip dexch iron ticlo ;

do over fix; if fix>=1 then fix=1; end;

```

```
keep dmpers dmdate var propo indom phenyb penta meper dicyc hyoscy propa bella
trimet metho cariso oxybut chlor meta cyclo flura lora oxaze alpraz temaz zolpi tria
diaz chlord mepro amitry doxe diphen diso digo dipyr methyd rese chlopro chlphen
diphy hydro cypro prom trip dexch iron ticlo ;
```

```
proc sort data=dr; by dmpers dmdate;
```

```
proc sort data=first; by dmpers dmdate;
```

```
data first; merge first(in=in1) dr(in=in2); by dmpers dmdate;
```

```
if in1;
```

```
array fix var propo indom phenyb penta meper dicyc hyoscy propa bella trimet metho
cariso oxybut chlor meta cyclo flura lora oxaze alpraz temaz zolpi tria diaz chlord
mepro amitry doxe diphen diso digo dipyr methyd rese chlopro chlphen diphy hydro
cypro prom trip dexch iron ticlo ;
```

```
if in1 & ^in2 then do;
```

```
do over fix; if fix=. then fix=0; end;
```

```
end;
```

```
** need to attach drugs at 30 day to "first" dataset;
```

```
data sdr; merge tmpfirst(in=in1) dr(in=in2); by dmpers;
```

```
if in1 & in2;
```

```
ckdays=intck('days',frstdat,dmdate);
```

```
if 1<=ckdays<=30;
```

```
proc sort data=sdr; by dmpers;
```

```
proc means noprint data=sdr; by dmpers;
```

```
var var propo indom phenyb penta meper dicyc hyoscy propa bella trimet metho
cariso oxybut chlor meta cyclo flura lora oxaze alpraz temaz zolpi tria diaz chlord
mepro amitry
doxe diphen diso digo dipyr methyd rese chlopro chlphen diphy hydro cypro prom trip
dexch iron ticlo ;
```

```
output out=edr sum= propo3 indom3 phenyb3 penta3 meper3 dicyc3
```

```
hyoscy3 propa3 bella3 trimet3 metho3 cariso3 oxybut3
```

```
chlor3 meta3 cyclo3 flura3 lora3 oxaze3 alpraz3
```

```
temaz3 zolpi3 tria3 diaz3 chlord3 mepro3 amitry3
```

```
doxe3 diphen3 diso3 digo3 dipyr3 methyd3 rese3 chlopro3
```

```
chlphen3 diphy3 hydro3 cypro3 prom3 trip3 dexch3 iron3 ticlo3 ;
```

```
proc print data=edr(obs=15);
```

```
data edr; set edr;
```

```
array drugd propo3 indom3 phenyb3 penta3 meper3 dicyc3
```

```
hyoscy3 propa3 bella3 trimet3 metho3 cariso3 oxybut3
```

```
chlor3 meta3 cyclo3 flura3 lora3 oxaze3 alpraz3
```

```
temaz3 zolpi3 tria3 diaz3 chlord3 mepro3 amitry3
```

```
doxe3 diphen3 diso3 digo3 dipyr3 methyd3 rese3 chlopro3
```

```
chlphen3 diphy3 hydro3 cypro3 prom3 trip3 dexch3 iron3 ticlo3 ;
```

```
do over drugd; if drugd>=1 then drugd=1; end;
```

```
keep dmpers propo3 indom3 phenyb3 penta3 meper3 dicyc3
```

```
hyoscy3 propa3 bella3 trimet3 metho3 cariso3 oxybut3
```

```
chlor3 meta3 cyclo3 flura3 lora3 oxaze3 alpraz3
```



```

    temaz3 zolpi3 tria3 diaz3 chlord3 mepro3 amitry3
    doxe3 diphen3 diso3 digo3 dipyr3 methyd3 rese3 chlopro3
    chlphen3 diphy3 hydro3 cypro3 prom3 trip3 dexch3 iron3 ticlo3 ;

proc sort data=edr; by dmpers;
proc sort data=first; by dmpers;

data first; merge first(in=in1) edr(in=in2); by dmpers; if in1;

array drugd propo3 indom3 phenyb3 penta3 meper3 dicyc3
    hyoscy3 propa3 bella3 trimet3 metho3 cariso3 oxybut3
    chlor3 meta3 cyclo3 flura3 lora3 oxaze3 alpraz3
    temaz3 zolpi3 tria3 diaz3 chlord3 mepro3 amitry3
    doxe3 diphen3 diso3 digo3 dipyr3 methyd3 rese3 chlopro3
    chlphen3 diphy3 hydro3 cypro3 prom3 trip3 dexch3 iron3 ticlo3 ;

if in1 & ^in2 & fu30=1 then do;
    do over drugd; if drugd=. then drugd=0; end;
end;

** do it again for 90 days;

proc sort data=dr; by dmpers;

data sdr; merge tmpfirst(in=in1) dr(in=in2); by dmpers;

if in1 & in2;

ckdays=intck('days',frstdat,dmdate);

if 1<=ckdays<=90;

proc sort data=sdr; by dmpers;

proc means noprint data=sdr; by dmpers;

```

```

var propo indom phenyb penta meper dicyc
    hyoscy propa bella trimet metho cariso oxybut
    chlor meta cyclo flura lora oxaze alpraz
    temaz zolpi tria diaz chlord mepro amitry
    doxe diphen diso digo dipyr methyd rese chlopro
    chlphen diphy hydro cypro prom trip dexch iron ticlo ;
output out=mdr sum=propo9 indom9 phenyb9 penta9 meper9 dicyc9
    hyoscy9 propa9 bella9 trimet9 metho9 cariso9 oxybut9
    chlor9 meta9 cyclo9 flura9 lora9 oxaze9 alpraz9
    temaz9 zolpi9 tria9 diaz9 chlord9 mepro9 amitry9
    doxe9 diphen9 diso9 digo9 dipyr9 methyd9 rese9 chlopro9
    chlphen9 diphy9 hydro9 cypro9 prom9 trip9 dexch9 iron9 ticlo9 ;
data mdr; set mdr;
array drugd propo9 indom9 phenyb9 penta9 meper9 dicyc9
    hyoscy9 propa9 bella9 trimet9 metho9 cariso9 oxybut9
    chlor9 meta9 cyclo9 flura9 lora9 oxaze9 alpraz9
    temaz9 zolpi9 tria9 diaz9 chlord9 mepro9 amitry9
    doxe9 diphen9 diso9 digo9 dipyr9 methyd9 rese9 chlopro9
    chlphen9 diphy9 hydro9 cypro9 prom9 trip9 dexch9 iron9 ticlo9 ;
do over drugd; if drugd>=1 then drugd=1; end;
keep dmpers propo9 indom9 phenyb9 penta9 meper9 dicyc9
    hyoscy9 propa9 bella9 trimet9 metho9 cariso9 oxybut9
    chlor9 meta9 cyclo9 flura9 lora9 oxaze9 alpraz9

```

```

    temaz9 zolpi9 tria9 diaz9 chlord9 mepro9 amitry9
    doxe9 diphen9 diso9 digo9 dipyr9 methyd9 rese9 chlopro9
    chlphen9 diphy9 hydro9 cypro9 prom9 trip9 dexch9 iron9 ticlo9 ;

proc sort data=mdr; by dmpers;
proc sort data=first; by dmpers;
data local.sample; merge first(in=in1) mdr(in=in2); by dmpers;
if in1;
array drugd propo9 indom9 phenyb9 penta9 meper9 dicyc9
    hyoscy9 propa9 bella9 trimet9 metho9 cariso9 oxybut9
    chlor9 meta9 cyclo9 flura9 lora9 oxaze9 alpraz9
    temaz9 zolpi9 tria9 diaz9 chlord9 mepro9 amitry9
    doxe9 diphen9 diso9 digo9 dipyr9 methyd9 rese9 chlopro9
    chlphen9 diphy9 hydro9 cypro9 prom9 trip9 dexch9 iron9 ticlo9 ;
if in1 & ^in2 & fu90=1 then do;
do over drugd; if drugd=. then drugd=0; end;
end;
** fix for NEW YORK;
do over drugd; if badny=1 then drugd=.; end;
** new variable for anybeers;
anybeer9=0;
do over drugd; if drugd>=1 then anybeer9=1; end;
if badny=1 or nofu=1 or fu90=0 then anybeer9=.;
array druge propo3 indom3 phenyb3 penta3 meper3 dicyc3

```

hyoscy3 propa3 bella3 trimet3 metho3 cariso3 oxybut3
chlor3 meta3 cyclo3 flura3 lora3 oxaze3 alpraz3
temaz3 zolpi3 tria3 diaz3 chlord3 mepro3 amitry3
doxe3 diphen3 diso3 digo3 dipyr3 methyd3 rese3 chlopro3
chlphen3 diphy3 hydro3 cypro3 prom3 trip3 dexch3 iron3 ticlo3 ;

** fix for NEW YORK;

do over druge; if badny=1 then druge=.; end;

*** new variable for anybeers;

anybeer3=0;

do over druge; if druge>=1 then anybeer3=1; end;

if badny=1 or nofu=1 or fu30=0 then anybeer3=.;

anybeer=0;

array drugf propo indom phenyb penta meper dicyc

hyoscy propa bella trimet metho cariso oxybut

chlor meta cyclo flura lora oxaze alpraz

temaz zolpi tria diaz chlord mepro amitry

doxe diphen diso digo dipyr methyd rese chlopro

chlphen diphy hydro cypro prom trip dexch iron ticlo ;

** fix for NEW YORK;

** new variable for anybeers;

anybeer=0;

do over drugf; if drugf>=1 then anybeer=1; end;

```

do over drugf;
if state="NY" and dmdate>='01-OCT-1995'd and (ncxxcnt=. or ncxxcnt=0)
  then drugf=.;
end;
proc contents data=local.sample;
proc freq data=local.sample;
tables nofu fu30 fu90 propo indom phenyb penta meper dicyc
  hyoscy propa bella trimet metho cariso oxybut
  chlor meta cyclo flura lora oxaze alpraz
  temaz zolpi tria diaz chlord mepro amitry
  doxe diphen diso digo dipyr methyd rese chlopro
  chlphen diphy hydro cypro prom trip dexch iron ticlo
  propo3 indom3 phenyb3 penta3 meper3 dicyc3
  hyoscy3 propa3 bella3 trimet3 metho3 cariso3 oxybut3
  chlor3 meta3 cyclo3 flura3 lora3 oxaze3 alpraz3
  temaz3 zolpi3 tria3 diaz3 chlord3 mepro3 amitry3
  doxe3 diphen3 diso3 digo3 dipyr3 methyd3 rese3 chlopro3
  chlphen3 diphy3 hydro3 cypro3 prom3 trip3 dexch3 iron3 ticlo3
  propo9 indom9 phenyb9 penta9 meper9 dicyc9
  hyoscy9 propa9 bella9 trimet9 metho9 cariso9 oxybut9
  chlor9 meta9 cyclo9 flura9 lora9 oxaze9 alpraz9
  temaz9 zolpi9 tria9 diaz9 chlord9 mepro9 amitry9
  doxe9 diphen9 diso9 digo9 dipyr9 methyd9 rese9 chlopro9

```

chlphen9 diphy9 hydro9 cypro9 prom9 trip9 dexch9 iron9 ticlo9
anybeer anybeer3 anybeer9;

** check bias;

proc freq data=local.sample;

tables (propo indom phenyb penta meper dicyc

hyoscy propa bella trimet metho cariso oxybut

chlor meta cyclo flura lora oxaze alpraz

temaz zolpi tria diaz chlord mepro amitry

doxe diphen diso digo dipyr methyd rese chlopro

chlphen diphy hydro cypro prom trip dexch iron ticlo)*fu30;

proc freq data=local.sample;

tables propo*propo3 indom*indom3 phenyb*phenyb3 penta*penta3

meper*meper3 dicyc*dicyc3

hyoscy*hyoscy3 propa*propa3 bella*bella3 trimet*trimet3

metho*metho3 cariso*cariso3 oxybut*oxybut3

chlor*chlor3 meta*meta3 cyclo*cyclo3 flura*flura3

lora*lora3 oxaze*oxaze3 alpraz*alpraz3

temaz*temaz3 zolpi*zolpi3 tria*tria3 diaz*diaz3 chlord*chlord3

mepro*mepro3 amitry*amitry3

doxe*doxe3 diphen*diphen3 diso*diso3 digo*digo3

dipyr*dipyr3 methyd*methyd3 rese*rese3 chlopro*chlopro3

chlphen*chlphen3 diphy*diphy3 hydro*hydro3

cypro*cypro3 prom*prom3 trip*trip3 dexch*dexch3 iron*iron3

ticlo*ticlo3 anybeer*anybeer3
propo*propo9 indom*indom9 phenyb*phenyb9 penta*penta9
meper*meper9 dicyc*dicyc9
hyoscy*hyoscy9 propa*propa9 bella*bella9 trimet*trimet9
metho*metho9 cariso*cariso9 oxybut*oxybut9
chlor*chlor9 meta*meta9 cyclo*cyclo9 flura*flura9
lora*lora9 oxaze*oxaze9 alpraz*alpraz9
temaz*temaz9 zolpi*zolpi9 tria*tria9 diaz*diaz9 chlord*chlord9
mepro*mepro9 amitry*amitry9
doxe*doxe9 diphen*diphen9 diso*diso9 digo*digo9
dipyr*dipyr9 methyd*methyd9 rese*rese9 chlopro*chlopro9
chlphen*chlphen9 diphy*diphy9 hydro*hydro9
cypro*cypro9 prom*prom9 trip*trip9 dexch*dexch9 iron*iron9
ticlo*ticlo9 anybeer*anybeer9/ missprint;

Endsas;

PROGRAM 4

PURPOSE: This program creates variables for sociodemographic characteristics and tabulates them.

```
options obs=max fmtsearch=(work library std_anal.hcfafmts std_anal.mrh_fmfs
std_anal.mmarfcmx);
```

```
** run crefile1.sas first;
```

```
** create a file that contains the date of the admitting assessment;
```

```
data new; set local.sample;
```

```
if anybeer9=. then delete;
```

```
numinapp=0;
```

```
array summit propo9 indom9 phenyb9 penta9 meper9 dicyc9
```

```
hyoscy9 propa9 bella9 trimet9 metho9 cariso9 oxybut9
```

```
chlor9 meta9 cyclo9 flura9 lora9 oxaze9 alpraz9
```

```
temaz9 zolpi9 tria9 diaz9 chlord9 mepro9 amitry9
```

```
doxe9 diphen9 diso9 digo9 dipyr9 methyd9 rese9 chlopro9
```

```
chlphen9 diphy9 hydro9 cypro9 prom9 trip9 dexch9 iron9 ticlo9 ;
```

```
do over summit;
```

```
numinapp=summit+numinapp;
```

```
end;
```

```
highsev9=0;
```

```
array high penta9 meper9 dicyc9 hyoscy9 propa9 bella9 flura9 diaz9 chlord9 mepro9
```

```
amitry9 doxe9 diso9 digo9 methyd9 chlopro9 ticlo9 ;
```

```
do over high;
```



```

if high>=1 then highsev9=1; end;

** prepare data for models;

female=0; misssex=0;

if idgendr=2 then female=1;

if idgendr=. then misssex=1;

agecat=.;

if .<idage<=64 then agecat=0;

if 65<=idage<=74 then agecat=1;

if 75<=idage<=84 then agecat=2;

if idage>=85 then agecat=3;

age7584=0; age85=0;

if 75<=idage<=84 then age7584=1;

if idage>=85 then age85=1;

black=0; white=0; othrace=0; missrace=0;

if idrace=5 then white=1;

if idrace=3 then black=1;

if idrace=1 or idrace=2 or idrace=4 then othrace=1;

if idrace=. then missrace=1;

**recoding cognitive function;

    if 0<=phcps<=1 then cogfncat = 1;

    if 2<=phcps<=4 then cogfncat = 2;

    if 5<=phcps<=6 then cogfncat = 3;

```

```

*recoding physical function;
    if 0<=phadla<=1 then phfuncat = 1;
    if 2<=phadla<=3 then phfuncat = 2;
    if 4<=phadla<=5 then phfuncat = 3;
cps24=0; cps56=0; misscps=0;
if cogfncat=2 then cps24=1;
if cogfncat=3 then cps56=1;
if phcps=. then misscps=1;
    *recoding physical function;
adl23=0; adl45=0; missadl=0;
if phfuncat=2 then adl23=1;
if phfuncat=3 then adl45=1;
if phadla=. then missadl=1;
home=0; hosp=0; oth=0; missfrom=0;
if idfrom=1 then home=1;
if idfrom=3 then hosp=1;
if idfrom=2 or idfrom=4 then oth=1;
if idfrom=. then missfrom=1;
proc freq data=new;
tables (idgendr agecat idrace numinapp idfrom phfuncat cogfncat)*
    (anybeer9 highsev9) / chisq;
Endsas;

```

SECTION III

Minimum Data Set (MDS)

MINIMUM DATA SET FOR NURSING FACILITY RESIDENT ASSESSMENT AND CARE SCREENING (MDS)
BACKGROUND INFORMATION AT ADMISSION

I. IDENTIFICATION INFORMATION

1. RESIDENT NAME			
2. DATE OF CURRENT ADMISSION	Month	Day	Year
3. MEDICARE No. (SOC. SEC. or Comparable No. if no Medicare No.)			
4. FACILITY PROVIDER NO.			
5. GENDER	1. Male	2. Female	
6. RACE/ETHNICITY	1. American Indian/Alaskan Native 2. Asian/Pacific Islander 3. Black, not of Hispanic origin 4. Hispanic 5. White, not of Hispanic origin		
7. BIRTHDATE	Month	Day	Year
8. LIFETIME OCCUPATION			
9. RESIDENTIAL HISTORY PAST 5 YEARS	(Check all settings resident lived in during prior 5 years) Prior stay at this nursing facility Other nursing facility/residential facility MR/psychiatric setting MR/DD setting NONE OF ABOVE		
10. MENTAL HEALTH HISTORY	Does resident's RECORD indicate any history of mental retardation, mental illness, or any other mental health problem? 0. No 1. Yes		
11. CONDITIONS RELATED TO MR/DD STATUS	Check all conditions that are related to MR/DD Status, that were manifested before age 22, and are likely to continue indefinitely. Not Applicable — no MR/DD MR/DD with Organic Condition Cerebral palsy Down's syndrome Autism Epilepsy Other organic condition related to MR/DD MR/DD with no organic condition Unknown		
12. MARITAL STATUS	1. Never Married 3. Widowed 5. Divorced 2. Married 4. Separated		
13. ADMITTED FROM	1. Private home or apt. 3. Acute care hospital 2. Nursing facility 4. Other		
14. LIVED ALONE	0. No 1. Yes 2. In other facility		
15. PRIMARY LANGUAGE	Resident's primary language is a language other than English. 0. No 1. Yes		
16. ADMISSION INFORMATION AMENDED	(Check all that apply) Accurate information unavailable earlier Observation revealed additional information Resident unstable at admission		

II. BACKGROUND INFORMATION AT RETURN/READMISSION

1. DATE OF CURRENT READMISSION	Month	Day	Year
2. MARITAL STATUS	1. Never Married 3. Widowed 5. Divorced 2. Married 4. Separated		
3. ADMITTED FROM	1. Private home or apt. 3. Acute care hospital 2. Nursing facility 4. Other		
4. LIVED ALONE	0. No 1. Yes 2. In other facility		
5. ADMISSION INFORMATION AMENDED	(Check all that apply) Accurate information unavailable earlier Observation revealed additional information Resident unstable at admission		

III. CUSTOMARY ROUTINE (ONLY AT FIRST ADMISSION)

1. CUSTOMARY ROUTINE (Year prior to first admission to a nursing home)	(Check all that apply. If UNKNOWN, check last box only) CYCLE OF DAILY EVENTS Stays up late at night (e.g., after 9 pm) a. Naps regularly during day (at least 1 hour) b. Goes out 1+ days a week c. Stays busy with hobbies, reading, or fixed daily routine d. Spends most time alone or watching TV e. Moves independently indoors with appliances, if used f. NONE OF ABOVE g. EATING PATTERNS Distinct food preferences h. Eats between meals all or most days i. Use of alcoholic beverage(s) at least weekly j. NONE OF ABOVE k. ADL PATTERNS In bed/clothes much of day l. Wakens to toilet all or most nights m. Has irregular bowel movement pattern n. Prefers showers for bathing o. NONE OF ABOVE p. INVOLVEMENT PATTERNS Daily contact with relatives/close friends q. Usually attends church, temple, synagogue (etc.) r. Finds strength in faith s. Daily animal companion/presence t. Involved in group activities u. NONE OF ABOVE v. UNKNOWN—Resident/family unable to provide information w.
--	---

END

Signature of RN Assessment Coordinator: _____
 Signatures of Others Who Completed Part of the Assessment: _____

APPENDIX

MINIMUM DATA SET FOR NURSING FACILITY RESIDENT ASSESSMENT AND CARE SCREENING (MDS)
(Status in last 7 days, unless otherwise indicated)

Assessment Date: <input type="text"/> / <input type="text"/> / <input type="text"/> Signature of RN Assessment Coordinator: _____		4. COGNITIVE SKILLS FOR DAILY DECISION-MAKING Made decisions regarding tasks of daily life (Code response) 0. Independent—decisions consistent/reasonable 1. Modified independence—some difficulty in new situations only 2. Moderately impaired—decisions poor; cues/supervision required 3. Severely impaired—necessitated made decisions
SECTION A. IDENTIFICATION AND BACKGROUND INFORMATION		5. INDICATORS OF DELIRIUM — PERIODIC DISORDERED THINKING/AWARENESS (Check where condition over last 7 days appears different from usual functioning) Less alert, easily distracted Changing awareness of environment Episodes of incoherent speech Periods of motor restlessness or lethargy NONE OF ABOVE
1. RESIDENT NAME _____	2. SOCIAL SECURITY NO. _____	6. CHANGE IN COGNITIVE STATUS Change in resident's cognitive status, skills, or abilities—in last 90 days 0. No change 1. Improved 2. Deteriorated
3. MEDICAD NO. (if applicable) _____	4. MEDICAL RECORD NO. _____	SECTION C. COMMUNICATION/HEARING PATTERNS
5. REASON FOR ASSESSMENT 1. Initial admission assess. 4. Annual assess. 2. Hosp/Medicare reassess. 5. Significant change in status 3. Readmission assessment	6. OPPORTUNITY TO PARTICIPATE IN ASSESSMENT (Code the correct response) a. Resident 1. Given opportunity 2. Not given opportunity b. Family 1. Given opportunity 2. Not given opportunity 3. No family	1. HEARING (With hearing appliances, if used) 0. Hears adequately—normal talk, TV, phone 1. Minimal difficulty when not in quiet listening conditions 2. Hears in special situation only—speaker has to speak loudly and speak distinctly 3. Highly impaired/absence of useful hearing
7. CURRENT PAYMENT SOURCE(S) FOR N.H. STAY (Billing Office to indicate; check all that apply) Medicaid a. VA d. Medicare b. Self pay/Private Insur. e. CHAMPUS c. Other f.	8. RESPONSIBILITY/LEGAL GUARDIAN (Check all that apply) Legal guardian a. Family member responsible e. Other legal oversight b. Resident responsible d. Durable power attorney/health care proxy c.	2. COMMUNICATION DEVICES/TECHNIQUES (Check all that apply during last 7 days) Hearing aid, present and used a. Hearing aid, present and not used b. Other receptive comm. technique used (e.g., lip read) c. NONE OF ABOVE d.
9. ADVANCED DIRECTIVES (For those items with supporting documentation in the medical record, check all that apply) Living will a. Feeding restrictions j. Do not resuscitate b. Medication restrictions k. Do not hospitalize c. Other treatment restrictions l. Organ donation d. NONE OF ABOVE Autopsy request e.	10. DISCHARGE PLANNED WITHIN 3 MOS. (Does not include discharge due to death; code correct response) 0. No 1. Yes 2. Unknown/uncertain	3. MODES OF EXPRESSION (Check all used by resident to make needs known) Speech a. Signs/postures/sounds c. Writing messages to express or clarify needs b. Communication board d. Other e. NONE OF ABOVE f.
SECTION B. COGNITIVE PATTERNS	1. COMATOSE (No discernible consciousness/persistent vegetative state) 0. No 1. Yes (Skip to SECTION E)	4. MAKING SELF UNDERSTOOD (Express information content—however able) 0. Understood 2. Sometimes understood 1. Usually understood 3. Rarely/never understood
2. MEMORY (Recall of what was learned or known; code correct response) a. Short-term memory OK—seems/appears to recall after 5 minutes b. Long-term memory OK—seems/appears to recall long past c. Memory OK 1. Memory problem d. Memory OK 1. Memory problem	3. MEMORY/RECALL ABILITY (Check all that resident normally able to recall during last 7 days) Current season a. That he/she is in a nursing facility c. Location of own room b. NONE OF ABOVE are	5. ABILITY TO UNDERSTAND OTHERS (Understanding verbal information content—however able) 0. Understands 2. Sometimes understands 1. Usually understands 3. Rarely/never understands
1. VISION (Ability to see in adequate light and with glasses if used) 0. Adequate—sees fine detail, including regular print in newspapers/books 1. Impaired—sees large print, but not regular print in newspapers/books 2. Highly impaired—limited vision, not able to see newspaper headlines, appears to follow objects with eyes 3. Severely impaired—no vision—e.g., may appear to see light, color, or shapes	SECTION D. VISION PATTERNS	6. CHANGE IN COMMUNICATION/HEARING Resident's ability to express, understand or hear information has changed over last 90 days 0. No change 1. Improved 2. Deteriorated
2. VISUAL LIMITATIONS/DIFFICULTIES (Check all that apply for last 7 days) Side vision problems—decreased peripheral vision; e.g., leaves food on one side of tray, difficulty traveling, bumps into people and objects, misjudges placement of chair when seating self Experiences any of following: sees halos or rings around lights, sees flashes of light; sees "curtains" over eyes NONE OF ABOVE	3. VISUAL APPLIANCES Glasses; contact lenses; lens implant 0. No 1. Yes	

SECTION E. PHYSICAL FUNCTIONING AND STRUCTURAL PROBLEMS

1. ADL SELF-PERFORMANCE
(Code for resident's PERFORMANCE during last 7 days—Not including setup)
0. INDEPENDENT—No help or oversight—OR—Help/oversight provided only 1 or 2 times during last 7 days.
1. SUPERVISION—Oversight help only; provided 3+ times during last 7 days—OR—Additional assistance provided only 1 or 2 times during last 7 days.
2. LIMITED ASSISTANCE—Resident highly involved in process, received physical help in guided maneuvering of limbs, or other nonweight bearing assistance 3+ times—OR—More help provided only 1 or 2 times during last 7 days.
3. EXTENSIVE ASSISTANCE—While resident performed part of activity, over last 7-day period, help of following type(s) provided 3 or more times:
— Weight-bearing support
— Full staff performance during part (but not all) of last 7 days.
4. TOTAL DEPENDENCE—Full staff performance of activity during entire 7 days.

2. ADL SUPPORT PROVIDED—(Code for MOST SUPPORT PROVIDED; code regardless of resident's self-performance classification)

0. No setup or physical help from staff	1	2
1. Setup help only		
2. One-person physical assist		
3. Two+ persons physical assist		

3. BED MOBILITY How resident moves to and from lying position, turns side to side, and actions body while in bed

4. TRANSFER How resident moves between surfaces—from: bed, chair, wheelchair, standing position (EXCLUDE toilet room bathroom)

5. LOCOMOTION How resident moves between locations in his/her room and adjacent corridor on same floor. If in wheelchair, self-sufficiency once in chair

6. DRESSING How resident puts on, fastens, and takes off all items of street clothing, including donning/removing prostheses

7. EATING How resident eats and drinks (regardless of diet)

8. TOILET USE How resident uses the toilet room for commode, bedpan, urinal; transfers on/off toilet, cleanses, changes pad, manages catheter or catheter, adjusts clothes

9. PERSONAL HYGIENE How resident maintains personal hygiene, including combing hair, brushing teeth, shaving, applying makeup, washing, crying face, hands, and perineum (EXCLUDE baths and showers)

10. BATHING How resident takes full-body bath, sponge bath, and transfers in/out of shower (EXCLUDE washing of back and hair and code for most dependent. Bathing Self-Performance codes appear below.)

0. Independent—No help provided	
1. Supervision—Oversight help only	
2. Physical help—mass to transfer only	
3. Physical help in part of bathing activity	
4. Total dependence	

11. BODY CONTROL PROBLEMS (Check all that apply during last 7 days)

Balance—partial or total loss of ability to balance self while standing	a	Hand-tact of extremity (e.g., problem using toothbrush or adjusting hearing aid)	
Stiffness all or most of the time	b	Lag—partial or total loss of voluntary movement	
Contracture to arms, legs, shoulders, or neck	c	Lag—unsteady gait	
Hemiplegia/paraplegia	d	Trunk—partial or total loss of ability to position, balance, or turn body	
Quadruplegia	e		
Arm—partial or total voluntary movement	f		
		NONE OF ABOVE	

12. MOBILITY APPLIANCES/DEVICES (Check all that apply during last 7 days)

Cane/walker	a	Other person wheeled	
Brace/prosthesis	b	Lifted (manually/mechanically)	
Wheeled self	c	NONE OF ABOVE	

6. TASK SEGMENTATION Resident's memory or mood problem requires or all of ADL activities be broken into a series of tasks so that resident can perform them.

0. No 1. Yes

7. ADL FUNCTIONAL REHAB. POTENTIAL (Check all that apply during last 7 days)
Resident believes he/she capable of increased independence in at least some ADLs
Direct care staff believe resident capable of increased independence in at least some ADLs
Resident able to perform task/activity but is very slow
Major difference in ADL Self-Performance of ADLs in mornings and evenings (at least a one category change in Self-Performance or Support in any ADL)
NONE OF ABOVE

8. CHANGE IN ADL FUNCTION Change in ADL function in last 90 days

0. No change 1. Improved 2. Deteriorated

SECTION F. CONTINENCE IN LAST 14 DAYS

1. CONTINENCE SELF-CONTROL CATEGORIES (Code for resident performance over all shifts)

0. CONTINENT—Complete control

1. USUALLY CONTINENT—BLADDER, incontinent episodes once a week or less; BOWEL, less than weekly

2. OCCASIONALLY INCONTINENT—BLADDER, 2+ times a week but not daily; BOWEL, once a week

3. FREQUENTLY INCONTINENT—BLADDER, tended to be incontinent daily, but some control present (e.g., on day shirt); BOWEL, 2-3 times a week

4. INCONTINENT—Had inadequate control, BLADDER, multiple daily episodes; BOWEL, all for almost all of the time.

5. BOWEL CONTINENCE Control of bowel movement, with appliance or bowel continence programs, if employed

6. BLADDER CONTINENCE Control of urinary bladder function (if dribbles, volume insufficient to soak through underpants), with appliances (e.g., Foley) or continence programs, if employed

7. IF INCONTINENT OF BLADDER (Skip if resident's bladder continence code equals 0 or 1 and no catheter is employed)
Resident has been tested for a urinary tract infection
Resident has been checked for presence of a fecal impaction, or there is adequate bowel elimination
NONE OF ABOVE

8. APPLIANCES AND PROGRAMS Any scheduled toileting plan

a. External (condom) catheter	b. Pads/foleys used
c. Indwelling catheter	d. Enemas/irrigation
e. Intermittent catheter	f. Ostomy
	g. NONE OF ABOVE

9. CHANGE IN URINARY CONTINENCE Change in urinary continence in last 90 days

0. No change 1. Improved 2. Deteriorated

SECTION G. PSYCHOSOCIAL WELL-BEING
(Check all that apply during last 7 days. If COMATOSE, SKIP to Section J)

1. SENSE OF INITIATIVE/INVOLVEMENT

Easy interactions with others

At ease doing planned or structural activities

At ease doing self-initiated activities

Establishes own goals

Pursues involvement in life of facility (e.g., makes/keeps friends; involved in group activities; responds positively to new activities; assists at religious services)

Accepts invitations into most group activities

NONE OF ABOVE

2. UNSETTLED RELATIONSHIPS

Covert/open conflict with and/or repeated criticism of staff

Unhappy with roommate

Unhappy with residents other than roommate

Openly expresses conflict/anger with family or friends

3. PAST ROLES	Strong identification with past roles and life status Expresses sadness/longing/empty feeling over lost roles/status NONE OF ABOVE	a. b. c.
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SECTION H. MOOD AND BEHAVIOR PATTERNS

SAD OR ANXIOUS MOOD	(Check all that apply during last 90 days)	a. b. c. d. e. f. g. h.
	VERBAL EXPRESSIONS OF DISTRESS by resident (sadness, sense that nothing matters, hopelessness, worthlessness, unrelenting fears, vocal expressions of anxiety or grief) DEMONSTRATED (OBSERVABLE) SIGNS of mental DISTRESS — Tearfulness, emotional groaning, sighing, breathlessness — Motor agitation such as pacing, handwringing or picking — Failure to eat or take medications, withdrawal from self-care or leisure activities — Persistent concern with health — Recurrent thoughts of death—e.g., believes he/she about to die, have a heart attack — Suicidal thoughts/actions NONE OF ABOVE	

2. MOOD PERSISTENCE	Sad or anxious mood intrudes on daily life over last 7 days—not easily altered, doesn't "cheer up"	a. No 1. Yes
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3. PROBLEM BEHAVIOR	(Code for behavior in last 7 days)	a. b. c. d. e. f. g. h.
	0. Behavior not exhibited in last 7 days 1. Behavior of this type occurred less than daily 2. Behavior of this type occurred daily or more frequently WANDERING (moves with no rational purpose; seemingly oblivious to needs or safety) VERBALLY ABUSIVE (others were threatened, screamed at, cursed at) PHYSICALLY ABUSIVE (others were hit, shoved, scratched, sexually abused) SOCIALLY INAPPROPRIATE BEHAVIOR (made disrupting sounds, noisy, screams, self-abusive acts, sexual behavior or disrupting in public, smeared/threw food/ feces, rummaged through others' belongings)	

4. BEHAVIOR MANAGEMENT PROGRAM	Behavior problem has been addressed by clinically developed behavior management program. (Note: Do not include programs that involve only physical restraints or psychotropic medications in this category.)	a. No behavior problem 1. Yes, addressed 2. No, not addressed
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5. RESIDENT RESISTS CARE	(Check all types of resistance that occurred in the last 7 days)	a. Resisted taking medications/injection b. Resisted ADL assistance c. NONE OF ABOVE
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6. CHANGE IN MOOD	Change in mood in last 90 days	a. No change 1. Improved 2. Deteriorated
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7. CHANGE IN PROBLEM BEHAVIOR	Change in problem behavioral signs in last 90 days	a. No change 1. Improved 2. Deteriorated
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SECTION I. ACTIVITY PURSUIT PATTERNS

1. TIME AWAKE	(Check appropriate time periods—last 7 days) Resident awake all or most of time (i.e., no naps or naps no more than one hour per time period) in the:	a. b. c. d.
	Morning _____ Evening _____	
	Afternoon _____ NONE OF ABOVE	

2. AVERAGE TIME INVOLVED IN ACTIVITIES	(Code correct responses)	a. Most 1. Some 2. Little 3. None
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3. PREFERRED ACTIVITY SETTINGS	(Check all settings in which activities are preferred)	a. Own room _____ b. Outside facility _____ c. Day/activity room _____
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4. GENERAL ACTIVITIES PREFERENCES (adapted according to resident's current abilities)	(Check all specific activity preferences)	a. Cards/other games _____ b. Crafts/hobby _____ c. Exercise _____ d. Music _____ e. Read/write _____
	f. Spiritist/religious acts _____ g. Trips/shopping _____ h. Walking/hiking outdoors _____ i. Watch TV _____	NONE OF ABOVE

5. PREFERS MORE OR DIFFERENT ACTIVITIES	Resident expresses/indicates preference for other activities/choices.	a. No 1. Yes
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SECTION J. DISEASE DIAGNOSES

Check only those diseases present that have a relationship to current ADL status, cognitive status, behavior status, medical treatments, or risk of death. (Do not list old/inactive diagnoses.)

1. DISEASES	(If none apply, CHECK the NONE OF ABOVE box)	a. b. c. d. e. f. g. h. i. j. k. l. m. n. o. p. q. r. s. t. u. v. w. x. y. z. NONE OF ABOVE
	HEART/CIRCULATION Atherosclerotic heart disease (ASHD) Cardiac dysrhythmias Cardiovascular accident(s) Congestive heart failure Hypertension Hypotension Peripheral vascular disease Other cardiovascular disease NEUROLOGICAL Alzheimer's Dementia other than Alzheimer's Parkinson's disease PULMONARY Emphysema/asthma/COPD Pneumonia PSYCHIATRIC/MOOD Anxiety disorder Depression Manic depressive (bipolar disease) SENSORY Cataracts Glaucoma OTHER Anemia Arthritis Cancer Diabetes mellitus Explicit terminal prognosis Hypothyroidism Osteoporosis Sclerema Septicemia Urinary tract infection—in last 30 days NONE OF ABOVE	

2. OTHER CURRENT DIAGNOSES AND ICD-9 CODES	a. b. c. d.
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K. HEALTH CONDITIONS

1. PROBLEM CONDITIONS	(Check all problems that are present; last 7 days unless noted)	a. b. c. d. e. f. g. h. i. j. k. l. m. n. o. p. q. r. s. t. u. v. w. x. y. z. NONE OF ABOVE
	Allergies _____ Internal bleeding _____ Aphasia _____ Joint pain _____ Constipation _____ Pain—resident complains or shows evidence of pain daily or almost daily Dermatitis _____ Recurrent long sores/ulcers in last 90 days _____ Edema _____ Shortness of breath _____ Fecal impaction _____ Syncope _____ Fever _____ Hallucinations/delusions _____ NONE OF ABOVE	

2. ACCIDENTS	(Check all problems that are present; last 7 days unless noted)	a. Hip fracture in last 90 days _____ b. Hip fracture in last 180 days _____ NONE OF ABOVE
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3. STABILITY OF BEHAVIOR (Check all that apply during last 7 days; if NONE apply, check NONE OF THE ABOVE.)

Conduct/behavior is more erratic, impulsive, or deteriorating

Resident experiencing an acute episode or a flare-up of a recurrent chronic problem

NONE OF THE ABOVE

4. SKIN PROBLEMS/CARE (Check all that apply to resident during last 7 days)

Skin desensitized to pain/pressure/discomfort

Protective/preventive skin care

Turning/repositioning program

Pressure relieving beds, bedsores pads (e.g., egg crate pads)

Wound care/treatment (e.g., pressure ulcer care, surgical wound)

NONE OF ABOVE

SECTION L. ORAL/NUTRITIONAL STATUS

1. ORAL PROBLEMS (Check all that apply)

a. Chewing problem

b. Swallowing problem

c. Mouth pain

d. NONE OF ABOVE

2. HEIGHT AND WEIGHT

a. Record height in inches and weight in pounds. Weight based on most recent status in last 30 days; measure weight consistently in accord with standard facility practice—e.g., in a.m. after voiding, before meal, with shoes off, etc. HT (in) WT (lb)

b. Weight loss (i.e., 5%+ in last 30 days; or 10%+ in last 180 days)

0. No 1. Yes

3. NUTRITIONAL PROBLEMS

Complains about the taste of many foods

Insufficient fluid; dehydrated

Did NOT consume at/least all liquids provided during last 3 days

Regular complaint of hunger

Leaves 25%+ food uneaten at most meals

NONE OF ABOVE

4. NUTRITIONAL APPROACHES

Parenterally feeding tube

Mechanically altered diet

Therapeutic diet

Supplement between meals

NONE OF ABOVE

SECTION O. MEDICATION USE

1. NUMBER OF MEDICATIONS (Record the number of different medications used in the last 7 days; enter "0" if none used.)

2. NEW MEDICATIONS (Code correct response)

Resident has received new medications during the last 90 days

0. No 1. Yes

3. INJECTIONS (Record the number of days injections of any type received during the last 7 days.)

4. DAYS RECEIVED THE FOLLOWING MEDICATION (Record the number of days during last 7 days, enter "0" if not used; enter "7" if long-acting med. used less than weekly)

Antipsychotics

Antianxiety/hypnotics

Antidepressants

5. PREVIOUS MEDICATION RESULTS (SKIP this question if resident currently receiving anti-psychotics, antidepressants, or antianxiety/hypnotics—otherwise code correct response for last 90 days)

Resident has previously received psychoactive medications for a mood or behavior problem, and these medications were effective (without undue adverse consequences).

0. No, drugs not used

1. Drugs were effective

2. Drugs were not effective

3. Don't know

SECTION M. ORAL/DENTAL STATUS

ORAL DISEASE PREVENTION (Check all that apply)

Debris (soft, easily movable substances) present in mouth prior to going to bed at night

Has dentures and/or removable bridge

Somewhat natural teeth lost—does not have or does not use dentures for partial plates

Broken, loose, or carious teeth

Inflamed gums (gingivitis), oral abscesses, swollen or bleeding gums, or ulcers, rashes

Daily cleaning of teeth/dentures

NONE OF ABOVE

SECTION P. SPECIAL TREATMENT AND PROCEDURES

1. SPECIAL TREATMENTS AND PROCEDURES

SPECIAL CARE—Check treatments received during the last 7 days.

Chemotherapy

Radiation

Dialysis

Suctioning

Trach. care

IV meds

Transfusions

Respiratory/O₂ therapy

Other

NONE OF ABOVE

THERAPIES—Record the number of days each of the following therapies was administered for at least 30 minutes during a day in the last 7 days:

Speech—language pathology and audiology services

Occupational therapy

Physical therapy

Psychological therapy

2. ABNORMAL LAB VALUES Has the resident had any abnormal lab values during the last 90-day period?

0. No 1. Yes 2. No tests performed

3. DEVICES AND RESTRAINTS Use the following code for last 7 days:

0 Not used

1 Used less than daily

2 Used daily

a. Bed rails

b. Trunk restraint

c. Limb restraint

d. Chair prevents reins

SECTION N. SKIN CONDITION

1. STASIS ULCER (i.e., open lesion caused by poor venous circulation to lower extremities)

0. No 1. Yes

2. PRESSURE ULCERS (Code for highest stage of pressure ulcer)

0. No pressure ulcers

1. Stage 1 A persistent area of skin redness (without a break in the skin) that does not disappear when pressure is relieved

2. Stage 2 A partial thickness loss of skin layers that presents clinically as an abrasion, blister, or shallow crater

3. Stage 3 A full thickness of skin is lost, exposing the subcutaneous tissues—presents as a deep crater with or without undermining adjacent tissue

4. Stage 4 A full thickness of skin and subcutaneous tissue is lost, exposing muscle and/or bone

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