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THE USE OF SLEEP MEDICATIONS IN SKILLED NURSING FACILITIES:

A STUDY OF BIOMEDICAL AND PSYCHOSOCIAL FACTORS

BY

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## CHAPTER ONE

## MEDICATION USE IN LONG-TERM CARE FACILITIES

A. INTRODUCTION

During recent years concern over the use of medications in long-term care facilities has increased. While there are a variety of reasons for this concern, in the following review it will be argued that sleep medications deserve special attention. Furthermore, data will be provided indicating that, while we have a vague understanding of the extent of medication ordering in nursing homes, we have almost no understanding of the extent of use of medications in these facilities. It does appear that about one-half of medications are ordered on a PRN (give as needed) basis and that sedative-hypnotics are one of the most commonly ordered medications.

Studies examining the correlates of medication ordering and use in nursing homes are few and suffer from methodological limitations. The following categories of variables are examined: resident characteristics, physician characteristics, and facility characteristics. It is noted that studies rarely control for the effects of illness on medication ordering or use.

Finally, the medication providing role of the nurse in these facilities is considered. It is argued that the nurse serves as intermediary between medication prescription and individual resident consumption. Because of the lack of research in this area, the relevant literature on physician prescribing is reviewed.

## B. CONCERN ABOUT MEDICATION USE

In recent years there has been increased concern over the use of medications in long-term care facilities. This concern is based on the development of two bodies of information: a) research indicating that the elderly, comprising the majority of residents in long-term care facilities, are more vulnerable to adverse reactions to medications, and b) reports about the extent of drug-drug interactions and other problems with medication use in long-term care facilities. Each area will be discussed briefly here.

### 1. Altered Response to Medications by the Elderly

It is accepted that there are age-related differences in drug response.<sup>1</sup> Although studies are based primarily on hospital populations, investigators demonstrate that adverse drug reactions occur with greater frequency in elderly individuals.<sup>2</sup> Research attempting to clarify the specific mechanisms for altered drug response focuses on only a few medications, but a variety of pharmacological principles are proposed. One principle is that the volume of drug distribution, i.e., where the drug actually goes in the body, changes as people age, primarily due to the increase in fat-muscle ratio. For some medications this results in no change in effect while for others it increases their effect.<sup>3</sup> A second physiological change for the elderly is a decrease in their ability to eliminate and metabolize medications meaning that the concentrations of most medications can be higher in the elderly. This occurs via two mechanisms: a) a decrease in renal excretion<sup>4</sup> or b) a decrease in liver metabolism<sup>5</sup>. A third principle

is that the elderly experience a decrease in plasma binding capacity of some medications thus altering the amount of free drug available.<sup>6</sup>

In summary, these and other biological changes, such as changes in gastrointestinal absorption, can serve to alter the response of the elderly person to medications and may in part account for the increased rate of adverse reactions to drugs among the elderly. The awareness of this difference in susceptibility to medications' effects is cause for concern about the use of medications by elderly people in general. In long-term care institutions, where the use of medications is reported to be greater than in community elderly populations<sup>7</sup>, there is need for additional concern.

## 2. Drug Interactions and Other Medication Problems

During the past ten years there have been several studies examining the extent to which nursing home residents are exposed to drug-drug interactions. With one exception, these investigations are based on a review of prescription records rather than actual consumption of medication. The percentage of residents shown to have a potential drug-drug interaction ranges from 2.7 percent of nursing home residents to 53 percent.<sup>8</sup> Studies reporting percentages toward the lower end of the range tend to examine interactions deemed "clinically significant."<sup>9</sup> Studies examining any type of potential drug interaction report figures nearer the high end of the range. In general, these studies indicate that approximately one out of two nursing home residents has some potential to experience a drug-drug interaction and about one resident out of five is exposed to a potential drug

interaction that is considered clinically important. The one study that assesses residents' actual consumption of medication reports that an alarming 22 percent of the 855 residents examined were exposed to a drug-drug interaction sometime during the course of a year.<sup>10</sup>

Other studies demonstrate additional problems with the use of medications among residents of long-term care facilities. Cheung and Kayne report finding 122 adverse drug reactions, such as allergic responses or side effects, occurring in the 453 residents monitored.<sup>11</sup> Segal's research group only assessed the potential for adverse reactions to occur and found an average of 3 potential adverse drug reactions per resident.<sup>12</sup> Still other studies assess inappropriate drug therapy in long-term care facilities<sup>13</sup>, the extent to which prescribing is not in accordance with FDA guidelines<sup>14</sup>, prescribing of ineffective or unnecessary medications<sup>15</sup>, or failure to prescribe medications in conformance with established protocols<sup>16</sup>. Taking the issue of medication use one step further, Sobel and McCart demonstrate that the use of specific medications, diuretics and sedative-hypnotics, was significantly greater in the population of nursing home residents that experienced falls than among a matched control group of residents.<sup>17</sup> These problems occur even though the Medicare and Medicaid skilled nursing facility regulations require a pharmacist to review the drug regimen of residents and report irregularities.<sup>18</sup>

Descriptive reports such as these place the prescribing and medication use among residents of long-term care facilities in question. They also emphasize a need: (1) to identify patterns of prescribing and administration of medications in these facilities before evaluation

of drug therapy can proceed and (2) to identify factors relating to prescribing and administration of medications so that plans for change (if change is viewed necessary based on the knowledge of the patterns) can be implemented where most likely to have impact.

### 3. Sleep Medication as a Special Case

As a specific therapeutic category of medications, the use of sleep medications in long-term care facilities demands special attention. First, it has been recognized that sedative medications, including sleep medications, are medications to which elderly are particularly sensitive and likely to experience adverse effects.<sup>19</sup> It has long been recognized that the barbiturates are inherently more acutely toxic than the other sedative-hypnotics. However recent evidence indicates that many of the other sedative-hypnotics have clinically undesirable effects in elderly populations.<sup>20</sup>

A second reason to examine the use of sleep medications in long-term care facilities stems from the continued claims that nursing homes are places where residents are kept under "chemical control" by sedation with medications.<sup>21</sup> In general, these claims are backed by anecdotal information or by pointing out that residents of nursing homes use more tranquilizers than the general population. Efforts to substantiate the suggestion that residents are oversedated are not based on examination of the patterns of medication use or biomedical factors relating to such use. This does not mean that no evidence exists suggesting the need to further examine the use of sedative medications. Indications that psychoactive medications commonly are associated with

adverse drug reactions<sup>22</sup>, potential drug-drug interactions<sup>23</sup>, and accidental falls<sup>24</sup> in long-term care facilities raise serious questions. Furthermore, one study that analyzes hypnotics separately found that an average of one out of every 100 residents was taking a hypnotic continuously for more than 30 days<sup>25</sup>, a practice contraindicated by the American Psychiatric Association's criteria<sup>26</sup>. Obviously further examination of sleep medication use, and the relationships between resident medical factors and the prescribing and administration of sleep medication, is necessary. In the next section what we already know about medication use in general, and specifically sleep medications, in long-term care facilities will be reviewed.

### C. PATTERNS OF MEDICATION PRESCRIBING AND USE

#### 1. Problems in Concepts and Measures as Previously Reported

Although the methodological problems involved in conceptualization and measurement of sleep medication use in long-term care facilities will be discussed at a later point in this chapter, it is important before beginning the review to mention problems with the literature that limit ability to make definitive statements. These limitations should be kept in mind as findings are discussed.

The first problem is that authors often confuse prescription of medications with consumption of medications<sup>27</sup> and refer to these as identical measures. However, because of the existence of standing orders for PRN (give "as needed") medication in institutions such as nursing homes, the number of different prescription orders per resident does not inherently reflect the number of different prescriptions

consumed. Those studies where, after reviewing their description of their methodology it could still not be discerned which measure is referred to, will not be included here.

A similar problem in summarizing the extent of medication orders or use in long-term care facilities arises from interchanging the terms "medications" and "prescriptions." It is not clear when the authors report on the "number of different medications" if they are referring to the number of different medications or if they are referring to the actual number of prescription orders. For example, if a prescription was written for a) diazepam 5 mg, sig. one daily, and another for b) diazepam 5 mg, sig. one at bedtime as needed, these can be considered two prescriptions for one medication. When the meaning of the term used is not clarified, it is not clear what is being reported.

The lack of precise meaning with the terms "prescription medication" and "prescribed medication" adds to this ambiguity. The term "prescription medication" may refer to only medications which by law require a physician's order or may refer to any medication (whether or not it requires the physician's authorization) that the physician orders. Similarly the term "prescribed medication" may include just prescription medications or may include prescription medication as well as nonprescription medications for which an order is written.

The fourth problem making study results difficult to compare is the frequent failure to state the time frame for assessing medication prescribing and/or use. It would be expected that use on a given day would be less than if use during 30 days is assessed. However, many authors fail to specify length of time for data collection and it has

to be assumed from the methodology that records are reviewed at one point in time and the data are reported for that point in time.

Ability to generalize from the studies reviewed is limited. Over one-half of the studies assess medication orders or use by less than 200 nursing home residents and in the majority of these studies, the residents reside in only one facility. Other biases, such as selecting only Medicaid residents in the study sample, prevent comprehensive understanding of medication ordering and usage patterns.

Lastly, many studies are conceived with the intention of demonstrating the impact of pharmacists or pharmacy services on the extent of medication ordering/use in nursing homes.<sup>28</sup> With only one exception<sup>29</sup>, these studies demonstrate what they set out to demonstrate. This group of studies will be reviewed in the section discussing correlates of medication prescribing and use. For the purposes of the review in this section, only the original baseline figures from these studies will be reported. However, it should be kept in mind that differences in pharmacy services or drug distribution systems and the existence of medication formularies can vary among facilities and that this adds to the ambiguity when comparing the various studies' results.

## 2. Extent of Medication Prescribing and Use

The most common way studies report the extent of medication ordering or prescribing in long-term care facilities is to assess the number of medications (or prescriptions) per resident at a given point in time or on a particular day. The range reported is from 3.33 to 7.9 medications ordered per resident<sup>30</sup> or 4.9 to 8.65 prescriptions

per resident<sup>31</sup> with the majority of studies reporting figures in the 6.5 to 7.5 range. Using different time frames, figures of 5.5 prescriptions/resident/week<sup>32</sup>, 4.86 medications/resident/week<sup>33</sup>, 3.98 to 6.63 medications/resident/month<sup>34</sup>, and 42.8 prescriptions/resident/year<sup>35</sup> are reported. While these numbers may at first glance seem excessive, it should be kept in mind that these measures do not indicate actual consumption of medication and that the population being prescribed for tends to have several chronic conditions. Also, because of the lack of uniform methods of measurement, it is impossible to determine how much variation between reports is due to historical fluctuation in medication consumption. At least one study<sup>36</sup> suggests that medication ordering in nursing homes has decreased over time.

Rarely are efforts made to actually assess the amount of medication consumed by nursing home residents (e.g., number of dosage units consumed, days of therapy used) nor are efforts made to standardize differences between prescription consumption based on the quantity of medication authorized. The extent of medication consumption in long-term care facilities is reported using four basic indices: a) the percent of residents using any medication<sup>37</sup>, b) the number of different medications used per resident<sup>38</sup>, c) the number of doses consumed per resident<sup>39</sup>, and d) the cost of medication consumed<sup>40</sup>. Because of the variation in these indices and variation in time frames used to assess medication use, any generalizations concerning the extent of medication use is impossible. Both the data on medication prescribing and medication use in long-term care facilities are extremely difficult to interpret and tell us very little about resident use of medication, who is

using medication, and who is using what kind of medication.

### 3. Extent of PRN Prescribing and Use

Of special interest is the extent to which medications in long-term care facilities are prescribed with the directions to administer PRN (pro re nata or give "as needed"). In effect the ultimate decision of whether or not to administer the PRN medications is delegated to the nurses in charge of medication administration and the nurses are placed in the role of medication gatekeepers with even greater control than with administration of scheduled medications (i.e., with directions to administer on a scheduled, specified routine).

With only two exceptions<sup>41</sup>, studies examining PRN prescribing in long-term care facilities report that residents have about 3 to 4 orders for PRN medication during a 30 days or less time period<sup>42</sup>. Where possible, the figures translate into approximately 50 percent ( $\pm$  10%) of all prescriptions for nursing home residents being written with directions for PRN administration.

The actual rate of administration of PRN medication is uncertain. While some studies report that approximately 50 percent of all PRN medications are used during a 30 or 60 days period<sup>43</sup>, other calculations indicate that about 50 percent of all the drugs administered are written PRN<sup>44</sup>. There are too few studies to clarify exactly what is being reported here. The research does indicate however, that not only do the nurses in long-term care facilities have the opportunity to make decisions concerning medication administration (i.e., via PRN

prescribing), they exercise that control to some extent.

#### 4. Sleep Medication Prescribing and Use

Discussion of sleep medication use in long-term care facilities is hampered by one consideration in addition to those mentioned earlier. There has been variation in how the category "sleep medications" is defined. The majority of authors use terms such as hypnotic, sedative-hypnotic, or sedative<sup>45</sup> without definition. To add to this confusion, traditional references have recently changed how they classify medications used for bedtime sedation. For example, the AMA Drug Evaluation<sup>46</sup> text dropped the classification of sedative-hypnotic in favor of the label "antianxiety and hypnotic" agents. The American Hospital Formulary Service<sup>47</sup> has kept the classification of sedative-hypnotic. Both these references now include with the hypnotic medications other medications previously labeled "minor" tranquilizers (i.e., the benzodiazepines). These changes occurred during 1980 and it can only be assumed that the research done prior to that time used the more conservative definition of sedative-hypnotic (which would include only barbiturates, ethchlorvynol, meprobamate, glutethimide, methprylon, chloral hydrate, methaqualone, and flurazepam). Recent studies also might include any of the benzodiazepines.

Despite this ambiguity, estimates of sleep medication ordering and use are surprisingly consistent. The reported<sup>48</sup> percents of nursing home residents with an order for a sedative-hypnotic range from about 25 to 50 percent<sup>49</sup>. Stated another way, when studies assess the most common category of medications ordered for nursing home residents,

sedative-hypnotics always are reported as one of the most common<sup>50</sup> (i.e., in the "most ordered" half of the listed categories). Furthermore, two studies<sup>51</sup> show that 53 to 57 percent of sedative-hypnotic orders are written with PRN (as needed) directions, suggesting a high rate of the decisions regarding whether or not to use these medications are being made at the facility.

In addition to these figures, there are studies reporting the most common individual drugs prescribed in nursing homes. At least one sedative-hypnotic is among the top ten medications although ranking varies.<sup>52</sup> While there is some disagreement over which sedative-hypnotic is the most often prescribed, it appears that chloral hydrate<sup>53</sup> and flurazepam<sup>54</sup> are the most popular sedative-hypnotics with the more current studies favoring flurazepam.

The reports on the rate of sedative-hypnotic consumption in nursing homes vary somewhat. Figures are reported of 26 percent of the residents using a sedative-hypnotic<sup>55</sup> on two consecutive nights<sup>56</sup>, 37 percent using during one month<sup>57</sup>, and 34 percent using during one year<sup>58</sup>. Somewhat out of line with these figures is one study's<sup>59</sup> report of 55 percent of the residents using sedative-hypnotics, but the time frame used for measurement is unclear. Other studies report that sedative-hypnotics are one of the most commonly used categories of medications.<sup>60</sup> One study<sup>61</sup> shows that 59.7 percent of the PRN hypnotic prescriptions are used by residents sometime during 60 days. Thus not only are sedative-hypnotics commonly ordered, but they are fairly extensively used.

Rarely are patterns of consumption of sleep medications mentioned.

A study<sup>62</sup> examining flurazepam use in geriatric nursing home residents demonstrates that 43 percent of those who use the medication use it 7 days a week. A bimodal usage pattern is suggested. That is, residents with flurazepam ordered either use it less than once a week or on a daily basis.

#### D. CORRELATES OF MEDICATION PRESCRIBING AND USE

##### 1. Review of Past Studies

While the literature reviewed to this point gives some idea as to the extent of medication ordering, nothing has been said about who is using medications, particularly sleep medications, in long-term care facilities. Studies of the correlates of medication use in nursing homes are few and the factors examined can be divided into four levels: a) resident characteristics, b) physician characteristics, c) pharmacy characteristics, or d) facility characteristics.

##### a. Resident characteristics

The resident characteristic most often examined is resident age. Older residents are found to have fewer medications prescribed.<sup>63</sup> Looking at only hypnotic orders, no resident age differences were found.<sup>64</sup> Whether or not a resident uses any medication is unrelated to age<sup>65</sup> but it is reported that the older age groups consume a significantly greater number of different medications than do younger residents<sup>66</sup>. Looking only at hypnotics or antipsychotic<sup>67</sup> medication use, this relationship is reported to be not significant<sup>68</sup>, decreasing significantly with increasing age<sup>69</sup>, and significantly

greater in older ages<sup>70</sup>. Examining just hypnotic use, no significant differences were reported.<sup>71</sup> Thus, the relationship between age and medication consumption may vary by category of medication, but the relationship for psychoactive medications remains unclear.

Reports of which sex receives more orders for medication conflict.<sup>72</sup> One study<sup>73</sup> showed that significantly more women are likely to have a major tranquilizer ordered than are men while another study<sup>74</sup> showed no gender differences for hypnotic orders. In terms of medication use, no significant relationships between sex and general medication use<sup>75</sup> or use of antipsychotic medication<sup>76</sup> or use of hypnotics<sup>77</sup> are found.

Studies examining resident payment plan are surprisingly consistent. Medicaid residents are found to have more medications ordered<sup>78</sup> and to consume more medication than private pay residents<sup>79</sup>. Looking specifically at sedative-hypnotics, Shepherd<sup>80</sup> reported that 39 percent of the Medicaid residents use a sedative-hypnotic during the year while only 25 percent of the non-Medicaid residents use.

Other resident sociodemographic factors considered are resident race and resident's county. Neither is found to relate significantly to antipsychotic medication use.<sup>81</sup>

None of the studies mentioned so far attempts to control for the effect of illness. As would be expected, the residents with a higher number of medical diagnoses are reported to have more medications prescribed.<sup>82</sup> Reports on the relationship between functional ability<sup>83</sup> and medication prescribing, including neuroactive medications, are inconsistent and so are the reports on resident mental status<sup>84</sup>. Anxiety

level and friendliness to other residents does not relate significantly to the existence of a major tranquilizer order but friendliness to staff does relate significantly (with unfriendly residents more likely to have an order).<sup>85</sup> This last study also finds interaction effects with sex. Anxious women are more likely to get a major tranquilizer order than anxious men. Men with low mental status or unfriendly toward staff are more likely to receive a major tranquilizer order than men with high mental status or friendly to staff. This suggests that the patterns of medication use may be much more complex than direct zero-order correlations can explain.

One unique study breaks down the percent of residents with a prescription for a sedative-hypnotic by diagnosis.<sup>86</sup> Residents with angina or myocardial infarction are much more likely to have a sedative-hypnotic prescription in comparison to all residents combined. Residents with arthritis are more likely and residents with mental illness are less likely to have a sedative-hypnotic ordered than are all residents. Although interpretation is difficult, examination of types of medication by category of diagnosis is an important step to understanding who is using which medications in long-term care facilities.

b. Physician characteristics

Although studies report that the extent to which physicians prescribe medications<sup>87</sup> in general, and neuroactive medications<sup>88</sup> in specific, varies by physician, the characteristics of the physician in relation to prescribing habits in long-term care facilities is examined by only one study<sup>89</sup>. Looking at the mean number of

daily doses of antipsychotic medication prescribed per resident, the size of the physician's nursing home practice is related significantly to higher prescribing. The most recent and the oldest graduates from medical school prescribe the least antipsychotic medication. Other physician characteristics are related to prescribing but only for physicians with small nursing home practices. For physicians with small nursing home practices, family practitioners prescribe more than internists who prescribe more than surgeons. Physicians located in rural areas prescribe more antipsychotic medication per resident than do urban physicians. No studies examine nurse characteristics and administration of medications in nursing homes.

c. Pharmacy and drug policy characteristics

In mid-January 1974, the federal Medicaid and Medicare regulations were revised and included the requirement that a pharmacist must perform monthly drug-regimen reviews on residents in skilled nursing facilities.<sup>90</sup> The mechanisms and guidelines for this review were not elucidated but the regulations clearly promoted the pharmacist's involvement in these facilities. Several years later (in 1980) the Department of Health and Social Services developed a list of indicators<sup>91</sup> to be used by state surveyors for assessing compliance with the drug-regimen review regulation. Although these indicators are only tools and not regulations, they are used by state surveyors and consultant pharmacists as guidelines for what should be covered by drug-regimen reviews.

Several studies conducted since the advent of the federal regulations have attempted to assess the impact of the pharmacist on the extent of medication ordering and/or use in nursing homes. In general these studies found that the presence of pharmacists, either full-time or part-time, is associated with a reduction in the number of medications ordered and the number of medications administered per resident.<sup>92</sup> Chrymko and Conrad<sup>93</sup> even demonstrated that when the pharmacist was removed from the facility, the number of medications used per resident rose to levels similar to what was seen before the pharmacist was involved. Taking the pharmacist's involvement even further, one study<sup>94</sup> demonstrated that having clinical pharmacists assume prescribing responsibilities significantly lowered the number of drugs prescribed per resident. Only one author<sup>95</sup> disagreed with these findings and he found that those facilities with a full-time pharmacist used more PRN (give "as needed") medications per resident than did facilities without a full-time pharmacist. Overall it appears that the pharmacist has an impact on medication use. However, one limitation to interpreting these studies is their failure to identify exactly what the pharmacist does that results in the decrease in medication use.

Other studies have focused on the development of protocols or policies such as the federal indicators and their implications to medication use. When the use of the federal indicators were specifically examined, it was found that facilities where the federal indicators are applied have fewer medications used per resident than those facilities where the indicators were not applied.<sup>96</sup> This difference was not

significant however. Others have implemented different policy changes and found the medication use decreased. Brodie's research group established drug use review procedures and found that the number of drugs administered per resident was reduced.<sup>97</sup> Brown formulated an automatic stop-order policy for most of the PRN (give "as needed") medications and found that the number of PRN medications prescribed per resident dropped significantly.<sup>98</sup> One other study first implemented an automatic stop-order policy and then a drug usage review procedure.<sup>99</sup> It was demonstrated that each step lowered the number of medications administered per resident. One last study tried implementing a new policy requiring physicians to rewrite completely all medication orders instead of allowing them to simply renew previous orders.<sup>100</sup> After the establishment of this policy, there was a significant decline in the number of drugs prescribed per resident although there was an increase (but not significant) in the number of drugs administered per resident.

d. Facility characteristics

Similar to the study of physician characteristics, the examination of nursing home characteristics and medication ordering/use is relatively nonexistent. Variation between facilities is demonstrated when studies examine the percent of residents having orders for medications in general<sup>101</sup>, the percent of residents with orders for hypnotics<sup>102</sup> or the percent of residents having orders for antipsychotic medications<sup>103</sup>. Use of hypnotics<sup>104</sup> and psychoactive medication<sup>105</sup> also is shown to vary between facilities.

Eliminating those studies using only two nursing homes in their study sample leaves only three studies examining facility characteristics and medication ordering or use. Aycock<sup>106</sup> considers PRN medication orders and use and finds the following relationships: a) PRN orders and use vary by type of facility ownership with private homes having the smallest number of PRN prescriptions per resident but county homes having the lowest number of PRN medications used, b) the larger the facility, the fewer the number of PRN drugs prescribed but there is no relationship between nursing home size and PRN medication use, c) homes with a full-time physician have fewer PRN medications ordered than those without a full-time physician but having a full-time physician does not relate to PRN medication use and, d) homes with a full-time pharmacist have more PRN medications used than homes without a full-time pharmacist although no relationship is reported for the extent to which PRN medications are prescribed. Ray's study group<sup>107</sup> looked at psychotropic medications and found only the nursing home size relates to the extent to which residents consume medication with larger nursing homes having greater consumption. Svarstad's group<sup>108</sup> found that residents of proprietary facilities with hypnotics ordered were significantly more likely to receive the hypnotic than residents of church-related facilities although no differences between the two facility types was shown for extent of hypnotic orders.

None of the studies make an effort to elucidate the mechanisms by which the organizational factors examined have an effect on prescribing and consumption of medications. As was discussed previously, the differences between facilities in their pharmacy services and medication

policies can dramatically alter the measure of medication use. Any differences such as these need to be considered and controlled for in addition to beginning to examine other organizational differences.

## 2. Nurses as Medication Providers

Worthy of special note is the absence of any mention of the nurse's part in administration of medications in long-term care facilities. This is surprising for three reasons. First there is a growing awareness of the nurse as a decision-maker<sup>109</sup> and in particular the autonomy of those nurses working in long-term care facilities<sup>110</sup>. Second, because of the frequency that medications in long-term care facilities are prescribed PRN (as discussed earlier) there is a high amount of opportunity for the nurse to influence medication consumption. The decision-making power of the nurse in these situations, specifically with sedative-hypnotics, is recognized by others.<sup>111</sup> The third reason that it is surprising that there is not more understanding of the nurse's influence on medication use in long-term care facilities is because of the central role medication administration plays in the nurse's daily activities. One study<sup>112</sup> reports that the time spent on medication procedures in one nursing home varies from 4.3 to 9.2 hours each day depending on pharmacy services and the distribution system. Others report figures of 9.7 hours each day per nursing home<sup>113</sup> and 10 hours each day per nursing station<sup>114</sup>. Using these last figures and assuming that the majority of medication procedures are handled by day or evening shift nurses<sup>115</sup>, medication administration can account for

approximately 60% of a medication nurse's activities during these shifts.

a. Factors relating to nurse administration of medications

What determines the extent to which nurses administer sedative-hypnotics has simply not been examined. Nor are systematic studies of factors relating to nurse administration of medications in nursing homes available. One hospital-based study indicates that the most frequently mentioned method of handling any patient complaint is to use a sedative or narcotic medication<sup>116</sup>, suggesting that patient demand plays a role in administration patterns. It is shown that educating nurses results in a decrease in sedative-hypnotic use on psychogeriatric wards<sup>117</sup> or the education of the staff in addition to adding more vigorous medication procedures results in a decrease in night sedation<sup>118</sup> in another study. However neither study attempted to assess whether the change was due to increased staff knowledge or an artifact of the special treatment conditions (Hawthorne effect). The study by Westfall and Speedie<sup>119</sup> avoids this problem. They demonstrate that the education does significantly increase nurse drug knowledge and that subsequent nurses' behaviors are changed, in this case more appropriate monitoring of drug therapy resulted.

In a related study<sup>120</sup>, Barker's research group attempts to identify factors related to nurse medication errors in a hospital setting. Nurse characteristics examined are: workload, type of unit worked on, shift, mental ability, clerical aptitude, vision, hearing, vocational interest, personality, biographical data (e.g., age, marital status,

education) and job related attitudes (e.g., job satisfaction, attitudes toward supervision, communication). These factors are assessed by error type and using various measures of error rates.<sup>121</sup> Results of this study are too complex to present in great detail. Significant factors include: a) shift, with day shift having significantly greater errors than evening shift<sup>122</sup>, b) as workload increases, rates of specific types of errors increase, c) visual acuity relates to errors but this varies by type of error and type of acuity problem, d) vocation interests scores, personality tests, clerical aptitude, and marital status all relate significantly but relationships vary by type of error. In summary, the authors conclude that the concept of a generalized medication error tendency among nurses is not supported. The evidence suggests that nurses with high rates of a certain error type are psychologically different from nurses with low rates of errors of the same type. Nurses who are error-free on one type of medication error may be prone to make medication errors of another type.

b. Factors relating to physician prescribing

Because of the relative lack of information regarding nurse administration of medications, research examining the correlates of physician prescribing is reviewed. Results from this body of literature can serve as preliminary guidelines for further examination of nurse medication administration behavior.

The amount of information on nurse administration of medications is made to seem even more miniscule by comparison to the plethora of studies on physician prescribing as is evident by the available review

articles.<sup>123</sup> These reviews can be referred to for a comprehensive approach to various aspects of physician prescribing. Here only those studies most applicable to nurse medication decision making are discussed. Therefore, the studies reviewed here comprise only those that use the physician as the unit of analysis (i.e., examine individual physician characteristics and measure the actual extent of individual physician prescribing) and are conducted within the United States.<sup>124</sup> These studies examine five groups of physician factors: characteristics of the patients cared for by each physician, conditions related to the physician's work, physician demographic characteristics, physician personality or beliefs, and physician beliefs about medication use. Each of these groups is discussed in turn and where possible, special consideration is given to studies that examine the prescribing of psychotropic medications.

i. Characteristics of patients cared for

The most obvious explanation for variation in physician prescribing is differences in the physician's patient population. However, surprisingly few studies assess the characteristics of the patients under each physician's care. The following patient demographic characteristics are examined and found not significantly related to the extent of physician prescribing: a) percent of patients categorized by religion<sup>125</sup>, b) percent of Medicaid patients<sup>126</sup> or patients covered by outside agency<sup>127</sup>, c) percent of patients that completed high school<sup>128</sup>, d) percent of patients with a comfortable income<sup>129</sup>, and e) percent of patients that are female<sup>130</sup>. Opposite to

what had been hypothesized, one study<sup>131</sup> found the percent of patients cared for that are nonwhite shows a significant negative relationship to the number of chloramphenicol prescriptions written by the physicians.<sup>132</sup>

Even the relationship between prescribing and patient age is inconsistent. Studies find no significant relationship between the percent of patients over 45 years old and the prescribing of chloramphenicol<sup>133</sup>, no significant relationship between average patient age and prescribing psychotropics<sup>134</sup>, a positive significant relationship between average patient age and prescribing nonpsychotropic medications<sup>135</sup>, and a significant relationship between age and prescribing volume with the relationship being positive as the rate of patients over 40 years old increases, negative as the rate of patients of 40 or under increases<sup>136</sup>. One study examining diagnoses and patient-rated symptoms finds no difference between physicians. Yet the physicians prescribe more tranquilizers and analgesics but less digitalis for people under 65 years old compared to people 65 and older.<sup>137</sup> Since age is shown to be a consistent predictor of drug use in epidemiological studies<sup>138</sup>, it seems unusual to not find more consistency in studies on prescribing rates. It may be that variables used do not measure age finely enough, that the relationship is not linear, or that the relationship varies by category of medication considered.

Of particular interest is the lack of effort to examine variation in extent of physicians' prescribing by variation in illness of physicians' patients. Only two studies attempt to assess the importance of the patients' conditions. One study reports that the more difficult

the psychotherapeutic problem, the more likely the physician is to report that he or she would use a medication in treatment.<sup>139</sup> The physician's willingness to use medication also varies by type of therapy (other than medication) that patients are reported receiving. Another study, that examines medical decisions with asthma patients, assesses both objective pulmonary function scores and patients' subjective expressions of symptomatology.<sup>140</sup> The results of this study are only examined by physician personality type and therefore will be discussed along with physician personality studies.

ii. Physician work and conditions

The three most frequently examined conditions are physician patient load, number of physicians in the practice, and the physician's specialty. It is logical that, as the number of patients cared for by the physician increases, the number of prescriptions written increases. This is the conclusion of one study where, even in multiple regression analysis, patient load is one of the most predictive physician factors.<sup>141</sup> Chambers research group<sup>142</sup> finds that as the number of patients seen per week increases, the percent of patients receiving a prescription for a minor tranquilizer also increases. In direct opposition to this, Becker and colleagues<sup>143</sup> results show a negative relationship between patient visits per week and prescribing of chloramphenicol. The relationship between physician practice group and prescribing is more consistently reported. Three studies<sup>144</sup> find solo practitioners prescribe to a greater percent of their patients, including minor tranquilizers, than do physicians

practicing in group settings. However, controlling for patient characteristics, Hadsall's research group finds no relationship.<sup>145</sup> While general practitioners care for more patients and prescribe more often than other specialties<sup>146</sup>, they are reported to be about equal to internal medicine and pediatric physicians in terms of the percent of visits resulting in a prescription<sup>147</sup>. Obstetric/gynecology physicians do have a lower prescribing rate. Looking only at the percent of patients receiving a minor tranquilizer prescription, general practitioners have a greater percent than other specialties (excluding psychiatrists).<sup>148</sup> When mental health specialists were considered, general psychiatrists are more willing to prescribe medication than psychoanalysts.<sup>149</sup> General conclusions are difficult to make especially since these conditions (patient load, practice group, specialty) and other work-related conditions vary the number and type of patients cared for by the different physicians.

A diversity of other practice related characteristics are tested. Those factors significantly related to the extent of physician prescribing (with direction of the relationship specified) include: being chief of staff (positive)<sup>150</sup>, clinic site (physicians in some clinics prescribe more than physicians working at other clinics)<sup>151</sup>, and tendency to prescribe drugs or to prescribe more than one drug (positive)<sup>152</sup>. In addition, Becker's research group<sup>153</sup> finds the following significantly related to the number of prescriptions written for chloramphenicol by each physician: increased practice size during past two years (negative), average time spent with patients (positive), number of ancillary personnel (negative), had adequate time free from

worry of practice (positive), engaging in medical activity outside practice (negative), increased use of consultants (negative), average number of therapeutic consultations (negative), percent of prescribing done by phone (positive), average number of times physician is used as a consultant (negative), use of journals for prescribing information and to learn drug's usefulness (negative), and use of retail pharmacists to learn about drug's usefulness (positive).

iii. Physician demographic characteristics

The demographic characteristics examined are the physician's sex, age, and whether or not the physician has had any postgraduate education. The length of time since graduation and time at current employment, although potentially relating highly to age, also are studied. The physician's sex is not demonstrated to relate directly to the extent of prescribing.<sup>154</sup> However, when prescribing extent is examined considering patient characteristics by physician sex, significant differences between male and female physicians are found (dependent upon the patient attribute under consideration).<sup>155</sup> When patients over 65 years of age were considered, female physicians prescribed to a higher proportion of these patients than did male physicians, although the average number of drugs prescribed was about the same regardless of physician sex. Male physicians ordered more drugs for returning patients compared to new patients while for female physicians this did not differ significantly. Female physicians were more likely to prescribe if the patient's visit was for a chronic problem and more likely to prescribe during nonillness visits than were male

physicians.

Physician age is shown repeatedly to relate to extent or willingness to prescribe with younger physicians prescribing less.<sup>156</sup> As authors<sup>157</sup> note though, older physicians tend to care for older patients and the question is raised as to whose age, the physician's or the patient's, accounts for the prescribing rate relationship. In multiple regression analysis, Hartzema and Christensen<sup>158</sup> find patient age to be significant while physician age is not.

Length of time since graduation and time employed show similar relationships to prescribing extent as physician age. As time since graduation increases and as time at current employment increases, the physicians' prescription rates also increase significantly.<sup>159</sup> Recent graduates have a lower percent of patients receiving minor tranquilizer prescriptions or central nervous system medication.<sup>160</sup> Only one study disagrees with these findings.<sup>161</sup> Similar to age, however, number of years since graduation and number of years at current position do not significantly relate to prescribing extent using multiple regression analysis.<sup>162</sup>

The two studies measuring physician postgraduate training both find that physicians who receive additional education prescribe significantly less than those who do not receive postgraduate education.<sup>163</sup> As with the other physician factors, this relationship does not remain significant in multiple regression.<sup>164</sup>

#### iv. Physician personality or beliefs

Efforts to try to identify physicians who write

prescriptions for larger proportions of their patients have resulted in a multitude of personality and belief assessments. Many of these measures are found to significantly relate to prescribing rates but are seldom used by more than one study. Personality assessments are covered here first.

Only one personality measure receives repeated attention and initial study results are replicated.<sup>165</sup> Supervisors of physicians caring for asthma patients are asked to rate each physician's sensitivity (defined as treating patients as real, whole persons). Patients are categorized according to objective symptoms (pulmonary function tests) and subjective symptoms (e.g., expression of panic-fear). Physicians scoring high on sensitivity prescribe fewer medications overall and use less intensive therapy in general. High sensitivity physicians' prescribing rates relate significantly to patients being high panic-fear reactors. Low sensitivity physicians' prescribing rates relate to patients' actual pulmonary function, suggesting that subjective versus objective symptoms are considered differently by different physician personalities. Other personality characteristics significantly related to higher prescribing rates are: authoritarianism, valuing assertiveness, valuing status, or valuing self control in a study by Klerman and others.<sup>166</sup> Becker's group<sup>167</sup> reports modern orientation, psychosocial orientation, and quality-of-care orientation relate to significantly lower numbers of chloramphenicol prescriptions.

In addition to personality characteristics, physician attitudes or beliefs also are tested. Cartwright<sup>168</sup> finds that physicians give patients more prescriptions if the physician feels the patient is not

easy to talk to or the physician rates the consultation as not satisfactory. After controlling for patient characteristics, Hadsall and colleagues<sup>169</sup> find that the more the physician believes that patients expect drug therapy, the more likely the physician is to prescribe nonpsychotropic medication. This belief does not relate to the physicians' prescribing rates for psychotropic medication. Becker's research group<sup>170</sup> examines twenty different physician attitudes and finds seventeen to be significantly related to the number of chloramphenicol prescriptions written. In general, physicians who prescribe in greater number are satisfied with community and patients, dissatisfied with medical background, less likely to seek information, and less likely to be concerned about quality of prescribing or information resources.

Obviously physicians' psychosocial characteristics are relevant to prescribing behavior. Since studies do not follow a consistent pattern for examining these factors, it is impossible to make global conclusions about what factors are most useful. There are some studies, however, that take the psychosocial approach one step further to examination of the physicians' beliefs about medication use specifically. If indeed psychosocial characteristics play a part in explaining prescribing variation between physicians, this is a more pertinent attitude to assess.

#### v. Physician beliefs about medication use

Unfortunately only one study assesses physician beliefs and extent of prescribing. This study uses only one

question.<sup>171</sup> Thirty-two physicians were asked if it was appropriate to use tranquilizers in the treatment of everyday emotional problems. Controlling for patient characteristics, this is found not to significantly relate to the percent of patient visits resulting in a prescription for a psychotropic medication. Considering the small sample and the one item, this is far from conclusive evidence.

Other studies demonstrate considerable variation in physicians' opinions about when medication should be used<sup>172</sup>, particularly psychotropic medications<sup>173</sup>. Older physicians, physicians in solo practice, and physicians preferring detailmen as sources are significantly more likely to express liberal views toward medication use<sup>174</sup> (i.e., use in greater number of situations). Significantly more favorable assessments of chlordiazepoxide (Librium®) use are made by physicians from business (white collar, service) backgrounds and those who have less frequent contact with colleagues.<sup>175</sup> No relationship is found between beliefs about chlordiazepoxide use and amount of postgraduate education, number of patients seen per week, specialty, reported number of prescriptions written per patient, physician age, average income, type of practice, or percent of minority group patients.<sup>176</sup> Similarly, approval of benzodiazepine use is not related to physician specialty, level of training, or sex.<sup>177</sup>

#### E. CONCEPTUALIZATION AND MEASUREMENT OF SLEEP MEDICATION USE:

##### ADDITIONAL ISSUES

As previously mentioned, one of the most blatant limitations of the current literature on medication use in nursing homes is due

to the authors' failures to explicate exactly what is being measured and how. Any critical review is hampered by this. With those studies where measurement can be clearly assessed, the measurements or medications under study are so variant that any conclusion drawn by comparing studies should be considered tentative. In general, results should be treated cautiously. Future research in this area will need to consider a number of conceptual and measurement problems.

First, there is clearly a need to explicitly define the dependent measure. This means deciding whether the study's focus is on medication orders, medication consumption, or both and subsequently utilizing appropriate data collection tools. In the instance of examining a specific category of medication, such as sleep medication, it means clearly defining what medications are included in the category.

Dependent variables also need to be operationalized as uniform, repeatable measures. At the level of the resident variables, careful consideration should be paid to the time frame for data collection and whether it allows adequate testing of study hypotheses. At the level of the health professional or institution, time frame is important as well as extent of opportunity. That is, a physician caring for more patients may indeed prescribe more sedative-hypnotics but this says little about the rate of the physician's prescribing. Studies need to consider more than the absolute number of prescriptions written or consumed.

A third problem is the lack of attention paid to the validity of measures used. Although the source of data is often unclear, it appears that the majority of studies assessing use of medication in

long-term care facilities rely on charting information at the nursing home or submitted billing records. Evidence from hospital based studies<sup>178</sup> and some studies conducted in nursing homes<sup>179</sup> indicates that the documentation of medication use (either charting as administered a medication that is not actually given or administering an unordered medication) occurs 3 to 22 percent of the times that a medication should be given. However, studies do demonstrate that when a unit-dose drug distribution system is used, these medication errors decrease dramatically. When medications are provided via a unit-dose system, reported figures indicate that from 0 to 8 percent of the possible doses are doses that are administered unauthorized or omitted.<sup>180</sup> Thus while the validity of charted information on medication use is not perfect, it is particularly problematic if a conventional floor stock medication distribution system is in use. In addition, physician prescribing data sometimes is collected by the physicians themselves<sup>181</sup> or based on their recall estimates<sup>182</sup>. Relying on third-party billing (e.g., Medicaid)<sup>183</sup> adds the problem of a biased sample population to the problem of potentially biased data collection methods.

A fourth problem is that global personality and belief measures have added little to our understanding of the phenomena. While it appears that psychosocial characteristics of residents and health professionals are important to explaining orders and use, measures specifically relevant to medication use may prove more practically and theoretically useful. Similarly individual characteristics should be measured whenever possible rather than assessing group characteristics and attempting to relate this to change in group behavior (as sometimes

is done with studies evaluating the effects of interventions).

Finally there is a need to move beyond zero-order analysis. Medication ordering and use is more complex, as is evident from the few studies that do use multivariate techniques.

#### F. CONCLUSIONS: THE NEED FOR THEORY AND RESEARCH

It is clear that there is an essential need for unifying theoretical constructs to be applied to examination of medication use in long-term care facilities. The lack of theoretical models guiding research questions makes coherent summary of findings difficult. Lack of repetition of variables under examination among the various studies makes findings at this point in time tentative. Failure to define, standardize, and validate the measures used to assess medication use only add to the ambiguity.

What can be surmised is that there are several plausible levels for examining medication use. The characteristics of the residents, nurses, physicians, institutions, and any interaction between each level could be investigated. The following general research issues need to be addressed:

1. Biomedical reasons for the ordering and use of medications should be examined at all levels. Prior studies have often neglected to examine the most obvious reasons for variation in medication use.
2. Medication use should be considered as part of a process. As a preliminary step, factors relating to the ordering of medication should be delineated from factors relating to

medication consumption.

3. As part of the process of medication use, the ordering and use of PRN medications should be considered separately from routine (scheduled) medications. This is of particular relevance in long-term care facilities where the extent of PRN prescribing has been shown to be almost half of all prescriptions. The decision to use a PRN medication is likely to be uniquely different from the decision to not use a routine medication.
4. Similarly the therapeutic category of medication should be considered. Variation in the results of studies reviewed could be in part attributed to the examination of different therapeutic entities. The decisions regarding antibiotics should be uniquely different from decisions regarding psychotropic medications, sleep medications in particular. Furthermore, grouping medications together regardless of therapeutic class blurs any possible relationship between illness and use of medications.

## FOOTNOTES - CHAPTER 1

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CHAPTER TWO  
RESEARCH PROBLEMS AND METHODOLOGY

A. BACKGROUND

The goal of this study is to begin to fill the void in investigations which examine correlates of sleep medication ordering and consumption in long-term care facilities. Previous work at the University of Wisconsin<sup>1</sup> demonstrated variation in the extent of sleep medication use among the skilled facilities studied, but was unable to address the questions of why and what accounted for the differences found. The study described here was part of a larger project on sleep medication use that was an outgrowth of this previous work and for which this investigator served as project coordinator.

As was mentioned in the last chapter, there are several possible approaches to examining sleep medication use in nursing homes. A number of considerations led this investigator to limit the problem under study here to resident and nurse factors.

The decision to conduct a limited, exploratory study was in large part a practical one based on the realization that a study of all levels of potential factors would involve considerably more resources than available. The decision to begin by examining the residents' characteristics was logically germane to the understanding of patterns of sleep medication administration or prescribing by nurse or physicians. That is, a major limitation of studies examining physician prescribing is the failure to consider variation in patients under the physician's care. Individual resident variation in sleep medication

orders and use will be a focus of this study. Methodologically the decision was made to use methods not requiring intensive resident involvement which could not be justified at the exploratory level.

The decision was made to focus also on nurse variation in sleep medication administration. This was proposed in large part because the assumption that ordering and use of sleep medications is a function only of resident characteristics was viewed as too simplistic an approach and ignores the decision making position of the nurse vis-a-vis medication consumption in institutions such as nursing homes.

On the basis of the above considerations and the literature review, it was decided to conduct a study of biomedical factors relating to residents' use of sleep medications and psychosocial factors relating to nurses' administration of sleep medications. The paradigms and hypotheses pertaining to each will be discussed next. Appendix A contains the operational definitions used by this study.

## B. RESEARCH PROBLEMS

### 1. Resident Factors: Biomedical Approach

As indicated in the last chapter, few studies have examined illness characteristics of residents as these characteristics relate to medication use in long-term care facilities. Furthermore it was suggested that consideration of residents' medical conditions would be an important first step to understanding who is using which medications, sleep medications in particular. However no comprehensive approach has been proposed previously for the assessment of biomedical factors contributing to ordering and use of sleep medications.

Consequently several medical references<sup>2</sup> were reviewed for an understanding of the factors delineated as contributing to sleep disruption and/or use of sleep medication. These concepts were synthesized and a testable format developed.

In general, the medical approach to explaining medication use suggests that prescribing a regimen of medication originates with a physiological need. With regard to sleep medication orders and use, the traditional medical perspective would examine three main categories of factors: sleep disruptive disease, symptoms disruptive of sleep, and orders or use of other medications.

According to the references reviewed, sleep disruptive diseases would include diseases which, because of pain, nocturia, metabolic imbalance influencing sleep, pulmonary complications, or other pertinent reasons disturb normal sleeping patterns. A list of these diseases is shown in Table II-1.

Table II-1. Diseases Disruptive of Sleep.<sup>3</sup>

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Neoplasms - of bone, prostate, bladder

Endocrine etc. - thyrotoxicosis

Mental disorders - senility, schizophrenia, psychoses,  
affective disorders, anxiety states,  
insomnia

Nervous system - Parkinsonism, carpal tunnel syndrome

Circulatory system - angina decubitus, heart failure

Digestive system - ulcer, colitis

Genitourinary system - urinary tract infection,  
prostatic hyperplasia, prolapse

Skin - dermatitis, pruritus

Musculoskeletal - arthritis

---

Symptoms disruptive of sleep fell into four broad categories:

- a) complaints of pain, b) agitation, restlessness, or sleeplessness,
- c) behavioral and emotional symptoms resulting in loss of orientation or difficulty sleeping and d) physical conditions that cause periodic waking or inability to sleep. These symptoms are listed in Table II-2.

Table II-2. Symptoms Disruptive of Sleep.<sup>4</sup>

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<b>Pain</b>
- any location
<b>Agitation</b>
- restlessness, agitation, anxiety
- sleeplessness
- awake at night
<b>Behavioral</b>
- confusion, disorientation
- combativeness, wandering
- depression
- fears, phobias
- delusions, hallucinations
- loneliness
<b>Physical</b>
- pruritis, skin irritation
- cough, shortness of breath
- constipation, diarrhea
- urinary frequency, nocturia
- nausea, vomiting
- other ill-feeling

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The use of other medication was seen as having two possible relationships to the use of sleep medication. First considered are those medications which disturb sleep because of their stimulant properties and thus may be used in conjunction with sleep medication. The second category of medications is those medications whose properties mimic sleep medications' properties and thus may be used as substitutes for sleep medication. Belonging in this latter category are medications with sedative effects (other than sleep medications), psychotropic medications, and analgesics.

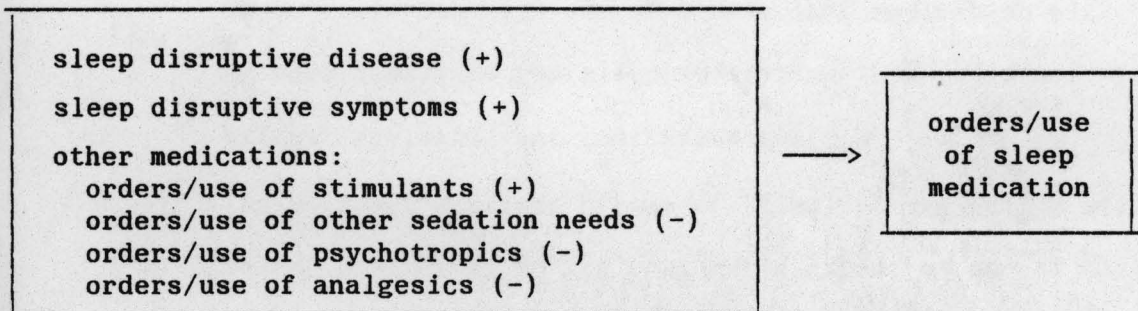


Figure II-1. Biomedical Approach.

The biomedical paradigm is outlined in Figure II-1 along with the hypothesized direction of the relationships. Resident demographic characteristics such as age, sex, medical payment plan, and length of stay at the facility will be examined in addition to examining the hypotheses based on the biomedical paradigm. Applying the biomedical approach, the following hypotheses are proposed.

- H<sub>1a-c</sub>: Those residents with a disease disruptive of sleep will be more likely to a) have an order, b) have any use and c) use more sleep medication than residents without a sleep disruptive disease.
- H<sub>2a-c</sub>: Those residents with a symptom disruptive of sleep will be more likely to a) have an order, b) have any use and c) use more sleep medication than residents without a sleep disruptive symptom.
- H<sub>3a</sub>: Those residents with an order for a stimulant medication will be more likely to have an order for a sleep medication than residents without any stimulant medication ordered.

- H<sub>3b</sub>: Those residents with use of a stimulant medication will be more likely to use sleep medication than residents without any stimulant medication use.
- H<sub>3c</sub>: The resident's extent of use of stimulant medication will relate positively to the resident's extent of use of sleep medication.
- H<sub>4a</sub>: Those residents with an order for a sedative medication (other than a sleep medication) will be less likely to also have an order for a sleep medication than residents without a sedative medication order.
- H<sub>4b</sub>: Those residents with use of a sedative medication will be less likely to use a sleep medication than residents without any sedative medication use.
- H<sub>4c</sub>: The resident's extent of use of a sedative medication will relate negatively to the resident's extent of use of a sleep medication.

Hypotheses 5 and 6, applying to psychotropic medications and analgesics whose effects might also substitute for sleep medication effects, can be stated similarly to hypotheses 4a through 4c.

- H<sub>5a-c</sub>: Those residents a) with an order, b) having use, and c) using more psychotropic medication will be less likely to a) have an order, b) have use, and c) will use less sleep medication than residents without psychotropic medication orders/use.

H<sub>6a-c</sub>: Those residents a) with an order, b) having use, and c) using more analgesics will be less likely to a) have an order, b) have use, and c) will use less sleep medication than residents without analgesic orders/use.

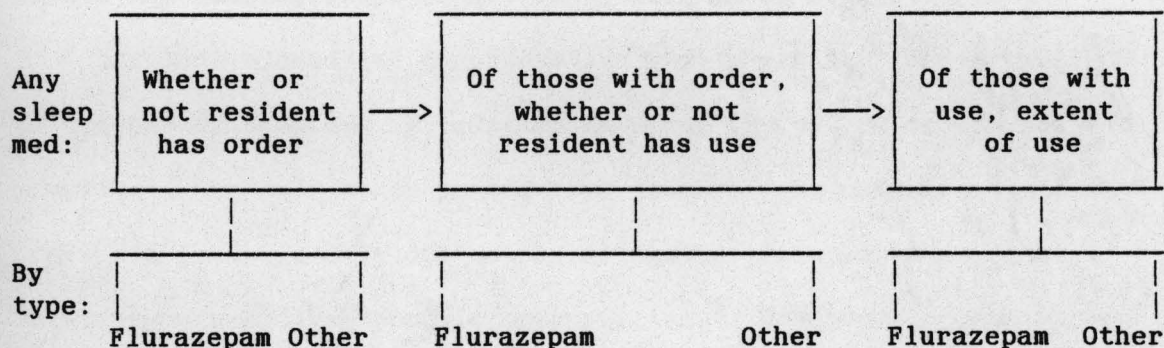


Figure II-2: The Process of Medication Consumption.

These hypotheses address medication use as a process. Figure II-2 delineates this process which is a modified version of the drug use process initially proposed by Knapp and colleagues.<sup>5</sup> This separates obtaining a prescription for a medication from consumption of the medication. It furthermore separates whether or not there is any use from how much is used. Thus the various steps would be to: a) assess whether or not the resident has any sleep medication ordered, b) considering those residents with sleep medication ordered, assess whether or not the resident used any and c) considering those residents with sleep medication use, assess the extent of their use.

This process also can be separated by drug product. Flurazepam has been shown by current studies to be the most often prescribed sedative-hypnotic in long-term care facilities<sup>6</sup>, a fact that was confirmed by the study conducted at the University of Wisconsin<sup>7</sup>. Another

consideration is that flurazepam's indicated uses only include the treatment of insomnia in contrast to many other sedative-hypnotic products which are marketed also for use as anxiolytics.<sup>8</sup> Consequently, the decision was made to examine the hypotheses sorting out flurazepam orders and consumption separate from other sleep medications.

The last biomedical consideration was to examine the category of disease or symptoms in relation to sleep medication orders and consumption. The only study considering diagnosis by sedative-hypnotic order did find specific diagnostic categories related to residents receiving a sedative-hypnotic prescription.<sup>9</sup> Other than being sleep disruptive illnesses, there is no current medical reason to hypothesize relationships between diagnostic categories and sleep medication orders/use. However examination of diagnostic categories could be useful in generating future hypotheses and in explaining any relationships found between sleep disruptive diseases as a collective group and sleep medication orders/use.

In summary, the biomedical approach used by this study considers sleep medication use as a three step process. These steps will also be broken down by specific drug product. The factors' relationships to sleep medication orders or use that will be examined are depicted in Figure II-1 and specified by hypotheses 1 through 6. Diagnostic categories also will be examined.

## 2. Nurse Factors: Psychosocial Approach

Previous investigations of nurses as medication givers have been few and atheoretical. Nor have studies on the extent of

physician prescribing applied theoretical models. What variables have been examined have been diverse. Furthermore authors suggest that physician prescribing is not always, and may not solely be, influenced by the medical need of the patient.<sup>10</sup> This leaves the potential approaches to examining nurse administration behavior unlimited. Clearly characteristics of the residents under the nurses' care should be considered. The next section will be devoted to this aspect.

Other than resident characteristics, the review here has shown that health professionals' personalities or attitudes, work situations, education, and specific demographic characteristics (e.g., age, time since graduation) were related to medication prescribing or administration. Patient demand also has been suggested to be important to nurse medication administration. Background of parents and interaction with colleagues were significantly related to beliefs about appropriate medication use. These findings suggest that the most useful approach is one that concentrates on the individual while giving consideration to social influences. Thus a psychosocial paradigm was developed based on a social psychological perspective.

The paradigm proposed for examining nurse behavior was grounded mainly in role theory but incorporates other perspectives as well as relying on the literature reviewed. It is not solely a psychological approach to examining nor solely a sociological approach to examining nurse behavior but selects a perspective encompassing both.

Many definitions of the term role appear in the literature. The primary sources for the concepts used here are the work by Gross and colleagues<sup>11</sup> and the theoretical model of Katz and Kahn<sup>12</sup>. The former

was chosen because of its operationalization of the theoretical concepts proposed by role theorists. Borrowed from the latter was the process approach used in their theoretical model of the factors involved in the taking of organizational roles.<sup>13</sup> While these two works differ somewhat in the basic definitions proposed, they more often than not run parallel. The relevant definitions and perspective applied will be briefly discussed before describing the subsequent paradigm developed for this study.

Gross and colleagues define role as a set of expectations applied to an incumbent of a particular position (with expectations being defined as evaluative standards).<sup>14</sup> Central to their formulation is that the actor is in a social location behaving with reference to expectations. They recognize that an actor's behavior is influenced by the actor's own expectations and those of others in the group in which the actor is a participant. This formulation thus embraces a normative element for how actors should behave.

While Gross' research group places emphasis on examining expectations of an incumbent held by relevant others, Katz and Kahn emphasize the distinction between role-sending and role-receiving. For Katz and Kahn, the process is based on four concepts:

. . . role expectations, which are evaluative standards applied to the behavior of any person who occupies a given organizational office or position; sent-role, which consists of communications stemming from role expectations and sent by members of the role-set as attempts to influence the focal person; received role, which is the focal person's perception of the role-sendings so addressed, including the reflexive role expectations that the focal person "sends" to himself or herself; and role behavior, which is the response of the focal person to the complex of information and information thus received.<sup>15</sup>

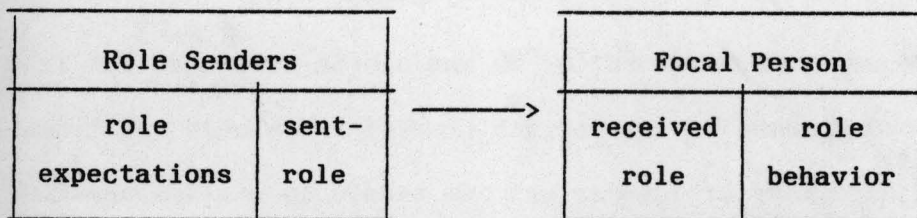


Figure II-3: The Role Episode.<sup>16</sup>

The portion of their model relevant here is presented in Figure II-3. The role episode is considered part of an interdependent cyclical process shaped by conceptual factors. It should be noted that the authors do not assume that role expectations are necessarily communicated from the role-senders to the focal person. Thus the focal person's received role consists of two components: a) the focal person's perceptions of role expectations of others, and b) the focal person's own or "self-sent" role expectations of self.

The psychosocial approach proposed by this investigator for the examination of nurse behavior relies heavily on the concepts described above. It is proposed that the extent of sleep medication orders and administration by a nurse are associated with the nurse's perception of her role in sleep medication decisions and administration. The nurse's role in sleep medication use is conceptualized as received role.

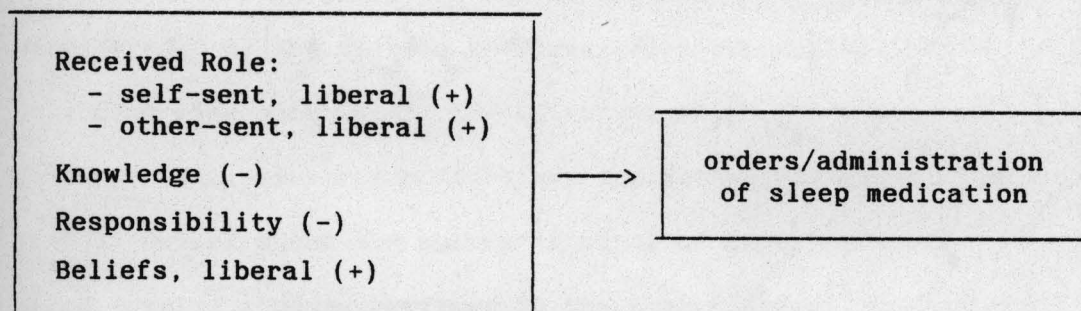


Figure II-4. Psychosocial Approach.

Thus self-sent role refers to the nurse's own set of expectations about what she should or should not do in the administration of sleep medication. The other-sent role is defined as the nurse's perception of the expectations of others who may attempt to influence her. Liberal expectations would imply the nurse should generously administer sleep medications whereas conservative expectations would imply the nurse should sparingly administer sleep medications. The following hypotheses are proposed.

H<sub>7a-c</sub>: The nurse's self-sent role expectations will relate positively to her behavior (i.e., the more liberal the nurse's expectations, the greater the extent of a) sleep medication orders, b) administration of sleep medication and c) administration of PRN sleep medication).

H<sub>8a-c</sub>: The nurse's other-sent role expectations will relate positively to her behavior (i.e., the more liberal the nurse's perception of other-sent role expectations, the greater the extent of a) sleep medication orders, b) administration of sleep medication and c) administration of PRN sleep medication).

Three additional components of the psychosocial approach will be considered: a) the nurse's knowledge of sleep medications' effects, including side effects, b) the extent to which the nurse feels responsible for decisions regarding sleep medication use and c) the nurse's general belief about the appropriateness of sleep medication use.

Since several studies reviewed in the last chapter<sup>17</sup> demonstrated that educational interventions were succeeded by a lowering in medication

ordering or use by nurses, it was decided to test nurses' knowledge of sleep medications' effects. Despite the previously cited evidence indicating that the long-term care nurse serves a central role as decision-maker, particularly regarding medications, the nurse's sense of responsibility regarding medication decisions has never been measured. Therefore, the extent to which nurses view themselves as medication gatekeepers remains unknown. If variation does exist in the nurse's sense of responsibility, it is anticipated that nurses who feel that medication decisions are in large part their own responsibility will scrutinize the appropriateness of medication orders and consumption, and thus exhibit a lower extent of orders and administration of medication than nurses not feeling this responsibility. The predicted negative relationships for nurse knowledge and responsibility also are based on an assumption that more knowledgeable, responsible nurses are more aware that sleep medications should be used with caution in geriatric populations. The hypotheses concerning these additional factors are stated below.

H<sub>9a-c</sub>: The accuracy of the nurse's knowledge about the effects of sleep medications will relate negatively to her extent of a) orders, b) administration, and c) PRN administration of sleep medications.

H<sub>10a-c</sub>: The awareness of flurazepam side effects by the nurse will relate negatively to her extent of a) orders, b) administration, and c) PRN administration of sleep medications.

H<sub>11a-c</sub>: The greater the personal responsibility for sleep medication decisions felt by the nurse will relate negatively to her extent of a) orders, b) administration, and c) PRN administration of sleep medications.

H<sub>12a-c</sub>: The nurse's belief that sleep medication use is appropriate will relate positively to her extent of a) orders, b) administration, and c) PRN administration of sleep medications.

Similar to resident consumption of medication, the nurse administration of sleep medication is considered as a process. The nurse's behavior as a process of medication administration is outlined in Figure II-5.

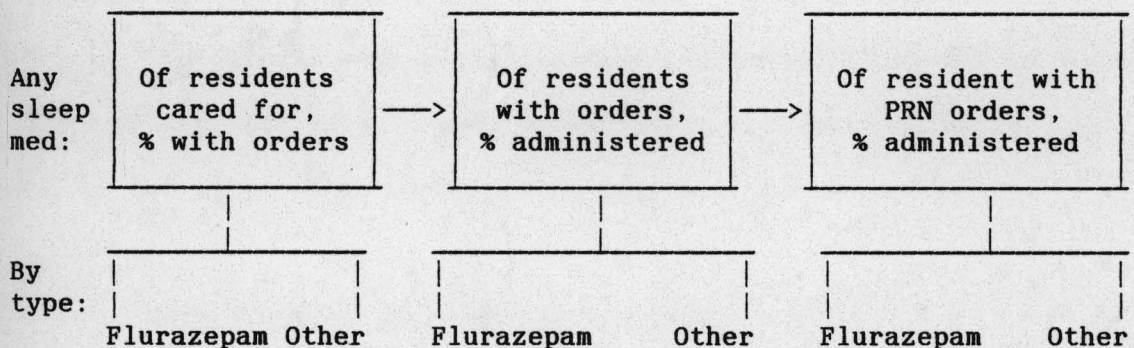


Figure II-5: The Process of Medication Administration By Nurses.

This separates the extent of opportunity to administer from the extent of administration. Furthermore, it separates the administration of PRN ("as needed") sleep medications from all others, since this is the regimen where the nurses are most likely to vary their behavior.<sup>18</sup>

Thus the various steps would be to: a) assess, among the residents each nurse cares for, the extent of sleep medication orders, b) assess,

among the residents that have sleep medication ordered that each nurse cares for, the extent of sleep medication administration by the nurse, and c) among the residents that have PRN sleep medication orders, assess the extent of PRN sleep medication administration by the nurse. This process also can be examined by drug product (i.e., flurazepam separate from other sleep medications).

In summary, the psychosocial approach proposed considers medication administration as a process. This process will be examined by specific drug product. The factors' relationships to sleep medication administration that will be examined are depicted in Figure II-4 and specified by hypotheses 7 through 12. In addition, nurse background characteristics such as age, length of time at the facility, parental background, and license held (R.N. vs. L.P.N.) will be considered. Data on the nurse's work situation characteristics also will be studied (time worked each week, number of different residents cared for, shift, and if the nurse works with varying groups of residents).

### 3. Nurse Factors: Biomedical Approach

It was intended that the research project be designed to allow the residents under each nurse's care to be identified. This allows the variation in residents cared for by the nurses to be examined, particularly the residents' medical characteristics. Based on the biomedical approach outlined by Figure II-1, the following hypotheses will be examined.

H<sub>13a-c</sub>: The extent of residents with sleep disruptive disease under the nurse's care will relate positively to her

extent of a) orders, b) administration, and c) PRN administration of sleep medications.

H<sub>14a-c</sub>: The extent of residents with sleep disruptive symptoms under the nurse's care will relate positively to her extent of a) orders, b) administration, and c) PRN administration of sleep administration.

H<sub>15a</sub>: The extent of residents with stimulant medication ordered and under the nurse's care will relate positively to her extent of a) orders for sleep medication.

H<sub>15b-c</sub>: The extent of residents with any stimulant medication use and under the nurse's care will relate positively to her b) administration and c) PRN administration of sleep medications.

Hypotheses 16, 17 and 18, applying to residents' orders and consumption of sedatives (other than sleep medications), psychotropics and analgesics, can be stated similarly to hypotheses 15a-c only with the opposite expected relationship.

H<sub>16a-c</sub>: The extent of residents with sedative medication a) ordered and b,c) use and under the nurse's care will relate negatively to her extent of a) orders, b) administration, and c) PRN administration of sleep medications.

H<sub>17a-c</sub>: The extent of residents with psychotropic medication a) ordered and b,c) use and under the nurse's care will relate negatively to her extent of a) orders, b) administration, and c) PRN administration of sleep medications.

H<sub>18a-c</sub>: The extent of residents with analgesic medication

a) ordered and b,c) use and under the nurse's care will relate negatively to her extent of a) orders, b) administration, and c) PRN administration of sleep medications.

The relationships between the medical characteristics of the residents under the nurse's care and the extent of flurazepam orders and administration, separate from the other sleep medications, also will be examined. Other resident characteristics that will be studied by nurse behavior are the mean age of residents cared for, the average length of stay of the residents at the facility, the percent male, and the percent on Medicaid.

## C. RESEARCH DESIGN

### 1. Introduction

The study was completed in three stages. The first stage was to conduct a two month audit of pharmacy records. While this allowed collection of biomedical information over an extended time, it did not allow collection of information on resident symptoms or complaints. Nor was any information on nurses and nurse administration of medication available. Consequently the second stage of the study was to conduct a seven day audit of records at the nursing homes. Nursing notes and medication cardex records were reviewed. The third stage was to survey the evening and night shift nurses who cared for the resident population included in the seven day audit. Each of these steps will be discussed in detail after the research settings have been described.

## 2. Research Settings

The settings for this study were seven skilled nursing facilities located in south central Wisconsin. They were chosen to vary by size (range of 54 to 285 beds with an average of 121 beds)<sup>19</sup>, location (majority not located in Madison), and type of organization (proprietary versus church affiliated). Every nursing home administration and director or nursing that was asked to participate in the study expressed their willingness to cooperate.

The facilities and their residents are served by Medical Health Pharmacy, Inc. located in Madison, Wisconsin. Medical Health Pharmacy of Madison is a branch of a private corporation that specializes in the provision of medication and pharmacy services to long-term care facilities. The branch in Madison employs seven pharmacists, one pharmacy intern and numerous technicians. The pharmacy maintains a computerized drug profile system and computerized billing system which made this study possible. It also distributes medications using a unit-dose system. The pharmacy's staff delivers to the facilities medication carts every two days. In these carts, each resident has a tray labelled with the resident's name and room number, and containing a two day supply of the medications for that resident. This medication is unit-dose, i.e., each dose is individually wrapped, labelled, and in ready-to-administer form. When the carts are returned back to the pharmacy after use, the resident is billed for the doses removed from the cart.

This pharmacy was chosen because it provides services to a large number of nursing homes, maintains an accurate and accessible data

base, and had staff who expressed interest and support for the research project. The pharmacists serving as consultants for each of the facilities selected for the study were interviewed prior to the initiation of the project. No major differences in the services provided by each pharmacist were found.

### 3. Stage I - Pharmacy Data Collection

#### a. Population

During the summer of 1983, detailed pharmacy record data for a two month time period were collected on the residents of the seven skilled nursing facilities. Each facility's administrator informed and obtained the consent of their residents or the residents' agents. An example of the letters sent is contained in Appendix E. Only six residents (less than one percent of the total sample) were unwilling to allow review of their records. To be included in the sample the resident had to reside in the facility one or more days during the second month of data collection. Retrospective data were collected on this sample of residents for both months. A total of 863 resident pharmacy profiles were reviewed. The background characteristics of these residents are given in Table II-3.

Table II-3. Comparison of Resident Background Variables -  
2 Month Data versus 7 Day Data.

<u>Variable</u>	<u>2 month data</u> <u>(N = 863)</u>	<u>7 day data</u> <u>(N = 730)</u>
AGE (mean age)	81.9	82.7
FEMALE (% female)	75.1	74.7
MEDICAID (% on Medicaid)	57.8	59.5
STAY (Mean # years)	3.3	3.3

b. Sources of data and collection

Two of the pharmacy's computerized data banks were used for information: the computerized resident's profile and the computerized billing records. Using the computerized resident's profile, the following data were obtained: the resident's age, sex, source of payment, and length of stay at the facility. This record also contained a list of the resident's medical diagnosis and all prescriptions written for the resident any time during the 2 month time period. The prescriptions of medications relevant to the study were noted and for further information a second data bank was reviewed. From the billing records of the resident, the actual number of dosage units per prescription that was consumed by the resident could be determined and linked to the noted prescription orders.

To maintain resident anonymity, residents were assigned identification numbers. The lists of names and numbers were stored at the pharmacy and the facilities. All identifying information was removed from the data collection forms before the forms left the pharmacy.

c. Measurements

Sleep medications were defined to include: a) flurazepam, b) diphenhydramine if ordered to be administered at bedtime (hs) or for sleep, or c) any other sedative-hypnotic, as defined by the American Hospital Formulary System (1983)<sup>20</sup>, ordered to be administered at bedtime (hs) or for sleep. The orders written for PRN (as needed) administration were not separated from the orders written for routine administration. The manual used for identifying sleep medications and for identifying the other medications for which billing information was obtained is contained in Appendix B.

Six sleep medication variables were created from the two month audit for subsequent analysis: a) whether or not the resident had an order for sleep medication, b) if the resident had an order, whether or not the resident used any sleep medication, c) if the resident used some sleep medication, the estimated percent of authorized days the resident used the sleep medication, d) whether or not the resident had an order for flurazepam, e) if the resident did have an order for flurazepam, whether or not the resident used any flurazepam, and f) if the resident used some flurazepam, the estimated percent of authorized days the resident used flurazepam. The variables calculating percent of use (i.e., c and f above) were based on the following formula:

$$\text{estimated \% of authorized days with use} = \left| \frac{\# \text{ doses consumed}}{\# \text{ doses administered} * \text{ the } \# \text{ days order active}} \right| * 100$$

Similarly data were collected on the other medications of interest: stimulants, sedatives, psychotropics, and analgesics. The manual in Appendix B contains details about which medications were included in each category. In summary, the stimulants included any amphetamine, monoamine oxidase inhibitor (MAOI) antidepressants, and other medications identified to disturb sleep. The sedatives included the antidepressants other than monoamine oxidase inhibitors, narcotic analgesics, narcotic cough syrups, tranquilizers, sedative-hypnotics not ordered for sleep, muscle relaxants, antihistamines, and some miscellaneous medications. Psychotropics included all antidepressants, tranquilizers, sedative-hypnotics not ordered for sleep, and lithium. Lastly, analgesics included both narcotic and nonnarcotic analgesics. Therefore these categories do not cover all medications, nor are they mutually exclusive.

The variables created for each category of medication considered (other than the sleep medications) were: a) whether or not the resident had any order for a medication in that category, b) whether or not the resident used any medication in that category, and c) the mean number of doses per resident day that the resident used medications in that category. The mean number of doses per resident day was calculated using the formula below.

$$\text{mean \# doses per resident day} = \left| \frac{\text{\# doses consumed}}{\text{\# days resident was in facility during 2 months}} \right|$$

Diagnoses were coded from pharmacy records. All diagnoses were coded using the International Classification of Diseases, 9th revision.<sup>21</sup> Classification was mutually inclusive and exclusive.

Table II-4. Disease Categories.

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Blood and blood forming organs
Respiratory system
Symptoms, signs, ill-defined conditions
Injury
Endocrine, nutritional, and metabolic
Mental disorders
Nervous system and sense organs
Circulatory system
Digestive system
Musculoskeletal system and connective tissue
Other

---

Major classification was done by organ type (see Table II-4). However finer subdivisions were created based on the ICDA codes to allow identification of diseases that have been documented as disruptive of

sleep. This list is shown in Table II-1. The diagnostic categories along with ICDA codes are shown in Appendix C.

Each resident received a code for each disease category indicating whether or not the resident had one or more diagnoses for that organ system. The resident also received a code for whether or not he/she had any sleep disruptive disease and a score indicating the total number of different sleep disruptive diseases diagnosed.

Intracoder reliability using the manual for identifying drugs (Appendix B) was better than 99%. Intracoder reliability for diagnostic codes was 99% and intercoder reliability for diagnostic codes was 99.5%. Furthermore, the diagnostic and billing data from the pharmacy records were compared with data independently collected from the records at the nursing homes. The two sources of diagnostic information agreed 97% of the time. The comparison of nursing home medication cardex records to the pharmacy billing information found these two sources to agree 94% of the time. Thus it was believed that the pharmacy records were reliable and valid data sources and that the manuals written for coding provided reliable data.

#### 4. Stage II - Nursing Home Data Collection

##### a. Population

During early 1984, this author arranged to visit six of the skilled nursing facilities<sup>22</sup> involved in the initial two month audit for the purpose of reviewing nursing notes and medication cardexes. Residents included in the sample had to reside in the facility one or more days during Monday through Friday of the week for which

data would be collected. Residents admitted over the weekend could not be included. Only one additional resident refused to allow record review at that time.

Data were collected for a total 730 residents. Seventy-six percent of these residents had been included in the two month audit sample. The characteristics of the residents in the seven day audit sample are shown in Table II-3 beside the characteristics of the two month sample. The similarity between the two sample populations is notable.

b. Sources of data and collection

Retrospective data for the prior week were collected on a) the resident's symptoms and complaints from the nursing notes for the seven days and b) the resident's use of sleep medications from the medication cardex. The nursing notes located in the resident's medical chart were reviewed for the seven day period and any symptom or complaint that could disturb sleep was noted on a checklist form.

For the collection of sleep medication consumption data, the pharmacy's staff provided a computerized record of medication orders for each resident in the sample. On the Friday before visiting a facility (one facility being visited each week), the pharmacy's staff printed out the medication profiles. After deleting all identifying information on the computer sheets and reassigning identification codes, these forms were removed from the pharmacy. Over the weekend, the resident's profiles were placed in order by room number which facilitated data collection once at the nursing home. Again using the manual shown in

Appendix B, all prescriptions for sleep medications were noted so that data on these medications would be collected.

Beginning Monday evening<sup>23</sup>, this investigator and one pharmacy student assistant would arrive with the data collection forms at the facility each night and conduct chart or cardex reviews one unit at a time. The following information was collected from the medication cardex using the prepared medication profile on each resident for the noted sleep medications: a) by day of the week (Monday through Sunday), whether or not the sleep medication was given each day, b) the number of doses given each day if greater than one, and c) the initials of the nurse that administered each dose. Thus it was possible to not only identify resident consumption of sleep medication but to also identify the nurse's administration of sleep medications during the seven day period. This latter measure will be discussed in the section on stage III data collection.

c. Measurements

How sleep medications were defined was previously discussed. Six sleep medication variables were created from the seven day audit for subsequent analysis: a) whether or not the resident had an order for any sleep medication, b) if the resident had an order, whether or not the resident used any sleep medication, c) if the resident used some sleep medication, the actual percent of authorized days the resident used the sleep medication, d) whether or not the resident had an order for flurazepam, e) if the resident did have an order for flurazepam, whether or not the resident used any flurazepam, and f) if

the resident used flurazepam, the actual percent of authorized days the resident used flurazepam. The variables calculating percent of use (i.e, c and f above) were based on the following formula:

$$\text{actual \% of authorized days with use} = \left| \frac{\# \text{ days a dose was consumed}}{\# \text{ days an order was active}} \right| * 100$$

If more than one dose was taken a night, this was still considered one night's use.

Symptoms were coded using the National Ambulatory Medical Care Survey: Symptom Classification.<sup>24</sup> Classification was mutually exclusive but only previously selected symptoms were coded. Only symptoms documented as disruptive of sleep were coded. This list is shown in Table II-2. The symptom categories along with NAMCS codes are provided in Appendix D.

Each resident received a code for each of the four categories of symptoms (shown in Table II-2) indicating whether or not the resident had one or more symptoms for that category. The resident also received a code for whether or not he/she had any sleep disruptive symptom during the week and a score indicating the total number of different sleep disruptive symptoms that were charted.

Intracoder reliability for symptom codes was 100%. All nursing home medication cardex usage information was compared to unit dose billing records at the pharmacy. Discrepancies were noted and reconciled.

It did not appear that any awareness by the nurses of the upcoming sleep medication study had a dampening effect on sleep medication

ordering when compared to the time the two month audit was conducted. Between the two month audit (which was collected retrospective from the time the facilities' administrators agreed to the study) and the seven day audit, the percent of residents with sleep medication ordered rose slightly (from 27.1% to 27.5%). Of course fewer residents had an opportunity to use during the seven day time period and consequently a lower percent of the seven day resident sample that had an order, used any sleep medication at all. The differences between these two data sets in the patterns of sleep medication ordering and use will be discussed in greater detail in the next chapter.

## 5. Stage III - Nurse Data Collection

### a. Population

Included in the nurse sample population were 76 evening and night shift nurses that cared for any resident in the seven day audit and that had responsibility for medication administration. This sample did not include administrative supervisors or treatment nurses who did not have opportunities to pass medications. The nurses were asked to read and sign a consent form and return the completed survey. After three follow-ups, 56 nurses (74%) had returned surveys. On the average, respondents were 34 years old, had worked in the facility 3.5 years, and both their mothers and fathers had 13 years of education. The licenses held by the nurses were almost equally divided with 47 percent being registered nurses (R.N.) and 53 percent being licensed practical nurses (L.P.N.).

The respondent nurses were compared to the nonrespondent nurses on 30 available variables (Tables II-5 through II-9). These two groups were more alike than dissimilar but they did differ significantly on three important characteristics. Compared to respondents, the nonrespondent nurses administered flurazepam to a significantly greater percent of their residents with flurazepam ordered, administered PRN flurazepam to a significantly greater percent of their residents with PRN flurazepam ordered, and cared for residents who used a significantly greater proportion of analgesic orders. Although not a significant difference, it appears that nonrespondent nurses cared for slightly more residents with any type of medication ordered (sleep medication, stimulants, sedatives, psychotropics with the exception of analgesics) than did the respondent nurses. Thus the nonrespondent nurses may be administering a greater amount of all medications compared to respondents. A similar possible explanation is that the nonrespondent nurses were the busier medication nurses and thus did not take time to complete the survey. The facility with the lowest response rate was a facility where, compared to other facilities in the study, this author perceived there was a relatively high level of disorganization on evenings when the facility was visited and there was a general lack of structure for the nurses. Between the time of the two month audit and the seven day audit, this facility had two different administrators, two different nursing directors, and three evening shift supervisors. It is also possible that nonrespondent nurses were aware of their flurazepam administration, perceived it as inappropriate, and did not want to be studied. In any case, the respondent sample is not

Table II-5. Nonrespondents Compared to Respondents -  
Nurse Interval Variables.<sup>a</sup>

Variables	Mean Ranks		Z
	Nonrespondents (N = 20)	Respondents (N = 56)	
TOTWORK (# eve/noc worked)	41.6	37.4	-.76
TOTRES (# residents cared for)	38.2	38.6	-.06
% of residents cared for with any sleep med order	46.3	35.7	-1.84
% of residents with sleep med order that nurse administered	40.5	37.8	-.48
% of residents with PRN sleep med order that nurse administered	44.0	36.5	-1.34
% of residents cared for with flurazepam order	45.3	36.1	-1.61
% of residents with flurazepam order that nurse administered <sup>b</sup>	40.2	30.2	-2.06*
% of residents with PRN flurazepam order that nurse administered <sup>b</sup>	40.2	30.2	-2.32*

\*p < .05.

<sup>a</sup>Using Mann-Whitney (Wilcoxon) test.

<sup>b</sup>N falls to 18, 47.

Table II-6. Nonrespondents Compared to Respondents -  
Nurse Dichotomous Variables <sup>a</sup>.

Variables	Percent in each group		Chi-square
	Nonrespondents (N = 20)	respondents (N = 56)	
NOCSHIFT			
% working night shift	45	36	.54
ONEPLACE			
% working only one place	65	55	.56

\*p < .05.

<sup>a</sup>Probability based on chi-square.

Table II-7. Nonrespondents Compared to Respondents - Background  
Characteristics of Residents Cared for by Each Group. <sup>a</sup>

Residents' Characteristics	Mean Ranks		Z
	Nonrespondents (N = 20)	Respondents (N = 56)	
$\bar{X}$ age	34.5	39.9	-.95
$\bar{X}$ length of stay	31.7	40.9	-1.61
% male	46.7	35.6	-1.93
% on Medicaid	36.0	39.4	-.58

\*p < .05.

<sup>a</sup>Using Mann-Whitney (Wilcoxon) test.

Table II-8. Nonrespondents Compared to Respondents - Diseases and Symptoms of Residents Cared for by Each Group.<sup>a</sup>

<u>Residents' characteristics</u>	<u>Mean Ranks</u>		<u>Z</u>
	<u>Nonrespondents (N = 20)</u>	<u>Respondents (N = 56)</u>	
% with sleep disruptive disease	33.4	40.3	-1.19
$\bar{X}$ # sleep disruptive diseases	32.2	40.8	-1.50
% with sleep disruptive sxs	41.2	37.5	-.64
$\bar{X}$ # sleep disruptive sxs	42.0	37.3	-.82
% with pain sx	45.0	36.2	-1.55
% with agitation sx	37.0	39.0	-.34
% with behavioral sx	39.1	38.3	-.14
% with physical sx	41.1	37.6	-.61

\*p < .05.

<sup>a</sup>Using Mann-Whitney (Wilcoxon) test.

Table II-9. Nonrespondents Compared to Respondents - Medication Orders and Use for Residents Cared for by Each Group.<sup>a</sup>

<u>Residents' characteristics</u>	<u>Mean Ranks</u>		<u>Z</u>
	<u>Nonrespondents (N = 20)</u>	<u>Respondents (N = 56)</u>	
% with stimulant order	40.6	37.7	-.51
% with stimulant use <sup>b,c</sup>	40.6	37.1	-.63
% with sedative order	42.6	37.0	-.96
% with sedative use <sup>c</sup>	33.9	40.1	-1.07
% with psychotropic order	40.6	37.7	-.50
% with psychotropic use <sup>c</sup>	35.9	39.4	-.61
% with analgesic order	31.9	40.9	-1.57
% with analgesic use <sup>c</sup>	48.9	34.8	-2.46*

\*p < .05.

<sup>a</sup>Using Mann-Whitney (Wilcoxon) test.

<sup>b</sup>N falls to 20, 55.

<sup>c</sup>Of the residents with an order for that category of medication, the percent of residents using some.

representative in regards to their administration of flurazepam since the nurses administering the most are not included.

b. Sources of data and collection

During the fall of 1983, the author made arrangements to interview each facility's nursing director and visit the facility on several evenings. The purposes of these visits were to a) obtain more information about the facilities so that data collection forms could be prepared and b) to conduct unstructured interviews with nurses so that the concepts of behavioral approach proposed earlier could be refined into valid questions. Two to three visits were made to each facility and 30 nurses, in addition to the directors, were interviewed. Although it would have been potentially too inhibiting to take notes during these interviews, detailed records consisting of written field-notes about what had been seen and heard at each facility (particularly about the interview information) and including diagrams were made immediately after each visit. This interview information was developed into a pilot survey.

The pilot survey went through a series of further refinements. The nursing directors and administrators of all the facilities were asked to review the questions.<sup>25</sup> In addition, three researchers familiar with survey technique and four nurses reviewed the preliminary survey's questions. On the basis of this feedback, additional survey changes were made.

Ultimately the survey, data collection forms, and methods were pretested in one of the six facilities involved in the seven day audit.

Five evening or night shift nurses completed the survey and later discussed it. Only minor changes in the survey were made after this pretest and the pretest nurses' responses have been combined with all others.

At this point in time, the remaining facility's directors of nursing were contacted and a week for data collection arranged. Careful consideration was given to the week selected to avoid holidays, state inspections, or any other disturbances that might unusually influence medication administration. On the Thursday or Friday before the designated week, the facility's director of nursing supplied a complete list of evening and night shift nurses working during the seven day audit time period. This list also identified which units each nurse worked on each day of the week. This made it possible to determine exactly which residents each nurse cared for and for whom she was responsible for medication administration. As mentioned previously, the information collected from the medication cardex included identification of the nurse actually administering the sleep medication.

While conducting the audit of the nursing notes and medication cardexes, the author distributed the surveys to the evening and night shift nurses. Each nurse was given a letter explaining the study, two consent forms (one copy for the nurse to keep), the survey, and a postage paid envelope for mailing completed surveys back to the project coordinator. If the nurse did not return the survey after one week she received a follow-up letter. If the survey had not been returned after two weeks, a second follow-up letter was sent along with another copy of the survey. After approximately four weeks, the nursing supervisors

were contacted and asked for their cooperation in distributing a third follow-up letter. The third follow-up letter and a third copy of the survey were given to the supervisors for distribution and collection. Forty-eight percent of the respondents completed the survey without follow-up. The first, second, and third follow-ups produced 11, 18, and 23 percent of the respondents respectively. Copies of the letters sent and consent form are in Appendix E. A copy of the survey is contained in Appendix F. The survey questions were made into a 5-1/2 by 8-1/2 inch booklet for distribution.

To maintain confidentiality, the nurses were assigned identification numbers. These numbers were stored separate from completed surveys. Upon receipt of signed consent forms and completed surveys, these were separated and stored separately.

c. Measurements

The first task was to develop measures of nurse opportunity and administration of sleep medications based on the information collected in the seven day audit. It was noted that, of the residents with sleep medication ordered, about 92 percent had the medication administered every night of the seven nights or not at all. There were relatively few sporadic users in this data set. Consequently the decision was made to operationalize nurse behavior by the number of residents and not take into account the number of nights each resident's order for sleep medication was active. The following measures were calculated for each nurse: a) of the residents cared for by the nurse, the percent with any sleep medication ordered, b) of the residents

cared for that had orders, the percent to whom the nurse actually administered the sleep medication, c) of the residents cared for that had PRN sleep medication ordered, the percent to whom the nurse actually administered the medication, d) of the residents cared for by the nurse, the percent with flurazepam ordered, e) of the residents cared for that had flurazepam ordered, the percent to whom the nurse actually administered the sleep medication, and f) of the residents cared for that had PRN flurazepam ordered, the percent to whom the nurse actually administered the medication. These measures were obtained by first manually sorting out the residents cared for by the nurse based on resident room number in conjunction with the nurse's unit assignment, then counting the number of residents with orders the nurse had opportunity to administer, and lastly counting the number of different residents the nurse administered to based on her initials. Only the first dose opportunities to give a sleep medication each evening/night the nurse worked were examined in this study.<sup>26</sup>

The resident characteristics under each nurse's care that are examined in this study are listed in Table II-10. For these variables the residents were computer sorted by room numbers relevant to where the nurse worked and the means or percents for that nurse were calculated on this group of residents. This information was then reentered into the nurse's data file. This procedure was repeated for each of the 56 nurses.

Four work situation characteristics were coded for each nurse (see Table II-11). Three of these variables were created from the work roster supplied by the nursing supervisors. These include a measure of

Table II-10. Resident Characteristics Under Each Nurse's  
Care That Are Examined.

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Mean age
Mean length of stay in facility
Percent male
Percent on Medicaid
Percent with any sleep disruptive disease
Mean number of sleep disruptive diseases
Percent with any sleep disruptive symptoms (also broken down by category).
Mean number of sleep disruptive symptoms
Percent with stimulant medication ordered
Of residents with stimulant medication ordered, percent with use
Percent with analgesic ordered
Of residents with analgesic ordered, percent with use
Percent with psychotropic ordered
Of residents with psychotropic ordered, percent with use
Percent with sedative medication ordered
Of residents with sedative ordered, percent with use

---

the number of evenings or nights the nurse worked during the seven day audit, what shift the nurse worked, and whether or not the nurse worked with the same group of residents each time she worked that week. The fourth variable is a count of the total number of different residents that the nurse cared for that week. This was computed using the work roster and adding up the number of residents cared for by the nurse for each of the units she worked on during the week.

Five nurse background variables were examined: nurse age, number of years that nurse had worked at the nursing home, number of years of father's education, number of years of mother's education, and license held (R.N. or L.P.N.). These variables were all coded from survey responses. Table II-11 indicates which questions were used.

Scales had to be developed to measure the nurse's self-sent role, perceived other-sent role, beliefs about sleep medication use, sense of responsibility for sleep medication decisions, and knowledge. Question 6 was used for self-sent role score. An answer of "no" was scored 0, "uncertain" scored 1, and "yes" scored 2. If the nurse was not missing answers on more than 50 percent of the items for question 6, the average of her responses on the answered items was filled in for the missing item. Item analysis was performed as recommended by Babbie<sup>27</sup> and Lemon<sup>28</sup>. Each item was examined for its variance and evenness of frequency distribution. Then item by item correlations were examined for direction of relationship and duplication. A composite score consisted of adding together all the items on question 6 with a high score representing liberal self-sent role. The inter-quartile rank of the items as well as item by composite score correlation were examined. On the

basis of this analysis, several items were not included in the final composite self-sent role score. Table II-11 indicates which items were used. The reliability coefficient for this score is .75 (Cronbach's alpha).

A score for nurses' perceptions of others role expectations was compiled from question 10. A response of "liberal administration" was coded +1, "conservative administration" coded -1, and "don't know" or left blank were coded 0. Item A ("your supervisor") was deleted because it had become clear while at the facilities that this did not represent any single person and that it could vary each night. Two other items were eliminated because responses to them did not vary. The composite score thus consisted of the addition of the ten remaining items (question 10B through K). A positive score indicated liberal other-sent role while the more negative score indicated more conservative other-sent role.

The belief score was developed from question 9.<sup>29</sup> Scores of 1 through 5 were assigned to responses with 5 representing strongly agree and 1 representing strongly disagree. The coding of the responses to items C, D, and G were reversed. The same procedure used for item examination with the self-sent role score was repeated for the belief score. Two items were removed from the final belief score. Table II-11 shows which items were used in the final belief score. These items were added together to form a composite measure with the score increasing as beliefs became more liberal. The reliability coefficient for this measure is .54 (Cronbach's alpha). This figure is low for a reliability coefficient. It may reflect the low internal consistency

of the belief measure but also reflects the small number of items used to form the measure.

The nurse's score for her sense of responsibility for decisions about sleep medications is a composite of all items from question 7. A count was made of the number of times the nurse checked that she (nurse) was responsible for one of the decisions and a second count made for all the times she indicated that someone (nurse, physician, resident, pharmacist) was responsible. These two figures were used to calculate the percentage of decisions for which the nurse felt solely responsible.

$$\% \text{ responsibility} = \left| \frac{\# \text{ decisions nurse responsible for}}{\# \text{ decisions anyone responsible for}} \right| * 100$$

The higher the percent, the more likely the nurse was to have indicated that she was solely responsible for decisions. The lower the percent, the more likely the nurse was to feel others should be involved in the decisions.

Two measures of nurse's knowledge were developed: a general knowledge score for sleep medications and a knowledge of the potential side effects of flurazepam. The general knowledge score was based on question 15. For items 10a, e, g, h, l the correct response was "false." For all other items the correct response was "true." A correct response was scored +1, incorrect response coded -1, and "do not know" or left blank were coded 0. One item was eliminated from the final score because responses did not vary. The final knowledge score

consisted of the addition of the codes on the remaining 13 items so that the higher the knowledge score, the greater the number of correct responses given by the nurse.

The score for knowledge of flurazepam side effects came from question 13. Five potential side effects of flurazepam were listed. The nurse received a score of one for each side effect she recognized. Thus a total score of 5 indicated that the nurse correctly identified all the side effects.

#### 6. Plan for Analysis

The analyses of this study's data are divided into two chapters. The next chapter, Chapter Three, contains the analyses with the resident as the unit of analysis and primarily assesses the biomedical approach to examining sleep medication consumption in long-term care facilities. Chapter Four presents the analyses at the level of the nurse and assesses both the psychosocial approach and the biomedical approach at this level.

Each of the next two chapters is divided into three analytical steps. The first step in analysis is to simply describe the patterns of sleep medication use seen with each of the two units of analysis. Next, the bivariate relationships proposed by the biomedical and psychosocial approaches are examined. The last step will be to reduce the number of variables and conduct nonparametric regression analysis using the factors found significant with the bivariate analysis.

Where relevant, qualitative data gathered from the preliminary nurse interviews will be added. Quantitative data were analyzed with

the aid of the facilities at the Engineering Research Center and the Madison Academic Computing Center, both at the University of Wisconsin-Madison. BMDP, SPSS, and SPSS-X programs were used for the statistical analysis.<sup>30</sup>

## FOOTNOTES - CHAPTER 2

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13. It was also felt that the approach taken by Katz and Kahn, that is of defining roles within an organizational context, would be useful to future research considering factors beyond the level of individual actors.
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18. It also was assumed, and later confirmed, that there would be too few cases of scheduled sleep medications not being administered to allow examination of factors related to the extent of scheduled sleep medication administration by nurses, i.e., there was too little variation.

19. This average bed size is extremely close to that reported for skilled nursing facilities in Wisconsin (126 beds/SNF) and for skilled or intermediate care facilities in the United States (120 beds/facility). See: Wisconsin Department of Health and Social Services. 1982. Nursing Home Utilization Data: Wisconsin, 1980. Division of Health, Bureau of Health Statistics. Resource Data Section, November; and U.S. Department of Health Education and Welfare. 1981. Utilization Patterns and Financial Characteristics of Nursing Homes in the United States: 1977 National Nursing Home Survey. (DHEW Pub. No. PHS 81-1714.) Washington, D.C.: U.S. Government Printing Office.
20. American Society of Hospital Pharmacists. 1983. American Hospital Formulary Service. Bethesda, MD.
21. International Classification of Diseases, 9th Revision. 1978. Clinical Modification (ICD-9CM). Ann Arbor, Michigan: Edwards Brothers, Inc.
22. At one of the original seven facilities, the administrator had arranged an inservice on sleep medications for the nurses. The inservice was conducted after the 2 month audit but prior to the 7 day audit. Because of the potential impact of this education on nurses administration of sleep medication, this facility was not included in the 7 day audit.
23. The data collection was conducted usually between 6 PM and midnight. This was a time period when charts were less frequently needed by staff. It also allowed the investigator to interface with the evening and night shift nurses asked to participate in the survey.
24. U.S. Department of Health, Education, and Welfare. National Center for Health Statistics. 1974. The National Ambulatory Medical Care Survey: Symptom Classification. Vital and Health Statistics. DHEW Pub. No. (HRA)74-1337. Rockville, MD: Public Health Service, May.
25. The nursing directors and administrators were explicitly instructed to not share any information about the survey with their staff nurses.

26. If the order for sleep medication was not active any evening/night that the nurse worked, the order was not counted as an opportunity (i.e., not considered an order for the nurse to possibly act upon). Similarly, if the evening shift nurse administered the first dose of the sleep medication there was no order counted for the night shift nurse since the night shift nurse no longer had the opportunity to administer the first dose to the resident that day. Thus, sleep medication orders authorizing repeated doses (e.g., sig: i at bedtime prn, may repeat x 1) could be coded the following ways depending on who administered the first dose of the medication: a) if neither the evening nor night shift nurse administered the sleep medication to the resident, the order would be coded as a possible order for each nurse to have administered but no administration by either nurse, b) if the evening shift nurse administered the medication, the evening shift nurse would be considered having an order to act upon and coded for administering a first dose of the sleep medication while the night shift nurse received no code for either first dose opportunity or administration, and c) if the night shift nurse administered the first dose of the sleep medication, the night shift nurse would be considered having an order to act upon and coded as administering the first dose of the sleep medication while the evening shift nurse was considered only having an order to act upon but no administration.
27. Babbie ER. 1973. Survey Research Methods. Belmont, CA: Wadsworth Publishing Company, Inc., p. 253-278.
28. Lemon N. 1973. Attitudes and Their Measurement. New York: John Wiley and Sons, Inc., p. 177-182.
29. Question 9 in the survey was adapted with the permission of Dr. Lawrence Linn (Department of Medicine, Health Services Research Center, Los Angeles, CA) from his prior work.
30. Nie NH et al. 1975. SPSS: Statistical Package for the Social Sciences. Second edition. New York: McGraw-Hill Book Company; Dixon WJ (ed.). 1983. BMDP Statistical Software. Berkeley: University of California Press; SPSS Inc. 1983. SPSS-X User's Guide. New York: McGraw-Hill Book Company.

CHAPTER THREE  
RESULTS OF THE BIOMEDICAL APPROACH -  
RESIDENT UNIT OF ANALYSIS

A. INTRODUCTION

In the last chapter, several hypotheses were posited using the biomedical approach for examining factors related to the various stages of the sleep medication use process. At the resident level of analysis, it was hypothesized that the existence of sleep disruptive disease, the existence of sleep disruptive symptoms, and the orders and use of stimulant medication would relate positively to the steps in the sleep medication consumption process. The orders and use of sedative medications, psychotropics, and analgesics were each hypothesized to relate negatively to the sleep medication use stages. The steps of the medication use process were defined to be a) the existence of a sleep medication order, b) the use of some sleep medication given there is an order, and c) the extent to which sleep medication use occurs given there is some use. It was further proposed to examine this process specifically for flurazepam, a medication that is marketed solely for use with sleep disorders.

The residents' demographic characteristics and the variables included in the hypothesized biomedical relationships resulted in thirty-five resident characteristics to be examined as independent variables. The categories of resident characteristics are background factors, diseases, orders and use of specified medications, and symptoms. These variables are described in Table III-1 with details provided in Appendix G.

TABLE III-1. Summary of Resident Background and Biomedical Variables. <sup>a,b</sup>

<u>Variable Name</u>	<u>Brief Description</u>	<u>Scale of Measurement</u>
<b>Background:</b>		
AGE	Actual age in years	Interval
FEMALE	Resident is female	Dichotomous
MEDICAID	On Medicaid payment plan	Dichotomous
STAY	Length of stay in years	Interval
<b>Diseases:</b>		
ANYDIS	Resident has sleep disruptive disease	Dichotomous
NUMDIS	Number of sleep disruptive diseases	Interval
Category:	Resident has a disease in category listed. Categories are: BLOOD, RESPIRATORY, SYMPTOMS, INJURY, ENDOCRINE, MENTAL, NERVOUS, CIRCULATORY, DIGESTIVE, MUSCULO., OTHER	Dichotomous (each category)
<b>Other medications:</b>		
STIMORD	Resident has stimulant ordered	Dichotomous
ANORD	Resident has analgesic ordered	Dichotomous
PSYORD	Resident has psychotropic ordered	Dichotomous
SEDORD	Resident has sedative ordered	Dichotomous
STIMUSE	Resident has stimulant use	Dichotomous
ANUSE	Resident has analgesic use	Dichotomous
PSYUSE	Resident has psychotropic use	Dichotomous
SEDUSE	Resident has sedative use	Dichotomous
MDDSTIM	Mean # stimulant doses used/day	Interval
MDDAN	Mean # analgesic doses used/day	Interval
MDDPSY	Mean # psychotropic doses used/day	Interval
MDDSED	Mean # sedative doses used/day	Interval
<b>Symptoms:</b>		
ANYSX	Resident has any sleep disruptive symptom	Dichotomous
NUMSX	Number of sleep disruptive symptoms	Interval
Category	Resident has sleep disruptive symptom in category listed. Categories are: PAIN, AGITATION, BEHAVIORAL, PHYSICAL	Dichotomous (each category)

<sup>a</sup>Detailed descriptions of coding and frequencies are provided in Appendix F.

<sup>b</sup>Symptoms were based on the seven day audit sample (N = 730). All other variables were from two month audit sample (N = 863).

The variables under consideration are dichotomous or interval. All variables except symptoms are based on data coded from the two month audit of records.

It should be noted here that the majority of the interval independent variables (as well as one of the dependent variables to be described next) are not normally distributed. Thus the decision was made to use nonparametric tests in analyses. The reasoning for this decision will become clearer when the patterns of sleep medication consumption are described.

This chapter presents only those findings using the resident as the unit of analysis. The study's findings are presented in the following order: a) the description of the patterns of sleep medication orders and consumption among residents, b) the bivariate analyses of factors relating to resident orders and consumption of sleep medication, and c) the nonparametric multivariate regression analyses.

## B. DESCRIPTIONS OF RESIDENT SLEEP MEDICATION ORDERS AND CONSUMPTION

### 1. Orders and Consumption of Any Sleep Medication

Figures III-1 and III-2 outline the patterns of sleep medication consumption by residents in the two data sets. These outlines follow the process approach to examining medication use that was discussed in Chapter Two (Figure II-2) and further delineates this process by type of medication (i.e., flurazepam versus any type of sleep medication).

In both data sets, about 27 percent of the residents had an order for some type of sleep medication. Comparing the two data sets on the

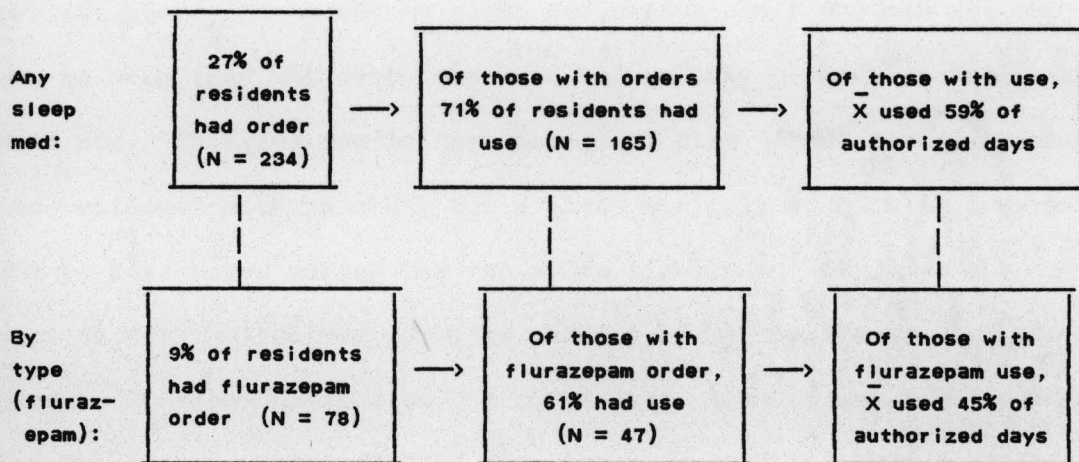


Figure III-1. Patterns of Sleep Medication Consumption (2 month data).

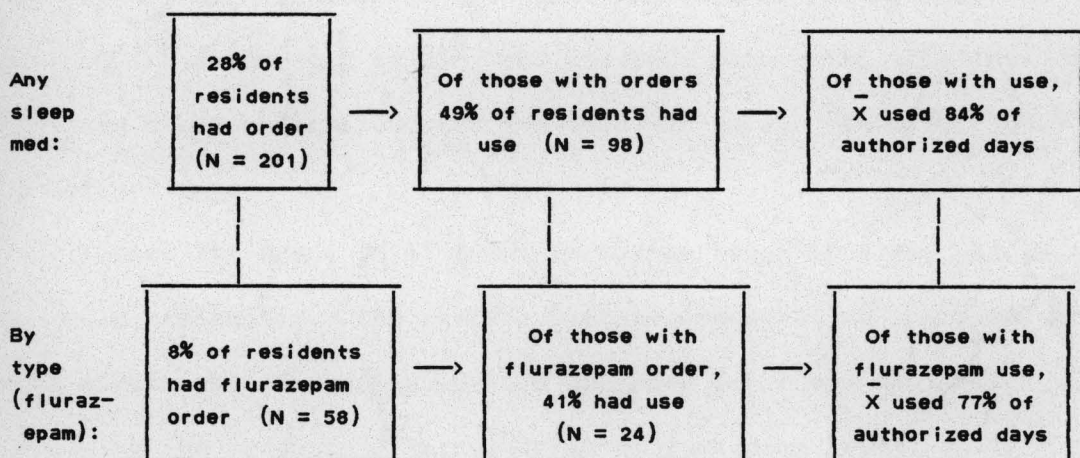


Figure III-2. Patterns of Sleep Medication Consumption (7 day data).

percent of residents with a sleep medication order who had any use, it can be seen that the seven day data had a lower percent of residents with use. When two months data were collected, about three-fourths of the residents with an order for a sleep medication actually consumed one or more doses during the two month time span. During the seven days of data collection, only 49 percent of the residents with an order consumed a sleep medication. A comparison of these two time frames indicates that, when a longer time frame is used for data collection, the majority of those residents with a sleep medication ordered do use the medication at some point in time.

On the average, the residents in the seven day data set who used sleep medication were using the medication almost nightly (84 percent of the authorized days or about 6 out of 7 days). Over the two month time span, the residents used sleep medication on the average 59 percent of the authorized days. Thus for both data sets, if a resident used any sleep medication, the tendency was to use the majority of authorized days.

Tables III-2 and III-3 indicate the patterns of sleep medication use more explicitly. The overall picture demonstrates a bimodal pattern of use with residents who had an order for sleep medication either consuming the medication infrequently or consuming almost daily. Therefore, the distribution of the extent of sleep medication consumption by residents who consume any sleep medication is U shaped rather than normally distributed.

TABLE III-2. Distribution of Resident Orders For and Use of Any Sleep Medication.

- 2 month data -

<u>Variable</u>	<u>Category</u>	<u>Code<sup>a</sup></u>	<u>Frequency</u>	<u>Relative Frequency (%)</u>
SLEEPORD <sub>1</sub> (Resident has an order)	None	0	629	72.9
	≥1	1	<u>234</u>	27.1
			863	
SLEEPUSE <sub>1</sub> (Of residents with any order, resident has use)	None	0	66	28.6
	≥1	1	<u>165</u>	71.4
			231	
SLEEPPT <sub>1</sub> (Of residents with use, estimated % of days used)	1-19%	b	46	27.9
	20-39%		17	10.3
	40-59%		15	9.1
	60-79%		11	6.7
	80-99%		32	19.4
	100%		<u>44</u>	26.7
			165	

<sup>a</sup>Code number refers to classification used in analysis.

<sup>b</sup>SLEEPPT<sub>1</sub> was coded using actual percent figures. Mean = 58.9, std. dev. = 39.5, and range = 1.6 to 100.

TABLE III-3. Distribution of Resident Orders for and Use of Any Sleep Medication.

- 7 day data -

<u>Variable</u>	<u>Category</u>	<u>Code<sup>a</sup></u>	<u>Frequency</u>	<u>Relative Frequency (%)</u>
SLEEPORD <sub>2</sub> (Resident has an order)	None	0	529	72.5
	<u>≥1</u>	1	<u>201</u>	27.5
			730	
SLEEPUSE <sub>2</sub> (Of residents with any order, resident has use)	None	0	103	51.2
	<u>≥1</u>	1	<u>98</u>	48.8
			201	
SLEEPPT <sub>2</sub> (Of residents with use, % of days used)	10-39%	b	14	14.3
	40-69%		4	4.0
	70-99%		12	12.2
	<u>100%</u>		<u>68</u>	69.4
			98	

<sup>a</sup>Code number refers to classification used in analysis.

<sup>b</sup>SLEEPPT<sub>2</sub> was coded using actual percent figures. Mean = 83.8, std. dev. = 29.2, and range = 14.3 to 100.0.

## 2. Orders and Consumption of Flurazepam

Figures III-1 and III-2 show that approximately one-third of the sleep medication orders were for flurazepam (in both data sets). Looking at flurazepam separately and comparing to sleep medication use in general, it is seen that residents with flurazepam ordered were somewhat less likely to use any and used somewhat less often. Sixty-one percent of the residents with flurazepam ordered used some of the medication during the two month time span and 41 percent of those residents with flurazepam ordered used during the seven day study.

Tables III-4 and III-5 demonstrate the patterns of flurazepam use in more detail. Similar to the pattern seen with sleep medication use in general, flurazepam use also shows a bimodal pattern. However, Tables III-4 and III-5 show that the use of flurazepam was more sporadic than seen with sleep medications in general. This is particularly apparent comparing the relative frequencies of Tables III-2 and III-4 (i.e., the two month data set). Looking at these residents in the two month data set who used but used infrequently (less than 20 percent of the authorized days), this low use group consisted of 28 percent of the general sleep medication users. Examining flurazepam users it is seen that the low use group (people who used flurazepam less than 20 percent of the authorized days) consists of 45 percent of all the flurazepam users. This demonstrates a tendency to use flurazepam less than sleep medications in general.

## 3. Summary

Although the definition of what is being considered a

TABLE III-4. Distribution of Resident Orders for and Use of Flurazepam.

- 2 month data -

<u>Variable</u>	<u>Category</u>	<u>Code<sup>a</sup></u>	<u>Frequency</u>	<u>Relative Frequency (%)</u>
FLURORD <sub>1</sub> (Resident has flurazepam order)	None	0	785	91.0
	≥1	1	<u>78</u>	9.0
			863	
FLURUSE <sub>1</sub> (Of residents with an order, resident has use)	None	0	30	39.0
	≥1	1	<u>47</u>	61.0
			77	
FLURPT <sub>1</sub> (Of residents with use, estimated % of days used)	1-19%	b	21	44.7
	20-39%		4	8.5
	40-59%		4	8.5
	60-79%		2	4.3
	80-99%		9	19.1
	100%		<u>7</u>	14.9
			47	

<sup>a</sup>Code number refers to classification used in analysis.

<sup>b</sup>FLURPT<sub>1</sub> was coded using actual percent figures. Mean = 45.3, std. dev. = 41.0, and range = 1.6 to 100.0.

TABLE III-5. Distribution of Resident Orders for and Use of Flurazepam.

- 7 day data -

<u>Variable</u>	<u>Category</u>	<u>Code<sup>a</sup></u>	<u>Frequency</u>	<u>Relative Frequency (%)</u>
FLURORD <sub>2</sub> (Resident has a flurazepam order)	None	0	672	92.1
	≥1	1	<u>58</u>	7.9
			730	
FLURUSE <sub>2</sub> (Of residents with an order, resident has use)	None	0	34	58.6
	≥1	1	<u>24</u>	41.4
			58	
FLURPT <sub>2</sub> (Of residents with use, % of days used)	10-39%	b	5	20.8
	40-69%		1	4.2
	70-99%		5	20.8
	100%		<u>13</u>	54.2
			24	

<sup>a</sup>Code number refers to classification used in analysis.

<sup>b</sup>FLURPT<sub>2</sub> was coded using actual percent figures. Mean = 77.2, std. dev. = 32.1, and range = 14.3 to 100.0.

sleep medication differs somewhat from that used by other studies, the percent of residents with a sleep medication order is similar to figures reported elsewhere.<sup>1</sup> If however diphenhydramine was not included as a sleep medication in this study, the percent of residents with a sleep medication order would be lower than that reported by others. This could indicate that orders for sleep medications in long-term care facilities has declined over time, preference for a particular product has shifted, or differences in the populations studied. Several nurses during the unstructured interviews commented on the decline in flurazepam use over the years.<sup>2</sup> Although the prestudy interviews with the pharmacists did not indicate any obvious efforts were being made to decrease sleep medication use at the facilities, it is still possible that the pharmacists' involvement at the nursing homes had an impact as well.

The differences between the two data sets should also be noted. The extent of sleep medication use (i.e., the percent of authorized days that residents used) was considerably less in the two month data set than in the seven day data set. When a longer time is examined, the usage figures reported are more likely to include additional numbers of residents who use the medication only occasionally. The shorter the time period, the lower the numbers of infrequent medication users that are included in the sample. This means that the patterns of sleep medication consumption reported by the two data sets are directly influenced by the time period used for data collection.

A bimodal pattern for sleep medication use was found regardless of time period studied or type of sleep medication. This is similar to

the pattern of flurazepam consumption found by others.<sup>3</sup> However as mentioned earlier, this does result in the need to use statistical tests which make minimal assumptions about the underlying distributions of data.

One last point highlighted by examining sleep medication usage patterns is the difference between flurazepam consumption from consumption of sleep medications in general. The lower use of flurazepam compared to sleep medications generally could reflect awareness of the adverse effects of flurazepam in geriatric populations particularly when compared to other sedative-hypnotics.<sup>4</sup> It also indicates a need to take into consideration the type of sleep medication when examining factors affecting sleep medication use.

#### C. FACTORS RELATING TO RESIDENT SLEEP MEDICATION ORDERS AND CONSUMPTION

Because of the volume of statistical tables needed to present the bivariate statistics for factors relating to resident orders and use of sleep medication, summary tables were prepared for use in the text. These tables (Tables III-6 through III-14) indicate the direction of the relationship and significance level for those relationships that were significant. No notation indicates that the relationship was not significant. Complete detailed statistical tables are provided in Appendix H.

##### 1. Resident sleep medication orders

Two background factors were found to relate significantly

to residents having an order for sleep medication: resident age and length of stay at the facility. The residents with an order for a sleep medication were significantly younger than residents without an order (see Table III-6). This may reflect a variety of factors not examined by this study such as a more conservative attitude toward medication use among older residents or a reluctance to give sleep medications to older residents. This relationship with age is consistent with studies demonstrating that older residents have fewer medications of all types prescribed.<sup>5</sup> The residents with a sleep medication order, flurazepam in specific, stayed at the facility less time than did those residents without an order. This relationship is supported by several nurses' comments during interviews that often residents have sleep medication prescribed upon entering the facility but if the sleep medication order does not get used, the order is discontinued.<sup>6</sup>

In contrast to what had been hypothesized, neither the existence of sleep disruptive disease nor the number of sleep disruptive diseases related to having a sleep medication order. However, the variable quantifying the number of sleep disruptive diseases may not adequately measure a resident's level of illness. It could be that, instead of the number of diseases, it is the severity of the illnesses that relate to the existence of sleep medication orders. Thus counting the number of diseases may be a poor proxy for level of illness.

Two disease categories did relate significantly to having a sleep medication. Residents with a respiratory disease were significantly more likely to have a sleep medication ordered and significantly more likely to have flurazepam specifically ordered. Residents with an

TABLE III-6. Summary Statistics - Resident Background and Disease Factors Relating to Orders for Any Sleep Medication and Flurazepam.<sup>a</sup>

- 2 month data -

<u>Variables</u>	SLEEPOD <sub>1</sub> Has an order (N = 863)	FLURORD <sub>1</sub> Has flurazepam order (N = 863)
Background:		
AGE	(-)*	
FEMALE		
MEDICAID		
STAY	(-)***	(-)**
Diseases <sup>b</sup>		
ANYDIS		
NUMDIS		
<u>Category</u>		
BLOOD		(+)*
RESPIRATORY SYMPTOMS	(+)**	(+)*
INJURY		
ENDOCRINE	(+)*	
MENTAL		
NERVOUS		
CIRCULATORY		
DIGESTIVE		
MUSCULO.		
OTHER		

\*p < .05.      \*\*p < .01.      \*\*\* p < .001.

<sup>a</sup>Significance based on  $\chi^2$  except AGE, STAY, NUMDIS which are based on Mann-Whitney (Wilcoxon). Supporting tables are provided in Appendix H, Tables H-1 through H-3.

<sup>b</sup>One case missing.

endocrine disease were also significantly more likely to have any sleep medication ordered. Having a disease of the blood system only related significantly to having flurazepam ordered. These results are difficult to explain particularly since they do not overlap with those reported by others.<sup>7</sup> The use of any type of sedative by people with respiratory disease is often contraindicated. However, it is well known that emotional factors can affect people with certain lung diseases (e.g., asthmatics) and thus low doses of sedatives are sometimes used.<sup>8</sup> The relationships between endocrine disease and sleep medication orders, and blood system disease and flurazepam orders remain obscure. The majority of residents with endocrine disease and a sleep medication order fell into three diagnostic categories: diabetes, hypothyroidism, and nutritional problems. Residents with diseases of the blood had primarily anemia. No clear connection between these disorders and the use of sleep medications can be offered. One underlying link between these people is that they all have special diets ordered and thus receive additional attention. Studies have shown that the physician's tendency to prescribe related to higher extent of medication prescribing.<sup>9</sup> Therefore while the physician, pharmacist, and nurse are giving the special consideration and time needed for the resident's diet, needs for additional medication become identified and prescriptions written, more so than for residents not receiving the special attention.

Table III-7 summarizes the relationships between the resident having one type of medication ordered (stimulants, analgesics, psychotropics, or sedatives) and having a sleep medication ordered. A positive

TABLE III-7. Summary Statistics - Resident Medication Factors Relating to Orders for Any Sleep Medication and Flurazepam.<sup>a</sup>

- 2 month data -

<u>Variables</u>	SLEEPORD <sub>1</sub> Has an order (N = 863)	FLURORD <sub>1</sub> Has flurazepam order (N = 863)
Stimulants (STIMORD)		
Analgesics (ANORD)		
Psychotropics (PSYORD)	(+)*	
Sedatives (SEDORD)	(+)**	

\*p < .05.      \*\*p < .01.      \*\*\* p < .001.

<sup>a</sup>Significance based on  $\chi^2$ . Supporting tables are provided in Appendix H, Table H-4.

TABLE III-8. Summary Statistics - Resident Symptom Factors Relating to Orders for Any Sleep Medication and Flurazepam.<sup>a</sup>

- 7 day data -

<u>Variables</u>	SLEEPORD <sub>2</sub> Has an order (N = 730)	FLURORD <sub>2</sub> Has flurazepam order (N = 730)
Symptoms:		
ANYSX		
NUMSX	(+)*	
<u>Category</u>		
PAIN	(+)**	(+)*
AGITATION		
BEHAVIORAL		
PHYSICAL		

\*p < .05.      \*\*p < .01.      \*\*\* p < .001.

<sup>a</sup>Significance based on  $\chi^2$  except NUMSX which is based on Mann-Whitney (Wilcoxon). Supporting tables are provided in Appendix H, Tables H-5 and H-6.

relationship had been hypothesized for stimulant medication orders. It had been hypothesized that the other categories of medications could substitute for a sleep medication's effects and therefore should have a negative relationship. Thus the significant results shown in Table III-7 are opposite to what had been predicted. It appears that residents with a sleep medication ordered are significantly more likely to have some other type of sedative medication ordered.

Examination of resident symptoms provides some support for the biomedical approach (Table III-8). The residents who had a sleep medication ordered had a significantly greater number of sleep disruptive symptoms. The category of sleep disruptive symptoms most relevant was pain. The residents with a sleep medication order, and with a flurazepam order in specific, were significantly more likely to have a painful symptom than residents with no sleep medication ordered.

## 2. Resident sleep medication use

Amazingly few factors related to whether or not those residents with a sleep medication ordered used any medication. Of the background variables, the women with sleep medication ordered were significantly less likely to take the sleep medication than were men with an order. None of the disease variables were significantly related to use (Table III-9).

The residents use of other medications did relate to use of sleep medication but not always in the way that had been hypothesized. As hypothesized, those residents with sleep medication orders and using a stimulant medication were significantly more likely to have used the

TABLE III-9. Summary Statistics - Resident Background and Disease Factors Relating to Use of Any Sleep Medication and Flurazepam.<sup>a</sup>

- 2 month data -

<u>Variables</u>	SLEEPUSE <sub>1</sub> Of residents with order, resident has use (N = 231)	FLURUSE <sub>1</sub> Of residents with flurazepam order, resident has use (N = 77)
Background:		
AGE		
FEMALE	(-)*	
MEDICAID		
STAY		
Diseases <sup>b</sup>		
ANYDIS		
NUMDIS		
<u>Category</u>		
BLOOD		
RESPIRATORY		
SYMPTOMS		
INJURY		
ENDOCRINE		
MENTAL		
NERVOUS		
CIRCULATORY		
DIGESTIVE		
MUSCULO.		
OTHER		

\*p < .05.      \*\*p < .01.      \*\*\* p < .001.

<sup>a</sup>Significance based on  $\chi^2$  except AGE, STAY, NUMDIS which are based on Mann-Whitney (Wilcoxon). Supporting tables are provided in Appendix H, Tables H-7 through H-9.

sleep medication (Table III-10). This relationship was true for flurazepam use as well, although the small cell size makes this result tentative. Similar to sedative orders, those residents using a medication with sedative effects were significantly more likely to also use a sleep medication. A pattern that could result in this unanticipated relationship is that residents determined to be in need of sedation could be receiving sedation around the clock. That is, the resident using a sleep medication at night could be the same individual needing sedation during the day time as well. This may also be related to any paradoxical excitement occurring as a side effect of sedative use but not being recognized as a medication side effect. Thus the side effect could lead to treatment with another sedative medication.

The examination of resident symptoms did not support the biomedical hypotheses with the exception of pain symptoms and flurazepam use. As Table III-11 shows, there were no significant relationships between having sleep disruptive symptoms, number of sleep disruptive symptoms, or category of sleep disruptive symptoms and the use of any type of sleep medication among residents with a sleep medication order. Having painful symptoms or agitation did relate significantly to use of flurazepam in the direction predicted although the small cell sizes make this tentative for agitation symptoms. Those residents with a flurazepam order and using some were significantly more likely to have painful symptoms.

TABLE III-10. Summary Statistics - Resident Medication Factors Relating to Use of Any Sleep Medication and Flurazepam.<sup>a</sup>

- 2 month data -

Variables	SLEEPUSE <sub>1</sub> Of residents with order, resident has use (N = 231)	FLURUSE <sub>1</sub> Of residents with flurazepam order, resident has use (N = 77)
Stimulants (STIMUSE)	(+)**	(+)* <sup>b</sup>
Analgesics (ANUSE)		
Psychotropics (PSYUSE)		
Sedatives (SEDUSE)	(+)*	

\*p < .05.      \*\*p < .01.      \*\*\* p < .001.

<sup>a</sup>Significance based on  $\chi^2$ . Supporting tables are provided in Appendix H, Table H-10.

<sup>b</sup>Small cell size. One or more cells have an expected cell frequency of less than five.

TABLE III-11. Summary Statistics - Resident Symptom Factors Relating to Use of Any Sleep Medication and Flurazepam.<sup>a</sup>

- 7 day data -

<u>Variables</u>	SLEEPUSE <sub>2</sub> Of residents with order, resident has use (N = 201)	FLURUSE <sub>2</sub> Of residents with flurazepam order, resident has use (N = 58)
Symptoms:		
ANYSX		
NUMSX		
<u>Category</u>		
PAIN		(+)*
AGITATION		(+)* <sup>b</sup>
BEHAVIORAL		
PHYSICAL		

\*p < .05.      \*\*p < .01.      \*\*\* p < .001.

<sup>a</sup>Significance based on  $\chi^2$  except NUMSX which is based on Mann-Whitney (Wilcoxon). Supporting tables are provided in Appendix H, Tables H-11 through H-12.

<sup>b</sup>Small cell size. One or more cells have an expected cell frequency of less than five.

### 3. Extent of resident sleep medication use

The next step in analysis was to examine the extent of sleep medication use among those residents that used any. Table III-12 indicates the significant relationships between resident background or disease characteristics and the extent of use of sleep medication. None of these factors related significantly to the extent of flurazepam use although it should be borne in mind that, by virtue of the smaller sample size, significance was less likely. Three out of the four background characteristics examined were related significantly to the

TABLE III-12. Summary Statistics - Resident Background and Disease Factors Relating to Extent of Use of Any Sleep Medication and Flurazepam.<sup>a</sup>

- 2 month data -

<u>Variables</u>	SLEEPPT <sub>1</sub> Of residents with use, estimated % of days used (N = 165)	FLURPT <sub>1</sub> Of residents with flurazepam use, esti- mated % of days used (N = 47)
Background:		
AGE		
FEMALE	(+)*	
MEDICAID	(+)*	
STAY	(+)**	
Diseases:		
ANYDIS		
NUMDIS		
<u>Category</u>		
BLOOD		
RESPIRATORY		
SYMPTOMS	(+)**	
INJURY		
ENDOCRINE		
MENTAL		
NERVOUS		
CIRCULATORY	(+)*	
DIGESTIVE		
MUSCULO.		
OTHER		

\*p < .05.      \*\*p < .01.      \*\*\* p < .001.

<sup>a</sup>Significance based on Mann-Whitney (Wilcoxon) except AGE, STAY, NUMDIS which are based on Spearman's rho. Supporting tables are provided in Appendix H, Tables H-13 through H-15.

extent of sleep medication use. Although it was shown previously that women with sleep medication ordered were less likely than men to use any (Table III-9), when users of sleep medication are examined it appears that female users of sleep medication used the medication more often than their male counterparts. Comparing Medicaid to non-Medicaid resident sleep medication users, the Medicaid residents were found to consume a significantly greater percent of the authorized days. This is similar to Shepherd's findings that Medicaid residents consumed a greater amount of medication than did the private pay residents.<sup>10</sup> Length of stay at the facility shows a significant positive relationship to extent of sleep medication use. Among sleep medication users, the greater the number of years the resident had been at the nursing home, the greater the use of sleep medications. This supports the previously suggested concept that if a sleep medication order is not used, or used infrequently after the resident arrives at the facility, the order gets discontinued. Thus over time the residents who still had sleep medication ordered most likely were frequent users.

Similar to orders and use, having any sleep disruptive disease and the actual number of sleep disruptive diseases did not relate significantly to the extent of sleep medication use by users. However two categories of disease did relate significantly: ill-defined symptoms and circulatory disease. Residents who used any sleep medication and had either illness category were significantly greater users of sleep medication than residents who used sleep medications but did not have one of the diseases. The types of diseases categorized as ill-defined symptoms in this population of residents were primarily seizures of

unknown etiology and vague complaints of discomfort that had been noted by the physician but not attributed to any cause. The use of sleep medication in this rather diverse category could be related to the need to control nighttime seizure activity or a method of attempting to alleviate ambiguous symptoms. In regards to circulatory disease, congestive heart failure was one of the diseases initially included in the sleep disruptive diseases (Table II-1) because of the nocturnal dyspnea (difficulty breathing). Heart failure was a major component of the circulatory disease category and thus could in part account for the significant relationship to extent of sleep medication use. Also there is some suggestion that an emotional component is involved with cardiac crises<sup>11</sup> implying that cardiac patients should be kept calm. This also could play a role in explaining the significant relationship between circulatory disease and extent of use (estimated percent of authorized days that the medication was used).

Consideration of the extent to which the resident used the four categories of medications (Table III-13) shows the same relationships to extent of sleep medication use as were found when orders for and any use were examined. In contrast to what had been hypothesized, the extent of sleep medication use among those who used any related positively to the extent of psychotropic use and the extent of sedative use.

Table III-14 indicates other significant relationships that are opposite the stated hypotheses. The relationships between sleep disruptive symptoms and sleep medication orders/use had previously been significantly positive or not significant at all. In examining extent

TABLE III-13. Summary Statistics - Resident Medication Factors Relating to Extent of Use of Any Sleep Medication and Flurazepam.<sup>a</sup>

- 2 month data -

<u>Variables</u>	SLEEPPT <sub>1</sub> Of residents with use, estimated % of days used (N = 165)	FLURPT <sub>1</sub> Of residents with flurazepam use, esti- mated % of days used (N = 47)
Stimulants (MDDSTIM)		
Analgesics (MDDAN)		
Psychotropics (MDDPSY)	(+)*	
Sedatives (MDDSED)	(+)**	

\*p < .05.      \*\*p < .01.      \*\*\* p < .001.

<sup>a</sup>Significance based on Spearman's rho. Supporting tables are provided in Appendix H, Table H-16.

TABLE III-14. Summary Statistics - Resident Symptom Factors Relating to Extent of Use of Any Sleep Medication and Flurazepam.<sup>a</sup>

- 7 day data -

<u>Variables</u>	SLEEPPT <sub>2</sub> Of residents with use, % of days used (N = 98)	FLURPT <sub>2</sub> Of residents with flurazepam use, % of days used (N = 24)
Symptoms:		
ANYSX	(-)*	(-)*
NUMSX	(-)*	(-)*
<u>Category</u>		
PAIN	(-)*	
AGITATION		
BEHAVIORAL		
PHYSICAL		

\*p < .05.      \*\*p < .01.      \*\*\* p < .001.

<sup>a</sup>Significance based on Mann-Whitney (Wilcoxon) except NUMSX which are based on Spearman's rho. Supporting tables are provided in Appendix H, Tables H-17 and H-18.

of sleep medication use, these relationships become significantly negative. Among the residents using sleep medication, those residents with sleep disruptive symptoms used significantly less sleep medication of any type and significantly less flurazepam than residents not having these symptoms. Similarly there was a negative significant relationship between the number of different sleep disruptive symptoms and extent of sleep medication use, in specific flurazepam. The symptom category relating to extent of sleep medication use was once again pain but the opposite direction than anticipated. This change in the direction of the relationships could indicate a threshold effect where

periodic symptoms prompted ordering and some infrequent use of sleep medications but the preference was to avoid continued, frequent use. Particularly since these symptoms are not specifically insomnia or sleeplessness<sup>12</sup>, occasional use of a sedative to help alleviate the symptoms would not be considered as inappropriate as regular use. Many nurses did indicate, on the survey questions, that they preferred to find the reason for sleeping difficulty rather than administer sleep medication but believed they lacked adequate time to assess patient needs.<sup>13</sup> Another consideration is that, for those residents who frequently experience sleeplessness and who continue to use sleep medication often, the nurse may cease to repeatedly document the symptom. These residents would thus appear as frequent medication users but not have symptoms recorded. Still one other possibility relates to the issue of cause and effect. Rather than symptoms causing medication use the reverse may occur. That is, the use of medications may affect the reporting of symptoms. The more sleep medication used by the resident could result in a decrease in the resident's expression of symptoms or complaints. Therefore the more sedated residents would appear to have less symptomatology documented for them.

#### 4. Summary

On overview, it is immediately apparent that medication consumption should truly be considered a process with different factors relating to each step. That is, different factors were found significantly related to sleep medication ordering, to sleep medication use, and to extent of sleep medication use. Sometimes the same variables

related significantly but in the opposite direction. The only variables examined that were consistent throughout the process of sleep medication use were the variables representing ordering and use of other medications with sedative effects. Having a sedative ordered related significantly to having a sleep medication ordered, using a sedative was related significantly to using a sleep medication, and the extent of sedative medication use related significantly to the extent of sleep medication use. All these relationships were positive.

The second notable point is that, in general, the relationships between flurazepam ordering/use and resident characteristics either duplicate those found with sleep medications grouped together or are not significant where analyses with any type of sleep medication were significant. There are a few exceptions to this but based on this evidence it cannot be determined that resident characteristics relating to general sleep medication ordering or use are distinctly different from those relating specifically to flurazepam ordering or use.

Lastly it appears that the biomedical approach has not been substantially supported. Although the multivariate analyses will better determine which variables best explain sleep medication ordering and use, the bivariate analyses found support only for hypothesis 3b, i.e., those residents with use of a stimulant medication were significantly more likely to use a sleep medication than residents without any stimulant medication use. The analyses of disease categories, the number of sleep disruptive diseases, and symptoms provide some indication that biomedical factors are important but the rationale behind these relationships to sleep medication consumption cannot be clarified by the

biomedical approach used in this study.

#### D. MULTIVARIATE ANALYSES

##### 1. Introduction

The last step in analyses was to reduce the number of variables via logistic regression analyses of the factors found with bivariate analyses to significantly relate to resident orders, use, and extent of use of sleep medication in general and flurazepam in specific. Several decisions were made regarding inclusion of variables in the regression statements. It should be noted that, since the symptom information was collected only on the 730 residents in the seven day audit while all other variables pertained to the 863 residents in the two month audit, it was not possible to combine the symptom data with the other data in one regression equation. Therefore the logistic regression analyses at the resident level were based only on the two month data set.

The second decision was to examine all relevant variables for multicollinearity. For any variables correlating at  $r = .50$  or better, a decision was made between the two variables. In general, each of the two variable's distribution and variance were examined along with the theoretical reasons for their inclusion. If a logical choice of one of the two variables still could not be made, the selection was based on the strength of the bivariate relationship. Correlation matrices for the resident variables are provided in Appendix I.

The third major decision regarded the lack of normality of the interval sleep medication variable. The decision was made to

dichotomize this variable. Therefore, for the residents the variable that previously assessed the extent to which the residents used sleep medication if they used any was divided into high and low users. Effort was made to divide the sample into two groups with the groups being as equal as possible.

Logistic regression was determined to be the most appropriate technique for analyses. This decision was based in large part on Cleary and Angel's<sup>14</sup> recent discussion of modeling techniques used for analyzing dependent dichotomous variables and the decision was confirmed by a consultant at the University of Wisconsin-Madison Statistics Lab. As presented by Breslow and Day<sup>15</sup> and Dixon<sup>16</sup>, the formula used for the logistic regression equations is presented below.

$$\text{pr}(y = 1 | x) = \frac{\exp(\alpha + \sum \beta_k x_k)}{1 + \exp(\alpha + \sum \beta_k x_k)}$$

$\alpha$  = log odds for an individual with a standard ( $x = 0$ ) set of regression variables; the constant term

$\exp \beta_k$  = the fraction by which the chance of  $y = 1$  is increased (or decreased) for every unit change in  $x_k$

$x_k$  = variables

Variables were entered into the equation stepwise with a limit to enter p-value set at .10 for the improvement in chi-square.

## 2. Regression Models - Resident Orders and Consumption of Sleep Medications

The regression equation predicting residents having an order for a sleep medication is presented in Table III-15. Three

variables were found to remain significant: length of stay at the facility (STAY), having a respiratory disease, and having a sedative order (SEDORD). No variables suggested by the biomedical hypotheses were represented in the equation except having a sedative order and this related to the existence of a sleep medication order in the direction opposite to what had been predicted. In general the model fits well and, when including the variable with p-value of less than .10, the model correctly predicts 74 percent of the residents on the outcome variable (whether or not the resident had an order for a sleep medication).

The regression equation predicting resident use among residents with an order for any sleep medication is presented in Table III-16. The only variable remaining significant at p-value of less than .05 was the resident's use of stimulant medication. For those residents with a sleep medication ordered, those residents using stimulant medications were significantly more likely to use their sleep medication. This was the relationship predicted by the biomedical approach, hypothesis 3b. Including those variables with p-values of less than .10, the model fits and predicts correctly whether or not the residents use sleep medication, given they have an order, 68 percent of the time.

The regression equation predicting high use of sleep medication among residents who used some sleep medication is shown in Table III-17. Only two variables remained significant at p-values of .05 or better. Being female related to high use of sleep medication among those residents who used any sleep medication. Length of stay related to high use of sleep medication with those residents staying longer more

TABLE III-15. Logistic Regression Relating STAY, Respiratory Disease, Endocrine Disease, and SEDORD to Has Sleep Medication Ordered (N = 862).

	Coefficients and $\chi^2$ of			Goodness of fit				
	STAY	Respiratory Disease	Endocrine Disease	SEDORD	$\chi^2$	p-Value	d.f.	% Correct Predictions
Has sleep medication ordered								
coeff.	-.22	.25	.15	.45	45.68	.21	39	74
$\chi^2$	33.06***	7.10**	2.72	23.97***				

\*p < .05.

\*\*p < .01.

\*\*\*p < .001.

TABLE III-16. Logistic Regression Relating Sex, STIMUSE, and SEDUSE to Used Sleep Medication (N = 231).

	Coefficients and $\chi^2$ of			Goodness of fit			
	FEMALE	STIMUSE	SEDUSE	$\chi^2$	p-Value	d.f.	% Correct Predictions
Used sleep medication							
coeff.	-.36	1.06	.28	1.39	.84	4	68
$\chi^2$	3.52	9.80**	3.12				

\*p < .05.

\*\*p < .01.

\*\*\*p < .001.

TABLE III-17. Logistic Regression Relating Sex, STAY, Symptoms, Circulatory System Disease, and MDDSED to High Percent Sleep Medication Use (N = 165).

	Coefficients and $\chi^2$ of				Goodness of fit $\chi^2$	p-Value	d.f.	% Correct Predictions
	FEMALE	STAY	Symptoms	System				
High sleep medication use								
coeff.	.35	.19	.42	.37	.22	172.11	.02 <sup>a</sup>	137
$\chi^2$	3.91*	9.93**	3.79	2.93	3.41			67

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup> Model does not fit well.

TABLE III-18. Logistic Regression Relating STAY, Blood Disease, and Respiratory Disease to Has Flurazepam Ordered (N = 862).

	Coefficients and $\chi^2$ of				Goodness of fit $\chi^2$	p-Value	d.f.	% Correct Predictions
	STAY	Blood Disease	Respiratory Disease	System				
Has flurazepam ordered								
coeff.	-.21	.34	.29		17.49	.62	20	91
$\chi^2$	11.59***	3.64	4.23*					

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

likely to be in the high use group. None of the biomedical hypotheses were supported for extent of sleep medication use. However, the overall p-value for this regression indicates that the model fits poorly and should not be used to predict the dichotomous dependent variable (high sleep medication users).

Looking only at flurazepam, the results seen with any type of sleep medication are duplicated. Table III-18 shows the regression equation predicting residents having an order for flurazepam. Length of stay at the facility and having respiratory disease related significantly to the residents having flurazepam ordered. Length of stay related negatively and respiratory disease related positively. The model correctly predicts which residents had flurazepam ordered 91 percent of the time.

Because the bivariate analyses did not find any variables related to flurazepam use or extent of flurazepam use, no further regressions were done at the resident level of analysis.

### 3. Summary

The logistic regression analyses of resident sleep medication orders and consumption resulted in only three useful models (out of a potential of six). Therefore the factors chosen for examination by this study did not significantly predict the extent of sleep medication use, the use of flurazepam, or the extent of use of flurazepam by residents in the sample. Examination of the regression equations where the models fit well indicates that the variables relating to flurazepam orders replicated those relating to any type of sleep medication order.

In general, certain resident demographic characteristics (sex and length of stay) and some illness variables (e.g., having an order for a sedative medication, the use of stimulant medication, and having a respiratory disease) were the characteristics most useful in identifying residents with any sleep medication ordered, residents with any sleep medication use given there was an order, and residents with any flurazepam order. The traditional biomedical approach was not useful in identifying residents who had orders for, used some, or used a high amount of sleep medication. However the variables that were significant indicate that a medical component plays some role in the consumption of sleep medications by the residents of long-term care facilities.

The relevance of residents' symptoms should not be overlooked. Although the seven day data on symptoms could not be combined with the two month data for the purpose of multivariate analyses, the bivariate analyses revealed several significant findings. Residents' symptoms, particularly complaints of pain, related significantly to orders, use, and extent of sleep medication use. This provides additional indication that biomedical components should be considered when examining factors relating to sleep medication use although the mechanisms for these relationships could not be elucidated by this study.

## FOOTNOTES - CHAPTER 3

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11. **Kimble MA, Elenbaas RM.** 1975. Congestive heart failure. In: **Herfindal ET, Hirshman JI (eds.)**. Clinical Pharmacy and Therapeutics. Baltimore: Williams and Wilkins Company, p. 164.
12. No resident had a diagnosis of insomnia or sleeplessness. Very few residents had the symptom sleeplessness documented. These few were included in the agitation category.
13. From surveys numbered 71, 72, 91, 94, 99, 108, 118, 120, and 128.
14. **Cleary PD, Angel R.** 1984. The analysis of relationships involving dichotomous dependent variables. J Health Soc Beh. 25:334-348.
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CHAPTER FOUR  
RESULTS OF THE PSYCHOSOCIAL AND BIOMEDICAL  
APPROACHES - NURSE UNIT OF ANALYSIS

A. INTRODUCTION

Chapter Two delineated a psychosocial approach to examining nurse behavior regarding sleep medication ordering and administration. This approach, based primarily on a role theory perspective, proposed that the extent of sleep medication orders and administration by a nurse are related to her self-sent role expectations, her perception of other-sent role, and her beliefs regarding sleep medication use. That is, liberal (with liberal referring to generous sleep medication use) expectations and beliefs were hypothesized to relate positively to extent of sleep medication orders and administration. In addition, the nurse's knowledge of sleep medication pharmacology and her sense of responsibility for sleep medication decisions were hypothesized to relate negatively to her extent of sleep medication orders and administration.

The relationships hypothesized by the psychosocial approach, in combination with nurse demographic and work situation characteristics, resulted in fifteen nurse characteristics to be examined as independent variables. These variables are described in Table IV-1 with details provided in Appendix I. The measurements of these variables are dichotomous, ordinal, or interval.

To supplement the psychosocial approach, the study was designed to allow examination of the characteristics of the residents under

TABLE IV-1. Summary of Nurse Background, Work, Attitudes, Beliefs and Knowledge Variables.<sup>a</sup>

<u>Variable Name</u>	<u>Brief Description</u>	<u>Scale of Measurement</u>
<b>Background:</b>		
NURSEAGE	Age of nurse (# of years)	Interval
FACYEARS	# of years worked at facility	Interval
EDFATHER	# of years of father's education	Interval
EDMOTHER	# of years of mother's education	Interval
RN	Nurse is RN (not LPN)	Dichotomous
<b>Work Situation:</b>		
TOTWORK	# eve/noc worked	Interval
NOCSHIFT	Worked night shift	Dichotomous
ONEPLACE	Nurse worked same place	Dichotomous
TOTRES	Total # residents cared for	Interval
<b>Attitudes, Beliefs, Knowledge:</b>		
ROLESELF <sup>b</sup>	Self-sent role score	Ordinal
ROLEOTH <sup>b</sup>	Perception of others expectations	Ordinal
BELIEF <sup>b</sup>	Beliefs concerning medication	Ordinal
RESP	% of responsibility for sleep medication decisions belonging to nurse	Ordinal
KNOWLEDGE	Knowledge score	Ordinal
SEKNOW	Knowledge of side effects of flurazepam (total # known)	Ordinal

<sup>a</sup>Detailed descriptions of coding and frequencies are provided in Appendix J.

<sup>b</sup>The higher the score, the more liberal the attitude.

each nurse's care. The primary purpose of creating variables on the nurse's residents was to enable re-examination of the biomedical approach (as outlined in Chapter Two and examined in Chapter Three with the resident as the unit of analysis) at the level of the nurse. Using the nurse as the unit of analysis, it was hypothesized that the extent to which the nurse cared for residents with sleep disruptive disease, residents with sleep disruptive symptoms, and residents with orders and use of stimulant medications would relate positively to the steps in the sleep medication administration process. The extent to which the nurse cared for residents with orders and use of sedative medications, psychotropics, and analgesics were hypothesized to relate negatively to nurses' extent of sleep medication orders and administration.

The relationships proposed by the biomedical approach applied to the nurse as the unit for analysis, in combination with the demographic characteristics of the residents cared for by the nurse, resulted in an additional twenty nurse characteristics to be examined as independent variables. These nurse variables are described in Table IV-2. Appendix J contains descriptive details for these variables. The variables under consideration are all interval variables.

The steps in the nurse sleep medication administration process were defined to be a) the extent of sleep medication orders among residents each nurse cares for, b) the extent of sleep medication administration by the nurse to those residents cared for and who have sleep medication ordered, and c) the extent of PRN (give "as needed") sleep medication administration by the nurse to those residents cared for and who have PRN sleep medication ordered. Thus nurse administration was

Table IV-2. Summary of Nurse Variables - Characteristics of Residents Cared for.<sup>a,b</sup>

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Mean age  
 Mean length of stay in facility  
 Percent male  
 Percent on Medicaid  
 Percent with any sleep disruptive disease  
 Mean number of sleep disruptive diseases  
 Percent with any sleep disruptive symptoms (also broken down by category)  
 Mean number of sleep disruptive symptoms  
 Percent with stimulant medication ordered  
 Of residents with stimulant medication ordered, percent with use  
 Percent with analgesic ordered  
 Of residents with analgesic ordered, percent with use  
 Percent with psychotropic ordered  
 Of residents with psychotropic ordered, percent with use  
 Percent with sedative medication ordered  
 Of residents with sedative ordered, percent with use

---

<sup>a</sup>Detailed descriptions of coding and frequencies are provided in Appendix J.

<sup>b</sup>All scales of measurement are interval.

further specified to encompass only PRN administration patterns. It also was proposed to examine this administration process separately for flurazepam.

The majority of the interval independent variables are not normally distributed as well as the dependent variables described next. The decision was once again made that nonparametric tests would be appropriate for analyses.

The remainder of this chapter presents only the statistics using the nurse as the unit of analysis. The study's findings are presented in the following order: a) the description of patterns of sleep

medication orders, administration, and PRN administration by nurses, b) the bivariate analyses of factors relating to nurse orders and administration of sleep medication and c) the nonparametric multivariate regression analysis.

## B. DESCRIPTION OF SLEEP MEDICATION ORDERS AND ADMINISTRATION BY NURSES

### 1. Orders and Administration of Any Sleep Medication

The process of nurse administration of sleep medication is presented in Figure IV-1. On the average, one out of five residents cared for by each nurse had some type of sleep medication ordered for them. Nurses administered sleep medication to about one out of three residents that had an order, but when only PRN orders are considered this falls to one and one-half residents out of ten (15 percent). Therefore nurses' decisions regarding sleep medication administration tended to be toward not administering to residents with sleep medication ordered.

The actual distributions of the nurse administration variables are presented in Table IV-3. All fifty-six nurses cared for residents who had some type of sleep medication ordered. Although they cared for residents with some type of sleep medication ordered, nine of the nurses did not administer any sleep medication during the study week. Examination of the relative frequencies in Table IV-3 indicates that the distribution of the extent of nurse administration, particularly PRN administration, is not normally distributed. Considering only the residents with any type of PRN sleep medication ordered, the peak frequency is on not giving any medication so that the distribution of the

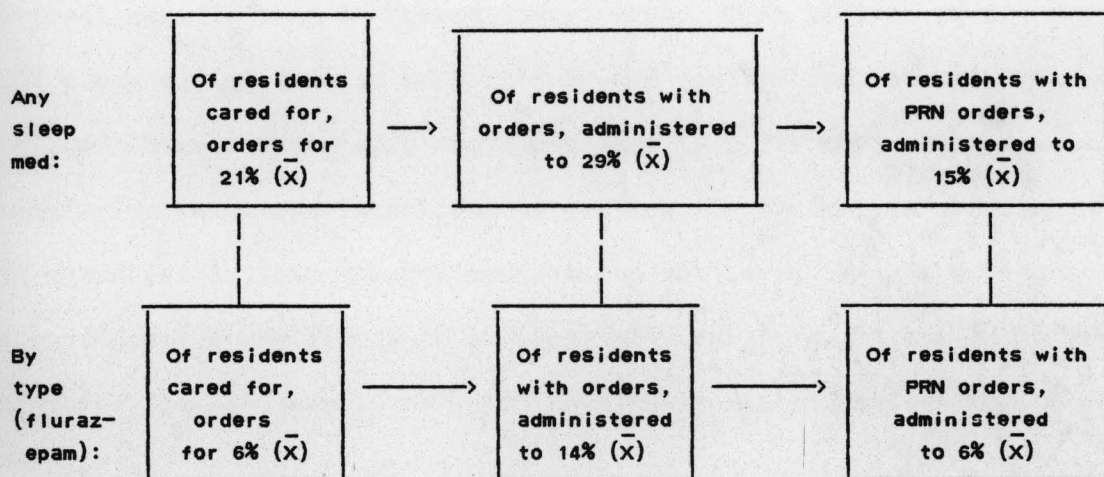


Figure IV-1. Patterns of Sleep Medication Administration By Nurses.

TABLE IV-3. Distribution of The Extent that Nurses Had Orders, Administered Any, and Administered Any PRN Sleep Medication (N = 56).

Variable	Category	Frequency	Relative Frequency (%)	Other Statistics
Of residents cared for, % with any ordered	8-10%	2	3.6	Ungrouped mean = 21.2 Std. dev. = 8.86 Range = 8-52
	11-20%	29	51.8	
	21-30%	18	32.1	
	31-40%	4	7.1	
	41-50%	2	3.6	
	51-52%	1	1.8	
Of residents with any ordered, % administered	0%	9	11.6	Ungrouped mean = 29.1 Std. dev. = 20.22 Range = 0-83
	1-20%	11	19.6	
	21-40%	18	32.1	
	41-60%	17	30.4	
	>60%	1	1.8	
Of residents with PRN, ordered, % administered	0%	22	39.3	Ungrouped mean = 15.0 Std. dev. = 17.71 Range = 0-80
	1-20%	16	28.6	
	21-40%	14	25.0	
	41-60%	3	5.4	
	>60%	1	1.8	

percent administered is skewed toward zero. This pattern of not giving PRN sleep medications is supported by the qualitative interview information. Nurses repeatedly mentioned that if a PRN medication is used regularly, there are incentives to getting the medication order changed to scheduled.<sup>1</sup> Thus the PRN medications not being changed to routine administration are likely to be those PRN orders that are used infrequently. It also should be noted that there are incentives for the pharmacists to have frequently administered PRN medications rewritten as scheduled. That is, it is less time consuming and less costly for the pharmacy service to dispense scheduled medication orders than it is to dispense PRN medication orders.

## 2. Orders and Administration of Flurazepam

Considering once again Figure IV-1, it can be seen that six percent of the residents under each nurse's care had flurazepam ordered. On the average the nurses administered to only fourteen percent of the residents who had flurazepam ordered and to only six percent of the residents who had flurazepam ordered PRN. Comparing to the top row of Figure IV-1 (any sleep medication administration), the rate of nurse administration of flurazepam is less than one-half the rate of administration of sleep medication in general.<sup>2</sup>

The actual distributions of the orders and administration of flurazepam are presented in Table IV-4. Only forty-seven of the nurses cared for residents who had flurazepam ordered leaving nine nurses who cared for no one with a flurazepam order. Slightly over one-half of the nurses caring for residents with a flurazepam order did not administer

any of that particular sleep medication during the study week. Considering only those residents under the nurse's care with PRN flurazepam ordered, about three-quarters of the nurses did not administer any flurazepam to those residents. This indicates that the distribution of the flurazepam administration variables, particularly PRN administration, are highly skewed toward zero.

TABLE IV-4. Distribution of The Extent that Nurses Had Orders, Administered Any, and Administered Any PRN Flurazepam.

<u>Variable</u>	<u>Category</u>	<u>Frequency</u>	<u>Relative Frequency (%)</u>	<u>Other Statistics</u>
Of residents cared for, % with flurazepam ordered <sup>a</sup>	0%	9	16.1	Ungrouped mean = 6.0 Std. dev. = 4.84 Range = 0-23
	1-10%	41	73.2	
	11-20%	5	8.9	
	21-30%	1	1.8	
Of residents with flurazepam ordered, % administered <sup>b</sup>	0%	27	57.4	Ungrouped mean = 14.5 Std. dev. = 19.31 Range = 0-50
	1-20%	7	15.0	
	21-40%	6	12.8	
	41-60%	7	15.0	
Of residents with PRN flurazepam ordered, % administered <sup>b</sup>	0%	36	76.6	Ungrouped mean = 6.4 Std. dev. = 12.92 Range = 0-50
	1-20%	4	8.5	
	21-40%	6	12.8	
	41-60%	1	2.1	

<sup>a</sup>N = 56.

<sup>b</sup>N = 47

### 3. Summary

Similar to what had been demonstrated the the level of resident analysis, patterns of flurazepam administration have been

demonstrated to be different from the patterns of general sleep medication administration. The nurse's behavior in administering flurazepam tended to be more conservative (i.e., gave to a lesser extent) than when considering the sleep medications as a group. This provides further support for the idea that decisions regarding medication administration vary by type of medication being considered and that examination of factors affecting sleep medication use need to take the type of sleep medication into account.

Overall when considering those residents under each nurse's care who had sleep medication ordered, the tendency was to not administer the sleep medication. This was particularly true with residents who had flurazepam ordered.

Several of the nurse sleep medication orders or administration variables had distributions skewed toward zero or with the mode being zero. This presents obvious problems for statistical analyses. Similar to the analysis at the resident level, the analysis using the nurse as the unit of analysis will require statistical tests that do not depend upon a normal distribution of the cases for each variable.

C. FACTORS RELATING TO SLEEP MEDICATION ORDERS AND ADMINISTRATION  
BY NURSES

This section is divided into two parts. The first part looks at the individual nurse characteristics as they relate to nurse sleep medication behaviors. This includes nurse background variables, work situation variables, and finally the attitude and knowledge scores that comprise the psychosocial approach. The second part examines the

characteristics of the residents under each nurse's care and the relation of these to nurse sleep medication behaviors. This latter part examines the variables proposed by the biomedical approach at the level of the nurse, in addition to looking at selected illness characteristics (i.e., category of resident symptoms) and the resident background characteristics.

1. The Psychosocial Factors

- a. Extent of Sleep Medication Orders By Nurses

The correlation coefficients of the fifteen nurse background variables, work situation characteristics, attitudes, and knowledge scores by a) the percent of residents with any sleep medication ordered and b) the percent of residents with flurazepam ordered are all shown in Table IV-5. Only one of these variables related significantly to the extent of orders for any sleep medication. The night shift nurse had a significantly lower rate of any sleep medication orders than did the evening shift nurse. Since the evening shift nurse administered most of the scheduled sleep medications and many of the PRN sleep medications, this relationship between shift and extent of sleep medication orders was expected. If the sleep medication had been administered prior to the night nurse coming on duty, it was no longer considered in this study as a medication order for the night shift nurse.

In contrast to the correlations for any type of sleep medication, the correlations between individual nurse variables and extent of orders for specifically flurazepam show several significant

TABLE IV-5. Nurse Factors Relating to Extent of Orders - Any Sleep Medication and Flurazepam.<sup>a</sup>

Variables	ANY SLEEP MED: Of residents cared for, % with orders (N = 56)	FLURAZEPAM: Of residents cared for, % with orders (N = 56)
<b>Background:</b>		
NURSEAGE	-.01	-.15
FACYEARS	.13	-.04
EDFATHER	-.17	-.28*
EDMOTHER	-.16	-.14
RN	.12	-.20
<b>Work Situation:</b>		
TOTWORK	.21	.20
NOCSHIFT	-.28*	-.14
ONEPLACE	.14	-.32**
TOTRES	-.17	.14
<b>Attitudes, Beliefs, Knowledge:</b>		
ROLESELF	.09	.29*
ROLEOTH	-.10	.30*
BELIEF	-.07	.08
RESP	.06	.01
KNOWLEDGE	-.05	-.02
SEKNOW	-.07	.08

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Significance based on Spearman's rho. On dichotomous variables, Mann-Whitney (Wilcoxon) test confirmed significance unless otherwise noted. Supporting table is provided in Appendix K, Table K-1.

relationships. Being on the night shift (NOCSHIFT) and the extent of flurazepam ordered is no longer significant although the relationship is in the same direction as for any type of sleep medication. The education of the nurse's father (EDFATHER) and the nurse's working only one place during the study week (ONEPLACE) both related significantly to the percent of residents under the nurse's care who had flurazepam

ordered. As education of father increased, the extent of flurazepam orders decreased. The nurses working in one place (i.e., with the same residents each time the nurse worked), had a lower percent of their residents with a flurazepam order. None of the literature on factors relating to physician prescribing studied characteristics identical to these. While Linn's<sup>3</sup> study had found that physicians whose fathers' occupations were in service or white-collar fields (versus blue-collar or professional) were more favorable toward use of a sedative, father's education was not measured directly and the results do not necessarily contradict those presented here. Nurses coming from better educated backgrounds may be more willing to assert themselves with physicians and thus get orders discontinued. Similarly, nurses who do not work with the same residents each night do not have the opportunity to follow up on their residents, and thus may not feel a commitment or willingness to question physician orders. In contrast to the hypotheses stated earlier, knowledge, beliefs, or responsibility felt by the nurse (RESP) did not relate significantly to extent of flurazepam ordered. However, the nurses' perceptions of self-set expectations (ROLESELF) and perception of others' expectations (ROLEOTH) did relate significantly and in the anticipated direction. The more liberal the nurse's own expectations of her behavior, the greater the percent of residents under her care that had an order for flurazepam. The more liberal the nurse's perception of others expectations, the greater the extent of her opportunity to administer flurazepam. Therefore hypotheses 7a and 8a were supported but only for flurazepam.

b. Extent of Sleep Medication Administration By Nurses

Factors relating to the rate at which the nurses administered sleep medications are shown in Table IV-6. Again the education of the nurse's father significantly relates but only to the extent of flurazepam administered. The nurse's own knowledge of sleep

TABLE IV-6. Nurse Factors Relating to Extent of Administration - Any Sleep Medication and Flurazepam.<sup>a</sup>

Variables	ANY SLEEP MED: Of residents with orders, % administered (N = 56)	FLURAZEPAM: Of residents with orders, % administered (N = 47)
Background:		
NURSEAGE	-.06	-.06
FACYEARS	-.01	-.11
EDFATHER	-.06	-.33*
EDMOTHER	-.11	-.15
RN	-.12	-.16
Work Situation:		
TOTWORK	-.18	.05
NOCSHIFT	-.55***	-.48**
ONEPLACE	.29*	.14
TOTRES	-.47***	-.29*
Attitudes, Beliefs, Knowledge:		
ROLESELF	-.01	.17
ROLEOTH	-.02	.23
BELIEF	-.16	-.07
RESP	.11	.23
KNOWLEDGE	-.13	-.23
SEKNOW	-.06	-.06

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Significance based on Spearman's rho. On dichotomous variables, Mann-Whitney (Wilcoxon) test confirmed significance unless otherwise noted. Supportinb table is provided in Appendix K, Table K-2.

medication pharmacology or the side effects of flurazepam did not relate significantly to either flurazepam administration or any type of sleep medication administration. None of the other nurse background factors were found to be significant. One explanation that can be offered for the correlation of father's education is that father's education relates to the willingness of the nurse to assert herself. Particularly since the correlation between father's education and administration of PRN flurazepam is zero (Table IV-7 shown later), the significance of the correlation between father's education and any flurazepam administration for those residents with orders is probably due to the nurse not giving scheduled flurazepam doses, a situation requiring careful consideration by the nurse.

Three out of the four work situation variables relate significantly to the administration of any type of sleep medication. Two of these also relate to flurazepam administration, while the third is not significant but the correlation is in the same direction. The night shift nurse administered any type of sleep medication, and specifically flurazepam, to a lesser extent than did evening shift nurses. Again, this is not surprising since the scheduled sleep medications were almost exclusively administered by evening shift nurses. Also relevant were the mentions of several nurses during informal interviews that they had been taught that sleep medications should not be administered after a certain time<sup>4</sup> (e.g., 2 AM, presumably because of the possibility of hangover effect the next morning). This would also limit night nurse administration of sleep medication.

The nurse working one place during the study week administered to significantly more of her residents with any sleep medication ordered than did the nurse working on a variety of units. If the nurse working on the same unit has decreased the less desirable sleep medication orders (e.g., scheduled flurazepam), the orders that remain are those that she is more tolerant of and possibly more willing to administer. It is also possible that the nurse working in the same place knows her residents better and identifies more need for sleep medication than the nurse caring for different groups of residents each time she works. Another possibility to consider is that the nurse working with the same residents may be more vulnerable to the residents' demands for medication. During both nurse interviews and on the open-ended survey questions, nurses repeatedly asserted that resident demand played an important role in the administration of sleep medications.

The last background variable relating significantly to the administration of sleep medication is the number of different residents cared for by the nurse (TOTRES). The greater the number of different residents cared for during the study week, the lower the rate of administration of sleep medications to residents with orders and the lower the rate of administration of flurazepam to residents with orders. The physician literature relating patient load to prescribing extent is contradictory with some authors reporting a positive relation while others report negative.<sup>5</sup> For the nurses in this study, number of residents cared for is strongly related to working in one place. That is, the nurse working on only one unit during the week, worked with fewer residents ( $r = -.60$ ). Therefore it is difficult to sort out the

different explanations attributable to these two variables. Patient demand may again play a role so that as the nurse cares for more (and different) residents, she is less vulnerable to their requests, less able to follow up on her medication decisions and thus administers less medication.

Of particular interest is the lack of support for the hypothesized relationships between nurse expectations (ROLESELF, ROLEOTH), other attitudinal variables (BELIEF, RESP), knowledge (KNOW, SEKNOW) and the rate of administration of sleep medication. None of the correlations were significant and therefore hypotheses 7b, 8b, 9b, 10b, 11b, and 12b were not supported.

c. Extent of PRN Sleep Medication Administration By Nurses

As emphasized earlier, it was believed that the nurse's decision making opportunities were best expressed when considering only the PRN medication orders. Table IV-7 contains the correlation coefficients for individual nurse characteristics by rate of PRN sleep medication administration and by PRN flurazepam administration. None of the nurse background or work situation characteristics were significantly correlated with extent of administration. Therefore, characteristics such as nurse's background (i.e., father's education), shift, working one place, or number of residents cared for appear not to play a significant role in the rate of PRN sleep medication administration to those residents who had an order.

None of the relationships hypothesized by the behavioral approach were significant either, with one exception. Hypothesis 7c was

TABLE IV-7. Nurse Factors Relating to Extent of PRN Administration - Any Sleep Medication and Flurazepam.<sup>a</sup>

Variables	ANY SLEEP MED:	FLURAZEPAM:
	Of residents with with PRN orders, % administered (N = 56)	Of residents with with PRN orders, % administered (N = 47)
Background:		
NURSEAGE	-.02	.05
FACYEARS	.08	.08
EDFATHER	.02	.00
EDMOTHER	.14	.05
RN	-.23* <sup>b</sup>	.00
Work Situation:		
TOTWORK	-.19	-.08
NOCSHIFT	-.12	-.17
ONEPLACE	.05	.02
TOTRES	-.06	-.06
Attitudes, Beliefs, Knowledge:		
ROLESELF	.02	.40**
ROLEOTH	.08	.23
BELIEF	.04	.15
RESP	-.14	.10
KNOWLEDGE	-.02	-.10
SEKNOW	.22	-.06

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Significance based on Spearman's rho. On dichotomous variables, Mann-Whitney (Wilcoxon) test confirmed significance unless otherwise noted. Supporting table is provided in Appendix K, Table K-3.

<sup>b</sup>Not significant using Mann-Whitney (Wilcoxon) test.

supported only for flurazepam. Nurses with more liberal expectations of their own behavior regarding sleep medication administration did administer to a greater percent of their residents who had PRN flurazepam ordered.

d. Summary

The individual nurse characteristics related differently to each step in the medication administration process. However, in contrast to what was seen at the resident level of analysis, these relationships tended to also vary dramatically by type of sleep medication. When any sleep medication as a group was examined, only the work situation characteristics of the nurse were significantly related and then only to rate of orders and rate of administration. No variables were found significantly related to PRN sleep medication administration. Therefore, none of the psychosocial approach's hypotheses were true for sleep medications in general.

For flurazepam, some of the background and work situation characteristics were related to orders for and administration but were not related significantly to PRN administration. Furthermore, the nurse's expectations of self and perceived expectations of others were significantly related to her rate of flurazepam orders, and for self-sent expectations, to her rate of PRN flurazepam administration. This provided some support for the psychosocial approach but only for the sleep medication that has been traditionally classified a hypnotic, i.e., flurazepam.

During the unstructured interviews with the nurses, when they mentioned the name of a specific sleep medication they tended to name flurazepam.<sup>6</sup> Since the survey did not specify what was being referred to by "sleep medication," flurazepam could have been the medication thought of by the nurses when answering the questions. This may account for the different relationships between some of the attitude

scales and any sleep medication versus the attitude scales and flurazepam.

## 2. The Biomedical Factors

### a. Extent of Sleep Medication Orders By Nurses

Table IV-8 contains the correlations between the nurses' orders for sleep medications and residents' background characteristics or biomedical characteristics. Background characteristics of the residents under the nurse's care frequently related significantly to her sleep medication orders. The older the residents cared for, the significantly lower the rate of flurazepam orders for the nurse. As the average length of stay of her residents increased, the nurse also had a lower rate of flurazepam orders as well as any type of sleep medication order. The percent of males cared for related significantly to extent of only flurazepam orders. The greater the percent of residents cared for that were male related to a higher percent of flurazepam orders per nurse. The percent of residents on Medicaid under a nurse's care also was significantly related to sleep medication ordered. As the percent of Medicaid residents rose, the percent of any type of sleep medication ordered for the residents under each nurse's care fell significantly.

The relationships between resident age, resident length of stay and orders for sleep medication were similar to what was demonstrated at the resident level and similar explanations may apply. The relation between flurazepam orders and percent of residents that were male suggests that the order may be there in case of need to sedate the male

TABLE IV-8. Characteristics of Residents Cared for Relating to Nurse Extent of Orders - Any Sleep Medication and Flurazepam.<sup>a</sup>

Variables	ANY SLEEP MED: Of residents cared for, % with orders (N = 56)	FLURAZEPAM: Of residents cared for, % with orders (N = 56)
Background characteristics:		
Mean age	.01	-.36**
Mean stay	-.34**	-.50***
Percent male	.11	.28*
Percent Medicaid	-.47***	-.00
Illness characteristics:		
Percent with disruptive dx	-.25*	.15
Mean # disruptive dx	-.16	.04
Percent with disruptive sx	.28*	-.30*
Mean # disruptive sx	.22	-.15
Category of sx:		
% with pain	.55***	-.29*
% with agitation	.09	-.39**
% with behavioral	.11	-.43***
% with physical	-.14	.40***
Medication characteristics:		
Percent with stimulant ordered	-.22	.36**
Percent with analgesic ordered	-.13	.04
Percent with psychotropic ordered	-.09	.16
Percent with sedative ordered	-.01	.55***

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Significance based on Spearman's rho.

resident. However the bivariate analyses of administration patterns did not support a relation between the percent of residents that were male and the nurses' actual administration of flurazepam (Tables IV-9 and IV-10 presented later). Why a nurse would have a greater percent

of Medicaid residents and a lower percent of sleep medication orders is potentially related to a stereotype of the Medicaid resident. That is, the private pay type of resident could be viewed as more affluent and a more desirable resident and thus be allowed to have more prophylactic medications available, while the Medicaid resident only has ordered what he/she needs.

The examination of the relationships between resident illness characteristics and sleep medication orders per nurse reveals several contradictory findings. As the percent of residents cared for with sleep disruptive disease decreased, the percent of sleep medication orders per nurse rose. However, the relation between percent of sleep disruptive symptoms was significantly and positively related to percent of any type of sleep medication ordered per nurse but negatively related to flurazepam orders. It seems reasonable to assume that the nurse's own documentation of resident problems (i.e., her notes that were used for the symptom coding) would relate most closely to the nurse's behavior; it is unclear why physicians' documentation would relate oppositely. The difference for flurazepam and any type of sleep medication possibly reflects more willingness to have available sleep medications that also are classified as anxiolytics or muscle relaxants for these vague symptoms than to consider flurazepam. The relationships between specific category of symptoms and orders for other medications in part bear this out. The relationships for any type of sleep medication and flurazepam in specific were always opposite. As the percent of residents with pain, or agitation, or behavioral symptoms increased, the percent of residents cared for with a flurazepam order

decreased. Only physical symptoms related positively and significantly to percent of flurazepam orders.

Consideration of the extent of ordering of other medications for the residents under the nurse's care does not provide support for the biomedical explanation either. As Table IV-8 shows, the percent of orders for stimulant medications related positively and significantly only for the percent of flurazepam orders. As the percent of residents with sedative orders rose, the percent of residents cared for who had flurazepam orders also rose significantly. As mentioned previously, this may represent the addition of daytime sedation orders to nighttime orders (i.e., to flurazepam).

It is apparent that when the level of analysis is the nurse, the biomedical approach to explaining the extent sleep medication orders for the nurses is more often than not negated. Only hypothesis 14a was supported for general sleep medication orders. The extent of residents with sleep disruptive symptoms under the nurse's care related positively to her extent of sleep medication orders. Hypothesis 15a was supported for only flurazepam. That is, of the residents cared for by each nurse, the extent of residents with stimulant medication ordered related positively to nurse extent of flurazepam orders. However, in many of the instances, the anticipated relationships were the opposite of what was found.

b. Extent of Sleep Medication Administration By Nurses

Table IV-9 contains the correlations for characteristics of residents cared for by: a) percent administration to residents

with any sleep medication ordered and b) percent administration to residents with flurazepam ordered. None of the background characteristics of the residents related significantly to the extent of any type of sleep medication administration. Only length of stay related to extent of flurazepam administration with the nurses caring for residents with longer stays at the facility administering significantly less flurazepam. The longer the resident's stay in the facility, the more successful the nurse would be in any efforts to decrease the use of potentially undesirable medications, such as scheduled flurazepam orders. Whether or not this can account for the relation between resident stay and rate of flurazepam administration cannot be tested here.

The relationships of the illness characteristics of the residents under the nurse's care to sleep medication administration show the same alternating direction as occurred with sleep medication orders. While the percent of residents with sleep disruptive diseases and the mean number of sleep disruptive diseases per resident related negatively to the extent of nurse administration of any type of sleep medication, the percent of sleep disruptive symptoms and the mean number of sleep disruptive symptoms per resident related positively. All four correlations were significant. The category of symptoms that was significantly related to nurse administration rate was behavioral symptoms. For flurazepam administration rate, only the mean number of sleep disruptive diseases was significant. No explanation can be offered for the differences in disease relationships to administration and symptoms relationships to administration. Again it could be assumed that the nurse's documentation (i.e., symptoms notes) would be more likely to

TABLE IV-9. Characteristics of Residents Cared for Relating to Nurse Extent of Administration - Any Sleep Medication and Flurazepam.<sup>a</sup>

Variables	ANY SLEEP MED: Of residents with orders, % administered (N = 56)	FLURAZEPAM: Of residents with orders, % administered (N = 47)
Background characteristics:		
Mean age	-.04	-.16
Mean stay	.04	-.35**
Percent male	-.11	.20
Percent Medicaid	.20	.00
Illness characteristics:		
Percent with disruptive dx	-.25*	-.18
Mean # disruptive dx	-.26*	-.25*
Percent with disruptive sx	.28*	-.02
Mean # disruptive sx	.23*	.01
Category of sx:		
% with pain	.13	-.13
% with agitation	.12	-.10
% with behavioral	.27*	-.07
% with physical	-.12	.05
Medication characteristics:		
Percent with stimulant use	-.05	-.03
Percent with analgesic use	-.28*	.03
Percent with psychotropic use	-.03	-.07
Percent with sedative use	-.01	-.12

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Significance based on Spearman's rho.

relationships for disease variables.

One of the medication characteristics, percent of residents using any analgesic, related significantly to the rate of sleep medication administration by the nurse. As the percent of residents under the nurse's care increased, the percent of residents administered sleep

medication decreased. This supports the hypothesis that analgesics are administered as a substitute for sleep medication (hypothesis 18b).

c. Extent of PRN Sleep Medication Administration By Nurses

The relationships between resident characteristics and nurse extent of any PRN sleep medication administration or extent of PRN flurazepam medication administration are shown in Table IV-10. Several background characteristics related significantly to PRN medication administration. Once again mean resident age related significantly and negatively to both PRN administration of any type of sleep medication and of flurazepam specifically. Resident length of stay also related negatively. Because of the side effects of sleep medications, flurazepam in particular (such as hangover sedation, daytime lethargy, and confusion), nurses may be more reluctant to administer these medications to older residents who may already experience disorientation.

As the average length of stay of residents under the nurses' care increased, the rate to which they administered PRN sleep medication decreased. Recall that Table IV-9 shows that the relationship between any sleep medication administration and mean resident length of stay was near zero. After removing the contribution of scheduled sleep medication to the rate of sleep medication administration, the relationship is now negative and significant. This supports the idea that, if residents use a sleep medication order regularly, over time the order becomes written for scheduled administration. Those residents using the medication infrequently have the order remain written PRN.

TABLE IV-10. Characteristics of Residents Cared for Relating to Nurse Extent of PRN Administration - Any Sleep Medication and Flurazepam.<sup>a</sup>

Variables	ANY SLEEP MED:	FLURAZEPAM:
	Of residents with PRN orders, % administered (N = 56)	Of residents with PRN orders, % administered (N = 47)
Background characteristics:		
Mean age	-.42**	-.27*
Mean stay	-.28*	-.21
Percent male	.17	.01
Percent Medicaid	.29*	-.10
Illness characteristics:		
Percent with disruptive dx	.08	-.02
Mean # disruptive dx	-.30*	.03
Percent with disruptive sx	-.23*	.05
Mean # disruptive sx	-.08	.08
Category of sx:		
% with pain	-.10	-.05
% with agitation	-.15	-.05
% with behavioral	-.26*	-.05
% with physical	-.03	.10
Medication characteristics:		
Percent with stimulant use	-.31**	.07
Percent with analgesic use	-.13	.29*
Percent with psychotropic use	-.31*	-.11
Percent with sedative use	-.08	-.14

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Significance based on Spearman's rho.

The last background variable that was significant was the percent of residents on Medicaid. As the percent of Medicaid residents under the nurse's care increased, so did the extent to which the nurse administered any PRN sleep medication. This is similar to the results found

at the resident level of analysis, i.e., residents who used sleep medication and were on Medicaid consumed sleep medication more often than did residents who were not on Medicaid. The results at the nurse level seem to coincide with this other finding. However this is not supported by one study that examined factors affecting physician prescribing and found no significant relationship between the percent of patients on Medicaid and extent of physician prescribing.<sup>7</sup>

Examination of the resident illness characteristics (Table IV-10) in relation to the extent of administration of sleep medication shows significant results only in the directions opposite to what had been hypothesized. As the mean number of sleep disruptive diseases per resident increased, the nurse's administration of any type of PRN sleep medication decreased. As the percent of residents cared for who had sleep disruptive symptoms increased, the rate at which the nurse administered any PRN sleep medication decreased. The category of symptoms that was significantly related to any PRN sleep administration was behavioral symptoms and this too was negative. None of the illness characteristics of the residents related significantly to PRN flurazepam administration. Since the relationship between the percent of residents with behavioral problems related positively and significantly to the rate of nurse administration of any (PRN or scheduled) sleep medication (Table IV-9), the reverse in the direction of the relationship when only PRN medication administration is examined (Table IV-10) suggests that the positive relationship between the percent of residents with behavioral problems and the nurse administration of any sleep medication may be due to the administration of scheduled sleep medication.

Table IV-10 also contains the relationships between the percent of residents using other categories of medication and the nurse's administration of PRN sleep medication. Only one of the significant relationships was in the anticipated direction. As the percent of residents receiving psychotropic medication increased, the percent of residents who administered any PRN sleep medication by the nurse decreased significantly. However, two other significant relationships were in the direction opposite to what had been predicted. As the percent of residents using stimulants increased, the administration of PRN sleep medication decreased and as the percent of residents using analgesic medications increased, the percent of residents administered PRN flurazepam increased. It seems plausible that the nurses would be willing to administer a pain medication in conjunction with a sleep medication in order for a resident to sleep (although alleviation of the pain would still seem more appropriate). However the results with stimulant medications are puzzling. Since many of the stimulant medications are used for respiratory illnesses, the negative relation to administration of PRN sleep medication could indicate a reluctance on the part of the nurse to administer sleep medications to those residents. Further information is needed to clarify this.

d. Summary

The consideration of medication administration as a process is supported by the findings of this study. Resident characteristics related quite differently to the extent to which the nurses had orders for any sleep medication, the extent to which the nurses

administered any sleep medication, and the extent to which the nurses administered any PRN sleep medication. Only the resident background characteristics seemed related to the step in sleep medication administration in the same fashion throughout, although the percent of residents on Medicaid showed varying significant relationships. Of more practical importance, the biomedical approach to explaining sleep medication administration was rarely supported. The percent of residents with sleep disruptive symptoms related significantly to orders and any administration in the anticipated direction (hypotheses 14a and 14b). Hypothesis 15a was supported only for flurazepam, i.e., as the percent of residents with stimulant orders increased, so did the percent with flurazepam ordered. The percent of residents with analgesic use related significantly to the rate of sleep medication administration (hypothesis 18b) and the percent of residents with psychotropic use related significantly to the rate of PRN sleep medication use (hypothesis 17c). Both these relationships were in the predicted direction. However, the other biomedical variables often related exactly opposite to what had been anticipated using the biomedical approach outlined.

It also becomes clear by comparing flurazepam administration to any sleep medication administration that the factors relating to each are remarkably different and sometimes relating oppositely. This provides further support for the concept that the nurses may view flurazepam differently than they assess other sleep medications with the implication that this difference has an influence on their sleep medication administration behavior.

#### D. MULTIVARIATE ANALYSES

##### 1. Introduction

The last step in analyses was to reduce the number of variables via regression analyses of the factors found with bivariate analyses to significantly relate to nurse orders, administration, and PRN administration of any sleep medication, and flurazepam in specific. All variables found significant at the nurse unit of analysis were included in each regression statement. Thus the significant psychosocial variables, biomedical variables, nurse background and work characteristics, and background characteristics of the residents cared for were combined into one regression model for each dependent variable.

Several decisions similar to those with the resident as the unit of analysis had to be made regarding inclusion of variables in the regression statements. All relevant variables were examined for multicollinearity. For any variables correlating at  $r = .50$  or better, a decision was made between the two variables. In general, each of the two variable's distribution and variance were examined along with the theoretical reasons for their inclusion. If a logical choice of one of the two variables still could not be made, the selection was based on the strength of the bivariate relationship. For the resident symptom variables at the nurse level of analysis, the decision was made to use the category of symptoms where possible. Correlation matrices for the nurse variables are provided in Appendix L.

The second major decision regarded the lack of normality of the interval sleep medication variables. Once again, the decision was made to dichotomize the dependent variables. The variables assessing nurse

extent of orders for sleep medication were divided into high and low sleep medication orders. Similarly the nurse extent of administration of sleep medication was divided into high and low administration and extent of PRN administration was divided into high and low PRN administration. Effort was made to divide the sample into two groups with the groups being as equal as possible.

Logistic regression was determined to be the most appropriate technique for analyses. This decision was discussed in Chapter Three along with the model presented by Breslow and Day<sup>8</sup> and Dixon<sup>9</sup>.

Variables were entered into each equation stepwise with a limit to enter p-value set at .10 for the improvement in chi-square.

## 2. Regression Models - Nurse Sleep Medication Orders and Administration

Variables relating to the nurse having a high percent of residents with any type of sleep medication ordered are shown in Table IV-11. Both the nurse's shift and the percent of residents with symptoms of pain related significantly to high percent of sleep medication orders. The night shift nurse was more likely to be in the low percent of orders group while the evening shift nurse was more likely to be in the group having a high percent of residents with sleep medication ordered. The nurses having a high percent of residents with pain were more likely to be in the group having a high percent of sleep medication ordered. This provided partial support for the hypothesis that sleep disrupting symptoms relate positively to the ordering of sleep medication. The model correctly predicts whether the nurse has a high

or low percent of sleep medication orders for 82 percent of the cases.

Table IV-12 contains the regression equation predicting high sleep medication administration for nurses. The only remaining significant variable was the nurse's shift. The night nurse was more likely to be in the low sleep medication administration group and the evening nurse was more likely to be in the high administration group. This variable alone predicts accurately 79 percent of the cases.

TABLE IV-11. Logistic Regression Relating Shift and Percent of Residents with Pain to High Percent of Sleep Medication Orders (N = 56).

	<u>Coefficients and <math>\chi^2</math> of</u>		<u>Goodness of fit</u>		<u>d.f.</u>	<u>% Correct Predictions</u>
	<u>NOCSHIFT</u>	<u>% with pain</u>	<u><math>\chi^2</math></u>	<u>p-Value</u>		
High sleep medication orders						
coeff.	- .83	.20	42.18	.30	38	82
$\chi^2$	5.15*	20.67***				

\*p < .05.    \*\*p < .01.    \*\*\*p < .001.

TABLE IV-12. Logistic Regression Relating Shift to High Percent of Sleep Medication Administration (N = 56).

	<u>Coefficients and <math>\chi^2</math> of</u>		<u>Goodness of fit</u>		<u>d.f.</u>	<u>% Correct Predictions</u>
	<u>NOCSHIFT</u>	<u>% with pain</u>	<u><math>\chi^2</math></u>	<u>p-Value</u>		
High sleep medication administration						
coeff.	-1.42		46.85	.21	40	79
$\chi^2$		19.95***				

\*p < .05.    \*\*p < .01.    \*\*\*p < .001.

For PRN sleep medication administration, the mean age of the resident and the percent of residents with psychotropic medication use significantly predicted high PRN administrators (Table IV-13). As the mean age of the resident increased, the nurse was more likely to be in the low PRN administration group. As the percent of residents under each nurse's care with psychotropic use increased, the nurse was also more likely to be in the low PRN administration group. This provided partial support for the hypothesis that some medications serve as substitutes for the administration of sleep medication. When the variable significant at a p-value of less than .10 is included in the equation, the model predicted PRN administration group (high versus low) accurately for 79 percent of the cases.

The last regression models to be examined are those with outcome variables pertaining to flurazepam. The regression equation for the nurse having a high percent of orders for flurazepam is shown in Table IV-14. The two variables significant were the mean length of resident stay for those residents under the nurse's care and the percent of residents cared for that had a sedative ordered. Length of stay related negatively to the nurse being in the group with a high percent of flurazepam ordered. The higher the percent of residents cared for with sedatives ordered, the more likely the nurse was to have a high percent of residents with flurazepam ordered. This relationship was the opposite of what had been predicted with the biomedical approach. The percent of correct predictions made with this model is 79 percent.

The education of the nurse's father, the nurse's shift, and the mean length of stay of the residents under the nurse's care all

TABLE IV-13. Logistic Regression Relating Mean Resident Age, Percent of Residents on Medicaid, and Percent of Residents Using Psychotropics to High Percent of PRN Sleep Medication Administration (N = 56).

	Coefficients and $\chi^2$ of						
	Mean Age	% Medicaid	% with Psychotropic Use	Goodness of fit $\chi^2$	p-Value	d.f.	% Correct Predictions
High PRN sleep medication administration							
coeff.	-.30	.06	-.09	44.02	.06	31	79
$\chi^2$	13.32***	3.52	5.69*				

\*p < .05.    \*\*p < .01.    \*\*\*p < .001.

TABLE IV-14. Logistic Regression Relating Mean Resident Stay and Percent of Residents with Sedative Ordered to High Percent of Flurazepam Orders (N = 56).

	Coefficients and $\chi^2$ of						
	Mean Stay	% with Sedative Ordered	Goodness of fit $\chi^2$	p-Value	d.f.	% Correct Predictions	
High flurazepam orders							
coeff.	-1.56	.11	57.36	.32	53	79	
$\chi^2$	6.22*	13.98***					

\*p < .05.    \*\*p < .01.    \*\*\*p < .001.

significantly predicted nurses with high administration rates of flurazepam (Table IV-15). As the education (number of years in school) of the father increased, the nurse was less likely to be a high flurazepam administrator. Again, the evening shift nurses were more likely to be in the high flurazepam administration group. The nurses caring for

residents who resided longer at the facility were nurses who were less likely to be in the high flurazepam administration group. This model was able to predict 86 percent of the cases correctly.

The last regression equation examined was the prediction of high PRN flurazepam administration (Table IV-16). As the nurse's expectations of her own behavior in administering sleep medication became more liberal, the nurse was significantly more likely to be a high PRN flurazepam administrator. This supports the hypothesis that the nurse's self-sent role expectations relate significantly to her administration of sleep medication, but in this study the relationship held true only for flurazepam. The other variable significantly predicting PRN flurazepam administration was the mean age of the residents cared for. Consistent with the relationship found between mean resident age and nurse administration of PRN sleep medication of any type, the relationship between resident age and PRN flurazepam administration is negative. When the variable with a p-value of less than .10 is included in the regression, the model predicts accurately 85 percent of the cases.

### 3. Summary

In contrast to the regression analyses with the resident as the unit of analysis, the regression analyses at the level of the nurse generated a greater number of useful regression models. Statistically the models from these two different levels of analysis cannot be directly compared. Yet it is noteworthy that examination of sleep medication use at the level of the nurse resulted in six (out of a potential of six) predictive regression equations.

TABLE IV-15. Logistic Regression Relating EDFATHER, Shift, Mean Resident Stay to High Flurazepam Administration (N = 46).

	Coefficients and $\chi^2$ of			Goodness of fit $\chi^2$	p-Value	d.f.	% Correct Predictions
	EDFATHER	NOCSHIFT	Mean Stay				
High flurazepam administration							
coeff.	-.26	-1.79	-2.06	34.34	.72	40	86
$\chi^2$	4.51*	9.30**	11.45***				

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

TABLE IV-16. Logistic Regression Relating ROLESELF, Mean Resident Age, and Percent of Residents with Analgesic Use to High PRN Flurazepam Administration (N = 47).

	Coefficients and $\chi^2$ of			Goodness of fit $\chi^2$	p-Value	d.f.	% Correct Predictions
	ROLESELF	Mean Age	% with Analgesic Use				
High PRN flurazepam administration							
coeff.	.25	-.29	.07	38.26	.72	42	85
$\chi^2$	8.57**	3.86*	2.45				

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

The logistic regression analyses of nurse sleep medication orders and administration indicate that factors relating to orders and administration of any type of sleep medication differ from those relating to flurazepam. For any type of sleep medication, the nurse's shift and extent of residents with symptoms of pain were predictive of a high

rate of orders while for high rate of flurazepam orders, the average length of stay of residents and the percent of residents with a sedative ordered were predictive. For administration of any sleep medication, only the nurse's shift remained significant. Shift also was predictive of a high rate of flurazepam orders but other variables remained significant as well (education of the nurse's father and average length of resident stay). No overlap was found for variables predicting high rate of PRN administration. Average resident age and the percent of residents with psychotropic use were predictive for administration of any PRN sleep medication. Self-sent role expectations and the average age of residents cared for were predictive of PRN flurazepam administration.

At the nurse level of analysis, only sketchy support was provided for either the psychosocial approach or the biomedical approach to explaining sleep medication use. Two of the significant variables provided partial support of the biomedical approach at the level of nurse decision-making for sleep medication in general. The extent of resident with pain predicted high rate of sleep medication orders and the extent of residents using psychotropic medication was useful in predicting high rate of PRN sleep medication administration. For flurazepam however, no support of the traditional biomedical approach was found. With one exception, no support was found for the psychosocial approach. The one important exception was that the nurse's self-sent role expectations significantly contributed to the prediction of high PRN flurazepam administration. This provided support for the psychosocial approach proposed for those circumstances where the nurse's

decision-making power is more easily exercised (PRN medication orders) and for a sleep medication that is solely marketed for sleeplessness.

## FOOTNOTES - CHAPTER 4

1. Field notes of Sept. 15 (page 4), Sept. 23 (page 4), and Nov. 14 (page 3).
2. When the nonrespondent nurses are included in the calculations, the rate of nurse administration of flurazepam changes to just slightly over one-half the rate of administration of sleep medication in general (including PRN administration).
3. Linn LS. 1971. Physician characteristics and attitudes toward legitimate use of psychotherapeutic drugs. J Health Soc Beh. 12:132-140.
4. Field notes of Sept. 21 (page 4), Sept. 22 (page 4), and Sept. 23 (page 4).
5. Becker MH et al. (1971), op cit.; Chamber CD et al. 1983. Physician attitudes and prescribing practices: a focus on minor tranquilizers. J Psychoact Drugs. 15(1-2):55-59; Hartzema AG, Christensen DB. 1983. Nonmedical factors associated with the prescribing volume among family practitioners in an HMO. Med Care. 21:990-1000.
6. Field notes of Sept. 15 (page 4), Sept. 15 (page 5), Sept. 23 (page 2), Sept. 28 (page 1), Sept. 28 (page 4), Sept. 29 (page 2), and Oct. 3 (page 4).
7. Hadsall RS et al. 1982. Factors related to the prescribing of selected psychotropic drugs by primary care physicians. Soc Sci Med. 16:1747-1756.
8. Breslow NE, Day NE. 1980. Statistical Methods in Cancer Research: Volume 1. Lyon: International Agency for Research on Cancer, p. 200.
9. Dixon WJ (ed.). 1983. BMDP Statistical Software. Berkeley: University of California Press, p. 337.

CHAPTER FIVE  
SUMMARY AND CONCLUSIONS

A. SUMMARY OF FINDINGS

The purposes of this study were to: a) describe patterns of sleep medication ordering and use in several skilled nursing facilities, b) examine biomedical factors relating to ordering and use of sleep medication, and c) examine psychosocial factors relating to nurses' orders for and administration of sleep medication. The patterns of sleep medication consumption and the relationships of biomedical factors were examined from both the resident's perspective and the nurse's perspective. The psychosocial approach was specific only to the level of the nurse. The study examined sleep medication ordering and use in general and then flurazepam separately.

In Chapter Two, the biomedical approach to explaining sleep medication use that guided the research was outlined and several related hypotheses proposed. At the resident level of analysis, the hypotheses proposed that the existence of sleep disruptive disease and the existence of sleep disruptive symptoms would be related to residents having a sleep medication order, using any sleep medication, and more use of sleep medication. It was suggested that the existence of orders or use of stimulant medications would relate positively while the orders or use of sedative medication (other than sleep medication), psychotropic medications, and analgesics would relate negatively to the residents having a sleep medication order, using any sleep medication, and more use of sleep medication.

In addition to examining the biomedical approach with the resident as the unit of analysis, it was intended that the residents' medical characteristics among those residents cared for by each nurse would be examined. Thus the biomedical approach was extrapolated to the nurse level of analysis. Here it was hypothesized that the proportion of residents under the nurse's care with sleep disruptive disease and the proportion with sleep disruptive symptoms would relate positively to the proportion of her residents with sleep medication ordered, the proportion she administered the medication, and the proportion she administered PRN medication. Furthermore, it was hypothesized that the proportion of residents cared for with stimulant medication ordered or used would relate positively while the proportion with sedative, the proportion with psychotropic, and the proportion with analgesic medications ordered or used would relate negatively to sleep medication orders, administration, and PRN administration by nurses.

In addition to describing the biomedical approach, the psychosocial approach to explaining nurse sleep medication administration was developed and hypotheses based on that approach were also proposed. It was hypothesized that the nurse's own set of expectations about what she should do in the administration of sleep medications and the nurse's perception of others' expectations would be related to the nurse's actual administration behavior. It was also hypothesized that nurse knowledge and sense of responsibility for sleep medication decisions would relate negatively while liberal beliefs about the appropriateness of sleep medication use would relate positively to the proportion of orders for, administration of, and PRN administration of sleep

medications by nurses.

Each of these two approaches (biomedical and psychosocial) met with varying degrees of success. The biomedical and psychosocial approaches' findings are summarized in the following pages, but first a summary on the patterns of sleep medication consumption and administration is presented.

1. Patterns of Sleep Medication Consumption and Administration

a. Resident Patterns of Sleep medication Use

Compared to the literature reporting the extent of sleep medication ordering and use among residents of long-term care facilities, this study's findings with the resident as the unit of analysis found the extent of both ordering and use to be similar to what has been reported previously. If however diphenhydramine was not included as a sleep medication, this study's figures would be lower than those reported by others. Conceptually this may be due to differences in the definitions used for sleep medications or differences in study populations. It may also indicate a shift in preference for a specific sleep medication agent, represent an actual decline in sleep medication use over time, be the result of involvement of the consultant pharmacist, or relate to the application of the federal indicators for conducting drug-regimen review. If factors affecting medication use are to be clearly understood, each of these possibilities needs to be addressed by future studies.

Focusing on the issue of extent of the use of sleep medication by residents in the seven skilled nursing facilities, use was shown to be

fairly common with approximately two out of every ten residents used some type of sleep medication during the two month study. Of more interest is the pattern of sleep medication use. A bimodal pattern of use was found with residents with a sleep medication order either using the medication infrequently or using almost daily. This pattern is similar to that reported in the literature. Using this study's figures, seventy-six residents, about one out of ten residents in the facilities, were using sleep medication on an almost nightly basis during the two months.<sup>1</sup> About one out of ten residents used sleep medication nightly during the seven day data collection.<sup>2</sup> This regular use is contraindicated by recommended guidelines for sleep medication use.<sup>3</sup> This result alone provides evidence for the need to more closely review the usage pattern of sleep medications in skilled nursing facilities and to re-evaluate chronic use.

b. Nurse Patterns of Sleep Medication Administration

Turning to the examination of sleep medication use from the nurse's level of analysis, it should be clearly stated that it was not anticipated that the patterns seen with the nurse as the unit of analysis (nor factors found significant) would replicate those seen with the resident as the unit for analysis. Indeed, they did not duplicate each other. For example, 29 percent of all residents in the seven day audit had an order for some type of sleep medication but on the average only 21 percent of the residents under the nurses care had orders for sleep medication. Similarly, 49 percent of the residents with a sleep medication ordered actually used some medication but the

nurses only administered to an average of 29 percent of the residents they cared for and who had orders. Not only did the measures of the dependent variables appear different, but the factors found related to sleep medication ordering and use varied between the resident level of analysis and the nurse level of analysis.

There are several methodological reasons for the differences seen with the resident as the unit of analysis versus the nurse as the unit of analysis. First there is the problem of response bias for the nurses. That is, not all the nurses who cared for all the residents completed the survey. Compared to respondents, the nonrespondent nurses administered flurazepam to a significantly greater percent of their residents with flurazepam ordered and administered PRN flurazepam to a significantly greater percent of their residents with PRN flurazepam ordered. This means that some of the residents who were users of flurazepam in the analysis at the resident level were potentially no longer included in the analysis at the nurse level because the nurse in charge of administering medication to those residents did not complete the survey (and thus was not included in the nurse sample).

A second reason why the results from the analysis at the nurse level would not replicate that seen at the resident level is that the information for the nurses was based on the seven day data audit while the majority of the data presented for the residents was based on the two month data audit. As was discussed in Chapter Three, the time period studied profoundly influences the patterns of the quantitative data collected. As the time period used for data collection increases, the medication usage figures reported are more likely to include

additional numbers of residents as having used the medication but who use only occasionally. Thus the seven day time period used for the nurse level of analysis included proportionately fewer sleep medication users (probably fewer occasional medication users) than did the two month data that was used for the majority of the resident level analysis.

The third reason that nurse data were not expected to replicate resident data relates to the extent of duplication of resident data among the nurses. The most obvious way this occurred was between the evening and night shift nurses. That is, the residents cared for by the night shift nurse by necessity overlapped with the residents cared for by the evening shift nurse. This overlap is complicated further when the different nurses working on each day of the study week are considered. For example, the nurse who cared for a given group of residents on Tuesday evening might be a different nurse than cared for the same residents on Monday. Ultimately, one resident could have had fourteen different nurses caring for him or her during the study week (seven different evening shift nurses and seven different night shift nurses) with the potential that the resident's sleep medication orders, use, and characteristics would be considered for fourteen different nurses.<sup>4</sup>

Looking at the pattern of sleep medication administration by nurse it was shown that the nurse's tendency was to not administer sleep medication, particularly sleep medications written PRN (give "as needed"). However, when both resident sleep medication consumption patterns and nurse administration patterns are considered, it appears that the

nurse's decision to administer could be of two types. There are those residents under the nurse's care who receive the sleep medication frequently (possibly because the order has been written to be administered routinely). On the other hand, there are those residents cared for by the nurse that have the sleep medication administered sporadically. Thus the decision to administer sleep medication may be both situation specific (i.e., reflecting night by night variation depending on the situation each night) and resident specific (i.e., decisions varying from resident to resident depending on the residents' characteristics). Because of the manner in which this study operationalized nurse administration of sleep medication (i.e., by considering the proportion of residents cared for who received the medication), only the resident by resident variation in sleep medication use was examined at the level of the nurse. Future studies will need to give more consideration to the night by night variation in nurse's administration. The steps leading to medication administration might be conceptualized as first deciding whether or not the resident should be given a sleep medication and then deciding whether or not the resident should be given a sleep medication on that particular evening.

c. Patterns of Flurazepam Use

The ordering and use of flurazepam was more conservative than for any sleep medication in general, both when resident unit of analysis was considered and when nurse unit of analysis was considered. Some ideas were proposed for why this occurred. It may be due to an increased awareness of the side effects of flurazepam when

administered to the elderly or the result of some input from the consultant pharmacist. It may also be the result of a shift toward using sedative medications marketed for a greater variety of uses and a reluctance to use medications marketed solely for sleeplessness. That is, if a resident has vague complaints and is unable to sleep, the tendency may be to use at bedtime sedative-hypnotics that are marketed for anxiety and sleeplessness.

This more conservative pattern of use for flurazepam, in conjunction with the findings that different factors related to flurazepam administration by nurses than related to any sleep medication administration, clearly indicate the need to examine the use of sleep medication by type of agent. This was more strongly demonstrated at the nurse level of analysis than at the resident level.

## 2. Evaluation of the Biomedical Approach

In general, at the level of the resident the biomedical approach to explaining sleep medication orders and use among long-term care facility residents was not supported by the data presented here. There was one exception: stimulant medication use significantly predicted which residents with a sleep medication use would use some of the medication.

Examining the biomedical characteristics of the residents under the nurse's care provided some support for the biomedical approach as a means for explaining the extent of sleep medication orders and administration per nurse. The percent of residents cared for who had sleep disruptive symptoms did relate to both the rate of nurse orders

for any type of sleep medication and to the extent of administration of any sleep medication. Three significant relationships supported the hypotheses that orders or administration of certain medications may relate to orders/administration of sleep medication among residents cared for by the nurse: percent of residents with stimulants ordered related positively to flurazepam orders; percent of residents with analgesic use related negatively to percent of any sleep medication administration; and percent of residents with psychotropic use related negatively to any PRN sleep medication use. However these few instances of support for the biomedical approach are outweighed by the number of significant relationships exactly opposite to what had been predicted. In addition, only the percent of psychotropic use predicting PRN sleep medication use remained significant using nonparametric regression analysis.

This does not necessarily mean that a biomedical approach should be abandoned. Even though many of the relationships were not as predicted, there existed significant relationships between resident illness characteristics (specific diseases, symptoms, orders or use of other medications) and resident use of sleep medications. The exact nature of these relationships cannot be clarified by this study but provide impetus for further exploration of the biomedical concepts. It also should be recognized that the examination of the biomedical factors in this study is limited by the validity of the medical record data.

### 3. Evaluation of the Psychosocial Approach

The psychosocial approach received some support but only for flurazepam orders and PRN flurazepam administration. Both the nurse's self-sent expectations and her perception of others expectations of her behavior in administration of sleep medication significantly related to the extent of nurse orders for flurazepam. The nurse's self-sent expectations related significantly to the extent of her actual administration of PRN flurazepam orders. Only this latter relationship remained significant in the regression. However, this does indicate that in those situations where the nurse has the greatest freedom for decision-making (i.e., administration of PRN orders) and with a medication that was clearly a sleep medication (flurazepam), the scale developed to assess self-sent role expectations proved useful in predicting nurse behavior.

#### B. LIMITATIONS OF THE STUDY

The most obvious limitation to evaluating the biomedical approach involves the sources for the residents' medical information. The validity of the physicians' documented diagnoses and of the nurses' charted symptoms remains unknown. It was noted by this investigator that between the two month data collection and seven day data collection (a period of six months or more) there had been only a few residents who had any diagnosis changed out of the 556 residents who resided in the facilities during both data collection times. Furthermore, when the accuracy of pharmacy diagnostic data was checked (comparing the pharmacy records to a chart review at the nursing home) it

was seen that rarely did any resident have a diagnosis changed after being admitted to the facility.

Even nurse documentation is not without its drawbacks. The extent of variation among the physicians and among the nurses in terms of what and how they documented both contribute to the limitations of charted data as valid sources of current medical information. Another potential problem is that the quality of record-keeping may vary among the nurses and that the nurses who keep good records also have different levels of medication administration.

The validity of the medical record is really dependent upon a process beginning with the existence of an independent condition experienced by the resident. The resident may become aware of the condition and then communicate its existence to the staff or the staff independently becomes aware of the condition. Thus staff receives information about the resident's condition. Next the staff must interpret the meaning of the information that has been obtained. The decision is made whether or not to provide written documentation of the condition. The last step determining the validity of the documented condition is the quality of the record made. In summary, there are a number of steps between the existence of an illness condition and the recording of its presence where validity can be jeopardized. The staff may never become aware of the existence of the resident's condition or the staff may misinterpret the meaning of the illness. The staff may choose not to document or incompletely document the condition. Also there may be additional steps in this process leading to physician diagnosis and prescribing. In some instances, the physician may

conduct an independent assessment of the resident's condition but often the determination of diagnosis and treatment is made based on the information provided to the physician by the facility's staff. This adds potentially one more stage where validity of the diagnosis (and rationale for medication prescribing) is in jeopardy. In the future, if a researcher's goal is to obtain valid measures of the resident's health status, data sources other than medical record information, such as independent assessment by individual health professionals, will need to be used.

A similar issue limiting the evaluation of the biomedical approach at the level of the nurse is the lack of specificity per nurse for coding the residents' characteristics under each nurse's care. While the extent of sleep medication orders and administration were precisely attributed to each specific nurse, the orders for and use of the other categories of medications in the residents cared for and the residents' symptoms were not this specific. For example, if the nurse cared for residents with a high percent of analgesic use, this did not necessarily mean that that particular nurse administered the analgesic medication to the residents. It may have occurred during the day shift or on days when the nurse was not working. This similar lack of specificity occurred with the symptoms. Thus the resident with a painful symptom documented by the Monday evening nurse could have been administered a sleep medication by the Friday evening nurse leading to a potentially false relationship between residents having pain and receiving a sleep medication. Although it would be a complex procedure to measure all behaviors specific to each nurse, the lack of specificity may account

for some of the unanticipated findings of this study. Future studies may try to assess the resident illness symptoms and each nurse's administration of pertinent medication during the nurse's shift. Observational study would be a method for accomplishing this.

Another limitation of the biomedical approach as applied by this study was the failure to consider the level of disease. That is, the mere existence of a sleep disruptive disease may not be sufficient to predict sleep medication use. Future studies should consider assessing the severity of illness in addition to the type of condition. Again validity becomes an issue and measures of illness severity will require independent, valid measures rather than depend upon recorded information.

One set of limitations derives from the relatively small sample sizes for the nurses studied ( $N = 56$ ) and for the residents with flurazepam ordered ( $N = 77$  in the two month data set and  $N = 58$  in the seven day data set). This obviously provides a barrier to finding statistically significant results. Furthermore, it limits the generalizability of the findings. When possible, researchers planning future studies with a potentially small number of cases should first consider the sample size needed to obtain significant results.

Adding to the problem of the relatively small number of nurses sampled is the matter of nurse response bias. Although the response rate by the nurses was good and the respondent nurses were more often than not similar to the nonrespondents, they did differ significantly on a few variables. Nonrespondent nurses administered a greater percent of flurazepam, including flurazepam ordered PRN, and cared for a

greater percent of residents using analgesics than did respondent nurses. This response bias may have decreased the variance for the nurses' administration rates of flurazepam by not including in the sample nurses who were on the high end of the continuum of flurazepam administration. Thus the response bias added an additional barrier for finding statistically significant results at the nurse level of analysis.

In terms of generalizability, limitations are placed upon the study's findings because the skilled nursing facilities, and subsequently nurses and residents, were selected based on the provision of services from only one pharmacy. At this exploratory level with limited resources this provided a necessary control for variation due to differences in pharmacy services. Pharmacy services different than those described here (using different drug distribution systems, the existence of restrictive formularies or protocols for drug use, different applications of the federal indicators, differences in state regulations governing Medicaid reimbursements of medications) may alter the medication usage patterns among long-term care facilities' residents. Thus, caution should be used in generalizing these findings to other populations.

Evaluation of the psychosocial approach was limited by the instrument used to assess nurse self-sent expectations. Although extensive effort was made to make the items as valid as possible, further testing and refinement are necessary. One potential limitation is that the items may not be a valid measure of self-sent role expectations. That is, the items may only reflect the nurse's attitudes about sleep

medication administration and not identify her medication giving expectations in her role as nurse. In addition, attention needs to be placed on the varying perceived expectations by type of sleep medication being considered, a shortcoming of the items of this study. Another deficiency of the self-sent expectation items is their failure to capture the resident versus situation differences contributing to variation in nurse decision-making. In the future, these items might be best developed into two categories: a) items that discern enduring resident qualities that may affect sleep medication administration and b) items assessing situational characteristics affecting sleep medication administration.

The question used to assess the nurse's perception of others' expectations of her sleep medication administration also has limitations. The terms "liberal" and "conservative" were not defined for the nurses in the survey question. While these were terms used by nurses during the unstructured interviews, it cannot be determined if they had similar meanings for all the nurses. Also the scope of the items needs to be broadened to allow for variation in perceived influence of the others' expectations. That is, it seems likely that some individual's expectations, such as the resident's, may have greater impact on the nurse's medication administration than others' expectations may have.

Further refinement of the knowledge questions also may be needed. The knowledge questions in this study used a pharmacological perspective to assess knowledge about sleep medications. While this may be an adequate way to assess pharmacists' knowledge, this may be an

inadequate method for assessing how a nurse evaluates the medications she is in charge of administering. Additional unstructured interviewing is needed to clarify the nurse's perspective for evaluating medications.

One last limitation to be mentioned here is the issue of cause and effect. Because this study was not longitudinal, it cannot be assumed that the factors relating to sleep medication orders or use cause the sleep medication to be ordered or cause the sleep medication to be used. In fact, in several instances the reverse relationship may be true. For example, it was proposed that sedated residents, i.e., those using sleep medication more often, may be less likely to express complaints or symptoms. Similarly for nurses, the extent to which they see residents with flurazepam ordered may influence their perception of what they feel others expect them to do regarding sleep medication administration. Thus, with a study such as this, the direction of cause and effect for many of the relationships found significant cannot be determined.

### C. FURTHER ISSUES AND IMPLICATIONS

#### 1. Issues for Theory and Research

The goal of this study was to begin to fill the void in investigations which examine correlates of sleep medication ordering and consumption in long-term care facilities. Previous research did not clearly define the category of sleep medication or delineate medication consumption as a process with the ordering of the medication as a step separate from the use of medication. Few studies have attempted

to assess the effect of resident illness either for individual resident use, nurse administration, or physician prescribing. While some research has been devoted to examining patient characteristics relating to physician prescribing, the focus has been on demographic characteristics rather than biomedical factors. A final major gap in past work has been the general neglect to consider the nurse's role in the medication use process in institutions such as nursing homes. Studies examining factors relating to the extent of physician prescribing indicated that psychosocial characteristics are relevant but the measures used lacked specificity.

This investigation has attempted to address these limitations. It has demonstrated variation in resident consumption of sleep medication as well as variation in nurse administration of sleep medications in long-term care facilities. Baseline data are provided on the patterns of sleep medication ordering and use both at the level of the individual resident and at the level of the nurse in charge of passing medication. The results of this study support continuing to examine medication use as a process. Different factors were shown to significantly relate to each step. Although further refinement of both the biomedical paradigm and the psychosocial paradigm are needed, these approaches proved useful preliminary concepts for examining sleep medication use. This information, the conceptualization of the process of medication use, and the definitions provided should prove useful to future studies. However future research should move beyond this exploratory stage. Several issues related to factors affecting sleep medication consumption or administration should be considered by future

investigations in this area. Many of these issues are directly related to the limitations previously discussed, but others are also proposed.

First, there is a need to continue to assess sleep medication consumption and administration as dynamic processes and to expand upon the paradigms proposed here. This study's findings indicate that there needs to be further consideration given to the type of medication and to the regimen of the medication order, i.e., PRN (give "as needed") versus routine, scheduled. The interpretation of these regimens by the health professionals involved, and whether or not there exists formal or informal protocols for administration, need to be given consideration in order to better understand medication administration. Also of importance, particularly since these medications are often recommended to be given to the elderly in lower dosages, is for the decision process to consider strength or dose of the medication. Thus the proposed process of medication ordering, use, and amount of use should be further broken down by drug product, regimen, frequency and dose, and the factors affecting each step investigated. One last consideration for this process is that it not be viewed as a unilateral movement beginning with an order and ending with use but rather viewed as having each step feeding back to the prior step. That is, current medication use is influenced by historical factors as well as influencing future medication use.

This process approach has implications for the type of study that can best assess factors relating to each step. Thus a second issue to be considered concerns the time frame used for data collection. Longitudinal studies would be the ideal means for assessing medication use

as a process. Factors relating to the initial ordering and initial use could be delineated from factors relating to repeat use. Longitudinal studies would also allow better identification of causal relationships. One of the issues raised by this study is the impact of time frame on the nature of the medication use data. The shorter the time frame for data collection, the lower the numbers of sporadic, occasional medication users included in the study's sample population. This indicates that researchers must give careful consideration to the period of time used for data collection in relation to their proposed hypotheses. Cross-sectional studies at one point in time allow identification of who has orders for what kinds of sleep medications, the regimens and doses prescribed, but this type of cross-sectional study would reveal limited information about the amount and frequency of use and be unable to identify the causes for orders or use. Cross-sectional studies covering longer time periods (e.g., several months to a year) will better describe usage patterns such as frequency and dosages of sleep medications used. Panel studies would identify how orders and use of medication change over time. Longitudinal studies, for example identifying newly admitted residents and following them over time, would permit identification of factors relating to initial ordering of sleep medication by type of product and regimen, initial use of sleep medication by type of product and regimen, and allow identification of changes (e.g., from PRN regimen to scheduled regimen, or from one drug product to another).

This leads to a third issue: the bimodal pattern of sleep medication use by residents. This pattern suggests that there may actually

be two categories of sleep medication users -- the occasional, infrequent users and the chronic users. Future studies will need to assess whether the extent of sleep medication use by individuals should be considered a continuum with factors affecting the resident's level of use or sleep medication use should be divided into chronic versus sporadic users with different factors determining each. Based on both the qualitative and quantitative data collected during this study, emphasis should be placed on the determining factors associated with chronic versus sporadic sleep medication use.

A fourth set of issues for future investigators to address concerns the biomedical approach and variables used to test it. It was mentioned previously that more valid data are needed than were available from record information. However, if nurse decision-making is to be clarified, increased understanding of the nurse's perception of the medical conditions among the residents she cares for is needed along with reliable methods for collecting the data. Several relevant disease and symptoms categories were identified by this study. Clarification of the relationships found was not possible but provides impetus for the refinement of the biomedical paradigm. Variables suggested for future focus include the resident's level of insomnia, the resident's level of pain, and resident behaviors such as those that might disturb ward routine or disturb other residents.

A fifth consideration is the refinement of the expectation measures employed by this study and the development of additional instruments. It is recognized that the concepts used here were static, ignoring the process-related components. Future studies will need to

assess the process of formation and change of expectations, particularly if they are to have practical application. Important questions were raised by the present study such as how were the nurses' expectations formed, how could these expectations be changed, what role does state regulations play in the development of these expectations, how do expectations vary by patient characteristics, settings, and drug type? Previous research has tended to focus on the demographic characteristics of providers such as physicians. While these characteristics are measured easily, they had added little to our understanding of medication ordering and consumption. This study indicates that future studies will need to tackle more difficult questions such as those pertaining to attitudes and additional issues such as how working conditions and provider knowledge impact.

This last consideration relates to a sixth direction for future exploration that was strongly indicated by this study. That is, to pursue examination of the interaction of the resident, nurse, and situation in determining the medication decision outcome. While it was previously recognized that conducting, analyzing, and interpreting multi-level data is complex and difficult, researchers cannot assume that decision-makers such as nurses act in isolation. Questions need to be addressed such as how does patient demand affect the nurse's decision to administer the medication? And under what circumstances? How do working conditions such as working on a variety of different units affect nurses' decisions? What is the impact of nurse-nurse interactions? Or how do the decisions made by one nurse influence another? One important work situation characteristic identified by

this study was the difference between the evening and night shift nurses. It was suggested that the decisions regarding sleep medication use necessarily were different for the night shift than for the evening shift. Subsequent studies will need to examine these two groups of nurses separately and elucidate the different factors influencing the decisions of each.

The impact of the nurse response bias is the seventh issue needing to be addressed. Future data collection procedures must result in the inclusion of a representative sample of nurses. This means that, if nurses doing the greatest amount of medication administration are reluctant to respond to surveys, other means of collecting the data such as face-to-face interviews may need to be used. Another possibility is to consider increasing the appeal to complete the surveys such as offering some incentive.

The eighth issue proposed here concerns the lack of results found with nurse knowledge and responsibility. Irrespective of the recommendation that further work is needed on the measurements used, refinement in the hypotheses should also be considered. That is, factors such as knowledge and nurse sense of responsibility for medication decisions could be necessary but not sufficient conditions relating to medication administration. The interaction effects of knowledge, responsibility, and perceived role should all be examined before these factors can be eliminated as potentially influencing decision-making.

Finally, but not of least importance, there is a need to broaden the scope beyond this study's focus. It had been recognized at the onset that the focus had to be narrow to make the project feasible.

Future studies need to expand to include other settings and other types of pharmacy providers. More important is the need to expand to incorporate other approaches suggested by the literature review such as pharmacist, physician, or institution characteristics. Also there were several relationships found between resident characteristics (such as gender or Medicaid payment plan) and sleep medication use that could not be adequately explained here. Additional studies are needed to test possible explanations and the paradigms expanded to incorporate them.

## 2. Implications for Pharmacists

This study's findings have several practical implications for pharmacists. These implications tended to arise not from the hypothesized findings but from the failure to find hypothesized relationships or from finding unanticipated relationships.

One of the most interesting results was the failure to find any relationship between the nurse's knowledge (as measured by this study) and her administration of sleep medications. This suggests that providing information similar to that tested by the survey questions (i.e., on the pharmacological aspects of sleep medications) to the nurses is not likely to result in direct changes in sleep medication administration although indirect effects are possible. This also means that future studies will need to better understand the nurses' needs for knowledge about medications and the nurses' decision-making process in order for pharmacists to appropriately improve their services. This clearly implies a need for further research with a focus on the

pharmacist's role vis-a-vis nurse decisions and how the pharmacist's involvement affects nurses' expectations or knowledge.

The examination of the relationships between nurse's shift (evening or night shift) and the proportion of nurses' residents with sleep medication ordered and with sleep medication administered indicates that it is primarily the evening shift nurse who must deal with sleep medication administration. This indicates that, if pharmacists wish to plan interventions and resources are limited, involvement of the evening shift nurses (versus both evening and night shifts) would be the more appropriate target.

This study demonstrates the need for more effective pharmacist involvement in drug utilization review of sleep medications. The pattern of sleep medication consumption demonstrates the need for reassessing those residents who use the sleep medication regularly. The positive relationships between the resident having a sedative ordered and having a sleep medication ordered, and between sedative use and sleep medication use indicates a need for review of those residents with concomitant orders and use of two or more medications with sedative effects. And lastly, the concomitant use of stimulant medication and sleep medication suggests that resident's use of stimulant medication should be reevaluated to determine its need as well as the need for the sleep medication.

Current federal regulations require that, for skilled nursing home facilities, the consultant pharmacist must review the drug regimen of each resident at least monthly. The regulations state:

The pharmacist reviews the drug regimen at least monthly, and reports any irregularities to the medical director and administrator. The pharmacist submits a written report at least quarterly to the pharmaceutical services committee [consisting of the pharmacist, the director of nursing, the administrator, and one physician] on the status of the facility's pharmaceutical service and staff performance.<sup>5</sup>

Thus, while the pharmacist is required to prepare reports, there is no requirement that these reports be shared with the staff nurses or with the prescribing physicians. Whether or not the information given to the medical directors, administrators, and directors of nursing is shared with facility staff probably varies greatly among facilities. Therefore the problems that the pharmacist finds from doing drug utilization review may never be shared with the most pertinent health professionals--the physician prescribing the medication and the nurse administering the medication.

The evening and night shift nurses have special problems in communicating with the consultant pharmacist by virtue of the hours these nurses work. That is, for many consultant pharmacists, they are finished working only a few hours after the evening shift nurse begins her work day and the consultant pharmacist's working hours may overlap even less with the night shift nurse's working hours. This creates obvious communication barriers between pharmacists and evening/night shift nurses.

There are several possible ways that pharmacists may increase the effectiveness of the services they provide. Providing drug usage review information directly to the staff nurses (including the evening and night shift nurses and to the prescribing physicians) is one method

of communicating with the individuals directly involved with the resident. Staggering pharmacists' working hours so that more overlap with nursing shifts working hours may also increase communication and allow greater visibility of the consultant pharmacist. The pharmacist could also work with the nurses and physicians to develop automatic stop order policies for sleep medications so that these prescriptions are not regularly renewed. Future research will need to assess the effectiveness of changes such as those mentioned above and address such issues as: What effect does third party payment of medications have on the use of medication by long-term care facility residents? How do the various systems for distributing medication influence resident use? What impact do drug formularies that restrict payment or use of medications have on orders and use of medications by nursing home residents?

### 3. Implications for Nurses

During the course of this study, the author had the opportunity to meet and talk with many nurses working in the study's sample of nursing homes. As a group, these nurses appeared to be dedicated, hard-working individuals who were sometimes frustrated by the system within which they had to work. Their candid conversations and responses to the open-ended survey raised two general issues relevant to nursing practice and administration of medications: a) the lack of time to deal with patient needs or the nurse's workload and b) the importance of patient demand in decisions to administer medications.

Four variables were used by this study to assess the nurse's work

situation: the number of evenings or nights worked during the study week, the shift (evening or night) that the nurse worked, whether or not the nurse worked on the same unit each time she worked, and total number of residents cared for by the nurse during the study week. Of these four variables, the shift of the nurse was repeatedly an important variable relating to orders and administration. Some practical reasons were given for why this occurred such as the evening nurse being the nurse responsible for administering the scheduled sleep medications. However it should be kept in mind that the different shifts are different on a variety of organizational factors such as differences in duties that the nurse must perform, different staffing patterns, or different resources. The failure to understand more completely the working conditions of the nurses is a limitation of this study that will need to be addressed in the future.

The impact of resident demands or complaints on the administration of sleep medication was the second issue raised. This study did find relationships between residents in pain and the ordering of sleep medications, both at the resident level of analysis and the nurse level of analysis. Also, residents with vague, ill-defined symptoms were found to use sleep medications more often. Future studies should give special attention to residents who express complaints that are difficult to deal with or who make special demands and what role those residents play in the nurse's decisions regarding sleep medication administration.

Some implications about the timing of sleep medication administration should also be noted. The typical time for the evening medication

distribution to residents was between eight and nine o'clock. The typical evening nurse left duty at approximately eleven o'clock. This timing has two important impacts. First, the evening nurse is frequently administering sleep medication before or at the residents' bedtimes without having the opportunity to determine residents' sleeplessness. Second, the evening nurse often leaves duty before having the opportunity to assess the residents' sleep patterns and without much time to determine the effectiveness of any sleep medication administered. The night shift nurse has little involvement in this process. Both nurses and nursing directors might reconsider the conflicts that this scheduling creates for evaluation of sleep medication administration. Measures that would postpone the medication's administration until need can be evaluated and increase information exchange between shifts might be considered.

One final implication for nurses is that future studies will need to give more consideration to nurses' knowledge of sleep, sleep medications, and training as these affect nurses' medication decisions. Questions raised include: Are nurses aware of the elderly's need for less sleep? Are nurses aware that chronic use of sleep medication is contraindicated? What effect does the nurse's training have on her decisions to administer sleep medications?

#### D. CONCLUSIONS

This exploratory investigation of sleep medication use in long-term care facilities raises as many new questions as it provides answers to existing ones. While it contributes to our understanding

of the patterns of sleep medication ordering and use, and the factors related to these, its major contributions stem from the identification of the process of sleep medication use in long-term care facilities and the suggestions for ways to better assess this process. It is clear that considerable work remains to be accomplished. It is hoped that the suggested improvements and concepts developed here will prove useful to others who attempt to better understand medication use among the institutionalized elderly. Finally, and most importantly, it is sincerely hoped that this study's findings and those of future investigations will be translated into practical applications for the benefit of the nursing home staff and residents.

## FOOTNOTES - CHAPTER 5

1. Figures are provided in Table III-3, Chapter 3.
2. Figures are provided in Table III-4, Chapter 3.
3. Dorsey R. et al. 1979. Psychopharmacological screening criteria development project. JAMA. 241:1021-1031; U.S. Department of Health and Human Services. 1982. Indicators for surveyor assessment of the performances of drug regimen reviews by pharmacists. State Operations Manual, Provider Certification, Section 3161. Washington, D.C.: Health Care Financing Administration.
4. Although this was possible, it did not occur in this study.
5. U.S. Department of Health, Education, and Welfare. 1974. Social and Rehabilitation Services, Social Security Administration. Skilled nursing facilities: standards for certification and participation in Medicare and Medicaid programs. Federal Register. 39:2238.

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APPENDIX A

OPERATIONAL DEFINITIONS

## OPERATIONAL DEFINITIONS

- Administration of sleep medication by nurses:** A sleep medication was considered administered to a resident by a nurse if the nurse documented administering a first dose of the medication to the resident some evening or night during the seven day audit.
- Analgesic medication:** All products listed in the American Hospital Formulary Service as analgesics (28.08).
- Nurse:** Any licensed practical nurse (L.P.N. or L.V.N.) or registered nurse (R.N.) working at the facility during the seven day audit.
- Order for medication (resident unit of analysis):** A medication was considered ordered for a resident when an active prescription was recorded.
- Orders for sleep medication (nurse unit of analysis):** Each resident who had a sleep medication ordered and for whom the nurse was in charge of administering medications during the seven day audit was counted as an order (or opportunity to administer) for that nurse. If the resident's order was not active on the evening the nurse worked or if another nurse had previously that evening administered a dose of sleep medication to the resident, then the resident's order was no longer considered an order for the nurse to act upon. Thus only the first possible dose of each evening was counted in the number of different sleep medications available for the nurse to administer.
- Other-sent role expectations:** Role expectations sent by members of the role-set as attempts to influence the focal person (in this case the nurse).
- PRN (pro re nata) orders:** Orders where the directions state that therapy should be provided according to the circumstances (in contrast to scheduled orders).
- Psychotropic medications:** All products listed in the American Hospital Formulary Service as tranquilizers (28:16.08), sedative-hypnotics (28.24) [excluding those sedative-hypnotics defined here as sleep medications], antidepressants (28:16.04), or lithium.
- Resident - 2 month audit:** Any person residing in the study facilities for one or more days during the second month of the two month audit period (N = 863).
- Resident - 7 day audit:** Any person residing in the study facilities for one or more days during Monday through Friday of the week used for the seven day audit (N = 730).

**Scheduled orders:** Orders where the directions specify a routine time period for when the therapy should be provided. Orders indicating that one dose of medication is to be given routinely (scheduled) but a second dose can be given as needed (PRN) were considered scheduled orders by this study.

**Sedative medications (other than sleep medications):** All products listed in the American Hospital Formulary Service as antidepressants (28:16.04) [excluding monoamine oxidase inhibitors], narcotic analgesics (28.08), narcotic cough preparations, tranquilizers (28:16.08), sedative-hypnotics (28:24) [excluding those defined here as sleep medications], muscle relaxants (12:20), ethanalamine derivative antihistamines and piperazine derivatives (4:00), or miscellaneous products with sedative effects.

**Self-sent role expectations:** The focal person's (in this case the nurse's) reflexive role expectations that the focal person "sends" to him- or herself.

**Sleep disruptive diseases:** Diseases which, because of pain, nocturia, metabolic imbalance influencing sleep, pulmonary complications, or other pertinent reasons disturb normal sleeping patterns.

**Sleep disruptive symptoms:** Symptoms including: a) complaints of pain, b) agitation, restlessness, or sleeplessness, c) behavioral or emotional symptoms resulting in a loss of orientation or difficulty sleeping, or d) physical conditions that could cause periodic waking or inability to sleep.

**Sleep medications:** a) Flurazepam, b) diphenhydramine if ordered to be administered at bedtime or for sleep, or c) any other sedative-hypnotic as defined by the American Hospital Formulary Service (28:24) ordered to be administered at bedtime or for sleep.

**Stimulant medications:** Products listed in the American Hospital Formulary Service as monoamine oxidase inhibiting antidepressants (28:16.04) or other products determined to frequently cause trouble in sleeping.

**Use of medication:** A medication was considered used if it had been documented as administered to the resident. In the two month audit, this determination was based on pharmacy billing records. In the seven day audit, this was based on nurses' medication chart records and supplemented with pharmacy billing records.

APPENDIX B

MANUAL FOR IDENTIFYING DRUGS  
TO BE CODED AND CODES

Criteria for inclusion of drugs on "List of Drugs Disruptive of Sleep"

- (1) The "Side/Adverse Effects" section of the drugs listed in the United States Pharmacopeia - Drug Information for the Health Care Provider, 1983 and updates were reviewed to identify those drugs causing "trouble in sleeping" and with a "more frequent" incidence. The following drugs were identified:

amantadine	isoproterenol
aminophylline	methoxsalen
amphetamines	oxytriphylline
ephedrine	pseudoephedrine
isoetharine	theophylline

- (2) The side-effects of the above drugs, drugs chemically related to them, and several additional drugs suggested by medical texts were also reviewed in the American Hospital Formulary (1983) and Facts and Comparisons (1983) to determine if any drugs should be added or deleted from the list. Since both the AHFS and Facts and Comparisons disagreed with the USPDI, the following drugs were added to the list:

isocarboxazid  
phenelzine  
tranylcypromine

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Primary references:

American Hospital Formulary Service, 1983

United States Pharmacopeia - Drug Information for the Health Care Provider,  
1983

Facts and Comparisons, 1983

Drugs to obtain usage information on - General overview

- S1 flurazepam  
 S2 diphenhydramine or hydroxyzine with sig. for only bedtime/sleep use  
 S3 other sedative-hypnotics (AHFS 28.24) with sig. for only bedtime/sleep use  
 T1 tranquilizers - major (AHFS 28:16.08)  
 T2 other sedative-hypnotics (AHFS 28.24) without sig. for only bedtime/sleep  
 AD1 antidepressants (AHFS 28:16.04) other than the MAOIs (see below)  
 AD2 antidepressants - MAOIs (as defined in AHFS 28:16.04)  
 AN1 narcotic analgesics (AHFS 28.08) to include: butorphanol, codeine, hydrocodone, hydromorphone, levorphanol, meperidine, methadone, morphine, nalbuphine, opium, oxycodone, oxymorphone, pentazocine, propoxyphene  
 AN2 other analgesics (AHFS 28.08) except those listed in AN1  
 NC narcotic cough preparations: those containing AN1 drugs and with primary indication for use - cough  
 L lithium  
 OD other drugs disruptive of sleep (see list)  
 MR muscle relaxants (AHFS 12:20) not including the benzodiazepines. Note: neuromuscular blocking agents not included.  
 OA other ethanolamine derivative antihistamines (other than diphenhydramine) and piperazine derivatives as defined in AHFS 4:00  
 MI miscellaneous

Categories of interest:

<u>Sleep medications</u>	<u>Drugs disruptive of sleep</u>	<u>Analgesics</u>
S1	AD2	AN1
S2	OD	AN2
S3		
<u>Other psychotropics</u>	<u>Drugs with sedative properties</u>	
AD1	AD1	T2
AD2	AN1	MR
T1	NC	OA
T2	T1	MI
L		

Code

## S1 FLURAZEPAM

## S2 DIPHENHYDRAMINE or HYDROXYZINE with sig. that indicates for only sleep or at bedtime.

## Examples of sig.:

i q hs	i hs prn
i q hs prn	i prn for sleep
i prn for insomnia	i qd for sleep
i at noc	i at noc prn
i qd (and no indication to give more often)	i qd 9 PM
	i hs

Note: All other diphenhydramine or hydroxyzine Rxs code 0A, except those written for "restlessness" or "agitation" which are coded T2.

## S3 Other sedative-hypnotics (AHFS 28.24) with sig. that indicates only for sleep or at bedtime (see examples S2).

Exceptions: (1) For sig. indicating one-time administration per day and lacking an indication for sleep (eg., "i qd", "i q hs") the following guidelines apply:

- (a) If the drug is a barbiturate, check the diagnoses. If there is a diagnoses of epilepsy, code the drug as MI.
  - (b) For all drugs not included in (a) and marked with an \*, code S3.
  - (c) For all drugs not included in (a) or (b), code T2.
- (2) For Limbitrol, if sig. indicates "hs prn" or similar, code S3. If sig. indicates "prn" and daytime use, code T2. If sig. indicates any scheduled use, code AD1.
- (3) Any order for diazepam with a sig. indicating that its for seizure control or epilepsy, code MI.

28:24

Sedatives & Hypnotics

Amobarbital  
Aprobarbital  
Butobarbital  
(continued)

Additions not yet in AHFS:

alprazolam  
halazepam  
temazepam

Sedatives & Hypnotics (cont'd)

*Chloral Hydrate	triazolam
Chlordiazepoxide	
Chlormezanone	
Clorazepate	<u>Combination products:</u>
Diazepam	
*Ethchlorvynol	plexonal
*Ethinamate	carbrital
*Glutethimide	milpath
Hexobarbital	belladenal
Lorazepam	donnatal
Mephobarbital	fiorinal
Meprobamate	butalbital w/ APC
*Methaqualone	equagesic
Methohexital	Limbitrol
Methotrimeprazine	
*Methyprylon	
Oxazepam	
Paraldehyde	
Pentobarbital	
Phenobarbital	
Prazepam	
Promethazine	
Propiomazine	
Secobarbital	
*Talbutal	
*Triclofos	
Tybamate	

## T1 Tranquilizers - major (AHFS 28:16.08)

28:15.08 Tranquilizers

Acetophenazine  
 Carphenazine  
 Chlorpromazine  
 Chlorprothixene  
 Droperidol  
 Fluphenazine  
 Haloperidol  
 Hydroxyzine  
 Loxapine  
 Mesoridazine  
 Molindone  
 Perphenazine  
 Piperacetazine  
 Prochlorperazine  
 Promazine  
 (continued)

Additions

Torecan (thiethyl perazine)

Tranquilizers (cont'd)

Thioridazine  
 Thiothixene  
 Trifluoperazine  
 Triflupromazine

Exceptions: (1) If sig. indicates use is for nausea or vomiting, code MI.

T2 Other sedative-hypnotics (AHFS 28.24) without sig. that indicates for only sleep or at bedtime (see list for S3).

Exceptions: (1) If the drug is a barbiturate and the resident has a diagnosis of epilepsy, give the barbiturate a code of MI.

(2) For drugs other than those coded in (1), if sig. indicates both daytime and bedtime use, code as follows:

(a) If either day or bedtime use are scheduled, separate the order into 2 parts and count each separately.

Examples: i q hs and i tid  
 i q hs prn and i tid  
 i q hs and i tid prn

(b) If both the day and bedtime use are prn, code as T2. (Note: Treat "MR x 1" the same as prn.)

Example: i q hs prn and i tid prn  
 i q hs-MR x 1 and t q 4h prn

AD1 Antidepressants (AHFS 28:16.04) not including MAOIs (see list of MAOIs in AD2).

28:16.04 Antidepressants

Amitriptyline  
 Amoxapine  
 Desipramine  
 Doxepin  
 Imipramine  
 Maprotiline  
 Nortriptyline  
 Protriptyline  
 Trimipramine

Additions

Trazodone

Combinations

Triavil 2-25

## AD2 Antidepressants (AHFS 28:16.04) - only MAOIs

isocarboxazid  
phenelzine  
tranycypramine

## AN1 Narcotic analgesics listed in (AHFS 28.08)

butorphanol  
codeine  
hydrocodone  
hydromorphone  
levorphanol  
meperidine  
methadone  
morphine  
nalbuphine  
opium  
oxycodone  
oxymorphone  
pentazocine  
propoxyphene

Combinations

Darvocet-N  
ASA with codeine  
Acetaminophen with codeine

Note: For those combination products other than narcotic cough syrups, the AN1 code prevails over other ingredients that might be coded in other categories.

## AN2 Other analgesics (AHFS 28.08) not including those listed in AN1.

28:08 Analgesics and Antipyretics

Acetaminophen, See Para-Aminophenol Derivatives  
Ethoheptazine  
Fenoprofen  
Fentanyl  
Ibuprofen  
Indomethacin  
Meclofenamate  
Mefenamic Acid  
Naproxen  
Oxyphenbutazone, See Pyrazolone Derivatives  
Para-Aminophenol Derivatives  
Pentazocine  
Phenacetin, See Para-Aminophenol Derivatives  
Phenylbutazone, See Pyrazolone Derivatives  
Proteolytic Enzyme  
Pyrazolone Derivatives  
Sulindac  
(continued)

Analgesics and Antipyretics (cont'd)

Tolmetin  
Zomepirac

Additions

Piroxicam

Combinations

Midrin

28:03.04 Nonsteroidal Anti-Inflammatory Agents

Aspirin  
Choline Salicylate, See Salicylate Salts  
Magnesium Salicylate, See Salicylate Salts  
Salicylates  
Salicylate Salts  
Salsalate  
Sodium Salicylate, See Salicylate Salts  
Trolamine Salicylate, See Salicylate Salts

Additions

Diflunisal

Combinations

Exedrin PM  
Ascriptin  
Ornex  
CAMA

28:03.92 Miscellaneous Analgesics and Antipyretics

Salicylamide  
Sodium Thiosalicylate

NC Narcotic cough preparations: those containing ANI drugs and with primary indications for use = cough (antitussives).

Contain codeine; hydrocodone

Examples:	Hycodan	Hycotuss
	Tussend	Calcidrine
	Tussionex	Tussi-Organidin
	Cheracol	Novahistine DH
	Robitussin AC	CPD Syrup (Benlyn & codeine)
	Terpin Hydrate with Codeine	Actifed-C
		Ambenyl
		Phenergan w/ codeine
		Triaminic Exp. DH



Ethanolamine Derivatives (Aminoalkyl Ethers)

bromodiphenhydramine	diphenhydramine
carbinoxamine	diphenylpyraline
clemastine	doxylamine
dimenhydrinate	phenyltoloxamine

Piperazine Derivatives

buclizine	hydroxyzine
chlorcyclizine	meclizine
cyclizine	

Combinations

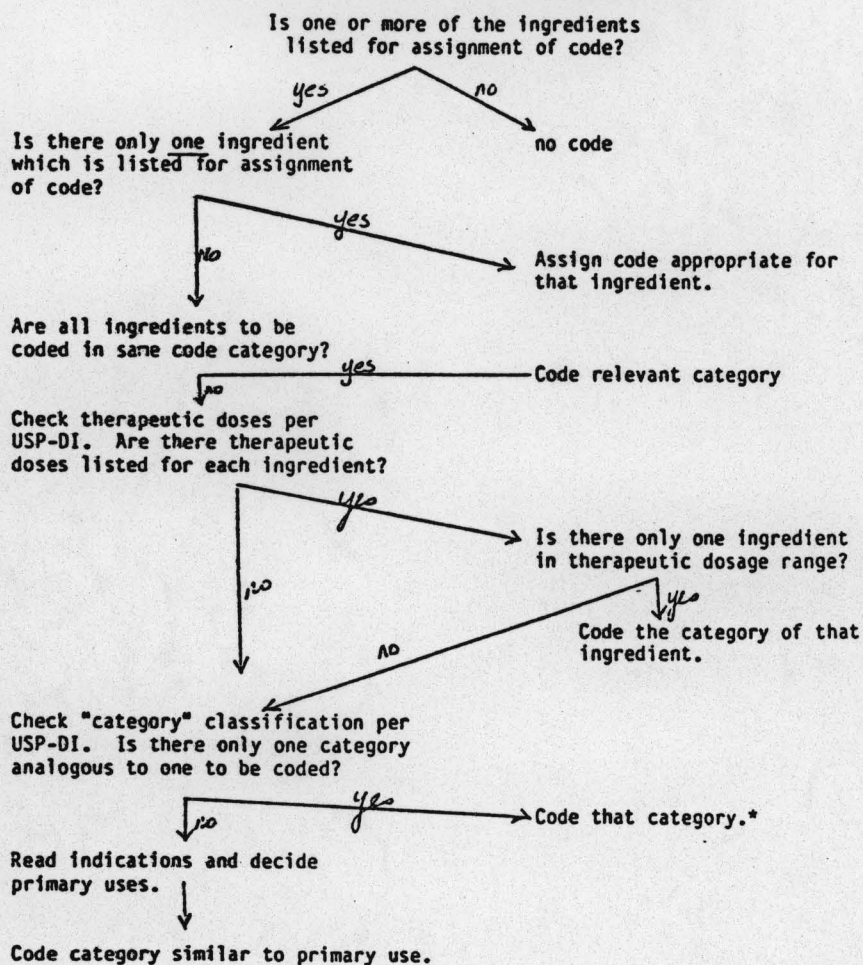
Benylin  
Enarax-5

Include here diphenhydramine or hydroxyzine with sig. other than for only bedtime or sleep and no mention of use for restlessness.

**MI Miscellaneous**

Includes major tranquilizers indicated for nausea or vomiting, barbiturates with dx of seizures or epilepsy, diazepam with sig. for seizures, wine, tranquilizers in combination cough products (e.g., Phenergan expectorant).

GUIDELINES FOR CLASSIFYING COMBINATION DRUG PRODUCTS



\*NOTE: If category = analgesic and combination contains a narcotic with dose in therapeutic range, code = narcotic analgesic.

APPENDIX C

DATA CODEBOOK - DIAGNOSES

## DATA CODEBOOK - DIAGNOSES

The International Classification of Diseases - 9th Revision was used to determine the following categories. For the diseases, code:

- 0 = no diseases in this category
- 1 = one or more diseases in the category
- 9 = no diseases listed for resident

All variables are 1 digit.

<u>Name</u>	<u>Variable Description</u>	<u>ICDA numbers</u>
DIAG7	INFECTIOUS AND PARASITIC DISEASES	001 - 139
DIAG8	NEOPLASMS - benign or malignant neoplasm of bone + articular cartilage, malignant neoplasm of bone marrow	170, 202.9, 213
DIAG9	NEOPLASMS - malignant or benign neoplasms of prostate	185, 222.2.
DIAG10	NEOPLASMS - malignant or benign of the bladder	188, 223.3
DIAG11	NEOPLASMS - any other than those listed above	140 - 239 (with above exceptions)
DIAG12	ENDOCRINE, NUTRITIONAL, AND METABOLIC - thyrotoxicosis	242
DIAG13	ENDOCRINE, NUTRITIONAL, AND METABOLIC - other than thyrotoxicosis	240 - 241, 243 - 279
DIAG14	BLOOD AND BLOOD FORMING ORGANS	280 - 289

<u>Name</u>	<u>Variable Description</u>	<u>ICDA numbers</u>
DIAG15	MENTAL DISORDERS - senile and presenile organic psychotic conditions, organic brain damage, (include: organic brain syndrome, chronic brain syndrome)	290, 310, 797
DIAG16	MENTAL DISORDERS - schizophrenic disorders	295
DIAG17	MENTAL DISORDERS - alcoholic psychoses, drug psychoses, transient organic psychotic conditions, other organic psychotic conditions (other than schizophrenia), paranoid states, other nonorganic psychoses	291 - 294, 297 - 298
DIAG18	MENTAL DISORDERS - affective disorders (includes: manic depressive disorders) neurotic depression (anxiety depression), depressive disorders not classified elsewhere	296, 300.4, 311
DIAG19	MENTAL DISORDERS - anxiety states	300.0
DIAG20	MENTAL DISORDERS - transient or persistent disorder of initiating or maintaining sleep (hyposomnia, insomnia, sleeplessness)	307.41, 307.42, 307.46 - .49 780.5
DIAG21	MENTAL DISORDERS - other than those listed above)	300 - 310, 312 - 319 (with above exceptions)
DIAG22	NERVOUS SYSTEM AND SENSE ORGANS - Parkinson's disease	332
DIAG23	NERVOUS SYSTEM AND SENSE ORGANS - carpal tunnel syndrome (median nerve compression)	354.0
DIAG24	NERVOUS SYSTEM AND SENSE ORGANS - other than those listed above	320 - 353 354.1 - 389
DIAG25	CIRCULATORY SYSTEM - angina decubitus (nocturnal angina)	413.0

<u>Name</u>	<u>Variable Description</u>	<u>ICDA numbers</u>
DIAG26	CIRCULATORY SYSTEM - heart failure	428
DIAG27	CIRCULATORY SYSTEM - other than those listed above	390 - 427 429 - 459 (with above exceptions)
DIAG28	RESPIRATORY SYSTEM	460 - 519
DIAG29	DIGESTIVE SYSTEM - gastric or duodenal ulcer	531, 532
DIAG30	DIGESTIVE SYSTEM - noninfectious enteritis and colitis	555 - 558
DIAG31	DIGESTIVE SYSTEM - other than those listed above	520 - 530 553 - 554 560 - 579
DIAG32	GENITOURINARY SYSTEM - infection of kidney, cystitis, urethritis (include: any UTI)	590, 595, 597
DIAG33	GENITOURINARY SYSTEM - hyperplasia of prostate	600
DIAG34	GENITOURINARY SYSTEM - genital/bladder prolapse (male or female)	596.8, 618
DIAG35	GENITOURINARY SYSTEM - other than those listed above	580 - 629 (with above exceptions)
DIAG36	PREGNANCY, CHILDBIRTH, PEURPERIUM	630 - 676
DIAG37	SKIN AND SUBCUTANEOUS TISSUE - contact dermatitis and other eczema, pruritus and related conditions	692, 698
DIAG38	SKIN AND SUBCUTANEOUS TISSUE - other than those listed above	680 - 691 693 - 697 699 - 709

<u>Name</u>	<u>Variable Description</u>	<u>ICDA numbers</u>
DIAG39	MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE - arthropathies, rheumatoid arthritis, polyarthropathies, osteoarthritis, ankylosing spondylitis and other spond- ylopathies, polymyalgia rheumatica	711 - 716 720, 721, 725
DIAG40	MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE - other than those listed above	710 - 739 (with above exceptions)
DIAG41	CONGENITAL ANOMALIES, CONDITIONS FROM PERINATAL	740 - 759 760 - 779
DIAG42	SYMPTOMS, SIGNS, ILL-DEFINED CONDITIONS (note: code any insomnia (780.5) in column 20, any senility (797) in column 15	780 - 799
DIAG43	INJURY AND POISONING	800 - 999
DIAG44	OTHER - diagnoses which don't seem to fit any of above categories of ICDA codes. Keep a list of these.	

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APPENDIX D

DATA CODEBOOK - SYMPTOMS

## DATA CODEBOOK - SYMPTOMS

The National Ambulatory Medical Care Survey: Symptom Classification (DHEW Pub. No. HRA 74-1337) was adapted to determine the following categories.

For symptoms, code:

0 = no symptoms in this category

1 = one or more symptoms in this category

All variables are one digit.

<u>Name</u>	<u>Audit Form designation</u>	<u>NAMCS code(s)</u>
SYMP1	a. restlessness, agitation, anxiety	800.0 Anxiety Includes: apprehension 805.0 Restlessness Includes: hyperactivity, overactivity 810.0 Nervousness Includes: "butterflies," nerves, tension, upset
SYMP2	b. sleeplessness	062.0 Disturbances of sleep Includes: insomnia, trouble sleeping, can't sleep, nightmares, sleepwalking Excludes: drowsiness, hypersomnia, sleepiness
SYMP3	c. pain - general	013.0 Pain, generalized, site unspecified Includes: ache, aches all over, cramp, hurt, stiffness
SYMP4	c. pain - nervous system	056.0 Headache Includes: migraine, nervous, tension
SYMP5	c. pain - skin, nails, hair	113.0 Skin irritation - pain
SYMP6	c. pain - respiratory system	304.0 Sinus problems - pain 322.0 Pain in chest Includes: burning sensation, chest tightness, pain in lung, pain over heart, pain (respiratory, rib, retrosternal, sternal, side of chest), pressure in/on chest
SYMP7	c. pain - musculoskeletal system	400.0 Pain - lower extremity Includes: ache, charley-horse, contracture, cramp, hurt, pulled muscle, soreness, spasm, stiffness, strain 405.0 Pain - upper extremity Includes: see 400.0

<u>Name</u>	<u>Audit Form designation</u>	<u>NAMCS code(s)</u>
		410.0 Pain - face and neck region Includes: see 400.0
		415.0 Pain - back region Includes: see 400.0
SYMP8	c. pain - digestive system	512.0 Toothache 520.0 Throat soreness Includes: painful throat, scratchy throat, sore throat 540.0 Abdominal pain Includes: intestinal colic, pain in epigastrium, iliac, inguinal, right/left upper/lower quadrants, stomach, umbilical region
SYMP9	c. pain - male reproductive system	631.0 Pain - male genital system Includes: pain at penis, scrotum, testes
SYMP10	c. pain - female reproductive system	660.0 Pain - pelvic 661.0 Pain - vaginal 663.0 Pain - vulvar 681.0 Pain or soreness of breast
SYMP11	c. pain - eyes or ears	705.0 Eye pain or irritation 735.0 Earache
SYMP12	d. confusion, disorientation	053.0 Confusion 058.0 Memory, disturbances of Includes: amnesia, lack or loss of memory, temporary loss of memory 065.0 Senility - old age
SYMP13	e. combativeness, wandering	815.0 Behavioral disturbance Includes: antisocial behavior, behavioral problems, irritability, quarrelsome, temper tantrums

<u>Name</u>	<u>Audit Form designation</u>	<u>NAMCS code(s)</u>
SYMP14	f. depression	807.0 Depression Includes: bitterness, crying excessively, dejected, discontent, feeling lost, feeling low, feeling rejected, hopelessness, unhappy, worrying
SYMP15	g. pruritis; skin irritation	112.0 Allergic skin reactions Includes: hives, photosensitivity, poison ivy, etc, diaper rash 113.0 Skin irritations Includes: inflammation, itching, ulcer, sore. Excludes: pain 116.0 Wound of skin Includes: bites, blisters, bruises, cuts, scratches
SYMP16	h. cough, shortness of breath	301.0 Nasal congestion Includes: drippy nose, postnatal drip, red nose, runny nose, sniffles, stuffy nose 304.0 Sinus problems Includes: congestion, impacted, infected, pressure Excludes: pain 306.0 Shortness of breath Includes: breathlessness, dyspnea, sensation of suffocation, trouble breathing 311.0 Cough 312.0 Cold 313.0 Flu Includes: grip, influenza 321.0 Congestion in chest Includes: lung congestion
SYMP17	i. constipation or diarrhea	554.0 Constipation 555.0 Diarrhea
SYMP18	j. urinary frequency; nocturia	601.0 Frequency and nocturia Includes: bed wetting, night discharge

<u>Name</u>	<u>Audit Form designation</u>	<u>NAMCS code(s)</u>
SYMP19	k. Nocturnal myoclonus	- no NAMCS
SYMP20	l. sundown syndrome, nocturnal delirium	- no NAMCS
SYMP21	m. other: drowsy	062.0 Disturbances of sleep Includes: drowsiness, hypersomnia, sleepiness Excludes: insomnia, trouble sleeping, can't sleep, nightmares, sleepwalking
SYMP22	m. other: fatigue	004.0 Fatigue Includes: exhausted, general weakness, pooped, rundown, tired, worn out
SYMP23	m. other - sleeps during day	- no NAMCS
SYMP24	m. other - chart showed doc- umentation the resident was awake during one or more nights	- no NAMCS Example: frequent calling to nurses station during night
SYMP25	m. other - fears and phobias	801.0 Fears and phobias
SYMP26	m. other - delusions and hallucinations	824.0 Delusions and hallucinations
SYMP27	m. other - nausea and vomiting	527.0 Nausea and vomiting Includes: retching, sick to stomach, throwing up
SYMP28	m. other - ill-feeling	005.0 General ill-feeling Includes: not feeling well
SYMP29	m. other - loneliness	806.0 Loneliness
SYMP30	Any other than above	- no NAMCS code - keep list of these (consists mainly of other behavioral symptoms)
SYMP31	c. pain - angina	- no NAMCS code

APPENDIX E

LETTERS AND CONSENT FORM

**SAMPLE LETTER**

**Dear Resident/Family Member:**

I want to take this opportunity to inform you that our facility is one of many long-term care centers that has recently agreed to cooperate in a study to evaluate the prescribing and usage patterns of sleeping medications. The study is being conducted by the School of Pharmacy at the University of Wisconsin-Madison in collaboration with Medical Health Pharmacy. The focus of the study is to evaluate the nature and extent of sleeping medication prescriptions and consumption with our residents. Attention will be given to whether a sleeping medication is given, when it is given, and what factors may influence usage. The results of the study would hopefully result in better pharmaceutical services for our residents and a greater understanding of drug utilization in long-term care facilities

In an effort to examine all the variables, the medical charts of those residents serviced by Medical Health Pharmacy will need to be reviewed. I have been assured by the study team that strict confidentiality of all data will be maintained. If you feel that a researcher should not review your medical chart, please forward this letter back to my attention stating your intentions by (10-14 days from date).

If you have any questions, please feel free to contact me. Thank you for your assistance.

Sincerely,

CONSENT FORM

I have been informed that the general purpose of this study is to gain a better understanding of sleep medication usage and factors influencing usage in long-term care facilities. It is my understanding that the information obtained will be used only for research purposes.

I understand that the information will become part of an anonymous data file and that research reports will not contain information that could identify me, my unit or place of work, my fellow workers or supervisors, or other persons with whom I have contact. Reports also will not reveal information that may identify the residents whose records are being reviewed.

The investigators have offered to answer my questions concerning this study and the measures which will be taken to protect my rights and welfare as well as those of the residents. I understand that my participation is voluntary. I am free to withdraw my consent and to stop participating in the study at any time.

AUTHORIZATION: I, \_\_\_\_\_, have read the above and decide to participate in the research project described. My signature also indicates that I have received a copy of this consent form.


SIGNATURE: \_\_\_\_\_

DATE: \_\_\_\_\_



THANK YOU FOR YOUR HELP!

## INITIAL LETTER

University of Wisconsin  Madison

## CENTER FOR HEALTH SCIENCES

School of Pharmacy  
425 North Charter Street  
Madison, Wisconsin 53706  
Telephone: 608/262-1416

(date) 1984

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Dear Ms. \_\_\_\_\_:

There has been increasing interest in recent years in health professionals' philosophies regarding the appropriateness and need for sleep medication among their patients. At the request of Medical Health Pharmacy, we are conducting a survey and review of sleep medication usage in seven facilities serviced by Medical Health Pharmacy. As an evening or night shift nurse at one of the facilities, we are asking you to take part in this study and contribute to the representation of nurses' perspectives regarding the use of sleep medications. This survey is important for accurate information about you, your facility, and the residents for whom you care. The information will aid our understanding of the process by which sleep medications are evaluated and used in long-term care facilities.

All information will be kept strictly confidential and is collected solely for research purposes. Participants will receive a summary of results without individual staff members or nursing units being identified. For your comparison, the averages on the information collected from all facilities will also be provided. If you are willing to participate, please sign and return the consent form. It is important that you complete the survey during the next 24 hours so that the information is as standard as possible.

If you have any questions or concerns, please feel free to contact us at the telephone numbers listed below. Ms. Robers will be visiting your facility several evenings this week and will be happy to discuss the study with you then or by telephone.


We hope you'll find this survey interesting and the results useful. Thank you for your assistance.

Sincerely,

Pamela A. Robers, M.S., R.Ph.  
Project Coordinator  
(608)-262-7434

Bonnie L. Svarstad, Ph.D.  
Associate Dean and Associate Professor  
(608)-262-7443

## FIRST FOLLOW-UP LETTER

University of Wisconsin  Madison

## CENTER FOR HEALTH SCIENCES

School of Pharmacy  
425 North Charter Street  
Madison, Wisconsin 53706  
Telephone: 608/262-1416

(date) 1984

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Dear Ms. \_\_\_\_\_:

During the week of \_\_\_\_\_, a survey concerning sleep medication use was left for you at the facility where you work. However, your completed survey has not been received yet.

This survey is an effort to improve knowledge and understanding of factors related to sleep medication use in facilities such as yours. The information you furnish is vital for the accurate representation of nurses' perspectives. All information you supply will be held strictly confidential.

If you have already returned your survey form, your response was greatly appreciated. If not, won't you take time now to complete and return the survey?

Thank you for your help!


Sincerely,

Pamela A. Robers, M.S., R.Ph.  
Project Coordinator

Bonnie L. Svarstad, Ph.D.  
Associate Dean and Associate  
Professor

PAR/BLS:cmg

## SECOND FOLLOW-UP LETTER

University of Wisconsin  Madison

CENTER FOR HEALTH SCIENCES  
School of Pharmacy  
425 North Charter Street  
Madison, Wisconsin 53706  
Telephone: 608/262-1416

(date), 1984

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Dear Ms. \_\_\_\_\_:

During the past two weeks, you were sent a survey concerning sleep medication use. As of today, we have not received your completed survey.

Describing accurately how nurses at your facility feel about sleep medications and related issues depends upon responses such as yours. You may have quite different opinions about sleep medications than those nurses who have already responded. Since the information from this survey will be used to plan future pharmaceutical services for your facility, it is important that it represent you.

We ask you to complete and return the enclosed survey as quickly as possible. A postage-paid return envelope is enclosed for your convenience. All information you supply will be held strictly confidential.

Your contribution to the success of this study will be appreciated greatly.

Sincerely,

Pamela A Robers, M.S., R.Ph.  
Project Coordinator

Bonnie L. Svarstad, Ph.D.  
Associate Dean and Associate  
Professor

PAR/BLS:cmg

## THIRD FOLLOW-UP LETTER

TO:

FROM: Pam Robers, Project Coordinator

DATE:

## THE GOOD NEWS AND THE BAD NEWS

Good news

Good news! We have finally finished collecting the medical chart and cardex information from those facilities taking part in the study on sleep medication use. We have also received completed surveys from the majority of evening/night shift nurses.

Bad news

At your facility, many of the nurses have not completed the survey.

Won't you please consider completing the attached survey? It can be returned in a sealed envelope to

(name) \_\_\_\_\_



**Your opinion counts!**

**Tell us so we can count it.**

APPENDIX F

NURSE SURVEY

#: \_\_\_\_\_

## SLEEP MEDICATION SURVEY

Please answer each of the following questions. The form will take about 30 minutes to complete.

1. Please think back to when you worked at this facility last week, that is during Monday \_\_\_\_\_ through Sunday \_\_\_\_\_. Below each time you worked, also indicate the \_\_\_\_\_ where you were in charge of passing medications.

Date:

worked:      Mon      Tues      Wed      Thurs      Fri      Sat      Sun  
 in charge of:    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_

2. Thinking back to last week, choose one of the days you worked as typical of the shifts you worked.
- a. Please specify day and shift you chose: \_\_\_\_\_
- b. How many residents were you responsible for during your typical shift? # \_\_\_\_\_
- c. Please estimate the number of residents to whom you provided the following types of care during your typical shift.
- |             |         |            |         |          |         |
|-------------|---------|------------|---------|----------|---------|
| medications | # _____ | treatments | # _____ | charting | # _____ |
| feedings    | # _____ | bathing    | # _____ |          |         |
3. a. What is your best estimate of the number of residents who experienced (or expected to experience) a sleep problem during your typical shift last week? # \_\_\_\_\_
- b. Approximately how many residents actually complained about a sleep problem to you or another staff member? # \_\_\_\_\_
- c. Approximately how many residents asked for or expected to receive a sleep medication? # \_\_\_\_\_
- d. Of the residents who asked for or expected to receive this medication, how many do you think are psychologically dependent on the drug? # \_\_\_\_\_
4. Was there a set time when the lights in all the residents' rooms were turned off for the night?    \_\_\_\_\_ no    \_\_\_\_\_ yes (Please specify the time: \_\_\_\_\_)
5. a. At what time is a sleep medication usually administered when it is ordered scheduled (q hs)? \_\_\_\_\_
- b. Does the time when a scheduled sleep medication is given vary by resident?  
 \_\_\_\_\_ yes    \_\_\_\_\_ no

For the following questions (6 through 10), there are no "right" or "wrong" answers. Rather, please provide answers which reflect what you truly believe.

6. Listed below are various situations involving the use of sleep medications in a unit such as yours. Assume that the resident has a PRN (as needed) order for a sleep medication and that you are responsible for administering it under ideal conditions. Under what circumstances do you think you should administer the medication?

Place a check (✓) in one of the three columns (YES, NO, or UNCERTAIN) beside each situation to indicate what you think you should do about administering the sleep medication.

SHOULD YOU ADMINISTER  
THE SLEEP MEDICATION?

	Yes	No	Uncertain	
A. The resident is asleep when you arrive to give the sleep medication.	7	86	7	%
B. The resident has been unusually tired during the day.	16	62	21	%
C. For the past several nights, the resident was awake often and seemed agitated.	77	9	14	%
D. The resident tells you that he/she doesn't need the medication.	0	91	9	%
E. The resident asks for sleep medication every night.	55	16	29	%
F. The resident was admitted to the facility this evening.	41	30	29	%
G. The resident is noisy and disturbing the roommate.	68	21	11	%
H. The resident asks for sleep medication every night but has fallen asleep early tonight.	5	82	12	%
I. The resident complains of being unable to get comfortable.	29	41	30	%
J. Other nurses mentioned having trouble getting the resident up in the morning.	4	71	25	%
K. The resident received a sleep medication regularly while in the hospital.	20	50	30	%
L. The resident asks for something to help get to sleep.	84	4	12	%
M. The resident has been napping often during the daytime.	25	43	32	%
N. The resident took a sleep medication for years prior to moving to the facility.	45	16	39	%
O. The resident is in pain and unable to sleep.	23	46	30	%
P. For several nights, the resident has been waking up at around 2 AM.	50	30	20	%

7. Who has responsibility, in your opinion, to make the following decisions about sleep medications? Please check (✓) the appropriate boxes. If the decision is the responsibility of more than one person, check all boxes that apply.

WHO HAS RESPONSIBILITY FOR:		[% with ✓:]				
		Nurse (yourself)	Physician	Resident	Pharmacist	
A.	determining if the resident <u>needs an order</u> for a sleep medication	96	79	62	4	%
B.	determining which <u>specific sleep medication</u> is best for the resident	34	100	9	34	%
C.	determining which <u>dose</u> of the sleep medication is best for the resident	43	100	18	39	%
D.	determining whether the sleep medication should be <u>scheduled</u> (nightly) or <u>PRN</u> (as needed)	88	79	32	7	%
E.	determining what <u>time</u> of the evening the resident should receive a sleep medication	96	25	61	14	%
F.	determining which <u>evening/night</u> the resident should receive a sleep medication	91	13	57	2	%
G.	monitoring <u>adverse effects</u> from a sleep medication	100	34	30	29	%
H.	monitoring for <u>drug interactions</u> with a sleep medication	98	46	7	74	%
I.	determining when to <u>change</u> the drug or dosage regimen	88	98	25	43	%
J.	determining when to <u>discontinue</u> the sleep medication	91	95	45	21	%

8. a. Assume that an alert resident has a sleep medication ordered on a scheduled (q hs) basis. In your opinion, how involved should the resident be in the decision to administer the medication? (Please check one.)

- The nurse should administer the medication without discussion with the resident.
- The nurse should suggest or offer the medication and let the resident decide whether it is needed.
- The nurse should not suggest or offer the medication until the resident has complained of sleeplessness or requested the medication.
- Other, please explain: \_\_\_\_\_

8. b. Assume that the resident is unable to make decisions concerning his/her care. How should a scheduled sleep medication be administered in this situation? (Please check one.)

The nurse should routinely administer the medication when administering other scheduled bedtime medications.

The nurse should wait to administer the medication until the resident shows signs of sleeplessness.

Other, please explain: \_\_\_\_\_

9. We are interested if you agree or disagree, on the whole, with the following general statements. Please use the following scale for your answers and circle the letter that represents how you feel.

a	b	c	d	e
strongly agree	agree	neither agree nor disagree	disagree	strongly disagree

A. A resident is better off getting a medication for sleep than missing a good night's sleep.	12	29	29	27	4	%
	a	b	c	d	e	
B. Much of the time, administering a sleep medication is about the only thing a nurse can do to help a resident sleep better.	2	7	5	38	48	%
	a	b	c	d	e	
C. Sleeping pills don't really cure anything, they just cover up the real trouble a resident may have.	14	34	33	16	2	%
	a	b	c	d	e	
D. The use of a sleeping pill by a resident is a sign of the resident's weakness.	2	2	11	29	57	%
	a	b	c	d	e	
E. Sleeping pills work very well to help the resident through the night.	4	18	59	18	2	%
	a	b	c	d	e	
F. An order for a PRN (as needed) sleep medication should be written for residents upon admission to the facility.	4	16	16	40	24	%
	a	b	c	d	e	
G. A resident should only be given a sleeping medication as a last resort.	21	30	23	25	0	%
	a	b	c	d	e	
H. An order for a scheduled sleep medication (q hs) should be given every night because the physician ordered it that way.	4	14	20	40	22	%
	a	b	c	d	e	

10. Some people have positive attitudes about sleep medications and expect nurses to be liberal when administering them. Other people have negative attitudes about sleep medications and expect nurses to be quite conservative when administering them. What is the situation in this facility? Please check the appropriate box to indicate what each of the following generally expects of you.

	Liberal administration	Conservative administration	Don't know	
A. Your supervisor	20	46	34	%
B. Director of nursing	11	25	64	%
C. Day shift nurses	16	36	48	%
D. Night shift nurses	50	29	21	%
E. Evening nurses	32	43	25	%
F. Aides	39	25	36	%
G. Attending physicians	14	34	52	%
H. Medical director	4	23	73	%
I. Consulting pharmacist	2	21	77	%
J. Residents	46	29	25	%
K. Residents' families	30	23	46	%
L. Facility's administrator	4	7	89	%
M. State inspectors	0	21	79	%

11. If you had a question about a sleep medication, where would you go to find the information you needed? Please rate the following choices in the order that you would use them with number 1 being the source you would go to first.

prescribing physician                       Physician's Desk Reference (PDR)  
 other nurse(s)                                       other, specify: \_\_\_\_\_  
 consultant pharmacist

12. a. Governmental agencies and professional groups have recently developed several sets of "indicators" or criteria for assessing the use of various prescription drugs, including sleep medications. Are you aware of any of these assessment tools?  
 no  yes (Please specify which ones: \_\_\_\_\_)
- b. Does your consulting pharmacist utilize any particular sets of indicators or criteria when performing drug regimen reviews that include sleep medications?  
 no  yes  do not know
- c. Have you ever attended a continuing education program, an in-service, or a staff meeting devoted to sleep medications and various guidelines for prescribing and administering these medications?  
 no  yes (Please indicate approximate dates and places)  
 Date: \_\_\_\_\_ Place: \_\_\_\_\_  
 Date: \_\_\_\_\_ Place: \_\_\_\_\_
- d. In the past year have you received or reviewed any other information devoted to sleep medications and their use?  
 no  yes (Please specify type: \_\_\_\_\_)
- e. How interested would you be in receiving more information about sleep medications and the various guidelines for using these drugs?  
 very interested  somewhat interested  not at all interested

To gain a better understanding of the kinds of information that might be useful to nurses, we would like you to answer some questions about drugs used to promote sleep.

13. Which of the following adverse effects might be caused by flurazepam (Dalmane)? (Please check all that apply.)

*% checking:* 63% a. ataxia (incoordination) 83% d. prolonged lethargy  
89% b. confusion and disorientation 30% e. respiratory depression  
35% c. paradoxical excitement

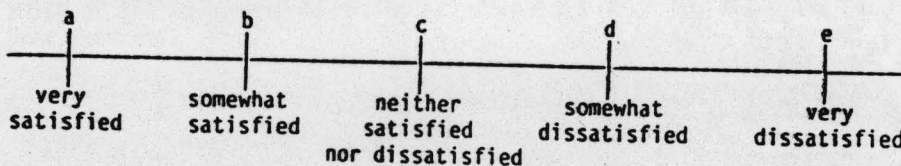
14. a. Should nurses question the continuous use of flurazepam?  
 no (go to question 15)  
 yes
- b. When should they question the continuous use of this drug?  
 after 1 week continued use  after 2 months continued use  
 after 2 weeks continued use  after 3 months continued use  
 after 3 weeks continued use  after 4 months continued use  
 after 1 month continued use

15. The statements below are about a variety of medications and may be true or false. Please circle the best answer. Some questions are more difficult than others so feel free to indicate when you are uncertain or do not know.

*Note: correct answers are circled:*

	TRUE	FALSE	DO NOT KNOW	%
a. Flurazepam (Dalmane) has proven to be effective after 28 consecutive nights.	24 T	39 F	37 DK	%
b. Flurazepam has a long half-life and strong possibility of hangover.	51 T	24 F	24 DK	%
c. The elderly are more likely to experience adverse effects when taking sleep medications.	100 T	F	DK	%
d. The impact of chronic dosing with flurazepam may not be seen for several weeks.	48 T	15 F	37 DK	%
e. Death due to overdose is more common with flurazepam than with the barbiturates.	10 T	37 F	53 DK	%
f. Triazolam (Halcion) has a short half-life and a decreased chance of hangover.	40 T	4 F	55 DK	%
g. Rebound insomnia (intense worsening of insomnia after abrupt discontinuance of agent) is more likely with flurazepam than with triazolam.	23 T	12 F	65 DK	%
h. Temazepam (Restoril) has a rapid onset of action and is most suitable for persons who have difficulty falling asleep initially.	51 T	8 F	40 DK	%
i. Amitriptyline (Elavil) can be used to treat sleep problems related to chronic depression.	88 T	4 F	8 DK	%
j. The concomitant use of flurazepam, haloperidol (Haldol), and imipramine (Tofranil) is a potential problem.	69 T	4 F	27 DK	%
k. Ideally, flurazepam should be given PRN rather than scheduled.	83 T	6 F	10 DK	%
l. If haloperidol is used to sedate a resident, it should be given PRN at irregular intervals.	15 T	73 F	12 DK	%
m. It is advisable to start all sedative-hypnotics at lower doses in the elderly population.	98 T	F	2 DK	%

16. The nurse's ability to manage sleeping problems can depend on available time, staff, and support from others. We would like you to evaluate the following from your perspective as a nurse in this facility. Please use the scale below to indicate how satisfied you are with each of the following. Circle the letter that represents how you feel.



- A. the availability of time to assess the residents' sleep problems      a   b   c   d   e
- B. the availability of qualified aides/orderlies      a   b   c   d   e
- C. the availability of qualified RNs      a   b   c   d   e
- D. the availability of qualified LPNs or LVNs      a   b   c   d   e
- E. the availability of social-recreational activities for residents      a   b   c   d   e
- F. the adequacy of the mental health services      a   b   c   d   e
- G. the adequacy of pharmaceutical services      a   b   c   d   e
- H. the adequacy of the physical facility and equipment      a   b   c   d   e
- I. the respect and appreciation shown toward you by the residents' families      a   b   c   d   e
- J. the respect and appreciation shown toward you by the residents      a   b   c   d   e
- K. the administrator's concern about quality of care      a   b   c   d   e
- L. the administrator's concern about cost      a   b   c   d   e
- M. nursing director's concern about quality of care      a   b   c   d   e
- N. nursing director's concern about cost      a   b   c   d   e
- O. co-workers' concern about quality of care      a   b   c   d   e
- P. the guidance provided by your supervisors      a   b   c   d   e
- Q. the physicians' receptivity to your recommendations      a   b   c   d   e
- R. the number and type of residents admitted      a   b   c   d   e
- S. the physicians' involvement in resident care      a   b   c   d   e

17. How would you prefer to manage your residents' sleeping difficulties if you had unlimited time and resources?

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The following questions concern your current job. We ask these kinds of questions so that your experiences can be compared to other individuals with similar work situations.

18. Which of the following do you hold? Check all that apply and indicate the year received.

	<u>Year received</u>
A. (1) <u>53%</u> Licensed Practical or Vocational Nurse	_____
(2) <u>47%</u> Registered Nurse	_____
B. (1) <u>29%</u> Associate degree (N=7)	_____
(2) <u>33%</u> Diploma degree (N=8)	_____
(3) <u>38%</u> Bachelor's degree (N=9)	_____
(4) <u>0</u> Master's degree	_____

19. What is your current position at this facility: (1) \_\_\_\_\_ staff nurse  
(2) \_\_\_\_\_ supervisor
20. How long have you worked at this facility?  $\bar{x} = 3.5$  # years and \_\_\_\_\_ # months
21. How many hours per week do you usually work in this facility?  $\bar{x} = 31$  # of hours/week
22. Which shift do you usually work when you are on duty at this facility?  
(1) \_\_\_\_\_ days (first shift) (3) \_\_\_\_\_ nights (third shift)  
(2) \_\_\_\_\_ PMs (second shift) (4) \_\_\_\_\_ rotating (specify shifts: \_\_\_\_\_)

The following questions concern your personal background. We ask these questions so that your personal experiences can be compared to others with similar backgrounds. This information, like everything else, will be only used for research purposes.

23. How old are you?  $\bar{x} = 34.3$
24. Please circle the highest year of education your father had.
- |                 |             |                                  |   |
|-----------------|-------------|----------------------------------|---|
| 1 2 3 4 5 6 7 8 | 9 10 11 12  | 13 14 15 16                      | 17 18+ $\bar{x} = 13.3$                                     |
| Elementary      | High School | College and/or<br>other training | More than four years<br>of college and/or<br>other training |
25. Please circle the highest year of education your mother had.
- |                 |             |                                  |   |
|-----------------|-------------|----------------------------------|---|
| 1 2 3 4 5 6 7 8 | 9 10 11 12  | 13 14 15 16                      | 17 18+ $\bar{x} = 12.9$                                     |
| Elementary      | High School | College and/or<br>other training | More than four years<br>of college and/or<br>other training |



APPENDIX G

DESCRIPTIONS OF RESIDENT  
BACKGROUND AND BIOMEDICAL VARIABLES

TABLE G-1. Description of Resident Background Variables (N = 863).

- 2 month data -

<u>Variable</u>	<u>Category</u>	<u>Code<sup>a</sup></u>	<u>Frequency</u>	<u>Relative Frequency (%)</u>
AGE	≤59	b	31	3.6
	60-69		55	6.4
	70-79		192	22.2
	80-89		390	45.2
	90-99		186	21.6
	≥100		9	1.0
FEMALE	Male	1	215	24.9
	Female	2	648	75.1
MEDICAID	Other	1	364	42.2
	Medicaid	2	499	57.8
STAY	≤1 yr	1	268	31.1
	≤2 yrs + >1	2	109	12.6
	≤3 yrs + >2	3	92	10.7
	≤4 yrs + >3	4	72	8.3
	≤5 yrs + >4	5	109	12.6
	>5 yrs	6	213	24.7

<sup>a</sup>Code number refers to classification used in data analysis.

<sup>b</sup>Age was coded in actual number of years. Mean = 81.9, std. dev. = 10.6, and range = 24-104.

TABLE G-2. Description of Resident Biomedical Variables -  
Diseases (N = 862).

- 2 month data -

<u>Variable</u>	<u>Category</u>	<u>Code<sup>a</sup></u>	<u>Frequency</u>	<u>Relative Frequency (%)</u>
ANYDIS	None	0	210	24.4
	$\geq 1$	1	652	75.6
NUMDIS	0	b	210	24.4
	1		376	43.6
	2		191	22.2
	3		70	8.1
	$\geq 4$		15	1.7
Resident has disease category:				
BLOOD	None	0	778	90.3
	$\geq 1$	1	84	9.7
RESPIRATORY	None	0	707	82.0
	$\geq 1$	1	155	18.0
Ill-defined SYMPTOMS	None	0	644	74.7
	$\geq 1$	1	218	25.3
INJURY	None	0	648	75.2
	$\geq 1$	1	214	24.8
ENDOCRINE	None	0	653	75.8
	$\geq 1$	1	209	24.2
MENTAL	None	0	442	51.3
	$\geq 1$	1	420	48.7
NERVOUS system	None	0	504	58.5
	$\geq 1$	1	358	41.5
CIRCULATORY	None	0	222	25.8
	$\geq 1$	1	640	74.2
DIGESTIVE	None	0	621	72.0
	$\geq 1$	1	241	28.0
MUSCULO- SKELETAL	None	0	560	65.0
	$\geq 1$	1	302	35.0
OTHER	None	0	568	65.9
	$\geq 1$	1	294	34.1

<sup>a</sup>Code number refers to classification used in data analysis.

<sup>b</sup>NUMDIS was coded using actual number. Mean = 1.2, std. dev. = 0.97, and range = 0-6.

TABLE G-3. Description of Resident Biomedical Variables - Other Medications (N = 863).

- 2 month data -

<u>Variable</u>	<u>Category</u>	<u>Code</u> <sup>a</sup>	<u>Frequency</u>	<u>Relative Frequency (%)</u>	<u>Other Statistics</u>
STIMORD	None	0	786	91.1	
	≥1	1	77	8.9	
ANORD	None	0	57	6.6	
	≥1	1	806	93.4	
PSYORD	None	0	431	49.9	
	≥1	1	432	50.1	
SEDORD	None	0	247	28.6	
	≥1	1	616	71.4	
<u>Use:</u>					
STIMUSE	None	0	804	93.2	
	≥1	1	59	6.8	
ANUSE	None	0	248	28.7	
	≥1	1	615	71.3	
PSYUSE	None	0	499	57.8	
	≥1	1	364	42.2	
SEDUSE	None	0	366	42.4	
	≥1	1	497	57.6	
<u>Extent of Use:</u>					
MDDSTIM	0	b	804	93.2	Ungrouped
	.01-1		22	2.5	mean=0.12
	1.01-2		22	2.5	Std. dev=0.58
	2.01-3		9	1.0	Range=0-8.08
	>3		6	0.6	
MDDAN	0	b	248	28.7	Ungrouped
	.01-1		286	33.1	mean=2.34
	1.01-2		103	11.9	Std. dev=2.78
	2.01-3		90	10.4	Range=0-20.87
	>3		136	15.8	
MDDPSY	0	b	499	57.8	Ungrouped
	.01-1		179	20.7	mean=0.78
	1.01-2		78	9.0	Std. dev=1.47
	2.01-3		49	5.7	Range=0-12.05
	>3		58	6.7	
MDDSED	0	b	366	42.4	Ungrouped
	.01-1		225	26.1	mean=1.11
	1.01-2		108	12.5	Std. dev=1.74
	2.01-3		70	8.1	Range=0-12.05
	>3		94	10.9	

<sup>a</sup>Code number refers to classification used in data analysis.

<sup>b</sup>Variables were coded actual values (mean # doses/day).

TABLE G-4. Description of Resident Biomedical Variables -  
Symptoms (N = 730).

- 7 day data -

<u>Variable</u>	<u>Category</u>	<u>Code<sup>a</sup></u>	<u>Frequency</u>	<u>Relative Frequency (%)</u>
ANYSX	None	0	202	27.7
	$\geq 1$	1	528	72.3
NUMSX	0	b	202	27.7
	1		234	32.1
	2		178	24.4
	3		76	10.4
	$\geq 4$		40	5.5
Resident has symptom category:				
PAIN	None	0	594	81.4
	$\geq 1$	1	136	18.6
AGITATION	None	0	596	81.6
	$\geq 1$	1	134	18.4
BEHAVIORAL	None	0	458	62.7
	$\geq 1$	1	272	37.3
PHYSICAL	None	0	468	64.1
	$\geq 1$	1	262	35.9

<sup>a</sup>Code number refers to classification used in data analysis.

<sup>b</sup>NUMSX was coded using actual number of symptoms. Mean = 1.36, std. dev. = 1.22, and range = 0-7.

APPENDIX H

DESCRIPTIVE STATISTICS - FACTORS RELATING TO  
SLEEP MEDICATION ORDERS/USE

TABLE H-1. Descriptive Statistics - Resident Sex and Payment Plan Relating to Any Sleep Medication Ordered and Flurazepam Ordered (N = 863).

- 2 month data -

Variables	SLEEPORD <sub>1</sub>			FLURORD <sub>1</sub>		
	0 (N=629)	1 (N=234)	$\chi^2$	0 (N=785)	1 (N=78)	$\chi^2$
FEMALE (% female)	76	74	0.43	75	72	0.50
MEDICAID (% on Medicaid)	59	54	1.66	58	56	0.07

\*p < .05.

TABLE H-2. Descriptive Statistics - Resident Age, Stay, and Number of Diseases Relating to Any Sleep Medication Ordered and Flurazepam Ordered (N = 863).<sup>a</sup>

- 2 month data -

Variable	by SLEEPORD <sub>1</sub>			by FLURORD <sub>1</sub>		
	Category	Mean Rank	Z	Category	Mean Rank	Z
AGE	0	443	-2.21*	0	437	-1.91
	1	401		1	381	
STAY	0	460	-5.61***	0	440	-3.25**
	1	356		1	347	
NUMDIS	0	431	-0.10	0	432	-0.18
	1	433		1	427	

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Mann-Whitney (Wilcoxon) test.

TABLE H-3. Descriptive Statistics - Resident Biomedical Factors  
 Relating to Any Sleep Medication Ordered and Flurazepam  
 Ordered (N = 862).

Variables	- 2 month data -					
	SLEEPORD <sub>1</sub>			FLURORD <sub>1</sub>		
	0 (N=628)	1 (N=234)	$\chi^2$	0 (N=784)	1 (N=78)	$\chi^2$
ANYDIS (% with)	74	79	2.58	75	82	1.91
<u>Category:</u>						
BLOOD (% with)	9	12	2.56	9	17	4.67*
RESP. (% with)	16	24	8.86**	17	27	4.65*
SYMPTOMS (% with)	26	23	0.83	26	18	2.45
INJURY (% with)	23	29	3.09	25	27	0.20
ENDOCRINE (% with)	22	29	4.05*	24	24	0.00
MENTAL (% with)	50	46	1.16	49	41	2.03
NERVOUS (% with)	42	40	0.42	42	32	3.17
CIRC. (% with)	74	76	0.56	75	69	1.13
DIGESTIVE (% with)	28	29	0.19	28	26	0.23
MUSCULO. (% with)	35	36	0.23	35	38	0.44
OTHER (% with)	36	30	2.03	35	28	1.33

\*p &lt; .05.

\*\*p &lt; .01.

\*\*\*p &lt; .001.

TABLE H-4. Descriptive Statistics - Resident Medication Factors  
 Relating to Any Sleep Medication Ordered and Flurazepam  
 Ordered (N = 863).

- 2 month data -

<u>Variables</u>	<u>SLEEPORD<sub>1</sub></u>			<u>FLURORD<sub>1</sub></u>		
	<u>0</u> <u>(N=629)</u>	<u>1</u> <u>(N=234)</u>	<u><math>\chi^2</math></u>	<u>0</u> <u>(N=785)</u>	<u>1</u> <u>(N=78)</u>	<u><math>\chi^2</math></u>
STIMORD (% with order)	8	12	3.66	9	13	1.60
ANORD (% with order)	93	96	2.83	93	96	1.06
PSYORD (% with order)	48	57	5.90*	50	54	0.49
SEDORD (% with order)	67	84	24.09***	70	81	3.70

\*p &lt; .05.

\*\*p &lt; .01.

\*\*\*p &lt; .001.

TABLE H-5. Descriptive Statistics - Resident Symptoms Relating to Any Sleep Medication Ordered and Flurazepam Ordered (N = 730).

- 7 day data -

Variables	SLEEPORD <sub>1</sub>			FLURORD <sub>1</sub>		
	0 (N=529)	1 (N=201)	$\chi^2$	0 (N=672)	1 (N=58)	$\chi^2$
ANYSX (% with $\geq 1$ )	71	77	2.55	61	69	2.68
<u>Category:</u>						
PAIN (% with $\geq 1$ )	15	29	21.04***	18	29	4.74*
AGITATION (% with $\geq 1$ )	18	19	0.20	18	19	0.02
BEHAVIORAL (% with $\geq 1$ )	36	40	0.77	37	36	0.03
PHYSICAL (% with $\geq 1$ )	36	36	0.02	36	31	0.65

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

TABLE H-6. Descriptive Statistics - Resident Symptoms Relating to Any Sleep Medication Ordered and Flurazepam Ordered (N = 730).<sup>a</sup>

- 7 day data -

Variable	by SLEEPORD <sub>2</sub>			by FLURORD <sub>2</sub>		
	Category	Mean Rank	Z	Category	Mean Rank	Z
NUMSX	0	354	-2.44*	0	365	-.28
	1	395		1	373	

\*p < .05.

<sup>a</sup>Based on Mann-Whitney (Wilcoxon) test.

TABLE H-7. Descriptive Statistics - Resident Sex and Payment Plan Relating to Any Sleep Medication Use (N = 231) and Flurazepam Use (N = 77).

- 2 month data -

Variables	SLEEPUSE <sub>1</sub>			FLURUSE <sub>1</sub>		
	0 (N=66)	1 (N=165)	$\chi^2$	0 (N=30)	1 (N=47)	$\chi^2$
FEMALE (% female)	83	70	4.16*	80	66	1.77
MEDICAID (% on Medicaid)	47	58	2.14	50	62	1.02

\*p < .05.

TABLE H-8. Descriptive Statistics - Resident Age, Stay, and Number of Diseases Relating to Any Sleep Medication Use (N = 231) and Flurazepam Use (N = 77).<sup>a</sup>

- 2 month data -

Variable	by SLEEPUSE <sub>1</sub>			by FLURUSE <sub>1</sub>		
	Category	Mean Rank	Z	Category	Mean Rank	Z
AGE	0	118	-0.32	0	42	-0.98
	1	115		1	37	
STAY	0	104	-1.84	0	37	-0.77
	1	121		1	40	
NUMDIS	0	111	-.73	0	40	-.23
	1	118		1	39	

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Mann-Whitney (Wilcoxon) test.

TABLE H-9. Descriptive Statistics - Resident Biomedical Factors Relating to Any Sleep Medication Use (N = 231) and Flurazepam Use (N = 77).

- 2 month data -

Variables	SLEEPUSE <sub>1</sub>			FLURUSE <sub>1</sub>		
	0 (N=66)	1 (N=165)	$\chi^2$	0 (N=30)	1 (N=47)	$\chi^2$
ANYDIS (% with)	80	79	0.02	83	81	0.08
<u>Category:</u>						
BLOOD (% with)	15	12	0.57	13	19	0.44
RESP. (% with)	21	26	0.60	27	28	0.01
SYMPTOMS (% with)	20	24	0.55	13	21	0.78
INJURY (% with)	26	31	0.60	23	30	0.38
ENDOCRINE (% with)	26	31	0.60	23	26	0.05
MENTAL (% with)	41	48	0.92	43	40	0.06
NERVOUS (% with)	41	39	0.09	37	28	0.69
CIRC. (% with)	71	79	1.51	67	72	0.28
DIGESTIVE (% with)	27	30	0.21	23	28	0.18
MUSCULO. (% with)	42	35	1.26	43	36	0.40
OTHER (% with)	29	30	0.05	27	28	0.01

\*p &lt; .05.

\*\*p &lt; .01.

\*\*\*p &lt; .001.

TABLE H-10. Descriptive Statistics - Resident Medication Factors Relating to Any Sleep Medication Use (N = 231) and Flurazepam Use (N = 77).

- 2 month data -

Variables	SLEEPUSE <sub>1</sub>			FLURUSE <sub>1</sub>		
	0 (N=66)	1 (N=165)	$\chi^2$	0 (N=30)	1 (N=47)	$\chi^2$
STIMUSE (% with use)	2	13	7.34**	0	21	5.57* <sup>a</sup>
ANUSE (% with use)	73	81	1.73	70	81	1.20
PSYUSE (% with use)	42	52	1.77	33	51	2.33
SEDUSE (% with use)	59	73	4.09*	53	68	1.70

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Small cell size. One or more cells have an expected cell frequency of less than five.

TABLE H-11. Descriptive Statistics - Resident Symptoms Relating to Any Sleep Medication Use (N = 201) and Flurazepam Use (N = 58).

- 7 day data -

Variables	SLEEPUSE <sub>1</sub>			FLURUSE <sub>1</sub>		
	0 (N=103)	1 (N=98)	$\chi^2$	0 (N=34)	1 (N=24)	$\chi^2$
ANYSX (% with)	73	81	1.70	65	75	0.70
<u>Category:</u>						
PAIN (% with)	28	31	0.15	18	46	5.39*
AGITATION (% with)	15	24	3.16	9	33	4.02* <sup>a</sup>
BEHAVIORAL (% with)	42	38	0.33	44	25	2.23
PHYSICAL (% with)	35	38	0.17	26	38	0.80

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Small cell size. One or more cells have an expected cell frequency of less than five.

TABLE H-12. Descriptive Statistics - Resident Number of Symptoms Relating to Any Sleep Medication Use (N = 201) and Flurazepam Use (N = 58).<sup>a</sup>

- 7 day data -

Variable	by SLEEPUSE <sub>2</sub>			by FLURUSE <sub>2</sub>		
	Category	Mean Rank	Z	Category	Mean Rank	Z
NUMSX	0	98	-.83	0	27	-1.22
	1	104		1	33	

\*p < .05.

<sup>a</sup>Based on Mann-Whitney (Wilcoxon) test.

TABLE H-13. Descriptive Statistics - Resident Age and Stay Factors Relating to Extent of Any Sleep Medication Use and Extent of Flurazepam Use.<sup>a</sup>

- 2 month data -

<u>Variable</u>	<u>SLEEPPT<sub>1</sub></u> (N = 165)	<u>FLURPT<sub>1</sub></u> (N = 47)
AGE	-.07	-.13
STAY	.28***	.22

<sup>a</sup>Significance based on Spearman's rho.

TABLE H-14. Descriptive Statistics - Resident Sex and Payment Plan Relating to Extent of Any Sleep Medication Use and Extent of Flurazepam Use.<sup>a</sup>

- 2 month data -

<u>Variables</u>	<u>Code</u>	<u>SLEEPPT<sub>1</sub> by . . .</u>			<u>FLURPT<sub>1</sub> by . . .</u>		
		<u>N</u>	<u>Mean Rank</u>	<u>Z</u>	<u>N</u>	<u>Mean Rank</u>	<u>Z</u>
FEMALE	Male	49	69		16	21	
	Female	116	89	-2.46*	31	25	-1.00
MEDICAID	Other	70	74		18	22	
	Medicaid	95	89	-2.03*	29	26	-0.98

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Significance based on Mann-Whitney (Wilcoxon) test.

TABLE H-15. Descriptive Statistics - Resident Disease Factors  
 Relating to Extent of Any Sleep Medication Use  
 (N = 165) and Extent of Flurazepam Use (N = 47).<sup>a</sup>

- 2 month data -

Variables	Code	SLEEPPT <sub>1</sub> by . . .			FLURPT <sub>1</sub> by . . .		
		N	Mean Rank	Z	N	Mean Rank	Z
ANYDIS	0	34	89		9	28	
	1	131	81	-0.83	38	22	-1.07
<u>Category:</u>							
BLOOD	0	146	82		38	23	
	1	19	94	-1.06	9	27	-0.80
RESP.	0	222	82		34	23	
	1	43	86	-0.47	13	26	-0.72
SYMPTOMS	0	125	77		37	23	
	1	40	100	-2.66**	10	28	-1.06
INJURY	0	114	81		33	22	
	1	51	87	-0.76	14	28	-1.31
ENDOCRINE	0	114	82		35	24	
	1	51	85	-0.32	12	25	-0.21
MENTAL	0	86	89		28	25	
	1	79	76	-1.75	19	22	-0.79
NERVOUS	0	101	81		34	25	
	1	64	86	-0.59	13	20	-1.19
CIRC.	0	35	68		13	18	
	1	130	87	-2.11*	34	26	-1.71
DIGESTIVE	0	115	82		34	25	
	1	50	85	-0.31	13	21	-0.85
MUSCULO.	0	108	83		30	25	
	1	57	83	-0.07	17	23	-0.39
OTHER	0	115	82		34	24	
	1	50	85	-0.41	13	23	-0.36

\*p < .05.

<sup>a</sup>Significance based on Mann-Whitney (Wilcoxon) test.

TABLE H-16. Descriptive Statistics - Resident Number of Diseases and Medications Factors Relating to Extent of Any Sleep Medication Use and Extent of Flurazepam Use.<sup>a</sup>

- 2 month data -

<u>Variable</u>	<u>SLEEPPT<sub>1</sub></u> (N = 165)	<u>FLURPT<sub>1</sub></u> (N = 47)
NUMDIS	-.04	-.01
MDDSTIM	.02	.19
MDDAN	.12	.16
MDDPSY	.16*	.10
MDDSED	.20**	.13

<sup>a</sup>Significance based on Spearman's rho.

TABLE H-17. Descriptive Statistics - Resident Number of Symptoms Relating to Extent of Any Sleep Medication Use and Extent of Flurazepam Use.<sup>a</sup>

- 7 day data -

<u>Variable</u>	<u>SLEEPPT<sub>2</sub></u> (N = 98)	<u>FLURPT<sub>2</sub></u> (N = 24)
NUMSX	-.22*	-.41*

\*p < .05.

<sup>a</sup>Significance based on Spearman's rho.

TABLE H-18. Descriptive Statistics - Resident Biomedical Factors Relating to Extent of Any Sleep Medication Use (N = 98) and Extent of Flurazepam Use (N = 24).<sup>a</sup>

- 7 day data -

Variables	Code	<u>SLEEPPT<sub>2</sub> by . . .</u>			<u>FLURPT<sub>2</sub> by . . .</u>		
		<u>N</u>	<u>Mean Rank</u>	<u>Z</u>	<u>N</u>	<u>Mean Rank</u>	<u>Z</u>
ANYSX	0	19	59		6	18	
	1	79	47	-2.09*	18	11	-2.40*
<u>Category:</u>							
PAIN	0	68	53		13	14	
	1	30	41	-2.46*	11	10	-1.55
AGITATION	0	74	51		16	12	
	1	24	44	-1.30	8	13	-0.03
BEHAVIORAL	0	61	48		18	13	
	1	37	52	-0.93	6	12	-0.22
PHYSICAL	0	61	52		15	14	
	1	37	46	-1.17	9	10	-1.76

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Significance based on Mann-Whitney (Wilcoxon) test.

APPENDIX I

CORRELATION MATRICES - RESIDENT VARIABLES

TABLE I-1. Correlation Matrix for Resident Background Factors.<sup>a</sup>

<u>Variables</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
1) AGE	-			
2) FEMALE	.15***	-		
3) MEDICAID	.03	.06*	-	
4) STAY	.23***	.17***	.38***	-

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Spearman's rho.

TABLE I-2. Correlation Matrix for Resident Disease Factors. <sup>a</sup>

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1) ANYDIS	-												
2) NUMDIS	.79***	-											
<u>Category:</u>													
3) BLOOD	.04	.05	-										
4) RESP.	-.02	-.04	.03	-									
5) SYMP- TOMS	-.04	-.03	.06	.01	-								
6) INJURY	.05	.06	.01	.02	.03	-							
7) ENDO- CRINE	-.03	.01	.03	.06*	.03	.01	-						
8) MENTAL	.45***	.49***	-.05	-.08**	-.01	.02	-.05	-					
9) NER- VOUS	-.05	.02	-.04	.01	.04	.01	.07*	-.10**	-				
10) CIRC.	.05	.11***	-.01	.08*	-.01	.04	.05	-.12***	.03	-			
11) DIGES- TIVE	.06*	.11***	.12***	.05	.02	.07*	-.00	.01	.01	.07*	-		
12) MUS- CULO	.30***	.40***	.09**	-.05	.02	.05	.06*	-.07*	.02	.04	.14***	-	
13) OTHER	.10**	.20***	.09**	.01	.04	.01	.03	-.06*	.06*	.06*	.09**	.03	-

\*p &lt; .05. \*\*p &lt; .01. \*\*\*p &lt; .001.

<sup>a</sup>Based on Spearman's rho.

TABLE I-3. Correlation Matrix for Resident Other Medication Factors - Orders.<sup>a</sup>

<u>Variables</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
1) STIMORD	-			
2) ANORD	-.03	-		
3) PSYORD	.04	.06*	-	
4) SEDORD	.06*	.13***	.63***	-

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Spearman's rho.

TABLE I-4. Correlation Matrix for Resident Other Medication Factors - Use.<sup>a</sup>

<u>Variables</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
1) STIMUSE	-			
2) ANUSE	.04	-		
3) PSYUSE	.03	.10***	-	
4) SEDUSE	.07*	.23***	.73***	-

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Spearman's rho.

TABLE I-5. Correlation Matrix for Resident Other Medication Factors - Extent of Use.<sup>a</sup>

<u>Variables</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
1) MDDSTIM	-			
2) MDDAN	.04	-		
3) MDDPSY	.05	.11***	-	
4) MDDSED	.08**	.25***	.80***	-

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Spearman's rho.

TABLE I-6. Correlations Between Resident Background Factors and Disease Factors.<sup>a</sup>

<u>Variables</u>	<u>AGE</u>	<u>FEMALE</u>	<u>MEDICAID</u>	<u>STAY</u>
ANYDIS	.19***	.07*	.03	.06*
NUMDIS	.20***	.08**	.04	.10**
<u>Category:</u>				
BLOOD	.10**	.02	-.02	-.02
RESP.	-.03	-.09**	.01	-.01
SYMPTOMS	-.08**	-.11***	-.07*	-.02
INJURY	.08**	.11***	-.02	.02
ENDOCRINE	-.09**	.02	.02	-.04
MENTAL	-.02	.04	.02	.06*
NERVOUS	-.05	-.05	.05	.05
CIRC.	.23***	.04	.05	.11***
DIGESTIVE	.08*	-.02	.05	.06*
MUSCULO.	.16***	.14***	.03	.06
OTHER	.04	-.10**	.02	.02

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Spearman's rho.

TABLE I-7. Correlations Between Resident Background Factors and Medication Characteristics.<sup>a</sup>

<u>Variables</u>	<u>AGE</u>	<u>FEMALE</u>	<u>MEDICAID</u>	<u>STAY</u>
STIMORD	-.19***	-.13***	-.03	-.06*
ANORD	.04	.14***	.07*	.12***
PSYORD	-.07*	.04	.03	.01
SEDORD	-.08**	.03	.00	-.06*
STIMUSE	-.17***	-.11***	-.05	-.06*
ANUSE	.04	.05	-.02	-.05
PSYUSE	-.06*	.03	.03	.01
SEDUSE	-.11***	.01	-.02	-.05
MDDSTIM	-.17***	-.11***	-.05	-.06*
MDDAN	.01	.08**	-.02	-.03
MDDPSY	-.10**	.05	.05	.04
MDDSED	-.16***	.03	.04	.01

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Spearman's rho.

TABLE 1-8. Correlations Between Resident Disease Factors and Medication Factors.<sup>a</sup>

Variables	STIMORD	ANORD	PSYORD	SEDORD	STIMUSE	ANUSE	PSYUSE	SEDUSE	MOOSTIM	MDDAN	MDDPSY	MDDSED
ANYDIS	-.00	.08*	.14**	.05	-.01	.11***	.11***	.06	-.01	.06**	.12***	.08*
NUMDIS	-.03	.11***	.13***	.03	-.03	.14***	.09**	.03	-.03	.13***	.10***	.05
<u>Category:</u>												
BLOOD	-.01	-.01	-.02	.04	-.01	.04	.00	.04	-.01	.05	-.00	.03
RESP.	.25***	.03	.01	.07*	.28***	.03	.00	.01	.29***	.03	.01	.02
SYMPTOMS	-.04	-.04	-.02	-.00	-.05	-.06*	-.01	.01	-.05	-.05	-.02	.02
INJURY	-.04	.04	-.03	-.01	-.03	.06*	-.02	.01	-.03	.07*	-.02	.01
ENDOCRINE	-.00	.06*	-.04	-.00	-.01	.08*	-.00	.04	-.01	.09**	.00	.05
MENTAL	.01	.04	.30***	.12***	-.02	.00	.24***	.12***	-.02	-.03	.27***	.16***
NERVOUS	-.03	.04	-.03	-.04	-.05	.01	-.01	.00	-.05	.03	-.01	.02
CIRC.	-.05	.05	-.00	-.00	-.02	.10**	-.02	-.04	-.02	.08**	-.03	-.06*
DIGESTIVE	.03	.04	-.01	.02	.04	.05	-.01	.02	.04	.07*	.00	.03
MUSCULO.	-.02	.17***	-.03	.01	-.01	.19***	-.00	.03	-.01	.25***	.00	.04
OTHER	-.03	-.04	-.04	-.00	-.05	-.00	-.03	.00	-.05	-.04	-.02	-.01

\*p &lt; .05. \*\*p &lt; .01. \*\*\*p &lt; .001.

<sup>a</sup>Based on Spearman's rho.

APPENDIX J

DESCRIPTIONS OF NURSE VARIABLES

TABLE J-1. Description of Nurse Background Variables (N = 56).

<u>Variable</u>	<u>Category</u>	<u>Code<sup>a</sup></u>	<u>Frequency</u>	<u>Relative Frequency (%)</u>	<u>Other Statistics</u>
NURSEAGE <sup>e</sup>	19-28	b	19	35.2	Ungrouped mean = 34.3 Std. dev.=11.61 Range = 19-70
	29-38		19	35.2	
	39-48		9	16.7	
	49-58		4	7.4	
	59+		3	5.6	
FACYEARS <sup>e</sup>	<1 year	c	21	38.9	Ungrouped mean = 3.5 Std. dev.=3.64 Range = 0-14
	>1 year		11	20.4	
	>2 years		3	5.6	
	>3 years		4	7.4	
	>4 years		15	27.8	
EDFATHER <sup>e</sup>	6-8	b	9	16.7	Ungrouped mean = 13.3 Std. dev.=3.38 Range = 6-18
	9-12		12	22.2	
	13-16		24	44.4	
	17+		9	16.7	
EDMOTHER <sup>f</sup>	8	b	7	13.2	Ungrouped mean = 12.9 Std. dev.=2.68 Range = 8-18
	9-12		16	30.2	
	13-16		27	50.9	
	17+		3	5.7	
RN <sup>d</sup>	LPN, LVN	1	29	52.7	
	RN		2	26	

<sup>a</sup>Code number refers to classification used in analysis.

<sup>b</sup>Variables were coded actual values.

<sup>c</sup>Coded to nearest year  $\pm$  6 months. Six months or less coded 0.

<sup>d</sup>One missing case.

<sup>e</sup>Two missing cases.

<sup>f</sup>Three missing cases.

TABLE J-2. Description of Nurse Work Variables (N = 56).

<u>Variable</u>	<u>Category</u>	<u>Code<sup>a</sup></u>	<u>Frequency</u>	<u>Relative Frequency (%)</u>	<u>Other Statistics</u>
TOTWORK	1-2	b	16	28.6	Ungrouped mean = 3.3 Std. dev.=1.33 Range = 1-6
	3-4		31	55.4	
	5-6		9	16.1	
NOCSHIFT	Evening	1	36	64.3	
	Night	2	20	35.7	
ONEPLACE	No	0	25	44.6	
	Yes	1	31	55.4	
TOTRES	≤25	b	9	16.1	Ungrouped mean = 56.3 Std. dev.=30.71 Range = 16-126
	26-50		23	41.1	
	51-75		10	17.9	
	76-100		10	17.9	
	>100		4	7.1	

<sup>a</sup>Code number refers to classification used in analysis.

<sup>b</sup>Variables were coded actual values.

TABLE J-3. Description of Nurse Attitudes, Beliefs, Knowledge Variables (N = 56).

Variable	Category	Code <sup>a</sup>	Frequency	Relative Frequency (%)	Other Statistics
ROLESELF <sup>b</sup>	2-6		15	26.8	Ungrouped mean = 10.1 Std. dev.=4.63 Range = 2-21
	7-11		22	39.3	
	12-16		14	25.0	
	17-21		5	8.9	
ROLEOTH <sup>b</sup>	-10 - -6		7	12.5	Ungrouped mean = -.43 Std. dev.=4.00 Range = -10-8
	-5 - -1		18	32.1	
	0 - 4		28	50.0	
	5 - 8		3	5.4	
BELIEF <sup>b</sup>	7-10		4	7.1	Ungrouped mean = 15.4 Std. dev.=3.33 Range = 7-22
	11-14		18	32.1	
	15-18		23	41.1	
	19-22		11	19.6	
RESP	23-32		12	21.4	Ungrouped mean = 40.4 Std. dev.=9.47 Range = 23-67
	33-42		22	39.3	
	43-52		16	28.6	
	>52		6	10.7	
KNOWLEDGE <sup>c</sup>	-1 - 1		2	4.0	Ungrouped mean = 4.6 Std. dev.=2.11 Range = -1-11
	2 - 4		20	35.7	
	5 - 7		23	41.1	
	8-10		3	5.4	
	11		1	1.8	
SEKNOW <sup>d</sup>	1		5	9.3	Ungrouped mean = 3.0 Std. dev.=1.17 Range = 1-5
	2		13	24.1	
	3		21	38.9	
	4		7	13.0	
	5		8	14.8	

<sup>a</sup>All variables were coded actual values.

<sup>b</sup>The higher the score, the more liberal the attitude.

<sup>c</sup>Seven missing cases.

<sup>d</sup>Two missing cases.

TABLE J-4. Description of Nurse Variables - Background  
 Characteristics of Residents Cared for (N = 56).<sup>a</sup>

<u>Variable</u>	<u>Category</u>	<u>Frequency</u>	<u>Relative Frequency (%)</u>	<u>Other Statistics</u>
$\bar{X}$ age	74-77	4	7.1	Ungrouped mean = 82.8 Std. dev. = 3.37 Range = 75.8-89.2
	78-81	20	35.7	
	82-85	9	16.1	
	86-89	23	41.1	
$\bar{X}$ length of stay	1.0-1.9	3	5.4	Ungrouped mean = 3.5 Std. dev. = .70 Range = 1.2-4.7
	2.0-2.9	5	8.9	
	3.0-3.9	31	55.4	
	4.0-4.9	17	30.4	
% male	0-9	2	3.6	Ungrouped mean = 22.9 Std. dev. = 8.54 Range = 6.1-45.7
	10-19	17	30.4	
	20-29	26	46.4	
	30-39	7	12.5	
	40-49	4	7.1	
% Medicaid	18-32	3	5.4	Ungrouped mean = 61.2 Std. dev. = 14.75 Range = 18.2-85.7
	33-47	2	3.6	
	48-62	25	44.6	
	63-77	21	37.5	
	78-92	5	8.9	

<sup>a</sup>All variables were coded actual values.

TABLE J-5. Description of Nurse Variables - Disease and Symptom Characteristics of Residents Cared for (N = 56).<sup>a</sup>

Variable	Category	Frequency	Relative Frequency (%)	Other Statistics
% with sleep disruptive disease	55-64	5	8.9	Ungrouped mean = 75.5 Std. dev. = 7.03 Range = 58.8-88.5
	65-74	16	28.6	
	75-84	32	57.1	
	85-94	3	5.4	
$\bar{X}$ # sleep disruptive diseases	0.7-0.9	2	3.6	Ungrouped mean = 1.2 Std. dev. = .15 Range = 0.9-1.6
	1.0-1.2	30	53.6	
	1.3-1.4	21	37.5	
	1.5-1.6	3	5.4	
% with sleep disruptive symptom	35-49	3	5.4	Ungrouped mean = 72.5 Std. dev. = 12.74 Range = 35.6-96.2
	50-64	8	14.3	
	65-79	26	46.4	
	80-94	18	32.1	
	>94	1	1.8	
$\bar{X}$ # sleep disruptive symptoms	0.5-0.8	4	7.1	Ungrouped mean = 1.4 Std. dev. = 0.32 Range = 0.5-1.9
	0.9-1.2	13	23.2	
	1.3-1.6	35	62.5	
	1.7-1.9	4	7.1	
<u>Symptom category:</u>				
% with pain	0-14	25	44.6	Ungrouped mean = 18.7 Std. dev. = 9.30 Range = 0-50.0
	15-29	25	44.6	
	30-44	5	8.9	
	>44	1	1.8	
% with agitation	2-8	3	5.4	Ungrouped mean = 17.8 Std. dev. = 5.63 Range = 2.2-26.7
	9-15	9	16.1	
	16-22	29	51.8	
	23-29	15	26.8	
% with behavioral	9-20	9	16.1	Ungrouped mean = 38.4 Std. dev. = 15.27 Range = 8.9-64.7
	21-32	8	14.3	
	33-44	21	37.5	
	45-56	10	17.9	
	57-68	8	14.3	
% with physical	16-27	9	16.1	Ungrouped mean = 35.0 Std. dev. = 9.35 Range = 15.8-56.0
	28-39	28	50.0	
	40-51	15	26.8	
	52-63	4	7.1	

<sup>a</sup>All variables were coded actual values.

TABLE J-6. Description of Nurse Variables - Medication  
 Characteristics of Residents Cared for (N = 56).<sup>a</sup>

<u>Variable</u>	<u>Category</u>	<u>Frequency</u>	<u>Relative Frequency (%)</u>	<u>Other Statistics</u>
% with stimulant order	0-5	5	8.9	Ungrouped mean = 10.3 Std. dev. = 4.62 Range = 0-24.0
	6-11	33	58.9	
	12-17	14	25.0	
	18-23	3	5.4	
	>23	1	1.8	
% with stimulant use <sup>b,c</sup>	20-39	6	10.9	Ungrouped mean = 68.6 Std. dev. = 26.0 Range = 20.0-100.0
	40-59	20	36.4	
	60-79	3	5.5	
	80-99	10	18.2	
	100	16	29.1	
% with analgesic order	88-90	1	1.8	Ungrouped mean = 97.0 Std. dev. = 2.78 Range = 89.1-100.0
	91-93	6	10.9	
	94-96	15	26.8	
	97-99	19	33.9	
	100	15	26.8	
% with analgesic use <sup>c</sup>	25-34	1	1.8	Ungrouped mean = 53.3 Std. dev. = 10.58 Range = 26.3-74.2
	35-44	11	19.6	
	45-54	13	23.2	
	55-64	25	44.6	
	65-74	6	10.8	
% with psychotropic ordered	56-64	4	7.1	Ungrouped mean = 78.7 Std. dev. = 9.58 Range = 56.2-100.0
	65-74	18	32.1	
	75-84	14	25.0	
	85-94	18	32.1	
	95-100	2	3.6	
% with psychotropic use <sup>c</sup>	10-23	1	1.8	Ungrouped mean = 47.4 Std. dev. = 9.05 Range = 11.1-63.2
	24-37	4	7.1	
	38-51	33	58.9	
	52-64	18	32.1	
% with sedative ordered	22-34	1	1.8	Ungrouped mean = 68.6 Std. dev. = 26.02 Range = 20-100
	35-47	1	1.8	
	48-60	12	21.4	
	61-73	26	46.4	
	74-85	16	28.6	
% with sedative use	<62	2	3.6	Ungrouped mean = 74.7 Std. dev. = 10.34 Range = 42.9-92.9
	62-72	21	37.5	
	73-83	22	39.3	
	84-94	11	19.6	

<sup>a</sup>All variables were coded actual values.

<sup>b</sup>One missing case.

<sup>c</sup>Of residents with an order, % with use.

## APPENDIX K

STATISTICS SUPPORTING DICHOTOMOUS VARIABLES IN  
TABLES IV-5 THROUGH IV-7

TABLE K-1. Nurse License (RN), Shift (NOCSHIFT), and Working One Place (ONEPLACE) Relating to Extent of Orders - Any Sleep Medication and Flurazepam.<sup>a</sup>

<u>Variables</u>	<u>Code</u>	<u>ANY SLEEP MED:</u> <u>Of residents cared</u> <u>for, % with orders</u>			<u>FLURAZEPAM</u> <u>% residents cared</u> <u>for, % with orders</u>		
		<u>N</u>	<u>Mean</u> <u>Rank</u>	<u>Z</u>	<u>N</u>	<u>Mean</u> <u>Rank</u>	<u>Z</u>
RN	1) LPN	29	26	-0.90	29	31	-1.67
	2) RN	26	30		26	24	
NOCSHIFT	1) eve	36	32	-2.04*	36	30	-1.05
	2) noc	20	23		20	25	
ONEPLACE	1) no	25	26	-1.05	25	34	-2.34*
	2) yes	31	31		31	24	

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Mann-Whitney (Wilcoxon) test.

TABLE K-2. Nurse License (RN), Shift (NOCSHIFT), and Working One Place (ONEPLACE) Relating to Extent of Administration - Any Sleep Medication and Flurazepam.<sup>a</sup>

<u>Variables</u>	<u>Code</u>	<u>ANY SLEEP MED:</u> Of residents with orders, % administered			<u>FLURAZEPAM</u> Of residents with orders, % administered		
		<u>N</u>	<u>Mean Rank</u>	<u>Z</u>	<u>N</u>	<u>Mean Rank</u>	<u>Z</u>
RN	1) LPN	29	30	-0.86	27	26	-1.10
	2) RN	26	26		20	22	
NOCSHIFT	1) eve	36	35	-4.08***	28	29	-3.27**
	2) noc	20	17		19	17	
ONEPLACE	1) no	25	23	-2.12*	25	22	-0.95
	2) yes	31	33		22	26	

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Mann-Whitney (Wilcoxon) test.

TABLE K-3. Nurse License (RN), Shift (NOCSHIFT), and Working One Place (ONEPLACE) Relating to Extent of PRN Administration - Any Sleep Medication and Flurazepam.<sup>a</sup>

<u>Variables</u>	<u>Code</u>	<u>ANY SLEEP MED:</u> Of residents with PRN orders, <u>% administered</u>			<u>FLURAZEPAM</u> Of residents with PRN orders, <u>% administration</u>		
		<u>N</u>	<u>Mean Rank</u>	<u>Z</u>	<u>N</u>	<u>Mean Rank</u>	<u>Z</u>
RN	1) LPN	29	31	-1.67	27	24	-0.03
	2) RN	26	24		20	24	
NOCSHIFT	1) eve	36	30	-0.86	28	25	-1.15
	2) noc	20	26		19	22	
ONEPLACE	1) no	25	28	-0.34	25	24	-0.13
	2) yes	31	29		22	24	

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Mann-Whitney (Wilcoxon) test.

APPENDIX L

CORRELATION MATRICES - NURSE VARIABLES

TABLE L-1. Correlation Matrix for Nurse Attitudes, Beliefs, and Knowledge Variables.<sup>a</sup>

<u>Variables</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
1) ROLESELF	-					
2) ROLEOTH	.31**	-				
3) BELIEF	.48***	.35**	-			
4) RESP	.10	.06	-.10	-		
5) KNOWLEDGE	-.19	-.05	-.19	-.12	-	
6) SEKNOW	.06	.08	-.03	-.11	.10	-

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Spearman's rho.

TABLE L-2. Correlation Matrix for Nurse Background and Work Variables.<sup>a</sup>

Variables	1	2	3	4	5	6	7	8	9
1) NURSEAGE	-								
2) FACYEARS	.59***	-							
3) EDFATHER	-.10	-.01	-						
4) EDMOTHER	-.11	-.23*	.51***	-					
5) RN	.05	.02	.15	.11	-				
6) TOTWORK	-.09	-.20	-.10	-.00	.12	-			
7) NOCSHIFT	.21	.04	-.08	.03	.12	-.01	-		
8) ONEPLACE	.13	.12	.09	-.08	.06	-.31**	-.08	-	
9) TOTRES	.06	.09	-.18	-.00	.11	.36**	.57***	-.60***	-

\* $p < .05$ .      \*\* $p < .01$ .      \*\*\* $p < .001$ .

<sup>a</sup>Based on Spearman's rho.

TABLE L-3. Bivariate Correlations Between Attitude, Belief, Knowledge Variables and Background, Work, Variables.<sup>a</sup>

	<u>ROLESELF</u>	<u>ROLEOTH</u>	<u>BELIEF</u>	<u>RESP</u>	<u>KNOW</u>	<u>SEKNOW</u>
<b>Background</b>						
NURSEAGE	-.19	-.35**	-.12	-.09	.16	.01
FACYEARS	-.13	-.04	-.17	.05	.35**	-.12
EDFATHER	-.07	-.06	.05	-.03	.12	.14
EDMOTHER	-.11	.14	.14	-.17	.06	.08
RN	.00	.02	.14	.05	.10	-.12
<b>Work Situation</b>						
TOTWORK	.10	.03	-.13	.25*	-.10	-.02
NOCSHIFT	-.10	.08	.29*	-.10	-.13	.12
ONEPLACE	-.12	-.13	-.00	.15	-.33**	-.00
TOTRES	.06	.08	.11	.01	.17	.14

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Spearman's rho.

TABLE L-4. Correlation Matrix for Resident Characteristics per Nurse - Background.<sup>a</sup>

<u>Variables</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
1) Mean age	-			
2) Mean stay	.58***	-		
3) Percent male	-.11	-.33**	-	
4) Percent Medicaid	-.35**	.25*	.07	-

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Spearman's rho.

TABLE L-5. Correlation Matrix for Resident Characteristics per Nurse - Diseases and Symptoms.<sup>a</sup>

<u>Variables</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
1) % with disruptive dx	-							
2) mean # disruptive dxs	.48***	-						
3) % with disruptive sx	-.11	.21	-					
4) mean # disruptive sxs	-.07	.21	.89***	-				
5) % with pain sxs	-.17	-.13	.57***	.52***	-			
6) % with agitation sxs	.24*	.34**	.59***	.49***	.21	-		
7) % with behavioral sxs	-.22*	.29*	.89***	.82***	.42***	.51***	-	
8) % with physical sxs	.34**	.15	.21	.38**	-.13	.06	.02	-

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Spearman's rho.

TABLE L-6. Correlation Matrix for Resident Characteristics per Nurse - Other Medications.<sup>a</sup>

Variables	1	2	3	4	5	6	7	8
1) % with stimulant ordered	-							
2) % with stimulant use	-.31*	-						
3) % with analgesic ordered	-.09	.34**	-					
4) % with analgesic use	-.02	.11	-.26*	-				
5) % with psychotropic ordered	.46***	-.54***	-.05	-.05	-			
6) % with psychotropic use	-.19	.51***	.46***	-.18	-.24*	-		
7) % with sedative ordered	.51***	-.16	-.31**	.22	.66***	-.19	-	
8) % with sedative use	-.01	.36**	.52***	-.48***	-.11	.57***	-.12	-

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Spearman's rho.

TABLE L-7. Correlations Between Resident Background Characteristics per Nurse and Resident Diseases, Symptoms.<sup>a</sup>

	<u>Mean Age</u>	<u>Mean Stay</u>	<u>Percent Male</u>	<u>Percent Medicaid</u>
% with disruptive dx	.04	-.02	-.23*	-.09
mean # disruptive dxs	.44***	.46***	-.55***	-.09
% with disruptive sx	.30*	.21	-.37**	-.43***
mean # disruptive sxs	.20	.01	-.31**	-.41***
% with pain sxs	-.05	-.22*	-.25*	-.41***
% with agitation sxs	.56***	.39***	-.11	-.38**
% with behavioral sxs	.41***	.42***	-.35**	-.18
% with physical sxs	-.14	-.28*	-.15	-.34**

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Spearman's rho.

TABLE L-8. Correlations Between Resident Background Characteristics per Nurse and Resident Orders, Use of Other Medications.<sup>a</sup>

	<u>Mean Age</u>	<u>Mean Stay</u>	<u>Percent Male</u>	<u>Percent Medicaid</u>
% with stimulant ordered	-.67***	-.42***	.28*	.40***
% with stimulant use	.01	.08	-.21	-.09
% with analgesic ordered	.19	.17	-.19	.12
% with analgesic use	.18	-.23*	.07	-.47***
% with psychotropic ordered	-.12	-.12	.15	.05
% with psychotropic use	.21	-.44***	-.14	.32**
% with sedative ordered	-.51***	-.44***	.17	.12
% with sedative use	-.29*	.17	-.05	.44***

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Spearman's rho.

TABLE L-9. Correlations Between Resident Diseases, Symptoms and Resident Orders, Use of Other Medications.<sup>a</sup>

	% with disruptive dx		mean # disruptive dxs		% with disruptive SX		mean # disruptive SXS		% with pain SXS		% with agitation SXS		% with behavioral SXS		% with physical SXS	
	dx		dxs		SX		SXS		SXS		SXS		SXS		SXS	
% with stimulant ordered	.06		-.45***		-.30*		-.19		-.27*		-.44***		-.34**		.16	
% with stimulant use	-.49***		.24*		.46***		.50***		.31*		-.10		.54***		-.01	
% with analgesic ordered	-.21		.03		.07		.03		.03		-.31*		.16		-.11	
% with analgesic use	.08		.27*		.04		.21		-.00		.13		-.07		.15	
% with psychotropic ordered	.35**		-.09		-.13		-.32		-.20		-.06		-.24*		-.01	
% with psychotropic use	-.30*		.25*		.16		.21		-.01		-.01		.42***		-.07	
% with sedative ordered	.34**		.01		-.21		-.19		-.18		-.24*		-.34**		.15	
% with sedative use	-.34**		-.12		-.14		-.20		.11		-.47***		-.06		-.19	

\*p < .05. \*\*p < .01. \*\*\*p < .001.

<sup>a</sup> Based on Spearman's rho.

TABLE L-10. Correlations Between Background Resident Characteristics and Nurse Attitudes, Beliefs, Knowledge.<sup>a</sup>

	<u>ROLESELF</u>	<u>ROLEOTH</u>	<u>BELIEF</u>	<u>RESP</u>	<u>KNOWLEDGE</u>	<u>SEKNOW</u>
Mean age	-.03	-.22*	-.20	.11	.00	-.18
Mean stay	-.14	-.28*	-.18	-.06	.04	-.14
Percent male	.07	.21	.02	-.03	-.21	.05
Percent Medicaid	-.10	.03	-.05	-.17	-.18	.17

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Spearman's rho.

TABLE L-11. Correlation Between Resident Diseases, Symptoms and Nurse Attitudes, Beliefs, Knowledge.<sup>a</sup>

	<u>ROLESELF</u>	<u>ROLEOTH</u>	<u>BELIEF</u>	<u>RESP</u>	<u>KNOWLEDGE</u>	<u>SEKNOW</u>
% with disruptive dx	.02	.03	-.06	.08	.24*	.18
$\bar{X}$ # disruptive dxs	.06	-.12	-.12	.08	.20	-.04
% with disruptive sx	-.06	.02	-.01	.18	-.03	-.37**
$\bar{X}$ # disruptive sxs	.04	.16	.06	.16	.05	-.32*
% with pain sxs	-.14	-.08	-.04	.02	.06	-.24*
% with agitation sxs	-.15	.05	-.19	.24*	.03	-.21
% with behavioral sxs	-.06	-.04	-.02	.12	-.03	-.40***
% with physical sxs	.24	.19	.24*	.13	.13	-.05

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Spearman's rho.

TABLE L-12. Correlations Between Resident Medication Characteristics and Nurse Attitudes, Beliefs, Knowledge.<sup>a</sup>

	<u>ROLESELF</u>	<u>ROLEOTH</u>	<u>BELIEF</u>	<u>RESP</u>	<u>KNOWLEDGE</u>	<u>SEKNOW</u>
% with stimulant ordered	.21	.34**	.17	.06	-.13	.10
% with stimulant use	-.06	-.02	.04	-.07	-.03	-.25*
% with analgesic ordered	-.01	-.24*	-.18	-.10	-.01	-.20
% with analgesic use	.30*	.25*	.05	.16	.06	.04
% with psychotropic ordered	.22	.09	.01	.06	-.14	.06
% with psychotropic use	.07	.08	-.02	-.24*	-.01	-.24*
% with sedative ordered	.28*	.27*	.22*	-.06	-.11	.19
% with sedative use	-.12	-.15	.05	-.34**	-.03	-.06

\*p < .05.      \*\*p < .01.      \*\*\*p < .001.

<sup>a</sup>Based on Spearman's rho.

TABLE L-13. Correlations Between Nurse Background, Work Characteristics and Resident Background, Diseases, Symptoms.<sup>a</sup>

	<u>NURSEAGE</u>	<u>FACYEARS</u>	<u>EDFATHER</u>	<u>EDMOTHER</u>	<u>RN</u>	<u>TOTWORK</u>	<u>NOCSHIFT</u>	<u>ONEPLACE</u>	<u>TOTRES</u>
Mean age	.10	-.13	.01	.08	.05	.22	-.24*	-.03	-.04
Mean stay	.20	.05	.24*	.13	.16	-.11	-.22	.07	-.12
Percent male	-.12	-.16	-.33*	.02	.03	.32	.20	-.03	.19
Percent Medicaid	-.01	-.16	.07	.07	-.20	-.24*	-.05	.00	-.05
% with disruptive dx	.10	.16	-.07	-.08	-.25*	.07	.17	-.35*	.47***
X # disruptive dxs	.03	-.02	.23*	.04	-.08	.08	-.19	-.27*	.12
% with disruptive sx	-.16	.06	.17	-.03	.18	-.18	-.23*	.20	-.38**
X # disruptive sxs	.31*	.03	.23*	.05	.07	-.16	-.24*	.06	-.33**
% with pain sxs	-.13	.07	.04	-.11	.12	-.06	.01	.24*	-.27*
% with agitation sxs	.02	.19	.17	.09	.19	.07	-.18	.15	-.06
% with behavioral sxs	-.21	-.08	.26*	.04	.13	-.16	-.32**	.16	-.42
% with physical sxs	-.18	.09	.06	-.06	.06	.05	.03	-.37**	.22*

\*p < .05. \*\*p < .01. \*\*\*p < .001.

<sup>a</sup>Based on Spearman's rho.

TABLE L-14. Correlations Between Nurse Background, Work Characteristics and Resident Medication Characteristics.<sup>a</sup>

	<u>NURSEAGE</u>	<u>FACYEARS</u>	<u>EDFATHER</u>	<u>EDMOTHER</u>	<u>RN</u>	<u>TOTWORK</u>	<u>NOCSHIFT</u>	<u>ONEPLACE</u>	<u>TOTRES</u>
% with stimulant ordered	.01	.17	.17	-.16	-.11	-.16	.24*	-.05	.17
% with stimulant use	-.31*	-.23	.19	.14	.01	-.14	-.26*	.11	-.49***
% with analgesic ordered	-.08	-.30*	-.21	-.16	-.28*	-.13	-.37**	.03	-.49***
% with analgesic use	.05	.27*	-.06	-.02	.05	.14	.04	-.10	.23*
% with psychotropic ordered	.17	.04	-.26	-.29	-.03	.08	.24	-.02	.28*
% with psychotropic use	-.36**	-.32**	.20	.18	-.13	-.09	-.32**	-.10	-.35**
% with sedative ordered	-.09	-.01	-.04	-.01	-.15	-.01	.22*	-.13	.29*
% with sedative use	-.20	-.28*	-.03	.03	-.04	-.17	.02	.02	-.27*

\*p < .05. \*\*p < .01. \*\*\*p < .001.

<sup>a</sup>Based on Spearman's rho.