

PREScription DRUG USE BY THE ELDERLY POPULATION  
OF BRITISH COLUMBIA

by

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#### ABSTRACT

The theory of ageism posits that the elderly members of society are discriminated against and treated as deviants. In response to ageism, social control is applied through the medical profession. An elderly person is brought into more frequent contact with physicians as chronic illnesses and diseases develop and increase. By seeking treatment for these health problems, the older individual may experience medical mistreatment, including the overprescription of drugs.


The purpose of this study was to investigate and establish the levels of use of prescription drugs by the population of B.C. aged 65 and older. Using B.C. Pharmacare data for 1984, the cost and number of prescriptions were analysed, comparing consumption by the community-based elderly with that of the elderly in nursing homes. Both populations were found to receive a high number of prescriptions per person, particularly in the Central Nervous System therapeutic class. Nursing home elderly, when compared to community-based elderly, received approximately 300 per cent more prescriptions per person, with a difference ranging from +100 per cent (for Anti-infectives) to +1,086 per cent (for Gastrointestinal agents) and +1,291 per cent (for Vitamins). In the area of


prescriptions for Central Nervous System drugs, nursing home patients received 354 per cent more prescriptions than community-based elderly. This includes 499 per cent more milligrams per person for selected C.N.S. drug families. Nursing home patients also received 4,424 per cent more milligrams of tranquilizers per person than the community-based elderly.

The results indicate the need for further study into the prescription of drugs for the elderly, but particularly those in nursing homes.

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to the memories of four individuals  
who had a profound influence upon my life,  
but are no longer with me  
to take pleasure in the completion  
of this, my first research endeavour.

My Grandparents:

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CHAPTER ONE: THE PROBLEM  
AND ITS THEORETICAL OVERVIEW

"Cast me not off in the time of old age;  
forsake me not when my strength faileth."

(Psalms 71: 9)

I. THE PROBLEM: The Prescription Drug Interlock of the  
Elderly

As a person ages, he or she is at increasing risk of becoming locked into a potentially serious situation involving prescription drugs. This begins with the onset of illness, leading an older person to seek medical help. Physician treatment frequently results in one or more prescriptions. Due to the drug(s) and the changing functional response of the body to chemicals, the elderly may become victims of adverse drug reactions. These, in turn, lead to more physician treatment, prescriptions, and often institutionalization. An important factor in this cycle is compliance by the patient with the drug regimen. This can be affected by all the other aspects -- illness, body function, number of prescriptions, adverse reactions, physician treatment and hospitalization.

The physician's role is the centrepiece of this interlock. Beyond the initial development of illness in the elderly person, all other aspects of the interlock hinge, to some extent, upon the treatment provided by the medical practitioner.

The research problem which is suggested by the drug interlock is overprescription of drugs for the elderly by the medical profession. It is not possible to assess the degree of overprescription for two reasons. The first is that there is no information available regarding which patients have a real need for the prescriptions, caused by chronic illnesses and diseases. Secondly, there are no standards or criteria established to indicate what constitutes overprescription. Fortunately, such standards are finally being described, but not in time for this research.

In order to study this problem, information has been collected under the auspices of B.C. Pharmacare, the government branch which is responsible for providing free prescription drugs to the elderly population of the province. This paper examines the number and cost of prescriptions for 14 therapeutics classes of drugs and, more specifically, prescriptions and milligrams available for Central Nervous System medications. Comparisons are made between two populations of elderly people: those who are independent and community-based and those who are

living in licensed long-term care institutions. Although, as previously mentioned, there are no absolute criteria for defining overprescription, it is the intention of this research to investigate and establish the level of prescription for these two populations.

Two concepts are useful in explaining the development of the drug interlock and placing it into a theoretical perspective. The first concept is ageism, wherein the elderly are often given minority group status and labelled as deviants. The other concept relates to social control as practised by the medical profession.

## II. MINORITY GROUP STATUS, AGEISM AND DEVIANCE

In this section the concept of ageism and the elderly as a deviant minority group, will be discussed.

### A. Minority Group Status

Traditionally, minority group status has been applied to racial, ethnic and religious groups such as Jews, blacks, North American Indians or Mexican Americans. More recently, homosexuals, the handicapped and others have been considered to be members of minority groups. There have been many definitions of minority groups, and there has been some discussion as to whether the elderly fit into the concept. In 1945, Wirth (cited in Levin and Levin, 1980: 65) observed that a minority group is comprised of people

who, "because of physical or cultural characteristics, are singled out from the others in the society in which they live for differential and unequal treatment."

The Theodorsons (1969) concluded that a minority group could be:

any recognizable racial, religious or ethnic group in a community that suffers some disadvantage due to prejudice or discrimination...This term, as commonly used, is not a technical term, and indeed it is often used to refer to categories of people rather than groups, and sometimes to majorities rather than minorities...On the other hand, a group which is privileged or not discriminated against but which is a numerical minority would rarely be called a minority group. Thus, as the term is often used, a minority group need be neither a minority nor a group, so long as it refers to a category of people who can be identified by a sizeable segment of the population as objects for prejudice and discrimination.

(Anderson and Frideres, 1981: 31-32)

Certainly, both of these general definitions could be applied to the elderly. In addition, many other researchers have agreed that the aged qualify for minority group status. Levin and Levin (1980: 66) cite several studies spanning almost 30 years.

#### B. Ageism

Where prejudice is seen by society to be extreme, a word is created to denote the condition. Racism refers to prejudice against non-whites and sexism to prejudice against women. In 1969, Robert Butler suggested the term

"ageism" in reference to discrimination against the elderly (Levin and Levin, 1980: 73).

Ageism comprises three basic aspects. One is the attitude towards old people which makes individuals avoid contact, victimize or do injury based on age alone. Studies done in emergency wards of hospitals by Glaser and Strauss (1964) and Sudnow (1967) (cited by Roth in Conrad and Kern, 1986: 323) established that the young are more highly valued than the old by emergency personnel. Sudnow found that one emergency room intern "could not stand to give mouth-to-mouth resuscitation to an old woman who came in and was later pronounced dead" (cited by Jarvis in Boydell, Grindstaff and Whitehead, 1972).

Secondly, ageism has become institutionalized legally and morally in our society. Mandatory retirement laws discriminate against those aged 65 and over. Occupation is one of our most important determinants of status. Therefore, a person without a job may be seen as having no place or value in the social system (Jarvis in Boydell, Grindstaff and Whitehead, 1972).

Thirdly, ageism leads to stereotyping. These are beliefs about the group which we use to justify our practices of discrimination. To the extent that our beliefs are incorrect, so too will be our conclusions. Harris and Associates (1975, cited in Atchley, 1980:254) did a study of what the general public believed to be the most serious

problems of the elderly compared to what older people really experienced. The results were that the general public greatly overestimated the occurrence of poor health, inadequate incomes, loneliness and poor housing. These inaccurate beliefs help to perpetuate the stereotype of old age as an unattractive state.

Bunzel (1972) and Atchley (1977) (cited in Levin and Levin, 1980:94) have both determined that prejudice against the elderly has causes not shared by other forms of prejudice. Bunzel labelled it "gerontophobia -- the unreasonable fear and/or hatred of the elderly". It is caused by the fact that most young people will reach old age and that milestone is associated with death. Therefore, young people try to deny this reality by shunning the elderly or treating them with intense hostility.

Another viewpoint on the subject of ageism, is that the elderly suffer from victim-blaming. According to Ryan (1971, cited in Levin and Levin, 1980: 37), the phenomenon works this way:

First, identify a social problem. Second, study those affected by the problem and discover in what ways they are different from the rest of us as a consequence of deprivation and injustice. Third, define the differences as the cause of the social problem itself. Finally, of course, assign a government bureaucrat to invent a humanitarian action program to correct the differences.

For some years, gerontologists have been studying the elderly -- their physiological aging, diseases, sensory and

perceptual processes, psychomotor performance, learning abilities, intelligence, memory, drives and motives. These aspects and more, are what cause the old to be a problem to society. Although the elderly are not accused of deliberately cultivating the problems, it is implied by doing these studies, that such characteristics are somehow the results of a failure on the part of the aged.

Physiologists and psychologists could well have chosen to study the young or middle-aged in society in order to discover the causes of the problems associated with aging. They chose, however, to single out the aged for study, and by so doing have blamed the old for their problems, even before their first research findings were reported.

(Levin and Levin, 1980: 44)

### C. The Elderly as Deviants

Not only does society give the elderly minority group status and develop prejudices against them which may be categorized as ageism, it also tends to classify older people as deviants.

A deviant can be defined as one who violates norms of society. An important class of norms is that defining expectations about role performance. Old people, though not intending to violate society's rules, are seen as not performing adequately some of the more important roles in our society. To the extent that old people become dependent, they are seen as a threat to those who must provide for their support. They demand services of us which we are not prepared to provide, and require financial outlays which we do not feel able to give, so that we feel they are not carrying their share of the load.

(Jarvis in Boydell, Grindstaff and Whitehead,

1972: 607)

The realm of health care is an area where the elderly are often treated as deviants. Sudnow found that elderly patients in his emergency room studies were treated similarly to patients who were not considered to be morally respectable such as alcoholics, people who commit suicide, criminals, and wife-beaters (cited by Jarvis in Boydell, Grindstaff and Whitehead, 1972).

In Canada, we like to institutionalize our elderly. On any given day in 1976, approximately 8.4 per cent of those Canadians aged 65 and over, and one-third of Ontario residents over 80, were in some kind of institution. This is greater than rates in the United States, England and Wales (Schwenger and Gross in Marshall, 1980). Part of this trend is due to a general tendency to institutionalize our deviant members -- criminals, invalids, young and old. In addition, our health insurance pays for this service but does not provide full coverage for home care. In fact, home care for the elderly, to allow them to stay out of institutions, is sorely lacking in most provinces. Since so much of the budget for health costs has been committed to institutions and physicians, it is very difficult to change direction. The nursing home industry, very big business today, has become an important lobby group in government legislation (Schwenger and Gross in Marshall, 1980).

### III. THE THEORY OF SOCIAL CONTROL BY THE MEDICAL PROFESSION

A discussion of minority group status, ageism and deviance leads to a consideration of social control by the medical profession. This control manifests itself in a general way, but may also be considered as a response to deviance as it is defined by society. Medicine is a social institution and therefore performs activities which are determined by a particular society to be relevant to health and illness (Koumjian, 1981). In recent years, social scientists have recognized that the institution of medicine has increasingly taken on functions of social control (Koumjian, 1981; Conrad and Kern, 1986; Zola, 1975; Zola in Conrad and Kern, 1986; Conrad in Schwartz and Kart, 1978).

#### A. The Medicalization of Society

Social control by the medical profession is also referred to as "the medicalization of society" (Conrad and Kern, 1986). Medicalization or control of society has developed as medicine has achieved a position of social and professional dominance. People's attitudes toward health and illness, new medical technology and available information, and economic and political factors which influence health issues have encouraged medicine to become involved in social control (Koumjian, 1981: 246). The

medicalization of much of daily living has occurred by "making medicine and the labels healthy and ill relevant to an ever increasing part of human existence" (Zola cited in Koumjian, 1981: 246).

By mid-century the domain of medicine had enlarged considerably: childbirth, sexuality, death as well as old age, anxiety, obesity, child development, alcoholism, addiction, homosexuality, amongst other human experiences, were being defined and treated as medical problems. Sociologists began to examine the process and consequences of this medicalization of society (e.g., Freidson, 1970; Zola, 1972) and most especially the medicalization of deviance (Conrad and Schneider, 1980a). It was clear that the medical model -- focussing on individual organic pathology and positing physiological etiologies and biomedical interventions -- was being applied to a wide range of human phenomena. Human life, some critics observed, was increasingly seen as a sickness-wellness continuum, with significant (if not obvious) social consequences (Zola, 1972; Conrad, 1975).

(Conrad and Kern, 1986)

When behaviour is redefined as a medical problem, the medical profession is provided with a mandate for treatment. The psychiatric and public health arms of the medical community have long been associated with social behaviour and social control. However, recent medical technology has allowed even more incursion into the social system through procedures such as psychosurgery,

psychotropic medications, genetic engineering, antipseudomonas and methadone treatment. This includes the medicalization of deviant behaviour (Conrad in Schwartz and Kart, 1978).

#### B. The Medicalization of Deviant Behaviour

Deviant behaviours such as mental illness, alcoholism, drug addiction and violence have, in recent years, become defined as medical problems. Sometimes this is because physiological etiological explanations have been implicated in the deviance, as in the case of XYY chromosomes and violence. In other cases, new drugs have been produced which allow the deviance to be controlled (e.g., alcoholism and antipseudomonas). Traditionally, anything dealing with the functioning of the body or that can be labelled as an illness, falls in the realm of the medical profession. When a problem is defined as medical, it is removed from the public domain and discussion by ordinary people, and placed in the control of the medical profession where only qualified people can treat it. Therefore, when deviant behaviour becomes part of medical jurisdiction, certain treatments which might not otherwise be considered, such as surgery, institutionalization, and psychomedication, may be given (Conrad in Schwartz and Kart, 1978: 77). In the case of the elderly, this may include non-treatment, exemplified by the situation of nursing home patients who are not adequately diagnosed for incontinence (discussed later in

this paper).

Psychoactive drugs are used to restrain people from behaviour which is not complementary to the requirements of society. This is a powerful and effective means of social control and could not be used without the medicalization of deviant behaviour. Such medicalization is part of the larger phenomenon of individualizing social problems. This means that we do not look to the social system for the causes of social problems in the individual. Instead we focus in a "blame-the-victim" way upon the person, trying to change him/her rather than the social situation (Conrad in Schwartz and Kart, 1978: 77). When the elderly are \* medicated with psychotropic drugs, rather than addressing the social issues which may be involved, such as loneliness, fear of dying, boredom, or lack of network support, we are treating aging as deviant behaviour by individualizing the problems.

Another aspect of social control by the medical profession is "depoliticizing" deviant behaviour. Such a situation occurred when political dissenters in the Soviet Union were declared mentally ill and placed in mental hospitals. The political dissention was effectively neutralized by making it the ravings of mad persons. In the same way, overactive children are relabelled "hyperkinetic", allowing us to focus on the individual with a neurological disorder, rather than on a disorder within

the school system or the child's home situation (Conrad in Schwartz and Kart, 1978: 77-78). Depoliticization can be applied to the treatment of aging persons who are medicated and institutionalized because they are labelled "elderly, sick, senile and old". Using this method, we do not have to search for a disorder in the social system and the way we care for, house, interact with, and support the elderly. \*

In the last analysis, medical social control...becomes a de facto agent of the status quo. The medical profession may not have entirely sought this role, but its members have been, in general, disturbingly unconcerned and unquestioning in their acceptance of it.

(Conrad in Schwartz and Kart, 1978: 78)

### C. The Power of the Medical Profession Over the Individual

Szasz and Hollender (in Schwartz and Kart, 1978) describe three basic models of the doctor-patient relationship. The oldest model, historically, is that of activity-passivity, where the doctor is active and the patient is passive. The concept originated in treatment for emergency situations but has remained and been expanded to apply to other areas such as psychoanalysis. The doctor-patient relationship is analagous to that of parent-helpless infant.

The second model, that of guidance-cooperation, is most

commonly used in medical practice today. The physician tells the patient what to do and the patient cooperates or obeys. This relationship is similar to that of parent-(adolescent) child. The physician holds the "power" and the patient is expected to "look up to" and obey his doctor without argument.

The third model is based on mutual participation of both players where they have equal power, are interdependent and engage in activity that will in some ways be satisfying to both. This relationship is one of adult-to-adult and is most appropriate for patients and doctors who are intellectually, educationally and experientially similar.

It is obvious that most people will interact with their physicians according to the second model where the patient cooperates and obeys. This is particularly true of most elderly people who were taught at an early age to respect and look up to doctors and have continued to do so through the years of advancing medical technology.

In order to allow physicians to exercise their skills, patients grant them extraordinary privileges.

The doctor's physical examination "is probably the only occasion in ordinary life when an adult renders to another so much of his freedom, dignity, and responsibility. It is one of the few occasions when the adult voluntarily exposes himself to pain and embarrassment with an implicit agreement not to retreat or defend." Submitting to treatment may, then, require extraordinary sacrifice: "The burdens the

physician asks his patients and their families to assume on his advice are often very severe. They include suffering -- you 'have to get worse before you can get better,' as for instance in the case of a major surgical operation. They include risk of death, permanent or lengthy disablement, severe financial costs and various others."

(Lander, 1978: 12)

The medical profession also exercises the right to intervene and change temporarily or permanently, the patients' lifestyles and daily habits such as working, sleeping, eating and playing (Zola in Conrad and Kern, 1986: 383). This is especially true when dealing with older people whose lives are often already in a state of flux due to onset of illness, loss of a lifetime companion, retirement or change of residence. Families frequently rely on the knowledge and expertise of a physician to tell them "what to do about mother".

Furthermore, use of computer technology has allowed physicians to store and analyse their patients' personal data more efficiently, but it has also increasingly robbed these patients of their privacy (Zola in Conrad and Kern, 1986: 383).

Finally, physicians have the exclusive right to do surgery and prescribe drugs. In the realm of drug prescribing, the power of doctors is at its most awesome. The greatest increase in drug use in recent years has not been for the purpose of treating organic disease, but

physician asks his patients and "his patients assume on his advice often very severe. They include suffering - you 'take it or leave it' before you can get better," as the instance in the case of a major surgical operation. They include risk of death, permanent or temporary disability, severe financial costs, and various others." (Lander, 1978: 18)

The medical profession also exercises its right to intervene and change temporarily or permanently the patients' lifestyles and daily habits such as eating, sleeping, resting and playing (Lander, 1978: 18). This is especially true when dealing with other people whose lives are often already in a state of flux due to onset of illness, loss of a lifetime companion, retirement or change of residence. Patients frequently rely on the knowledge and expertise of a physician to tell them "what to do about what".

Furthermore, use of computer technology has allowed physicians to store and analyze their patients' personal data more efficiently, but it has also increasingly robbed these patients of their privacy (Lander, 1978: 18).

Finally, physicians have the exclusive right to do surgery and prescribe drugs. In the realm of drug prescribing, the power of doctors is at its most awesome. The greatest increase in drug use in a half century has been for the purpose of treating chronic disease, but

rather to provide medication for psychosocial states (Zola in Conrad and Kern, 1986).

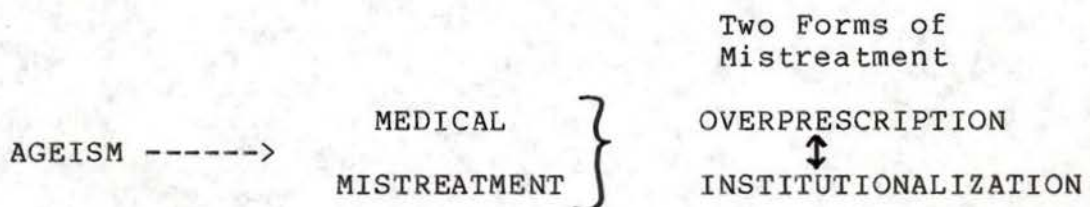
Thus we have drugs for nearly every mood:  
 to help us sleep or keep us awake  
 to enhance our appetite or decrease it  
 to tone down our energy level or to increase it  
 to relieve our depression or stimulate our  
 interest.

(Zola in Conrad and Kern, 1986: 384)

#### IV. THEORETICAL FRAMEWORK

The theoretical framework of this research problem follows an ageism-labelling perspective. Ageism Theory states that the elderly are labelled as a deviant group which must be controlled. A socially accepted form of control is medicalization. As indicated earlier, the theory of ageism suggests that the elderly may experience medical mistreatment including the overprescription of drugs. An extreme manifestation of ageism is institutionalization. It is in this setting that most medical misadventures, as a result of overprescription, can occur.

FIGURE 1: The Theoretical Framework



This is a very oversimplified view of the theoretical

perspective used in this research paper. A much more complex framework for understanding the interactions involved in the medical treatment of the elderly will be addressed in the next chapter. However, this simple framework suggests the theoretical hypotheses which will be tested. These are:

1) Elderly people, aged 65 and older, living in the community (i.e., non-institutionalized) will receive more prescriptions than the general population.

2) It is expected that the institutionalized elderly will receive more prescriptions than the general population and more than the community-based elderly.

## CHAPTER TWO: THE ELDERLY AND THE PRESCRIPTION DRUG INTERLOCK

In the industrialized nations of the world, the elderly consume drugs at a rate considerably above that of the rest of the population (Alexander, Goodwin and Currie, 1985:827). This situation has become the cause of much concern among health professionals. In this chapter, the consumption of medications by the elderly will be considered and some of the concerns will be discussed. The prescription drug interlock which was mentioned in Chapter One, will be examined in detail.

It is not, however, the purpose of this research to present an "anti-drug" argument. The need by the elderly for medications to alleviate pain, infections, anxiety and other health problems cannot be denied. The problem being addressed in this paper is the overprescription of drugs as a result of medical mistreatment and a departure from rational therapeutics when dealing with the aged.

### I. CONSUMPTION OF DRUGS BY THE ELDERLY

#### A. An Overview

It is apparent that prescription drug use by the

general population internationally and within nations, is high. Consumption is even greater for the elderly population aged 65 and over.

The problems of drug management should claim the attention of any well-informed person who deals with old people, especially someone in one of the helping professions...not a day passes in an active geriatrics practice when there is not a patient seen with symptoms and signs of drug misuse.

(Poe and Holloway, 1980:3).

It is not just a problem of taking one drug at a time. "The number and type of medications increase with age, with some patients taking greater than ten medications per day" (Alexander, Goodwin and Currie, 1985:827).

One does not have to work with the elderly very long before one realizes that there is inappropriate use of drugs. Not infrequently, we see an elderly person who complains of intellectual impairment and takes between twelve and twenty different medications.

(Beck in Yaggy, 1984:133)

Too frequently, drugs are prescribed or renewed without addressing whether they are really needed or how long they have been taken without a review. Drugs are prescribed without consideration being given to what other drugs are also being taken and the possible consequences of interaction. Dosages are recommended which are not correct for the individual person and particularly, the aging

system. A dosage which was tolerated well when a person was forty or fifty years old can have dire consequences when that individual is seventy. Over-the-counter medications also serve to complicate the issue (Kayne, 1978; Jarvik, Greenblatt and Harman, 1981).

Skoll, August and Johnson (1979) studied drug prescribing for the elderly in Saskatchewan in 1976. They found that patients 65 years or older accounted for 11 per cent of the population but used 28 per cent of the prescription drugs at an average rate of 12.8 prescriptions per person. Patients in the age groups 65-74, 75-84, and 85+, received an average per person of 11.44, 14.02 and 16.15 prescriptions respectively. By comparison, individuals aged 35-54 received an average of 6.67 prescriptions. Cardiovascular agents, diuretics and psychoactive agents were most commonly prescribed for the elderly, with barbiturates being prescribed 4.5 times more frequently. The researchers concluded that barbiturates, considering their potential toxicity, appeared to be overprescribed.

The Grossman Task Force on Human and Social Services for the Progressive Conservative Caucus of Ontario (1986), found that in ten years, the average drug utilization for persons over 65 years of age, had increased from 17 to 25 claims per year. This involved a 345 per cent rise in cost for the program. They stated:

There are serious indications that many of our seniors are over-drugged and that serious health concerns arise over the utilization of the Ontario Drug Benefit Plan. As much as 10 to 15 per cent of all seniors admitted to hospitals are admitted because of drug-related problems.

(The Grossman Task Force, 1986:35).

#### B. Concern About Consumption

Many people in the professional community dealing with health care issues and the elderly are concerned about high rates of prescription use. It would appear that, "Doctors write prescriptions, apparently with abandon" (Gryfe and Gryfe, 1984:301). It has been estimated that 75 per cent of all doctor-patient contact results in a written prescription (Gryfe and Gryfe, 1984:301). Martin Green, geriatric consultant at the Royal Free Hospital in London, England, stated that, "One of the functions of geriatricians is to take patients off drugs prescribed by other doctors" (Green cited in Gryfe and Gryfe, 1984:301).

Drugs are chemicals. Therefore, whenever a drug is ingested, it affects the functioning of the body in some way. In order to fight disease or illness, a drug must have a positive effect. However, it may also produce other reactions in an individual some of which are expected by the medical profession because they are dose-related, and

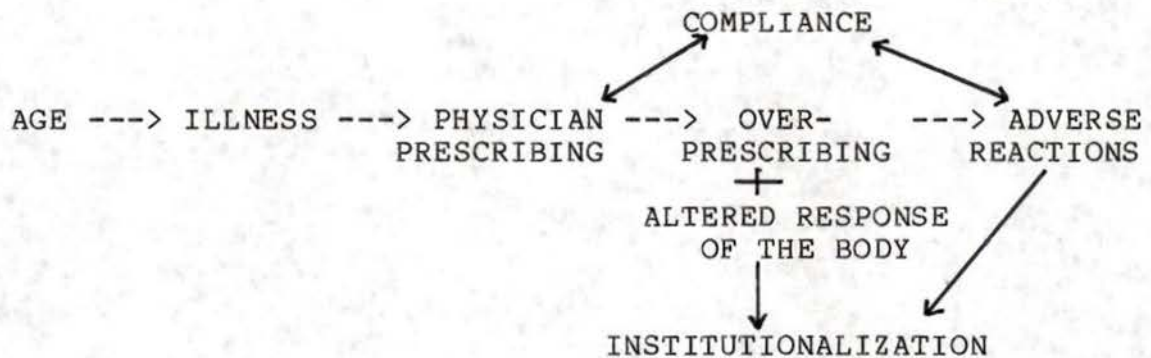
some which are not expected because they are idiosyncratic. When more than one drug is taken at the same time, the situation can become very involved. Each chemical in the body can interact with the other; each has various known side-effects; each has unknown side effects which are unique to individuals; and, finally, combinations of these chemicals have side effects which are both known and unknown.

Since the elderly are more highly medicated than the rest of society, they are susceptible to all of these reactions. However, they are also open to complications which are peculiar to the process of aging. As the body grows older, it begins to change in its response to chemicals. Dosages which were well-tolerated at a younger age, may now be the catalysts for serious drug reactions.

## II. THE PRESCRIPTION DRUG INTERLOCK OF THE ELDERLY

The prescription drug interlock is an expansion of the model of the theoretical framework discussed in Chapter One. This expanded model presents a more complex picture of the interactions involved in the medical treatment of the elderly.

FIGURE 2: THE PRESCRIPTION DRUG INTERLOCK



The potentially serious prescription drug interlock of the elderly (see Figure 1) begins with the onset of chronic illness or disease. As an individual ages, he or she is increasingly susceptible to many health problems. It is estimated that 80-86 per cent of adults aged 65 and older have at least one chronic disease (Weg in Kayne, 1978; Ostrom et al, 1985). It has also been shown that 43 per cent are somewhat limited in activity, compared to 3 per cent of those aged 25 to 44; 14-15 per cent may be completely inactive compared to only 1 per cent of those under 44 years of age. This increase in illness and disease leads to an increase in the number of medications prescribed.

Once chronic illness or disease creates the need for medical treatment, an elderly person is caught in a complicated web of circumstances. Physician treatment often results in the prescribing of one or more medications.

Adverse reactions may be caused by either a single drug or a combination of drugs and may be exacerbated by the altered functional response of the aging body to chemicals. A "pharmacokinetic hypothesis" has been developed to explain this altered response. According to this hypothesis, as a person ages, the body does not absorb, distribute or excrete chemicals as efficiently. This may result in reactions leading to more physician treatment which, in turn, involves the elderly individual with more drug consumption. Physician treatment also may result in institutionalization.

Compliance with the drug regimen by the patient is another area of potential complication. Compliance is tightly locked to physician treatment, chronic illness and disability, the number and type of drugs being taken, and adverse reactions. When all the pieces of the interlock are examined, it becomes obvious that drug prescription for the elderly is an involved and tightly woven network of considerations.

#### A. Disease Multiplicity and Chronicity

As an individual grows older, physiological changes occur in the body due to the aging process. These are inherent, universal and time-determined changes associated with normal aging. Complicating matters is the fact that organic diseases increase in number in old age, are often

multiple, are usually chronic, and many have symptoms which are atypical and misleading. There is not yet sufficient data available to allow for complete understanding of the effect of chronic disease in one system, on different diseases in other systems, or the interaction of multiple diseases. In addition, it is difficult to separate physiologic aging from pathologic processes. This health scenario in the elderly is a serious problem for physicians striving for diagnostic accuracy (Gryfe and Gryfe, 1984:301).

Older people also suffer from acute illnesses which may require care and medication. These diseases are characterized by rapid onset, severe symptoms and brief duration (Bantam Medical Dictionary, 1981:6) and can usually be remedied within thirty days, depending on the age of the patient (Wessen, 1964 cited in Bigot and Munnichs in Brocklehurst, 1978:793). Opposed to this is the situation of chronic illnesses -- "diseases of long duration involving very slow changes...often of gradual onset" (Bantam Medical Dictionary, 1981:81).

Gerson and Strauss (1975, cited in Bigot and Munnichs in Brocklehurst, 1978:793) characterize chronic illnesses as having the following components: they are long-term, uncertain in a variety of ways, require proportionately large efforts at palliation, are multiple diseases, are disproportionately intrusive upon the lives of patients,

require a wide variety of ancillary services if they are to be properly cared for, imply conflicts of authority among patients, medical workers and funding agencies, are expensive, and primary care is essential.

This list of attributes shows that chronic illnesses are not just medical problems, but require attention to the whole patient, including the social and psychological aspects. Bigot and Munnichs (in Brocklehurst (1978:793) paraphrased six of these aspects from work by Bogdonoff and Nichols (1960):

1. The patient suffers from a manifest disturbance of one or more organ systems;
2. As a result, his usual patterns of activity undergo change;
3. Social interaction with his family, friends and associates will be modified, and these modifications are viewed as limitations;
4. He is unable to visualize a solution to the disease process in the foreseeable future;
- 5 He will attempt new adaptive manoeuvres to reduce psychological stress;
6. In view of his multiple attempts to regain physical and psychological equilibrium he will experience intense changes in feeling tone, including anxiety, helplessness, despair and guilt.

Since the 1960's, many researchers have felt that physicians find chronic illness frustrating and non-interesting (Bigot and Munnichs in Brocklehurst, 1978:

793). This attitude has had an impact upon treatment of the elderly, since they are so prone to chronic illness.

For many doctors the common chronic diseases such as strokes, congestive heart failure, diabetes etc., are less 'interesting' than more dramatic illness in younger patients, even when the illness in the young is refractory to treatment.

(Lasagna, 1969 cited in Bigot and Munnichs in Brocklehurst, 1978:793)

Although the studies cited here are from the 1960's, Bigot and Munnichs (in Brocklehurst, 1978) state:

One is inclined to suspect also that not much has changed in this regard until this day. Diagnostically orientated procedures should cope with the psychological as well as social consequences of chronic illness. Perhaps in Britain, given the recent establishment of university chairs of geriatric medicine at several schools of medicine, it should now be made possible to equip medical students as well as health care professionals...with the appropriate knowledge and understanding regarding social and psychological aspects of aging, of chronic illness and disability. Such knowledge and understanding should also include increased attention to the development of positive attitudes toward aging and the aged.

From 1977 to 1980, Peach and Pathy carried out a study of medical students at the Welsh National School of Medicine. One group of students had experience in a geriatric setting, while the other group had only general experience. The differences in their clinical experience had significant effects on their attitudes toward the elderly. For example, fifty-eight per cent of the general group but only 16 per cent of the geriatric group agreed

that: "Most old people have diseases for which doctors can do very little." Seventy-six per cent of the general group as opposed to 56 per cent of the geriatric group agreed that: "Many old people have social problems with which doctors should not concern themselves." And finally, eighty-three per cent of the general group and 68 per cent of the geriatric group believed that: "Old people are often impossible to communicate with" (Peach and Pathy, 1982:199).

This research indicates that medical students are still not being sufficiently educated in the holistic care and understanding of elderly patients and their chronic disorders. In fact, the Grossman Task Force report referred to earlier (1986:32) made the following statement:

In the past we trained our medical professionals to be oriented toward high technology "cures" and toward acute care surgical interventions. But since "aging" cannot be cured, our health professionals are often under-equipped to deal with many of the basic chronic ailments of the elderly.

Very few of Ontario's 17,000 physicians have any formal training in geriatrics and even now our medical schools do not devote much time to clinical geriatric training.

In Canada, the government considers people over 60 years of age to be at high risk for "heart and circulatory diseases, cancer, arthritis, rheumatism, diabetes and other chronic diseases connected to the aging process" (Lalonde, 1975:59 cited in Marshall, 1980:155). For the Canadian

aged, heart and cerebrovascular diseases are the major causes of hospitalization (Marshall, 1980:155).

This situation of disease chronicity and multiplicity sets the elderly on the road to increased prescription drug use. The first step along this path is contact with a physician.

#### B. Physician Treatment and Prescribing of Medications

The prescription of medications is a major activity of doctors, "but there is evidence that it is not always done rationally" (Gehlbach et al., 1984:193).

Like diplomacy, drug treatment is the art of the possible and we as physicians should remember it. Effective treatment, which avoids over-treatment and detriment to the patient, must be based on accurate diagnosis in all its aspects, mental, physical, social and functional. The ability, for example, to maintain an upright posture is of paramount importance in an elderly person. If you cure one syndrome, but render him incapable of standing upright or walking, you have done that patient a grave disservice. Function for our patients is paramount.

(Davison in Cape, 1973:60)

Governments and medical associations have tried various tactics to bring the importance of rational prescribing to the attention of physicians. These strategies have included: "restricting access to drugs through limited formularies, mandatory review of certain prescriptions by pharmacists or infectious diseases consultants, use of

special prescribing forms, and resolutions passed by professional societies" (Gehlbach et al., 1984:193). Gehlbach and associates determined through their research that the major problems in rational drug prescribing involve physician judgement in the areas of drug efficacy, proper dosage and toxicity of products (1984:200).

The possible reasons for overprescription of drugs are numerous and include the management of a physician's practice, the attitudes of doctors toward their elderly patients, the attitudes of society, and the influence of the drug industry.

(i) Practice Management

Prescribing of drugs is influenced by the ways in which a doctor manages his time and workload. By increasing the number of contacts between patients and physicians, the hazard of overmedication is introduced (Wolf, 1978:28). When a physician is able to see more patients, it not only increases his income, but it makes each doctor-patient encounter shorter.

In one hospital study, it was found that doctors spent an average of four-tenths of a minute per visit in private rooms and two-tenths of a minute in semiprivate rooms, consulting with their patients (Lander, 1978:21). "Another study found that the patient's greatest problem with his doctor's visits was their being so short that asking

questions was impossible -- 'They don't stand still long enough for you to draw a bead on um,' as one patient put it" (Lander, 1978:21).

When a patient consults with his or her doctor at an office, the prescription has been called a "termination strategy" which the doctor uses to limit the length of appointments (Muller cited in Lander, 1978:205).

Talking through the patient's problems, exploring the possible connection between his somatic pain and the sense in which his life is a pain, becomes intolerably unproductive...In such a situation, the prescription pad becomes an increasingly valuable instrument of treatment, for a prescription gives the patient the illusion that he has received something of value for his money, while it takes the doctor only a minute to execute.

(Lander, 1978:71)

In addition to being quicker, it is also easier to prescribe medication. The alternative is often extra time spent explaining to the patient, and convincing him or her, that no drug is needed. This often results in a dissatisfied patient who may turn to another doctor who will prescribe (Fry, 1978:83; Allentuck, 1978:65; Holahan and Stuart, 1977:21; Lander, 1978:49-50). Using data from the United States, it was discovered that physician-patient encounter time also decreased with the age of the patient (Beck cited in Yaggy, 1984:133).

(ii) Societal Attitudes

Activism is a direct result of the evolution of modern medical technology.

The "technologic imperative" that propels medical practice, as it propels other sectors of American society, means that "procedures get done because we have the capability. We build a new machine because the technology is there, but it really doesn't add anything to what we can do for the patient." This tendency is but one reflection of the fact that, like other important actors on the American scene, the doctor is trained and expected to be an activist, to engage in active intervention rather than passive observation. "Given the choice of administering or withholding therapy, the American physician appears likely to choose active therapy."

(Lander, 1978:38)

This activism is not only encouraged, but to a large extent, demanded by society. In the late 1800's, Sir William Osler stated: "Man has an inborn craving for medicines...it is really one of the most serious difficulties with which we [physicians] have to contend" (Allentuck, 1978:63).

After the second World War, the development of "wonder drugs" encouraged a belief by the public that any disease symptom could be quickly ameliorated. This is part of the "doctor mystique -- the belief that the doctor can heal anything" (Allentuck, 1978:65).

Why is prescribing and imbibing of medicines by human beings so popular? It is one of the major

distinctions between human beings and other mammals...The reasons for this human habit must be many and various. A large part of it comes from consumer (patient) demands and expectations. The patient goes to consult his (or her) physician with a problem, a symptom or a diagnosis. He expects something to be done or given, and this is usually a pill or mixture or injection or suppository or balm, depending on local customs.

Medicine is still a mystical art, supported by science. The physician still has a high social status and is held in fear and awe. He has the knowledge and power to help with the unknown, illness and sickness. He is consulted in the hope and the expectation that he will do something to cure or relieve. He is expected to be an activist doer, rather than a non-doer.

(Fry, 1978:82-83)

Society has come to believe that a cure exists for almost everything. We have also come to think of ourselves, to some extent, as "consumers" rather than patients, while doctors are regarded as "health providers". This is in opposition to the old relationship of physician-patient, where patients felt that they were dependent upon the doctor (Cockerham, 1982:153-154).

The consumer-provider interaction has helped to place patients and doctors on a more equal footing, allowing laypeople to place increased pressure on the medical profession for a market-place type of transaction.

The market aspect appears most clearly when the patient emerges from a visit to the doctor feeling that he has bought a prescription or an operation...In the words of one economic analyst: "We have a national consensus for good health. One problem is that somehow we have been educated

to think we can buy it."  
(Lander, 1978:94)

(iii) Physician Attitude

Canada's population includes a growing number of elderly persons who are suffering from chronic illnesses requiring drug therapy. This therapy does not result in a cure, a fact which may cause an "increasing sense of frustration" for the medical practitioner who is trained and expected to be an activist (Gryfe and Gryfe, 1984:301). In the study done by Peach and Pathy (1982), 55 per cent of the general medical students and 17 per cent of students in geriatric units agreed that: "Old people have so many symptoms that doctors cannot help prescribing many drugs." One hundred per cent of the general and 59 per cent of the geriatric students agreed that: "Geriatric wards are depressing places in which to work" (1982:199).

Few doctors are choosing to concentrate on health care for the elderly. Using a 1977 American Medical Association data base, it was found that 715 out of 363,000 physicians, (i.e., only 0.2%) considered the care of the elderly to be their primary, secondary or even tertiary interest (Beck in Yaggy, 1984:133).

In Ontario, very few of their 17,000 physicians have had any formal training in geriatrics. Medical schools do not devote much time to clinical geriatric training and

only 13 of 19 geriatric residency posts in these schools are currently being used to train specialists in geriatrics. To respond to this situation, it has been recommended that the Ontario government introduce economic incentives for medical schools to ensure that such training is provided, establish a Department of Geriatrics at one school to train future geriatricians and re-train graduate doctors, and institute incentives to encourage physicians to learn "newly developed skills and techniques for treating elderly persons" (Grossman Task Force, 1986:32).

Chapron and Lawson (1978, cited in Gryfe and Gryfe, 1984:303) identified two types of prescribing for geriatric conditions, calling them "symptomatic reflex prescribing" and "rationalized activism".

The "reflex prescriber" moving his pen while the patient speaks his or her complaint, is the agent in a too-brief encounter, and is typically concerned only with the patient's symptoms. The "rationalizing activist" is usually preoccupied with the internal dysfunctions of a single organ system, and, assuming that it is better to do or give something than not to do or give, tends to overtreat while supporting the rationality of prescribing on "a priori" grounds. His arguments are usually plausible but his proofs are inaccessible.

#### (iv) The Drug Industry

Both doctors and patients are influenced by the drug industry in their use of prescriptions (Fry, 1978:83). Most of the advertising of drug companies is aimed at the

primary physician through professional journals, and the public by means of commercial television (Fry, 1978; Lander, 1978).

In 1964, the Canadian Royal Commission on Health Services stated:

The traditional relationship between physicians and the drug manufacturer has been altered. As in earlier days the physician continues to be the sole deciding factor when prescribing drugs. But the growing complexity of drug combinations and the great number of new drugs coming on the market, the lack of time to study adequately all the relevant literature relating to advances in drug therapy, and the absence of an up-to-date Canadian Drug Formulary has made it necessary for many physicians to rely increasingly on the promotional literature of drug manufacturers passed on to them in an unending stream of pamphlets, notices, samples, advertising matter and visits from detail men.

(Volume 1:341)

Bringing the concerns up-to-date, Smith (in Morgan and Kagan, 1983:260) observes: "Perhaps the most damning criticism of advertising, if substantiated, would be that it results in inappropriate prescribing -- either too much, too little (hardly likely), or the wrong drug."

#### (v) Conflict of Interest

A final aspect to be considered is that of conflict of interest. In the United States, a physician may be involved in selling prescription items, from medicines to eyeglasses, or directing patients to a pharmacy in which the physician has a financial interest, or investing in a

pharmaceutical company from which he orders drugs. This conflict of interest may result in a doctor prescribing in a way which will improve his income, rather than in the best interests of his patients (Stroman, 1976:65).

(vi) Other Reasons for Prescribing

When a physician consults with a patient, he may fail to deal properly with the total drug situation. Elderly people frequently require the services of specialists in addition to their regular general practitioners. Double- or multiple-doctoring can occur legitimately, resulting in the prescribing of several different drugs. Recent studies suggest that doctors often do not obtain information about other drugs being used before prescribing one or more new ones. The other drugs may not only include prescription items, but also over-the-counter preparations and alcohol as well. In addition, the doctor may not ask about living or working conditions which would influence safe and effective use of a prescribed medication (Straus in Gallagher, 1976:420).

Stolley et al. (1972:539) found that the elderly, particularly older women, received a disproportionate number of drugs. One woman had seen 9 different doctors and received 181 prescriptions during a one-year period. In B.C., it was discovered that one elderly woman had utilized the services of thirty different doctors and pharmacies,

over a period of three months (B.C. Pharmacare, 1985).

There also may not be appropriate monitoring of drugs, corresponding to their high rate of utilization. In Wiltshire, England, Dennis (1979) analyzed 1,000 repeat prescriptions for psychotropic drugs which were given without patients seeing their doctors. The results showed that the longer the repeat prescribing had occurred, the older the patient was likely to be, and the less closely monitored by the doctor. In 1976, again in England, Shaw and Opit studied 127 people aged 70 or over in a group general practice. Psychotropic and cardiovascular drugs were the most commonly prescribed to these patients. Such drugs require regular monitoring but only 30 per cent of the patients had seen their physicians in the preceding month and another 30 per cent had not seen their doctors for over six months (cited in Gryfe and Gryfe, 1984:303).

Many aspects of the prescribing habits of physicians suggest how and why overprescription occurs.

In general then over-treatment in the elderly is due to under-diagnosis, under-utilisation of available data and ignorance of clinical pharmacology...Unfortunately such are the pressures from the patient, the public and the advertiser to prescribe drugs that it may be extremely difficult for us to avoid over-treatment...Although over-prescribing may rarely not be our fault, it is so ninety-nine times out of a hundred!

(Davison in Cape, 1973:60-61)

Studies have shown that better physician prescribing is linked to younger age, specialization, more pharmacology training, group practice and urban location. It has been observed over the past decade that: "...major changes occurred in the characteristics of practicing physicians in the direction associated with better prescribing patterns. These changes should be reflected in national prescribing practices (Rabin in Morgan and Kagan, 1983:19).

Two recent studies of the contributions to be made by pharmacists in the nursing home setting show that when they assume responsibility for drug management, under direction of a physician, the average number of drugs per patient can be significantly lowered (Thompson et al., 1984; Cooper, 1985). This would indicate that pharmacists could be used more effectively by the medical profession, a position supported by Gryfe and Gryfe (1984).

### C. Altered Functional Response of the Body to Chemicals

Chronicity and multiplicity of illnesses lead the elderly to seek medical attention. Physicians prescribe drugs in an effort to palliate these conditions. However, the elderly also experience intensified responses to drugs as a result of age-dependent declines in their ability to dispose of chemicals within their systems. These responses, which have been discussed in biomedical literature for some time, can lead to adverse drug reactions (Schmucker, 1984:144).

...in the elderly, over-treatment stems from a number of factors peculiar to the elderly patient. He has a small lean body mass, and multiple pathology with multiple symptoms each inviting prescription. Excretion through various organs is impaired with the kidney having a key role to play. There is impairment of metabolic pathways and erosion of organ reserve in the brain affecting the maintenance of an upright posture and other functional attributes. Together these make over-treatment more likely in the elderly, and make its effects possibly disastrous. For example: To give a young person a night sedative such as nitrazepam or a barbiturate may cause a mild hangover or muzziness in the morning but he has sufficient cerebral reserve and postural control to function for the whole day without real trouble. The same dose with a similar degree of hangover may make the elderly person quite incompetent the next morning with confusion, loss of mobility and a tendency to fall which in turn may mean a fracture.

(Davison in Cape, 1973:61)

The "pharmacokinetic hypothesis" suggests that an age-related decrease in the ability to deal with chemicals introduced into the body is responsible for an exaggerated pharmacologic response in the elderly. This hypothesis includes four important factors which are: drug absorption; drug distribution; metabolism; and excretion (Schmucker, 1984).

(i) Drug Absorption

Although age-dependent changes in the absorption of drugs in the gastrointestinal tract have not been extensively studied, four of the affecting factors are: decreased gastric acid secretion; reduced splanchnic blood flow; reduced gastrointestinal motility; and declines in the number and/or absorptive capacity of the enterocytes (intestinal cells) (Schmucker, 1985:134).

An acid PH enhances the absorption of certain drugs in the intestines. Therefore, any age-related reduction in gastric acid secretion will negatively affect absorption. Such changes have been reported by various researchers (Schmucker, 1985:134).

Splanchnic or intestinal blood flow declines by 30 to 40 per cent as a person ages. This may contribute to a decreased absorption of drugs. In addition, the declining rate of gut motility and gastric emptying, and the lessening of the height of intestinal villi contribute to a lessening of the capacity to deal properly with chemicals

through absorption (Schmucker, 1985:134-135).

(ii) Drug Distribution

When the body can distribute the amount of a drug within the blood stream, there is less likelihood of toxicity. However, aging may increase body fat or a loss of body water. This means that drugs which distribute themselves through the use of body water or lean mass end up with higher concentrations in the blood stream, which in turn increases retention and prolongs action in the body (Schmucker, 1984:146).

In addition, plasma proteins (albumin) often decrease with age. This indicates that drugs which are highly protein bound in the circulation have greater concentration in a free and active state in the older person (Goldberg, 1980:76).

(iii) Drug Metabolism

Drugs are metabolized in several different organs including the liver, lungs and kidneys. The liver is the major location for this metabolism and acts on drugs by making them more water-soluble or less toxic before they are eliminated. It appears that this function of the liver declines with age, allowing the elderly to metabolize drugs at only one-half to two-thirds of the rate of younger people (Schmucker, 1984:148).

#### (iv) Drug Excretion

"As a result of slower elimination, drugs and metabolites will circulate in higher concentrations for longer periods" (Goldberg, 1980:76). Many researchers believe that the reduced ability of the kidneys to clear drugs from the system is the main factor responsible for the total decline in disposition in the elderly. Renal functions decline significantly with age. For instance, blood flow to the kidneys is reduced by 1 to 2 per cent per year of age, and filtration declines by 50 per cent in older people (Schmucker, 1984:148).

#### (v) Other Explanations

Some altered responsiveness of the elderly to drugs seems to be explicable only by age-related differences in tissue sensitivity. In other cases, the presence of pathology may have an effect on the way an elderly person responds to a drug. And finally, impaired homeostatic mechanisms may cause many non-specific, undesirable drug effects in the elderly, such as dizziness, confusion and agitation, which would not occur in younger patients (Crooks in Cape, 1973:69-70).

The most recent studies available suggest that the problem of drug disposition in the elderly is far more

involved than previously thought and there is a very incomplete understanding of the mechanisms responsible for the age-related decline. In addition, more information is needed concerning when during the life-span these specific changes occur and whether they are universal or subject to species, strain or sex differences (Schmucker, 1985:144).

However, regardless of this lack of complete understanding, Goldberg (1980:76) suggests that: "With careful monitoring of older patients, it is possible, though difficult, to develop rational, effective drug therapy for them."

#### D. ADVERSE DRUG REACTIONS

##### (i) General Discussion

With increased drug consumption, the risk of adverse drug reactions is multiplied. Elderly patients have such reactions approximately three times as often as younger patients (Long, 1977; Clark and Vestal, 1984). Drug-induced illnesses have been shown to cause 41.3 per cent of hospital admissions for patients 61 years and older (Clark and Vestal, 1984:53). In Great Britain, one study showed that drug reactions were implicated as either the sole or contributing cause of hospitalization in over 10 per cent of 1,998 admissions to geriatric departments (Berlinger and

Spector, 1984:45). Drug therapy "may spare a patient's life but leave him blind or afflicted with kidney, liver or brain damage, bone necrosis, ulceration of the bowel, intestinal hemorrhage, skin scars, extreme sensitivity to sunlight, or other disabilities that may last for months or years" (Lander, 1978:45). Drug-induced problems among the elderly are so common that doctors in clinical practice are cautioned that they may have to consider them as a possible diagnosis at least once a day (Clark and Vestal, 1984:54).

In a study of adverse drug reactions sponsored by the Ontario Medical Association, it was found that of the reported reactions approximately 20 per cent were in people 70 years of age or older, while more than 33 per cent were in people aged 60 and older. During the first three years of the study, 51 deaths involving drug-induced adverse reactions were reported. The mean age at which these deaths occurred was 62.9, and 51 per cent of them were in people aged 70 and older (Gowdey and Brennan, 1985:21).

Our results indicate that the reports of adverse drug reactions in elderly patients were disproportionately high considering the fraction of the population they represented...The continuing reports of adverse drug reactions associated with the use of NSAIDs \* that were received over the first 3 years of our program suggested that elderly patients with arthritic symptoms were most at risk. The severity of the gastrointestinal hemorrhages, sometimes without premonitory symptoms, that were reported in association with these drugs led the committee to issue a warning to the medical profession...

(Gowdey and Brennan, 1985:22)

\* Nonsteroidal anti-inflammatory drugs

Polypharmacy, which is the prescribing of multiple medications, can cause a risk that is greater than the sum of risks from single drugs, because the chemistry of their interactions creates new dangers. In a study by Knapp et al. (1984), it was found that in about 10 per cent of office visits by elderly patients, five or more drugs were indicated as being prescribed. Simonson and Pratt (1981 cited in Knapp et al., 1984:142) discovered that "very elderly patients receiving five or more drugs concurrently have an increased risk for adverse drug reactions and interactions."

Adverse drug reactions may be classified into types A and B. Type A are exaggerated manifestations of the usual pharmacologic action. They are dose-dependent and usually happen when the patient takes more medication than he is able to excrete which results in accumulation to a toxic level, or when the patient is particularly sensitive to serum drug concentrations. Type A occur commonly and may account for the majority of adverse reactions in elderly people (Berlinger and Spector, 1984:45).

Type B are usually dose independent, involving the unique reactions of individuals. As such they cannot be anticipated from the usual pharmacologic actions and are unpredictable (Berlinger and Spector, 1984:45).

### (ii) Drug-Drug Interactions

There is an infinite number of problems which can occur involving medication, considering the great variety of drugs on the market and the possible combinations. For instance, when an anticoagulant is combined with an antiarthritic drug, serious fatal hemorrhaging may occur because the latter has a potentiating effect on the former. On the other hand, the effect of tetracycline (an antibiotic) is nullified if the individual is also taking an antacid containing calcium, magnesium or aluminum, because the metallic substances block the absorption of the antibiotic (Lander, 1978:45).

Many studies have been concerned with drug-drug interactions, but as yet unanswered is the important question of how often such interactions result in adverse drug reactions. The Boston Collaborative Drug Surveillance Program carried out a study in which it was estimated that 22 per cent of adverse drug reactions were related to drug-drug interactions. However, the study did not provide details on the criteria used to define an adverse drug reaction nor on the clinical significance and severity of them (Blaschke et al. in Jarvik, Greenblatt and Harman, 1981:14).

When writing prescriptions, physicians are hampered in dealing with possible drug-drug interactions because of the increasingly large number of potentially interacting drug

combinations being commonly used.

As the number of concurrent prescriptions per patient increases, there is a sharp increase in the number of possible combinations which must be evaluated for potential interactions. The general expression which denotes the number of different combinations of two drugs for a given set of drugs is:

$$\text{number of combinations} = \frac{(\text{number of drugs})!}{2!(\text{number of drugs} - 2)!}$$

Thus, for a patient receiving seven drugs concurrently, there are 21 possible combinations of two drugs which are different, and for a patient receiving 10 drugs concurrently there are 45 different combinations of two drugs. Coadministration of more than one drug to the same patient is common, especially in the inpatient or nursing home setting. In a study involving the monitoring of all inpatients at the Stanford Medical Center, there was an average of 6.92 prescriptions per patient, and in surveys carried out at a series of nursing homes, there was an average of 3.2 to 7.7 prescriptions per nursing home patient. At acute care hospitals and on general medical services, it is not unusual to have 10 per cent or more of patients who are receiving more than 10 drugs simultaneously.

(Blaschke et al. in Jarvik, Greenblatt and Harman, 1981:12).

According to Davison (in Cape, 1973), two common areas of overtreatment in the elderly are cardiac failure and hypertension. Frequently, drugs such as digoxin and a diuretic are prescribed and never reviewed. Some time later, the patient presents with difficulties which may or may not seem related to the specific drugs being taken. Davison found that he could often correct problems by stopping the drug regimen. Anxiety and depression are also

commonly overtreated by drugs, when sympathy, care and love are the missing ingredients in the patient's life.

#### (iii) Diuretics

Diuretics are major drugs used in the therapy of the elderly. They increase the flow of urine and the net loss of water and are prescribed for conditions such as high blood pressure. Their pharmacodynamics and side effects are diverse, with the potential to cause symptoms which are difficult to diagnose. These side effects, depending on the type of diuretic being taken, may include deafness, bladder spasms, anorexia, confusion and nausea (MacLean, 1982).

The main side effect of diuretics is potassium depletion which may result in general malaise and apathy. Diuretics which have been designed to spare potassium may still cause a condition of hyperkalaemia (the presence in the blood of an abnormally high concentration of potassium) in patients with poor renal function. Diuretics can be involved in urinary retention or incontinence. Over-enthusiastic use of this medication can also result in dehydration (Hodkinson, 1976:125-126).

#### (iv) Digitalis

Drugs in the digitalis group are among the oldest and most effective therapeutic agents available to the medical profession for treatment of congestive heart failure.

Digitalis therapy is often given to the elderly for inadequate reasons, despite its dangers (Hodkinson, 1976:125). Dall (1970 cited in Hodkinson, 1976:125) found that three quarters of older patients could stop digitalis therapy without encountering a problem. Toxic effects are common to all digitalis preparations, resulting in arrhythmias, anorexia, nausea, or mental confusion (Hodkinson, 1976:125).

(v) Insomnia and Incontinence

Insomnia in the elderly is frequently treated with medication, particularly in nursing homes. Another serious problem is incontinence among the elderly, especially in care facilities. American statistics show that approximately one-fifth of the patients in acute geriatric facilities and between one-third and one-half of the nursing home residents are incontinent (McGinnis, 1986). The situations of insomnia and incontinence are often related. It is suggested by Davison (in Cape, 1973) that night sedation reduces the sensitivity of the patient, resulting in incontinence. When such drugs are stopped, the incontinence may also end. Incontinence is strongly associated with mental confusion (O'Hara et al., 1981:174; Hodkinson, 1976:93) and certainly, confusion can result from psychotropic drugs. Improvement in incontinence can be achieved by establishing a regular routine of bladder

emptying and improving the mobility of the patient (Hodkinson, 1976:93). Such routines and mobility are not possible where patients are sedated, particularly at night, to keep staff requirements at a minimum.

In addition, insomnia is not an indication of a need for sleeping pills, except when it is perceived as an inconvenience by a misguided institutional staff. Tying these two problems together:

If the incontinence is due to lack of cerebral control and there is erosion of cerebral reserve because of disease and you further this with barbiturates or Valium, then you make the situation worse. The matron of a home must recognise that normal people do not sleep throughout every night. All sorts of interesting things go on during the night and if an elderly person wants to get up and walk around at 2 a.m., go to the lavatory or have a cup of tea, read a little and then go back to bed, I maintain she should. If she lived at home she would certainly do it, but if she lives in residential accommodation there is a real risk that she will be given a tranquilliser, or if you like, a pharmacological strait-jacket.

(Davison in Cape, 1973:65)

#### (vi) Psychotropic Medications

Psychotropic drugs have the potential to cause many different drug interactions. The elderly are among the most frequent users of psychotropics and when a drug of this type is added to other medications being taken, an interaction is more likely to occur (Richelson, 1984:30). Blaschke et al. (in Jarvik, Greenblatt, and Harman, 1981:21) found that nearly one-half of all potential drug

interactions in a nursing home involved psychotropic drugs.

Eleven benzodiazepines are presently available in the United States for use as sedative/hypnotics. This means they are all similar in their pharmacology so they can be used interchangeably as sedatives (anxiolytics) or hypnotics (Richelson, 1984:30). If the benzodiazepines are prescribed for older patients, they should be given in lower doses and less frequently. This is due, in part, to the longer half-lives of some of these drugs. Klotz et al. (cited in Richelson, 1984:31) found that the half-life of diazepam for an 80-year old person would be four times that for a 20-year old. These drugs may also cause excessive daytime sedation, often resulting in accidents (Richelson, 1984:31).

Benzodiazepines taken with other drugs can produce serious effects. In Britain, 40 per cent of drug overdoses include benzodiazepines (Ashton, 1985:805). Because of addictive effects, when large doses of them are taken with other depressants, respiratory failure, especially in the elderly, may be precipitated. In overdose situations, they may impair performance in skilled tasks such as driving a vehicle, or prolong withdrawal effects such as insomnia and anxiety for weeks after apparent recovery of the patient (Ashton, 1985:805).

A normal dose of benzodiazepines in an elderly patient can cause memory problems, diminish self-control, or

promote inappropriate aggressive or sexual behaviour. An excessive dosage or prolonged use can cause depression, delirium or drowsiness (Morrant, 1983:246).

Barbiturates can cause a hung-over feeling, depression, irritability, sluggishness, confusion and dementia (Morrant, 1983:246). They should be avoided in the elderly because they tend to produce paradoxical excitement and sleep disturbances. In addition, they have the potential for abuse, suicide and accidental fatal overdose (Richelson, 1984:42).

Generally, when used carefully in small doses, antidepressants can be safe and effective. However, when they are combined with several drugs having anticholinergic side effects, such as an antidepressant with an antipsychotic and an antiparkinsonism drug, this compounds the chances of physical and mental side effects (Morrant, 1983:246). Some antidepressants can increase anxiety or agitation, cause hypertensive reactions when used with certain drugs and foods, cause hypotensive responses and respiratory depression when combined with some analgesics and anesthetics, or cause psychologic dependence (Morrant, 1983:246).

According to Morratt (1983), all antipsychotic drugs

cause side effects in the extrapyramidal nerve system, which is "mainly concerned with the regulation of stereotyped reflex muscular movements" (Bantam Medical Dictionary, 1981). These side effects can imitate a cerebrovascular accident or cause an inability to sit still which can easily be misdiagnosed as an anxiety state with agitation. A condition involving writhing, chewing movements of the lips, tongue and face can occur soon after beginning treatment with an antipsychotic, or weeks and even months after stopping the drug. Anticholinergic side effects such as blurred vision may keep elderly patients from reading or doing handiwork. They can also produce dryness of mouth leading to ulceration, urinary retention, constipation, postural hypotension so that a patient is afraid to get up in case he/she falls down. All of these conditions can be alleviated if the patient is under proper care (Morrant, 1983:247).

Finally, lithium salts have an antithyroid action which may cause dementia (Richelson, 1984:41).

Freedom from disease, including iatrogenic disorders, is as important to the elderly as it is to any other age group, but what distinguishes our concept of health in this age group is that it must be broadened away from the traditional emphasis on disease states. The World Health Organization advised that health in the elderly is best measured in terms of function. This comprises mental status, mobility, continence,

and a wide range of personal, domestic, and social functions of daily living. Emphasis on such functions is of paramount importance to the elderly, and health maintenance measures must take this into account.

(Kennie, 1984:316)

#### E. Drug Compliance

Drug compliance is a major problem among the elderly. Compliance refers to a patient taking his own prescribed medication as his physician intended. Wandless et al. (cited in Gryfe and Gryfe, 1984) have reported that less than half of patients over 65 take their drugs exactly as prescribed. "No person can keep up with more than three or four prescriptions, yet it is not at all unusual for some old people to be taking 15 or 20 different medicines" (Poe and Holloway, 1980:4). In one study, potentially serious errors in compliance were found in 26 per cent of elderly patients (Hollister in Jarvik, 1981:2).

Hulka et al. (cited in Gryfe and Gryfe, 1984:304) categorized the situation into four sections. Omissions refer to drugs prescribed but not taken. Commissions are drugs taken but not prescribed. Misconception is when the drug schedule is misunderstood, and non-compliance is when the schedule is rejected. Obviously, when medication is not taken as prescribed, it can lead to drug misadventures and an increase in health problems.

Problems with compliance are also linked to almost all other aspects of the drug/elderly interlock. If a drug is not taken properly, it can lead to an increase in illness, adverse reactions, physician visits and institutionalization. Non-compliance can also create the need for more prescriptions to rectify adverse reactions or to treat the original condition with new medications, because the physician is under the impression that the first drug is not working.

In their study, Hulka et al. reported 17 to 19.55 per cent rates of occurrence in omissions, commissions and misconceptions, with only 3 per cent overt non-compliance. They found that the number of drugs being taken was positively correlated with the rates of omission and commission, but not the rate of misconception. Therefore, they concluded that the greater the proportion of drugs for which the patient knew the function, the less likely he would be to make errors (cited in Gryfe and Gryfe, 1984:304).

For a patient to know the function of a drug, he must have adequate instruction from the doctor. Sometimes the individual understands the purpose of an over-the-counter medication suggested by friends or family better than he understands the purpose of a prescribed drug. It is in this area that the pharmacist can play a very important role. He is probably the most accessible professional health care

person for the elderly patient who does not understand a drug, its purpose or schedule.

McAlister and Tong (cited in Gryfe and Gryfe, 1984:305) placed 950 telephone calls, trying to speak with 161 family physicians and less than half of the doctors were immediately available. This highlights the problem of who will make the time to help an older person. When druggists consult with a client who has a new prescription, or a problem with an old one, it has been shown to improve compliance. A counselling session ideally lasts about fifteen minutes and includes information on storage of medication, disposal of unwanted drugs, the name and purpose of the new drug, an explanation of how to use it, cautions about interactions, and a conservative warning about side effects. When side effects are known by patients, it helps them persevere through initial difficult times when they might otherwise stop taking the drug. The druggist should include written information on the medication because verbal instructions are easily forgotten or confused (Gryfe and Gryfe, 1984:305).

In another study done by Schwartz et al. (cited by Lofholm in Kayne, 1978:20), 178 patients were studied and 59 per cent made medication errors. The greatest number of errors were made by those 75 to 79 years of age, with gender having no bearing on the situation. People living alone made more mistakes than those with a companion. On

the other hand, sharing a house often results in sharing medications, too. Those with less education made more errors, and when more prescriptions were taken, more errors occurred.

The Self-Medication Program at the Youville Memorial Wing of Edmonton General Hospital (1984) reports what they consider to be the most common and potentially dangerous self-medication habits. They are: lack of knowledge of name and reason for a drug; lack of knowledge of how a drug should be taken, i.e. with/without food or swallowed whole; lack of knowledge of what a side effect is; saving old medications and tending toward self-treatment; stretching medications to last longer and taking more than needed because "two are better than one"; borrowing, lending, swapping medications; taking medication irregularly due to forgetfulness or illness; taking several medications of similar shapes and colors or taking those which are more attractive in shape and color.

It can be added here that when a physician prescribes medication, he should know the circumstances of the patient. Is there anyone living at home to help him or her follow the schedule? And more importantly, does the schedule conform to the living pattern of the patient? The doctor may assume that the instruction to take a pill three times a day with meals is simple enough to follow. However, the patient may not eat three times a day for a variety of

reasons and therefore may take all three at one sitting or not take them at all. Drugs can provide a problem in other ways. For instance, if a laxative or a diuretic is prescribed, the patient may find it too difficult to reach the bathroom, depending on the floor plan of his house, and may stop using the medication. Or a diuretic may be discontinued because the person refuses to keep making trips to the bathroom all night, especially if he or she doesn't know that it is a temporary condition.

To help the patient comply, there have been many suggestions made and aids developed (Gryfe and Gryfe, 1984; Hammarlund, Ostrom and Kethley, 1982; Sherman, 1983; Shannon, 1983; Kim and Grier, 1981; Hatch, 1982; Hall, 1981). The Self-Medication Program in Edmonton has listed some of the strategies which were found to be effective. For non-compliance due to poor vision, they suggest braille, identifying markers such as elastic bands, wires, strings, or colored dots on the containers, or different sizes of bottles. Magnifying glasses, large print instructions, and brands of drugs which are easily distinguished by shapes and/or colors are also considerations.

For memory loss or confusion, the regimen should be simplified as much as possible and simple written instructions provided with samples of the medication attached. A limited supply of drugs should be provided and

medication times incorporated with the individual's activities. Patients with poor hand function can be aided by more easily accessible containers and the containers can be attached to a stationary base with glue or velcro.

Other compliance aids are tear-off daily calendars listing drugs to be taken that day, an I.D. card describing each drug, a pill wheel with a separate compartment for each dose (this was sometimes found to add to the problem if dexterity or vision were not good), and unit packaging.

Many drug stores are now providing computer-typed labels and instructions on how to take the pills. Sixty-three per cent of elderly were found to have difficulty with child-proof caps and many did not know that they could request snap caps. Pharmacist's records on each patient showing what medications are being taken, and for how long, can be very helpful in alerting the physician to potential problems. Interestingly, it has been reported that many physicians, particularly those in private urban practice, do not really know about the pharmacist's training and capabilities. It is also thought that they may not know about the choice of snap caps on the bottles (Gryfe and Gryfe, 1984). Obviously, physician education is an important aspect of this problem of drugs and compliance.

#### F. Institutionalization

There are several levels of institutional care which may be used by an elderly person. For various health reasons, he or she may be admitted to a general hospital. When it is expected that an individual will regain sufficient health status to return home, given a longer period of recuperation than the general hospital provides, the patient may be placed in an extended care unit. When there does not seem to be an expectation of independent living, an elderly person is accepted into a long term care facility or nursing home.

As it has become easier to put the patient in the hospital, it has simultaneously become harder to care for him at home. The disappearance of household help, maiden aunts, and grandmothers from the American family unit has meant that hospitalization of a seriously ill member serves the social function of sparing the nuclear household, with its limited caring resources, from a possibly intolerable strain.

(Lander, 1978:18)

No matter at which institutional level the elderly enter, drug therapy is a crucial aspect of care. Drugs prescribed during hospitalization can result in new or enhanced existing conditions. One study of nine facilities concluded that 4 to 7 per cent of all discharges "reflected morbidity caused or exacerbated by inappropriate drug therapy (LeRoy and Morse, 1977, cited in Rucker in Morgan and Kagan, 1983:26). These figures were for the general population. Considering that the elderly take many more

drugs, we may conclude that they have a higher incidence of iatrogenic illnesses (conditions resulting from treatment, as either an unforeseen or inevitable side-effect). In fact, data indicate an unfavourable drug reaction in 11 to 21 per cent of hospital patients over 60 years of age (Berlinger and Spector, 1984:45).

Approximately 8 to 9 per cent of Canadians over 65 are institutionalized (Marshall, 1980). In nursing homes, the type of drug generally prescribed falls into the realm of long-term maintenance medications used to control chronic diseases (Thompson et al., 1984). Unfortunately, this drug therapy is often so "irrational" and so "irresponsible" that it creates new drug-induced illnesses (Brady in Kayne, 1978). In a three year nursing home study in the United States, the patients received an average of 6 drugs, and 20 per cent received a potentially interacting combination. Almost 10 per cent of the patients were receiving 12 or more drugs. In a Stanford study, 18 per cent of nursing home patients to whom drugs were administered were receiving 12 or more, and 30 per cent of these people had potential drug-drug interactions (Blaschke et al. in Jarvik, Greenblatt, and Harman, 1981).

In the acute care hospital at Stanford, 6 of the 25 most frequently occurring potential interactions involved psychotropic drugs. This was compared with a nursing home situation where nearly one half of the 25 potential

interactions involved psychotropics. This is consistent with data concerning acute care and chronic care, as well as drug utilization studies in aging patients (Blaschke et al. in Jarvik, Greenblatt, and Harman, 1981:22-23).

The Boston Collaborative Drug Surveillance Program (cited in Lander, 1978:47) studied causes of death for patients treated on the medical services of 21 acute disease hospitals in 7 countries. It was found that 0.9 deaths per 1,000 patients could be attributed to a drug or drugs administered during hospitalization. In another study of 1,252 admissions to the Yale University Medical Service of Grace-New Haven Community Hospital, one-half of the iatrogenic incidents recorded were adverse reactions to therapeutic drugs and involved 9.5 per cent of admissions (Lander, 1978:48). Brady (in Kayne, 1978) suggests that many of these problems occur as a result of a callousness which develops in the health care workers who must administer hundreds of drug doses a day. These workers often feel that the responsibility for the patient's progress lies in no way with themselves. Instead, they feel that the drug program and its results are the total responsibility of the physician. However logical this reasoning may seem, the fact remains that good patient care is in the hands of all health professionals who work in the care facility.

Responsibility for the health of institutionalized

elderly is a team effort divided among physicians, nurses and pharmacists. Increasingly, research is showing the benefits of using the skills and judgements of all members of this team, not just those of the doctors. "Surveys of physicians' prescribing habits in skilled nursing facilities indicate that patients are given many different numbers of drugs, often without the prescribing physician's apparent awareness of potential drug incompatibilities and therapeutic misadventures" (Thompson et al., 1984:154). In 1974, in the United States, a regulation was passed requiring care facilities receiving Medicaid funds to have a monthly review of patients' medications by a qualified pharmacist. The pharmacist then communicates his findings to the attending physician and the nursing staff. In a trial utilizing prescribing pharmacists for one group of patients and physicians prescribing for another group, the average number of drugs prescribed per patient was significantly lower for the pharmacist group. Their group also had statistically significantly better outcomes, including a lower mortality rate (Thompson et al., 1984).

Geriatric assessment units in the United States all show that in the elderly population discharged from acute tertiary care, there are 3 to 4 unrecognized problems that have not been identified, or if identified, have not been dealt with (Beck in Yaggy, 1984:133). This can be tied to an attitude of hospital staff members which was discerned

by Hoffman (in Coburn et al., 1981:294). She found that medical personnel involved in the care of stroke patients commonly felt that "nothing can be done" to help them. Stroke patients "were described at best as 'frustrating', and at worst, as 'gorks' ". Hoffman felt that professional and institutional goals fostered these attitudes of the hospital staff.

As mentioned earlier, a serious problem in nursing home patients is incontinence. This accounts for one-third of the cost of nursing home care in the United States (Beck in Yaggy, 1984:132). Beck surveyed a series of nursing homes in Los Angeles and reported that 40 to 50 per cent of the patients were incontinent. Yet most of them had not had a urinalysis and less than one per cent had had any appropriate urological investigation. In the same vein, a National Health Services Research survey in nursing homes in 1977, found that between 50 and 70 per cent of the residents were intellectually impaired. However, the majority had not had even the simplest testing procedures to establish who might have a reversible impairment such as an unrecognized depression (Beck in Yaggy, 1984:133).

Some patients in nursing homes just sit there like the sphinx and people think they are senile. But a lot are not senile. They are depressed and over-drugged...For ten cents a day you can keep a person tranquilized. It is much easier. But with the proper medication they can be brought out of their depression and live.

(Dr. David Lander cited in Baum, 1977:109)

### G. Summary

While our model of the drug interlock of the elderly is elaborate, we are really interested in testing the most central hypothesis within this model. Fully recognizing that each of the other variables in the model is very important for understanding the overall situation of the elderly population with respect to prescription drugs, the link between ageism and medical treatment is the one which will be specifically tested. In Chapter Three, the methodology will be described and the research hypotheses will be set out.

### CHAPTER THREE: METHODOLOGY

In order to discuss prescription drugs and the elderly, certain concepts must be used. These include the elderly, prescription drug plans and their populations, therapeutic drug classes, scripts, and milligrams per person. This chapter will provide operational definitions for these concepts, the specific hypotheses of the research, a description of the data, and the methods which were used to analyse the statistics.

#### I. THE DATA

The data to be used in this research are from the 1984 records of B.C. Pharmacare and were supplied by that department which is part of the Ministry of Human Resources (soon to become a department of the Ministry of Health). The data represent all prescriptions purchased by or for two groups of persons designated as Plan A and Plan B. Plan A services community-based elderly-- people aged 65 years and older, who are living independently in the community. Newcomers to B.C. over the age of 65 must establish residence for three months and may then apply for Pharmacare assistance. Plan B provides prescription drugs for patients in licensed long-term care facilities, referred to here as "nursing homes". The majority of these

people are aged 65 and older; however, no precise breakdown by age is available from Pharmacare. The total number of people eligible to use each plan in 1984 were: Plan A - 318,000 and Plan B - 19,500. The data are drawn from the period January 1, 1984 to December 31, 1984.

B.C Pharmacare does not provide information regarding drug use according to gender. Nor are the Plans subdivided into age groups, such as 65-69, 70-74 and 75-79.

The drugs purchased are divided into 22 groups of classified therapeutic agents. Within each group are listed the specific products. For instance, Antihistamines is the first therapeutic drug class. Within this division, Pharmacare places all prescription drugs purchased which fall into the antihistamine category. These would include products such as Tavist, Benadryl and Seldane. Each product may be mentioned more than one time according to the dosage strength and method of administration. As an example, Benadryl is cited in Plan A once as an elixir (12.5MG per 5ML) and again as a capsule (25MG each). For each product, the following information is also provided: the manufacturer; the therapeutic class; the total number of prescriptions purchased; the total cost of those prescriptions; the total quantity of units, e.g. 25MG capsules; the average price per unit, e.g. per 25MG capsule; and the average quantity of units per prescription, e.g. 58-25MG capsules on average per

prescription.

The therapeutic class may also be divided into families of drugs. The Autonomic Class contains six subdivisions: Autonomic Drugs, Cholinergic Agents, Anticholinergic Agents, Adrenergic Agents, Adrenergic Blocking Agents, and Skeletal Muscle Relaxants. The family group may be further subdivided into groups. Anticholinergic Agents contain Antiparkinsonian Agents and Antimuscarinics Antispasmodics. At the end of each major family and again at the end of each therapeutic class, totals are provided for prescriptions, cost, units, average price per unit, and average quantity per prescription.

## II. OPERATIONALIZATIONS

The term "elderly" refers to individuals aged 65 years and older. There is no differentiation between elderly male and elderly female.

As indicated above, Plan A refers to community-based, independently-living elderly. Plan B refers to the residents of nursing homes.

The statistics are for the whole province of British Columbia. The "total population" of each Plan is defined as the total number of people who are eligible to receive prescription drugs which are paid for by the provincial government. "Unique population" is operationally defined as the number of people within each Plan who actually received

prescriptions, during the period January 1 to June 30, 1985 -- not 1984. This unique population figure was not available for 1984, but was provided for the period stated and has been used occasionally in this study to provide some indication of what the "true" situation of prescription drug use may be.

Prescriptions are operationally referred to as "scripts" in accordance with Pharmacare's terminology. The data are for scripts filled, not scripts provided to patients, because there is no way of knowing if all prescriptions given out are actually taken to pharmacies to be filled. Furthermore, there is no information provided on whether the script is a new prescription or a refill.

Pharmacare provides data for 22 groups of classified therapeutic agents. Where the total scripts for any one therapeutic class were less than .50 per cent of the total scripts for the Plan, that class was not included. This was because the data were not sufficient to make significant comparisons with the other classes. Therefore, 14 therapeutic classes, rather than 22, were used.

The therapeutic classes are better understood when some information is given regarding their uses and effects. Therefore, what follows is a brief description of the 14 classes as explained in Bergersen and Goth (1973).

#### 1. Antihistamines

These drugs prevent histamines from reaching their sites of action within the body. A histamine which has been released, can provoke allergic reactions and troublesome side effects. The principal actions of histamines are: (a) contraction of smooth muscle; (b) dilation of capillaries; (c) promotion of gastric acid secretion; (d) noticeable dilation of the arterioles.

## 2. Anti-infectives

Anti-infectives generally fall into two categories: antiseptics, which are chemical agents that inhibit the growth and development of microorganisms, but may not necessarily kill them; and disinfectants, germicides and bactericides which produce rapid death of harmful microorganisms. This latter category includes antibiotics, agents used to inhibit or kill microorganisms, ideally without seriously damaging human cells.

## 3. Autonomic Agents

The autonomic nervous system automatically (involuntarily) regulates many physiologic tasks necessary to preserve a constant internal environment (homeostasis), emergency mechanisms, and repair. This includes digestion of a meal, heart rate, and pressure of circulating blood. Therefore, autonomic agents are prescribed to help this nervous system perform properly.

#### 4. Blood Formation and Coagulation Agents

Correct diet is usually sufficient to create proper conditions for blood formation, however, some disease states require treatment to bring about more rapid formation than diet alone will produce. Anemia is such a condition. Anticoagulents are important in preventing abnormal clotting within blood vessels which results in many deaths each year.

#### 5. Cardiovascular Agents

These drugs affect the heart and may change the rate, force and rhythm of the organ. For instance, the digitalis group of cardiovascular drugs are among the oldest and most effective therapeutic agents for the treatment of congestive heart failure.

#### 6. Vitamins

Vitamins are essential to maintain normal metabolic functioning, growth and health. Most must be ingested in food or as dietary supplements. Restricted diets or gastrointestinal disorders which impair absorption may cause a patient to require therapeutic doses of vitamins.

#### 7. Electrolytic, Caloric, Water Balance Agents

An imbalance in this system can occur due to

dehydration through excessive sweating, diarrhea, or vomiting, as well as the action of certain diseases such as diabetes. For instance, the use of diuretics which cause water loss, and, depending on the drug, potassium depletion, can create an imbalance. Potassium loss can also be due to certain metabolic diseases, kidney diseases or loss of gastrointestinal secretions rich in potassium. To correct such deficiency, potassium is administered to the patient.

#### 8. Antitussives, Expectorants, Mucolytes

Antitussives are used to relieve coughing, expectorants facilitate the expulsion of mucous secretions in the bronchi, and mucolytic agents reduce the thickness and stickiness of pulmonary secretions.

#### 9. Eye, Ear, Nose and Throat Preparations

Drugs in this therapeutic class are used to provide relief for conditions relating to eyes, ears, noses or throats. This would include various ointments, solutions, drops and tablets which perform as antibiotics, antivirals, anti-infectives, anti-inflammatory agents, contact lens solutions and vasoconstrictors.

#### 10. Gastrointestinal Medications

These drugs affect the digestive tract by acting on

smooth muscles and gland cells, and indirectly on the autonomic nervous system. They may increase or decrease function, tone, emptying time, peristaltic action of the stomach or bowel, relieve enzyme deficiency, counteract excess acidity or gas formation, produce or prevent vomiting, or act as diagnostic aids.

#### 11. Hormones, Synthetic Substitutes

Hormones are usually considered to be well-recognized and chemically specific products of endocrine glands, that have specific, well-defined physiologic effects on metabolism. Drugs in this class are used: (1) for replacement when a patient is lacking in a particular hormone (e.g. using insulin when treating diabetes); (2) to create a pharmacologic effect beyond the replacement norm (e.g. using large doses of adrenal steroids for anti-inflammatory effects).

#### 12. Skin, Mucous Membrane Agents

Drugs in this class are used to treat skin and mucous membrane reactions or disorders, such as itching, pain, tingling, blistering, or eruptions.

### 13. Smooth Muscle Relaxants

Pharmacare lists drugs used to relax smooth muscles in general, and in the genitourinary and respiratory areas in particular. Such medications relax muscles and stop spasming in areas such as the ureter, the colon or the bronchi.

### 14. Central Nervous System Drugs

The central nervous system is composed of the brain, the spinal cord and numerous cells called neurons. Skeletal or voluntary muscle control and brain functions such as reasoning and memory, are primary concerns of this system. Information from outside the body relating to things such as sight, sound, touch, smell and taste, and from inside the body, involving oxygen and carbon dioxide blood levels, muscle tension, and body temperature, is sent to the correct area of the central nervous system. This information is processed and appropriate cells or tissues are instructed to carry out specific actions. The cells and tissues then feed information about their actions, back into the central nervous system. This communication system allows the body to maintain control over its functions. Drugs affecting this system are used to increase or decrease the activity of nerve centers and conducting pathways. Stimulants and depressants of the brain, the spinal cord, or specific centers of each have been

developed.

Within the therapeutic class of Central Nervous System drugs, there are seven categories. Again, using Bergersen and Goth (1973), the categories are explained here.

(a) Analgesics and Antipyretics

These drugs relieve pain without producing loss of consciousness and reflex activity.

(b) Anticonvulsants

Medications in this category are used to treat various kinds of convulsive seizures such as epilepsy and psychomotor attacks. The aim of anticonvulsive drugs is to control seizures while causing a minimum of undesirable side effects.

(c) Psychotherapeutic Agents

These drugs are used to modify the behaviour state of the patient and enable him or her to interact with the environment in a more productive way. Antidepressants are used to treat depression and feelings such as worthlessness, inadequacy, hopelessness, guilt and suicidal tendencies. Minor Tranquilizers are used to treat moderate anxiety states and the muscle tension associated with psychomotor agitation. Major Tranquilizers are

antipsychotic agents used to treat mental illness. Their most important pharmacologic characteristics include an ability to calm aggressive, overactive, disturbed patients.

(d) Respiratory and Cerebral Stimulants

This class of drugs is used to treat disorders such as epilepsy, parkinsonism, minimal brain dysfunction, apathetic or withdrawn senile behaviour, obesity, or to stimulate respiration.

(e) Anxiolytics, Sedatives and Hypnotics

An anxiolytic agent helps reduce anxiety in a patient. A hypnotic produces sleep, and sedatives also soothe and relieve anxiety. Drugs in this class include the barbiturates and benzodiazepines which are used as sedatives and hypnotics. Other barbiturates and benzodiazepines are included in the Anticonvulsant category where they are used primarily to treat conditions related to this class of drugs. However, the barbiturates in this group have effects which vary from mild sedation to deep anesthesia, depending on the drug, how it is administered, the dosage and the reaction of the individual's nervous system. The benzodiazepines administered here are used to treat anxiety, tension and irritability.

(f) Antimanic Agents

These agents are used to treat manic and/or depressive episodes and are generally Lithium Carbonate derivatives. Lithium carbonate is extremely reactive and lithium therapy must be carefully controlled. The mechanism whereby lithium controls manic episodes is not yet known (Canadian Pharmaceutical Association, 1976: 413).

(g) General C.N.S.

This category contains a few items which have not been included by Pharmacare in the other six divisions.

### III. RESEARCH HYPOTHESES

The theoretical hypotheses stated earlier suggested that due to ageism and social control, the community-based and institutionalized elderly receive more prescription drugs than the general population. Now this general statement can be elaborated upon in a research context through the development of three testable hypotheses. Both Plans A and B represent people who are believed to be discriminated against and controlled by society due to their age, their illnesses or their inability to perform independently. The research hypotheses reflect this situation through the expectation that as ageism and social control increase, overprescribing will occur and those

persons in Plans A and B will receive a larger number of prescriptions per person than the general population. Prescriptions for these Plans will parallel the community-based elderly and the institutionalized elderly in Ontario and Saskatchewan. They will also increase with institutionalization.

#### Hypothesis A

Plans A and B will show a higher average number of prescriptions per person than the statistics indicate for the general population of the United States (these figures are not available for Canada).

#### Hypothesis B

Plans A and B prescriptions per person on average will parallel available statistics for the elderly of Ontario and Saskatchewan.

#### Hypothesis C

Within the B.C. Pharmacare system, Plan B (nursing home elderly) will have the highest average number of prescriptions per person.

#### IV. METHODS OF ANALYSIS

The purpose of this research has been of an investigative nature. Since relatively few studies of this type have been done in Canada, it has been important to begin laying a foundation of information about the exact nature of drug prescriptions for the elderly. This was accomplished by processing 242 pages of 1984 Pharmacare data, in several stages, using a computer spreadsheet program. Each stage was designed ultimately to aid in testing the hypotheses. Although the cost of Pharmacare is not integral to any of the hypotheses, it is an important adjunct to any discussion of prescription drugs due to the impact it makes on the total health care costs of the government. Therefore, as prescriptions were reviewed, so also were costs.

**Step One:** The research began with a review of the total prescriptions used by Plans A and B in 1984, and the cost of those drugs. This was broken down by Plan and then averaged on a per person basis. These figures were able to be compared to similar figures for the 1980 U.S. general population.

**Step Two:** After eliminating 8 therapeutic drug classes because of insufficient data (as mentioned earlier), 14 classes were analysed by total cost and by total

prescriptions filled for each Plan. The per cent differences between Plans A and B were calculated for each drug class, using Plan A figures as the base. The classes were ordered to establish which were prescribed most frequently.

Step Three: Again using 14 therapeutic drug classes, the total number of prescriptions per Plan was divided by the total and unique populations of each Plan to determine the average number of prescriptions filled per person. The same procedure was used for cost. The per cent difference between Plans was calculated using Plan A as the base.

Step Four: Having established the order of drug classes by frequency of use, Central Nervous System medications stood out as the most highly prescribed class for both Plans. Therefore, a decision was made to study the Central Nervous System Class in more detail. There are 7 drug categories within the class and these were reviewed by total prescriptions and total cost, and by prescriptions and cost per person, for each Plan. Both the total and unique populations were used to make this assessment.

Step Five: Narrowing the focus of investigation again, the C.N.S. categories of Psychotherapeutic Agents and Anxiolytics, Sedatives and Hypnotics were reviewed.

"Psychotherapeutic" Agents are divided by Pharmacare into the drug families of Antidepressants and Tranquilizers. The therapeutic category called "Anxiolytics, Sedatives and Hypnotics", contains the families of Barbiturates, Benzodiazepines and Miscellaneous Anxiolytics, Sedatives and Hypnotics. All medications listed for these families, where tablets or capsules had been prescribed and milligrams per capsule stated, were expanded upon. This was accomplished by multiplying the number of milligrams per unit (tablet or capsule) by the total number of units prescribed, giving the total milligrams of that medication. For all the medications in each family, the milligrams prescribed were added. In this way, the total number of prescribed milligrams of Antidepressants, Tranquilizers, Barbiturates, Benzodiazepines, and Miscellaneous Anxiolytics, Sedatives and Hypnotics, were determined for each Plan. The per cent difference between Plans was calculated using Plan A as the base.

Step Six: The next step of the research involved the calculation of how many milligrams had been prescribed per person for the total and unique populations in each Plan. The per cent difference between Plans was calculated using Plan A as the base.

Step Seven: At this point, the milligrams per person per

Plan were divided by 365 days, to calculate how many milligrams would be available for every individual each day of the year.

Step Eight: Having established a basis of comparison for B.C. statistics, it was possible to create tables using data from the Ontario Drug Benefit Plan and the 1976 Saskatchewan data. Prescriptions per Plan and per person were compared. In addition, a nine year comparison of drug use by the elderly population of B.C. (Plan A) was possible by using the 1984 statistics in a table with 1976/77 and 1980/81 data.

## CHAPTER FOUR: RESULTS

The results of this study are shown through a series of tables. Table 1 is used to compare the total number of prescriptions filled and the prescriptions per person, for five different populations. Data for the 1980 general population of the United States are used to provide a base figure for this comparison, since similar information is not available for Canada. However, Table 1 does provide prescription data for the population aged 35-54 in Saskatchewan in 1976, and for the elderly in Saskatchewan (1976), in Ontario (1984-85) and B.C. Plan A (1984) which are compared to the general population of the United States. On a per person basis, prescriptions filled in all categories, are higher than the U.S. figures.

The middle aged group, 35-54, in Saskatchewan is only 33.4 per cent higher than the general population of the U.S. However, a fairly large discrepancy is seen between the U.S. general population figures and the elderly, in all three provinces. The population aged 65+ in Saskatchewan showed a difference of +156 per cent when compared to the United States, while Ontario and B.C. showed a difference of +344.8 per cent and +161.4 per cent respectively. It is notable that the elderly population is almost twice as high as the middle-aged and almost the same as the 1984 figures for B.C. elderly. Internationally, over the last 25 years,

there has been an increase in prescribed medicines (Rabin and Bush, 1974). Therefore, it may be expected that the figures for the elderly in Saskatchewan would be higher now.

TABLE 1:  
THE TOTAL NUMBER OF PRESCRIPTIONS FILLED AND PRESCRIPTIONS PER PERSON FOR THE TOTAL POPULATION OF THE UNITED STATES (1980); FOR THE POPULATION OF SASKATCHEWAN AGED 35-54 (1976); AND FOR PEOPLE AGED 65+ IN SASKATCHEWAN (1976), IN ONTARIO (1984-85), AND IN B.C. (1984)

| VARIABLE   | 1980 U.S.             | 1976                   | POPULATION AGED 65+ |                    |                     |
|--|-----------------------|------------------------|---------------------|--------------------|---------------------|
|  | GENERAL<br>POPULATION | SASK.<br>AGED<br>35-54 | 1976<br>SASK.       | 1984-85<br>ONTARIO | 1984 B.C.<br>PLAN A |
| TOTAL<br>SCRIPTS   | 1.4<br>BILLION        | 792,557                | 1.0<br>MILLION      | 21.8<br>MILLION    | 4.1<br>MILLION      |
| SCRIPTS<br>PER PERSON  | 5                     | 6.67                   | 12.80               | 22.24              | 13.07               |
| PER CENT<br>DIFFERENCE<br>FROM U.S.<br>SCRIPTS<br>PER PERSON | 0<br>(BASE)           | +33.4%                 | +156%               | +344.8%            | +161.4%             |

SOURCE: MORGAN AND KAGAN (1983); ONTARIO MINISTRY OF HEALTH (1986); SKOLL, AUGUST AND JOHNSON (1979); B.C. PHARMACARE DATA (1984)

The number which stands out in this table is the 22.24 prescriptions per person for the Ontario elderly, which is a +344.8 per cent difference from the general population of the United States. It cannot be concluded that any number of prescriptions per elderly person is too many since we do not know the circumstances of each patient. However, unless there are significant differences in the elderly population across provinces, prescribing for this population must be based (in part) on some criteria other than need.

Table 2 uses the same figures for the general population of the United States as a base for comparing prescriptions for the nursing home populations of Ontario and B.C. The Ontario nursing home residents receive an average of 27.19 prescriptions per person which is not far from the number for community-based elderly. However, in B.C. the nursing home population receives an average of 51.27 prescriptions per person, a difference from the general population of the U.S. of +925.4 per cent. This is also much higher than the B.C. community-based population aged 65+, as well as the nursing home population of Ontario. The data in this table indicate that there may be a problem of overprescription among the nursing home elderly of B.C.

TABLE 2:  
 THE TOTAL NUMBER OF PRESCRIPTIONS FILLED AND  
 PRESCRIPTIONS PER PERSON FOR THE TOTAL POPULATION OF THE  
 UNITED STATES (1980) AND FOR THE INSTITUTIONALIZED ELDERLY  
 OF ONTARIO AND B.C.

| VARIABLE   | 1980 U.S.<br>GENERAL<br>POPULATION | 1984-85<br>ONTARIO<br>INST.<br>ELDERLY | 1984<br>B.C.<br>INST.<br>ELDERLY |
|--|------------------------------------|--|----------------------------------|
| TOTAL<br>SCRIPTS   | 1.4<br>BILLION                     | 388,261                                | 1.0<br>MILLION                   |
| SCRIPTS<br>PER PERSON  | 5                                  | 27.19                                  | 51.27                            |
| PER CENT<br>DIFFERENCE<br>FROM U.S.<br>SCRIPTS<br>PER PERSON | 0<br>(BASE)                        | +443.8%                                | +925.4%                          |

SOURCE: MORGAN AND KAGAN (1983); ONTARIO MINISTRY OF  
 HEALTH (1986); B.C. PHARMACARE DATA (1984)

Table 3 utilizes data from the B.C. study by Danforth (1982), expanding this five year comparison of drug usage by adding the relevant 1984 figures. This provides a nine year span of information on the prescriptions and related costs for Pharmacare's Plan A, or the community-based elderly aged 65 and older. Over the nine years from 1976 to 1984, there has been an increase of 53 per cent in the total number of prescriptions for Plan A. At the same time, the eligible population increased by only half that amount, or 28 per cent. Scripts increased on a per person basis by 20 per cent while the total cost for Plan A increased by 193 per cent. The greatest increase in prescribing occurred between 1980/81 and 1984, during a period when the eligible population and the cost increased the least.

The data in Table 4 are based on the 14 therapeutic drug classes in the B.C. Pharmacare Plan; in particular, the total number of prescriptions filled for each of Plans A and B are presented. For both Plans, the class of Central Nervous System drugs is the most highly prescribed. For the population aged 65+, Cardiovasculars place second, Electrolytics are third, Hormones are fourth, and Anti-infectives are fifth. For nursing home patients, Electrolytics are second, Gastrointestinal drugs are third, Cardiovasculars place fourth, and Hormones are fifth. The five most frequently prescribed classes are very similar for both Plans.

TABLE 3:  
A NINE YEAR COMPARISON OF DRUG USAGE IN B.C. FOR  
THE COMMUNITY-BASED POPULATION AGED 65+ (PLAN A)

| VARIABLE                      | PER CENT CHANGE |               |         |                   |                 |                 |
|-------------------------------|-----------------|---------------|---------|-------------------|-----------------|-----------------|
|                               | 1976-<br>1977   | 1980-<br>1981 | 1984    | '76/77<br>-'80/81 | '80/81<br>-1984 | '76/77<br>-1984 |
| TOTAL<br>SCRIPTS              | 2.7M            | 3.2M          | 4.1M    | +19               | +29             | +53             |
| TOTAL<br>PATIENTS<br>ELIGIBLE | 249,000         | 292,000       | 318,000 | +17               | +9              | +28             |
| TOTAL<br>COST                 | \$16M           | \$33.1M       | \$46.9M | +107              | +42             | +193            |
| SCRIPTS<br>PER PERSON         | 10.9            | 11            | 13.07   | +1                | +19             | +20             |

SOURCE: DANFORTH (1982); B.C. PHARMACARE DATA (1984)

TABLE 4:

PRESCRIPTIONS FILLED FOR EACH THERAPEUTIC  
DRUG CLASS, BY B.C. PHARMACARE PLAN

| THERAPEUTIC<br>DRUG CLASSES | PLAN A<br>65+ | PLAN B<br>NURSING<br>HOME |
|-----------------------------|---------------|---------------------------|
| ANTI-HISTAMINES             | 27,071        | 4,750                     |
| ANTI-INFECTIVES             | 259,076       | 31,630                    |
| AUTONOMIC                   | 159,502       | 36,748                    |
| BLOOD FORM./COAG.           | 36,003        | 19,086                    |
| CARDIOVASCULAR              | 790,067       | 116,186                   |
| CENTRAL NERV. SYST.         | 1,104,709     | 306,425                   |
| ELECTRO/CAL/WATER           | 566,196       | 157,520                   |
| ANTITUSS/EXPEC/MUCO         | 43,136        | 7,020                     |
| EYE/EAR/NOSE/THROAT         | 201,758       | 28,550                    |
| GASTROINTESTINAL            | 182,602       | 131,887                   |
| HORMONES/SYN. SUB.          | 308,186       | 45,260                    |
| SKIN/MUCOUS MEMB.           | 191,611       | 33,655                    |
| SMOOTH MUSC. RELAX.         | 68,978        | 10,290                    |
| VITAMINS                    | 33,597        | 29,879                    |

SOURCE: 1984 B.C. PHARMACARE DATA

In Table 5, the data for drug classes are taken a step further and broken down by prescriptions per person for each Plan. In addition, the per cent difference between Plans A and B are shown -- using Plan A as the base figure for comparison. The most significant figures on this table involve Central Nervous System drugs. For people aged 65+, the number of prescriptions per person is 3.47 compared to 15.71 for patients in nursing homes. This is a difference from Plan A of +352.74 per cent.

Although other drug classes show a high number of prescriptions per person for both classes, none are even close to C.N.S. drugs for the nursing home elderly. For most other areas, such as Blood Formation and Coagulation or Gastrointestinal drugs, it can be rationalized that chronic illnesses and diseases, which would be more prevalent in nursing home patients, account for the increase in prescribing. However, it is difficult to rationalize the necessity for this amount of C.N.S. drugs. In addition, the category of Vitamins shows a high increase for Plan B when compared to Plan A. Nursing home patients are prescribed +1290.91% more than the community-based elderly population.

In a recent newspaper column, Dr. Paul Donohue (1986) commented that not only are fat-soluble vitamins such as A, D, E and K considered to be dangerous because they are more easily stored in the body, but so now are the water-soluble

B and C, when taken in large quantities. For example, it is known that, in large amounts, B-6 can cause numbness, and vitamin C can have deleterious effects. Although he states that most people get sufficient amounts of vitamins from a reasonably balanced diet, he recognizes that: "Elderly people with less-than-ideal diets need supplements. So do people with illnesses that prevent their bodies from absorbing foods properly." It would seem more reasonable if doctors were prescribing vitamins to supplement the diets of community-based elderly who often do not eat properly for a variety of reasons, rather than prescribing considerably more highly for nursing home elderly whose meals are well planned and served regularly.

TABLE 5:  
THE NUMBER OF PRESCRIPTIONS PER PERSON FOR  
EACH DRUG CLASS, BASED ON TOTAL POPULATIONS  
OF B.C. PHARMACARE PLANS

| DRUG CLASSES           | PLAN<br>A<br>65+ | PLAN<br>B<br>NURS.<br>HOME | %<br>DIFF.<br>BETW.<br>A AND B |
|------------------------|------------------|----------------------------|--------------------------------|
| ANTI-HISTAMINES        | .09              | .24                        | +166.67                        |
| ANTI-INFECTIVES        | .81              | 1.62                       | +100.00                        |
| AUTONOMIC              | .50              | 1.88                       | +276.00                        |
| BLOOD FORM./COAG.      | .11              | .98                        | +790.91                        |
| CARDIOVASCULAR         | 2.48             | 5.96                       | +140.32                        |
| C.N.S.                 | 3.47             | 15.71                      | +352.74                        |
| ELECTRO/CAL/WATER      | 1.78             | 8.08                       | +353.93                        |
| ANTITUSS/EXPEC/MUCO    | .14              | .36                        | +157.14                        |
| EYE, EAR, NOSE, THROAT | .63              | 1.46                       | +131.75                        |
| GASTROINTESTINAL       | .57              | 6.76                       | +1085.97                       |
| HORMONES/SYN. SUB.     | .97              | 2.32                       | +139.18                        |
| SKIN/MUCOUS MEMB.      | .60              | 1.73                       | +188.33                        |
| SMOOTH MUSC. RELAX.    | .22              | .53                        | +140.91                        |
| VITAMINS               | .11              | 1.53                       | +1290.91                       |

SOURCE: 1984 B.C. PHARMACARE DATA

Table 6 is similar to Table 5 in that it also shows the number of prescriptions per person in each Plan. However, this average is based on the unique populations rather than the total. Unique populations are the numbers of people who actually received prescriptions in each Plan, but not for the 1984 period, on which the rest of this study is based. A unique population figure was not available for 1984, but had been discerned for the first six months of 1985. Granted, this figure is only a general reflection of the number of patients who would ultimately be the beneficiaries of drugs in any twelve-month period. It is used here to provide some indication of what the rates of prescription would be when based on a figure closer to the unique number of people receiving drugs, rather than the total population. This unique population base is used in only three of the tables as a method of attempting to establish a truer picture of drug use.

For the period January to June, 1985, the unique populations for Pharmacare were: Plan A, 256,206, and Plan B, 19,500. Because the population in nursing homes in 1984 and 1985 were virtually identical, the total population of 1984 was used. Therefore, Plan A shows a higher number of prescriptions on a per person basis when compared to nursing home patients. C.N.S. drugs remain very highly used by Plan B and Plan A increases in this category by less than one full prescription per person. Over all therapeutic

classes, Plan A scripts per person do not change significantly from what they were when based on the total population. However, because a slightly smaller base is represented in the "unique" as opposed to "total" populations, the per cent differences between Plans A and B are narrowed.

TABLE 6:  
THE NUMBER OF PRESCRIPTIONS PER PERSON FOR  
EACH DRUG CLASS, BASED ON UNIQUE POPULATIONS  
OF B.C. PHARMACARE PLANS

| DRUG CLASSES           | PLAN<br>A<br>65+ | PLAN<br>B<br>NURS.<br>HOME | %<br>DIFF.<br>BETW.<br>A AND B |
|------------------------|------------------|----------------------------|--------------------------------|
| ANTIHISTAMINES         | .11              | .24                        | +118.18                        |
| ANTI-INFECTIVES        | 1.01             | 1.62                       | +60.40                         |
| AUTONOMIC              | .62              | 1.88                       | +203.23                        |
| BLOOD FORM./COAG.      | .14              | .98                        | +600.00                        |
| CARDIOVASCULAR         | 3.08             | 5.96                       | +93.51                         |
| C.N.S.                 | 4.31             | 15.71                      | +264.50                        |
| ELECTRO/CAL/WATER      | 2.21             | 8.08                       | +265.61                        |
| ANTITUSS/EXPEC/MUCO    | .17              | .36                        | +111.77                        |
| EYE, EAR, NOSE, THROAT | .79              | 1.46                       | +84.81                         |
| GASTROINTESTINAL       | .71              | 6.76                       | +852.11                        |
| HORMONES/SYN. SUB.     | 1.20             | 2.32                       | +93.33                         |
| SKIN/MUCOUS MEMB.      | .75              | 1.73                       | +130.67                        |
| SMOOTH MUSC. RELAX.    | .27              | .53                        | +96.30                         |
| VITAMINS               | .13              | 1.53                       | +1076.92                       |

SOURCE: 1984 B.C. PHARMACARE DATA

Table 7 shows the cost of all the prescriptions filled for each therapeutic drug class, by Pharmacare Plan. The top five classes for each Plan are very similar. One difference between the number of prescriptions and the cost per Plan is that Central Nervous System drugs are not the top category by cost for both Plans. Plan A seniors have as their highest cost category, Cardiovascular drugs. Following this class, in order, are C.N.S., Electrolytics, Gastrointestinal drugs, and Hormones. For Plan B, C.N.S. drugs are the most costly and the next four categories are Gastrointestinal, Cardiovascular, Electrolytics, and Autonomic agents.

In Table 8, the total costs are broken down into costs per person for each Plan. In addition, the per cent differences between Plans A and B are shown -- using Plan A as the base figure for comparison. Cardiovascular drugs are the most costly on a per person basis for Plan A. Central Nervous System drugs are most costly for Plan B, at \$102.91 per person. These figures are based on the total populations of each Plan.

TABLE 7:

COST OF PRESCRIPTIONS FILLED FOR EACH  
THERAPEUTIC CLASS, BY B.C. PHARMACARE PLAN

| DRUG CLASSES        | PLAN<br>A<br>65+ | PLAN<br>B<br>NURS. HOME |
|---------------------|------------------|-------------------------|
| ANTI-HISTAMINES     | \$ 218,710       | \$ 24,771               |
| ANTI-INFECTIVES     | 1,456,061        | 184,099                 |
| AUTONOMIC           | 2,052,853        | 272,384                 |
| BLOOD FORM./COAG.   | 277,279          | 53,420                  |
| CARDIOVASCULAR      | 12,615,329       | 709,197                 |
| C.N.S.              | 11,009,680       | 2,006,654               |
| ELECTRO/CAL/WATER   | 4,093,498        | 515,123                 |
| ANTITUSS/EXPEC/MUCO | 261,745          | 26,087                  |
| EYE/EAR/NOSE/THROAT | 1,821,705        | 192,127                 |
| GASTROINTESTINAL    | 3,384,437        | 929,581                 |
| HORMONES/SYN. SUB.  | 2,382,302        | 184,868                 |
| SKIN/MUCOUS MEMB.   | 1,461,380        | 235,838                 |
| SMOOTH MUSC. RELAX. | 883,477          | 93,996                  |
| VITAMINS            | 160,834          | 74,786                  |

SOURCE: 1984 B.C. PHARMACARE DATA

TABLE 8:

COST OF PRESCRIPTIONS PER PERSON FOR EACH  
DRUG CLASS, BASED ON TOTAL POPULATIONS OF B.C.  
PHARMACARE PLANS

| DRUG CLASSES        | PLAN<br>A<br>65+ | PLAN<br>B<br>NURS.<br>HOME | %<br>DIFF.<br>BETW.<br>A AND B |
|---------------------|------------------|----------------------------|--------------------------------|
| ANTIHISTAMINES      | \$ .69           | \$ 1.27                    | + 84.06                        |
| ANTI-INFECTIVES     | 4.58             | 9.44                       | +106.11                        |
| AUTONOMIC           | 6.46             | 13.97                      | +116.25                        |
| BLOOD FORM./COAG.   | .87              | 2.74                       | +214.94                        |
| CARDIOVASCULAR      | 39.67            | 36.37                      | - 8.32                         |
| C.N.S.              | 34.62            | 102.91                     | +197.26                        |
| ELECTRO/CAL/WATER   | 12.87            | 26.42                      | +105.28                        |
| ANTITUSS/EXPEC/MUCO | .82              | 1.34                       | + 63.41                        |
| EYE/EAR/NOSE/THROAT | 5.73             | 9.85                       | + 71.90                        |
| GASTROINTESTINAL    | 10.64            | 47.67                      | +348.03                        |
| HORMONES/SYN. SUB.  | 7.49             | 9.48                       | + 26.57                        |
| SKIN/MUCOUS MEMB.   | 4.60             | 12.09                      | +162.83                        |
| SMOOTH MUSC. RELAX. | 2.78             | 4.82                       | + 73.38                        |
| VITAMINS            | .51              | 3.84                       | +652.94                        |

SOURCE: 1984 B.C. PHARMACARE DATA

Having observed that Central Nervous System drugs are highly prescribed for both Plans, this therapeutic class was emphasized in the next step of the research. Table 9 illustrates the results of the investigation into total prescriptions filled for each Plan. B.C. Pharmacare divides the C.N.S. class into seven categories. For both Plans, Analgesics and Antipyretics are the most highly prescribed, with a total of 630,545 prescriptions. For Plan A, the next most highly prescribed category is Anxiolytics, Sedatives and Hypnotics, with 436,552 prescriptions. The number two position for Plan B is held by Psychotherapeutics, while Anxiolytics, Sedatives and Hypnotics place third. Psychotherapeutics are in third spot for Plan A. Therefore, the same three categories are most commonly prescribed for both Plans, just in different orders. Plan A receives a total of 1,104,705 C.N.S. prescriptions, followed by Plan B with 306,425. The number of C.N.S. prescriptions received by both Plans totals just over 1.4 million.

TABLE 9:  
 PRESCRIPTIONS FILLED FOR CENTRAL NERVOUS  
 SYSTEM DRUGS, BY B.C. PHARMACARE PLAN

| CENTRAL NERVOUS<br>SYSTEM DRUG<br>CATEGORIES | PLAN<br>A<br>65+ | PLAN<br>B<br>NURS. HOME | TOTALS    |
|--|------------------|-------------------------|-----------|
| GENERAL C.N.S.                               | 67               | 328                     | 395       |
| ANALGESICS AND<br>ANTIPYRETICS               | 530,848          | 99,697                  | 630,545   |
| ANTICONVULSANTS                              | 30,878           | 21,685                  | 52,563    |
| PSYCHO-<br>THERAPEUTICS                      | 99,444           | 96,518                  | 195,962   |
| RESPIRATORY &<br>CEREBRAL STIM.              | 4,658            | 392                     | 5,050     |
| ANXIOLYTICS,<br>SED. & HYPNOT.               | 436,552          | 84,381                  | 525,983   |
| ANTIMANICS                                   | 2,258            | 3,424                   | 5,682     |
| TOTALS                                       | 1,104,705 *      | 306,425                 | 1,411,130 |

SOURCE: 1984 B.C. PHARMACARE DATA

\* NOTE: THE DIFFERENCE BETWEEN THE TOTAL SHOWN FOR PLAN A IN THIS TABLE AND THAT IN TABLE 4 IS FOUR PRESCRIPTIONS FOR DRUGS LISTED AS "UNKNOWN" IN THE PHARMACARE STATISTICS

TABLE 10:

THE NUMBER OF PRESCRIPTIONS PER PERSON FOR  
CENTRAL NERVOUS SYSTEM DRUGS, BASED ON TOTAL  
AND UNIQUE POPULATIONS OF B.C. PHARMACARE PLANS

| CENTRAL NERVOUS<br>SYSTEM DRUG<br>CATEGORIES | TOTAL POPULATION |           | UNIQUE POPULATION |           |
|--|------------------|-----------|-------------------|-----------|
|  | PLAN<br>A        | PLAN<br>B | PLAN<br>A         | PLAN<br>B |
| GENERAL C.N.S.                               | 0.00             | .02       | 0.00              | .02       |
| ANALGESICS AND<br>ANTIPYRETICS               | 1.67             | 5.11      | 2.07              | 5.11      |
| ANTICONVULSANTS                              | .10              | 1.11      | .12               | 1.11      |
| PSYCHO-<br>THERAPEUTICS                      | .31              | 4.95      | .39               | 4.95      |
| RESPIRATORY &<br>CEREBRAL STIM.              | .01              | .02       | .02               | .02       |
| ANXIOLYTICS,<br>SED. & HYPNOT.               | 1.37             | 4.33      | 1.70              | 4.33      |
| ANTIMANICS                                   | 0.00             | .18       | 0.00              | .18       |
| TOTALS                                       | 3.46             | 15.72     | 4.30              | 15.72     |

SOURCE: 1984 B.C. PHARMACARE DATA

The figures in Table 9 become more interpretable as they are translated into scripts per person in Table 10. Both total and unique populations are used to provide some basis of comparison. Of course, Plan B figures remain the same as they were in Table 8, since the total and unique populations are equal. Analgesics and Antipyretics are again, the highest category of C.N.S. drugs prescribed, with Psychotherapeutics and Anxiolytics, Sedatives and Hypnotics placing second or third, depending on which Plan is being discussed. In the area of Psychotherapeutics, the nursing home population, at 4.95 prescriptions per person, is much more highly prescribed for than Plan A with scripts amounting to .31 per person (total population). Again for Anxiolytics, Sedatives and Hypnotics, Plan B has the highest prescriptions per person at 4.33. However, Plan A is prescribed more highly in this case than in Psychotherapeutics, with 1.37 prescriptions per person for the total population.

In an attempt to be even more specific regarding the amount of C.N.S. drugs which are prescribed, Table 11 shows the total milligrams of Psychotherapeutic Agents and Anxiolytics, Sedatives and Hypnotics received by both Plans. These two categories were chosen from the seven C.N.S. groups in Tables 9 and 10 because their use appears to be very high and such use is coupled with potential risk for older patients. B.C. Pharmacare subdivides

Psychotherapeutics into two families of drugs: Antidepressants and Tranquilizers. The Anxiolytic, Sedative and Hypnotic category is subdivided into three families: Barbiturates, Benzodiazepines, and Miscellaneous Anxiolytics, Sedatives and Hypnotics. These five families are used in Table 11, to provide information on milligrams prescribed. In addition, the per cent difference between Plans A and B is shown -- using Plan A as the base figure for comparison. All milligram figures are in millions, except the final total for Plans A and B, which is in billions.

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TABLE 11:

TOTAL MILLIGRAMS PRESCRIBED OF SELECTED CENTRAL NERVOUS SYSTEM DRUG FAMILIES, BY PHARMACARE PLAN (MG ARE IN MILLIONS, UNLESS OTHERWISE INDICATED)

| CENTRAL NERVOUS SYSTEM DRUGS                     | PLAN A<br>65+ | PLAN B<br>NURS.<br>HOME | % DIFF.<br>BETW.<br>A AND B | TOTALS<br>PLANS<br>A AND B |
|--|---------------|-------------------------|-----------------------------|----------------------------|
| ANTIDEPRESSANTS                                  | 167.9         | 49.5                    | - 70.53                     | 217.4                      |
| TRANQUILIZERS                                    | 29.4          | 82.0                    | +178.86                     | 111.4                      |
| BARBITURATES                                     | 148.0         | 9.3                     | - 93.66                     | 157.3                      |
| BENZODIAZEPINES                                  | 144.8         | 21.1                    | - 85.42                     | 165.9                      |
| MISC. ANXIOLYTICS,<br>SEDATIVES AND<br>HYPNOTICS | 475.9         | 193.1                   | - 59.42                     | 669.0                      |
| TOTALS   | 966.2         | 355.1                   | - 63.24                     | 1.32B                      |

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SOURCE: 1984 B.C. PHARMACARE DATA

Plan A patients receive the highest number of milligrams in the area of Miscellaneous Anxiolytics, Sedatives and Hypnotics -- 475.9 million MG. Their second highest area of use is Antidepressants, at 167.9 million MG. Barbiturates are the third highest family of C.N.S. drugs prescribed for Plan A, followed by Benzodiazepines and, finally, Tranquilizers. In all of these areas except the last, Plan B is less in total number of MG prescribed, which should not be surprising since the population is smaller. However, in the subdivision of Tranquilizers, Plan B has a difference from Plan A of +178.86 per cent. Plans A and B receive 1.32 billion milligrams of these families of C.N.S. drugs. These figures do not include injections, suppositories or liquid medications which cannot be assessed accurately from the Pharmacare data, but which would add substantially to the amount of C.N.S. drugs being taken.

TABLE 12:  
 THE NUMBER OF MILLIGRAMS PRESCRIBED PER PERSON  
 FOR SELECTED CENTRAL NERVOUS SYSTEM DRUG FAMILIES,  
 BY PHARMACARE PLAN

| CENTRAL NERVOUS<br>SYSTEM DRUGS        | PLAN<br>A<br>65+ | PLAN<br>B<br>NUR.HOME | % DIFF.<br>BETW.<br>A & B |
|--|------------------|-----------------------|---------------------------|
| ANTIDEPRESSANTS                        | 528              | 2,539                 | +381                      |
| TRANQUILIZERS                          | 93               | 4,207                 | +4424                     |
| BARBITURATES                           | 466              | 482                   | +3                        |
| BENZODIAZEPINES                        | 456              | 1,083                 | +138                      |
| MISC. ANXIOLYTICS,<br>SED. AND HYPNOT. | 1,497            | 9,903                 | +562                      |
| TOTALS                                 | 3,039            | 18,213                | +499                      |

SOURCE: 1984 B.C. PHARMACARE DATA

Once again, the information in Table 11 is made more interpretable in Table 12, by calculating the number of milligrams of the five C.N.S. families, which are being prescribed per person for each Plan. In Table 11, Plan A appeared to be the most highly medicated group because of their higher population. In Table 12, it becomes apparent that Plan B is extremely highly medicated when compared with Plan A on a per person basis. Enough milligrams of these C.N.S. drugs are allotted to Plan B, to allow each and every patient to receive 2,539 MG of Antidepressants, 4,207 MG of Tranquilizers, 482 MG of Barbiturates, 1,083 MG of Benzodiazepines, and 9,903 MG of Miscellaneous Anxiolytics, Sedatives and Hypnotics, for a grand total of 18,213 MG during the year 1984. In the case of Tranquilizers, Plan B receives 4424 per cent more than Plan A. Plan A is prescribed a total of 3,039 MG.

In Table 13, the information from Table 12 is reduced a step further to show the number of milligrams available per person every day throughout the year. Both the total and unique populations are used to provide some basis of comparison. As shown previously, Plan B figures remain the same since the total and unique populations are equal. Once again, Plan B shows some startling results. There are enough milligrams prescribed to allow every person in a nursing home in B.C. to receive on a daily basis: 6.96 MG of Antidepressants, 11.53 MG of Tranquilizers, 1.32 MG of

Barbiturates, 2.97 MG of Benzodiazepines, and 27.13 MG of Miscellaneous Anxiolytics, Sedatives and Hypnotics, for a total of 49.90 MG. This total may be compared to 8.32 MG and 10.33 MG for Plan A's two population bases. The impact of the figures for Plan A is dwarfed by the enormity of Plan B's total.

TABLE 13:  
THE NUMBER OF MILLIGRAMS PRESCRIBED PER PERSON FOR  
SELECTED CENTRAL NERVOUS SYSTEM DRUG FAMILIES,  
CALCULATED ON A DAILY BASIS, BASED ON TOTAL AND UNIQUE  
POPULATIONS OF B.C. PHARMACARE PLANS.

| CENTRAL NERVOUS<br>SYSTEM DRUG<br>CATEGORIES | TOTAL POPULATIONS |           | UNIQUE POPULATIONS |           |
|--|-------------------|-----------|--------------------|-----------|
|  | PLAN<br>A         | PLAN<br>B | PLAN<br>A          | PLAN<br>B |
| ANTIDEPRESSANTS                              | 1.45              | 6.96      | 1.80               | 6.96      |
| TRANQUILIZERS                                | .25               | 11.53     | .32                | 11.53     |
| BARBITURATES                                 | 1.28              | 1.32      | 1.58               | 1.32      |
| BENZODIAZEPINES                              | 1.25              | 2.97      | 1.55               | 2.97      |
| MISC. ANXIOLYTICS<br>SED. & HYPNOTICS        | 4.10              | 27.13     | 5.09               | 27.13     |
| TOTALS                                       | 8.32              | 49.90     | 10.33              | 49.90     |

SOURCE: 1984 B.C. PHARMACARE DATA

Plan A shows an increase in the total milligrams prescribed for its unique population and available on a daily basis. Furthermore, the unique population receiving these prescriptions will not likely be taking the drugs each day for the whole year. When the number of people actually taking the drugs decreases along with the number of days per year during which the drugs are being consumed, the higher the total milligrams available per day becomes. Under these circumstances, Plan A would appear to be receiving a large number of milligrams on a daily per person basis. By comparison, with 50 milligrams of selected C.N.S. drugs available per person every day of the year, the patients in Plan B seem to be in an extremely serious situation.

## CHAPTER FIVE: DISCUSSION AND CONCLUSIONS

The purpose of this research was to examine the prescription drug situation of the elderly population of British Columbia. The literature reviewed in Chapter Two suggested that people aged 65 and older, in many countries, are being prescribed much more highly than the general populations. This combined with the physiological states which are specific to older individuals places the elderly at potential risk. It was expected that the elderly of B.C. would not be exceptions to what appears to be a universal model of drug prescription wherein they receive medications in number and volume in excess of what the rest of the population receives.

In this chapter, the relationship between the results of data analysis and the hypotheses stated in Chapter Three will be discussed. The data will then be interpreted in a broader framework, looking at their implications for the elderly population specifically, and society generally. The limitations of this study and suggestions for further research will also be presented.

## I. INDICATIONS OF THE DATA

Hypothesis A which predicted that Plans A and B would show a higher average number of prescriptions per person

than the statistics would indicate for the general population of the United States was supported in that Plan A showed an increase of 161.4 per cent over the 1980 U.S. population while Plan B was 925.4 per cent higher. Tables 1 and 2 provide evidence of this support.

Hypothesis B stated that prescriptions per person for Plans A and B would parallel available statistics for Ontario and Saskatchewan. This was supported when comparing the community-based elderly of Saskatchewan and B.C., because the B.C. population received less than one-half of one prescription more per person. The hypothesis was not supported when comparing B.C. and Ontario community-based or nursing home elderly. Ontario people aged 65+ received 9.17 more prescriptions per person than B.C.'s 65+ population. On the other hand, B.C.'s nursing home patients received 24.08 more prescriptions on a per person basis than did Ontario's nursing home population. Therefore, Hypothesis B received only modest support.

Based on the model showing ageism leading to higher drug prescribing in institutions, Hypothesis C suggested that the nursing home elderly would have the highest rate of prescriptions. This was supported by the data. However, it was not expected that there would be such a discrepancy between the two Plans. In every case and by every comparison, the nursing home elderly of B.C. appear to be very highly prescribed.

## II. INTERPRETATION OF THE RESULTS

It is difficult to interpret results which tend to reflect on certain professional responsibilities of a group within society. It is not possible to judge the use of prescriptions for chronic illnesses such as heart disease or gastrointestinal problems. Only the consulting doctor, the patient, and to some extent, nurses and pharmacists, are in positions to make such assessments. However, the statistics presented in this study do tend to support the concerns of many professionals, which are reflected time and time again in the relevant literature.

There are no absolute standards regarding what constitutes overprescription, although it is interesting to note that such standards are beginning to be described. In addition, we have no way of knowing through Pharmacare statistics, which patients receiving prescriptions do so as a result of need. However, the data indicate that community-based elderly in B.C. receive what is considered in the literature to be a high number of prescriptions. If that is a situation of concern, then the statistics would suggest that the nursing home elderly are receiving an extremely high volume of drugs. The data also indicate that, in all areas involving drugs given to treat chronic and acute illnesses, a hard look at prescribing habits is necessary.

Because Central Nervous System drugs are not highly disease-linked, there is an indication for a firmer line to be taken. As previously stated, although the prescribing of some categories of C.N.S. drugs is more easily understood, psychotherapeutic medications, sedatives and hypnotics are being given in quantities which strongly suggest the need for more study. The number of milligrams of drugs in all therapeutic classes other than the Central Nervous System is very large. When these milligrams are added to those of the C.N.S. therapeutic class, it would seem to create a situation fraught with risk. This applies to both Plans, but to the patients in nursing homes in particular. The problems involved with taking any psychotherapeutics, anxiolytics, sedatives or hypnotics were discussed in Chapter Two and have been well-documented in the literature. Physicians are cautioned to use these drugs in lower doses and with less frequency when prescribing for elderly patients. Medications in these categories have the potential to cause many side effects and harmful drug interactions.

Nursing home patients are often stereotyped as being senile, demented, confused and incompetent shells of human beings. The literature acknowledges that these people are frequently highly medicated to allow easier management by the staff. Furthermore, psychotherapeutic drugs often create symptoms of senile dementia which disappear when the

medications are stopped. Patients are frequently not tested to assess specific health problems which might be alleviated with different procedures. One of these health issues is incontinence which is not only serious and debilitating to the individual but expensive to the health care system as well (Davison in Cape, 1973; Knapp et al., 1984; McGinnis, 1986; O'Hara et al., 1981; Hodkinson, 1976). In addition, physician treatment in nursing homes is not always a consistent situation. This, too, can lead to a lack of proper assessment and medication.

During the last decade, society has been cautioned regarding the use of psychotherapeutic drugs, yet they are still being widely prescribed for the elderly population. Emergency room nurses, with whom the writer has spoken, are quick to identify the residents of nursing homes as patients often seen on an emergency basis as a result of drug overdoses. Particular nursing homes are commonly known to be the settings for these overdoses. Certain drugs which are contra-indicated for use in the elderly are frequently implicated.

When speculating about the high use of C.N.S. drugs, consideration must be given to the prescribing habits which create a high use of these medications. Is this the result of reflex prescribing where not enough time is spent assessing the patient's total situation? Is there not sufficient understanding of the emotional needs of elderly

people as they strive to cope with the psychological effects of increasing age, the debilitating effects of chronic illnesses, bereavement, widowhood, loss of friends, the ageism rampant in our society, changes in finances and living arrangements, and a variety of family situations? Do physicians take all these factors into consideration before they provide medication? Are they in touch with support groups and services which they can recommend to patients and their families? Are families providing the necessary support by being understanding and informed, keeping track of the medications being taken by elderly family members, encouraging them to become involved in support groups, and not hesitating to discuss problems with physicians? And is society, as a whole, showing the necessary interest and taking the required responsibility to monitor the medical welfare of its older citizens? If, as suggested by the literature, we have reached a provider-consumer relationship with our physicians, then concomitantly, the admonition "caveat emptore" must be applied. If society insists upon pampering itself with pills and pressuring physicians to provide solutions for every ailment, then society must also take some responsibility for how and to whom these drugs are supplied.

The cost of universal medical care has become a serious concern for many professionals, in and out of the government. Recently, Dr. Gerry Karr, out-going president

of the B.C. Medical Association, voiced this concern (Mullens, 1986). He stated that the present method of funding the ever-rising cost of health care is not sufficient. His solution was to create a deductible system of payment by the patient whereby an individual would pay the health care premium as well as a fee whenever the health system is used. Patients would be reimbursed by the government for all costs after the deductible had been paid (Mullens, 1986). The results of this study indicate that it may be possible to save a considerable amount of money in the realm of drug prescription alone if a concerted effort were to be made.

The significance of the results must also be placed into the context of ageism and the medicalization of the elderly. Society condones attitudes of avoidance and victimization, legally and morally institutionalizing ageism. The elderly are stereotyped as senile, non-productive, unhealthy and dependent. As citizens who look and behave in ways which violate the norms of society, they are classed and treated as deviants.

Society has encouraged one of its arms of control, the institution of medicine, to perform certain activities in response to this defined deviance. These activities include prescribing drugs, particularly those affecting the Central Nervous System, placing the elderly in institutions, and non-treatment. Institutionalization and psychomedication

are commonly used to control other forms of deviant behaviour, and it can be seen that their uses go hand-in-hand when treating the elderly. This medicalization is made particularly easy because of the era in which the elderly have lived and the respect with which they view the medical profession.

### III. LIMITATIONS AND IMPLICATIONS

A much more specific and accurate picture of the prescription drug situation of the elderly in B.C. could be made if additional data and information were available. It would be helpful to be able to differentiate between male and female use of drugs. Differentiating age groups within each Plan would also allow for better comparisons, and provide an indication as to the health status of people as they move from age category 65 to 74, into 75 to 84, and 85+.

The number of people actually receiving the drugs -- the unique population of each Plan -- is of considerable importance for accurate assessment. This would be of further benefit if the unique number of people receiving each drug prescribed, and in what amounts, were known. Pharmacare has begun to put together this information, and it is to be hoped that it will soon be available for a full

twelve-month period.

As previously indicated, this study does not allow for any assessment regarding the need for the medications. There is no available guideline to determine what constitutes over-prescription. Therefore, all assumptions must be made using the weight of accumulated professional literature, limited existing comparisons with data from other studies, and a common-sense approach. Without knowing intimately each and every individual circumstance of drug prescribing, specific criticisms cannot be levelled. However, this does not prevent us from using the available statistics to piece together a picture which demands further attention and study.

Two very important issues which affect the situation of the elderly, particularly those who are not institutionalized, are the use of over-the-counter medications and the use and abuse of alcohol. These two areas account for a large proportion of the total use of drugs, not only by the elderly, but by the general population as well. For older people, over-the-counter medications and alcohol confound an already serious situation of drug use. Although an understanding of the implications and use of over-the-counter medications and alcohol is extremely important, each area must be the subject of its own investigation. Therefore, it was decided initially to concentrate solely on prescription drugs

during this study.

Using this Pharmacare data, several areas may still be researched. These include the specific, brand-name drugs being taken and at what cost, in what amounts, and produced by which companies. In light of the pending legislation involving the pharmaceutical industry and generic drugs, this could provide an important view of the situation.

Further study is needed using data showing the unique population and their consumption of specific medications. Up-to-date information is needed for prescription drugs and the elderly populations in every province in Canada. In addition, research into medication use by the general population of the country, as well as province by province, is required. Such studies would supply a much needed basis for comparison. The Pharmaceutical Manufacturers Association in the United States puts together an annual factbook supplying many statistics regarding drug use and cost. However, a similar association in Canada does not publish a comparable document.

There have been many studies into prescription and over-the-counter drug use of community-based elderly. They have investigated problems of compliance, whether individuals understand the purposes of their medications, how drugs are stored, if they are traded or swapped, how frequently patients visit their physicians and have their medications reviewed, and what professional people are

available for consultation when problems arise. In addition, studies have focussed on drug prescribing for the institutionalized elderly. Such research could, and should, be replicated and expanded upon in Canada.

This study was prompted by a growing awareness and concern regarding the number and variety of drugs being given to older people, and subsequently ingested by them, frequently with less than optimum results. Elderly people with whom the problem was discussed exhibited an amazing tolerance of the situation. Although, without exception, each individual had a frightening tale to tell involving a personal drug misadventure, or the experience of a friend, there appeared to be more acceptance than indignation.

The people who comprise our elderly population today have experienced and observed many changes in society. Not the least of these has been the elevation of the physician from simple country doctor to practicing scientist whose authority should be respected, trusted and not questioned. It is, therefore, very difficult for older people to voice objections to treatment which they do not understand, which does not make them feel well, or with which they disagree. It is often easier for seniors just to stop following the prescribed treatment or medication than to discuss the situation with their doctors. This, of course, can lead to non-compliance and drug misadventures when a prescription

is involved.

Therefore, if the senior members of society cannot or will not address potential prescription drug problems, it is a situation calling for advocacy on their behalf. Such advocacy must be based on a foundation of research and reliable data. The purpose of this study has been to provide some of these foundation blocks. Further Canadian research will shed more light on the need for advocacy in this area of prescription drugs and the elderly, and the methods by which it may be accomplished.

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