

AN ABSTRACT OF THE THESIS OF

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Title: THE IDENTIFICATION OF MEDICINE EDUCATION LEARNING OUTCOMES  
FOR AMBULATORY, NON-INSTITUTIONALIZED OLDER ADULTS

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Dr. John K. Ellis

The primary purpose of this study was the identification of specific medicine education learning outcomes which are important and appropriate for ambulatory, non-institutionalized older adults.

A modification of the Delphi technique was utilized and a panel of 16 national experts was selected on the basis of four criteria to respond to two rounds of a questionnaire. Professions represented on the expert panel included three medical doctors, eight pharmacists and/or pharmacologists, four geriatric nurses and one biological gerontologist. Panel members were asked to indicate their level of agreement or disagreement on a six-point scale regarding the appropriateness and importance of specific medicine education learning outcomes for inclusion in a medicine education program designed expressly for older adults. The six-point scale was assigned numerical values of one through six, where one represented "Strongly Disagree" and six, "Strongly Agree." Experts were also asked to make modifications of, and additions to, the original outcomes submitted for their judgment.

The specific learning outcomes were grouped under one of the following seven general instructional objectives to which they relate: 1) understands fundamental principles of aging; 2) knows common drug terms; 3) understands fundamental concepts concerning drugs; 4) recognizes that each drug has risks as well as benefits; 5) understands the older adult is vulnerable to problems with drugs; 6) recognizes the importance of being an activated patient; and 7) comprehends older adults are susceptible to fraudulent health practices. Gronlund's scheme was used for developing the general instructional objectives and the respective specific learning outcomes which must be demonstrated by the learner to determine whether or not a given objective has been achieved.

The mean and the percentage agreement index were calculated for each specific learning outcome. Those which had both a mean of 4.80 or above and a "Strongly Agree" or "Agree" rating by a minimum of 75 percent of the expert panelists (percentage agreement index) were considered to have reached consensus. The first questionnaire presented 123 specific learning outcomes. The experts' recommendations for modifications and additions obtained in the first round of questioning were utilized to construct round two of the questionnaire which consisted of 11 additional and 18 modified specific learning outcomes.

Utilizing the criteria for consensus established for this study, a total of 119 (86.8%) of the specific learning outcomes submitted on two rounds of the questionnaire reached consensus, with approximately one-third (31%) of these reaching a consensus rating of 100% as defined by this study.

The modified Delphi technique proved useful as a research method by affording the experts the opportunity to modify, or to add to, the specific learning outcomes submitted in the first round of the questionnaire. This procedure resulted in a greater number of specific learning outcomes reaching consensus as well as an increased level of agreement for those outcomes which were modified to incorporate the recommendations of the experts.

The 119 specific medicine education learning outcomes identified in this study can be utilized: 1) as a basis for the development of a complete medicine education program for older adults by establishing guidelines for the selection of appropriate content, methods, materials and evaluation procedures; 2) in the academic preparation and inservice education of professionals who are involved in maintaining and promoting the health of older adults; and 3) as guidelines for the preparation of educational materials for the safe and effective use of medicines by the elderly.

In view of the relative paucity of medicine education programs for older adults, notwithstanding the empirically substantiated need for such programs, the relevance and timeliness of this study are apparent.

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THE IDENTIFICATION OF MEDICINE EDUCATION  
LEARNING OUTCOMES FOR AMBULATORY, NON-  
INSTITUTIONALIZED OLDER ADULTS

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## THE IDENTIFICATION OF MEDICINE EDUCATION LEARNING OUTCOMES FOR AMBULATORY, NON-INSTITUTIONALIZED OLDER ADULTS

### I. INTRODUCTION

From cradle to grave, mankind's existence in the civilized world is increasingly characterized by expanded contact, exposure and the use of drugs and chemicals of all kinds. Asimov states:

Man now has at his disposal all sorts of synthetics of great potential use and misuse: explosives, poison gases, insecticides, weed-killers, antiseptics, disinfectants, detergents, drugs - almost no end of them (5, p. 500).

This lifelong propinquity between man and drugs begins prior to one's birth. When a pregnant woman contacts and consumes a drug of any kind, whether it be in the food she ingests, the air she breathes, or the manufactured formulations prescribed by her physicians, her child will receive at least part of that drug (131).

The susceptibility of the developing fetus to the exposure of drugs was painfully brought to the world's attention by the Thalidomide disaster of the late 1950's. Shortly after it was introduced there appeared to be an increase in the number of infants born with phocomelia, a defective development of the arms or legs, or both, resembling the flippers of a seal. It was not until 1961 that researchers, working at the University Pediatric Clinic in Hamburg, reported the association between phocomelia infants and mothers receiving Thalidomide (56).

At the opposite end of the life continuum are the aged, the fastest growing segment of the population. The number of elderly in the United States aged 65 and over has increased dramatically since the turn of the century. Between the years 1900 and 1974, the number of the elderly increased from three million to 22 million while the percentage of the U.S. population aged 65 and over more than doubled, from 4.1 percent in 1900 to 10.3 percent in 1974 (185).

In addition to being the fastest growing segment of the population, the elderly are also the greatest consumers of drugs. While individuals 65 years of age and older represent one-tenth of the population, one out of every four prescriptions written in this country today are for them, compared to one out of five in 1965 (196). This disclosure is disturbing in the light of the fact that there exists a vast interplay of age-related variables working together, as well as in isolation, to contribute to the increased vulnerability of the aged drug consumer to problems with his/her medicines.

### Origins of the Problem

The necessity of developing and implementing medicine education programs for the community-dwelling, older adult received much needed notoriety in June of 1975. At this time the National Institute on Drug Abuse sponsored a conference titled, "Drug Use and the Elderly: Perspectives and Issues." This conference served as a forum for the presentation of various perspectives and relevant issues related to the area of drug use and the elderly.



The conference participants consisted of consultants and researchers who have interests in drug problems among the elderly, academicians and researchers in the field of gerontology, representatives of organizations that serve the older population, as well as practitioners and representatives of concerned professional groups.

The dialog stimulated by the conference presentations and discussions resulted in the formulation of five specific recommendations, one of which pertains specifically to this research. It states:

Programs must be developed simultaneously for both health care providers and consumers. There is an immediate need for specialized manuals that provide treatment models reflecting the unique requirements of the elderly. Consumer education among the aged should be initiated immediately. Specialized information should be made available in pamphlets and other media to foster development of healthy perspectives on medical care and the use of drugs (134, p. 5).

The vulnerability of the older adult to problems with medicines is a profoundly multi-dimensional problem that involves the intimate interaction of many physiological, sociological and psychological parameters associated with the aging process. However, the crux of the problem specifically involves the interassociation of three age-related variables: polymorbidity; polymedicine; and polypharmacy.

Modern science and technology have provided mankind with the tools and the knowledge to extend life expectancy. With the advent of antibiotics in the middlepart of the century, medicine was virtually capable of eradicating many of the infectious childhood diseases that have plagued mankind since the beginning of time. This medical intervention effectuated a lowering of the infant mortality rate which, in

turn, has made it possible for more and more individuals to reach old age (38). A child born in 1900 could be expected to live an average of 47 years, whereas a child born in 1973 could expect to live an average of 71 years (185).

As an individual ages, his capacity to withstand stress of any kind, be it chemical, physical, mental or social, decreases dramatically. Declining resistance to stress in the form of disease is one of the most characteristic features of an aging population (96, p. 119). With advanced age one's immune response appears to diminish and the individual's susceptibility to chronic and degenerative disease increases (6).

#### Polymorbidity

It appears that older people suffer disproportionately more than do younger age groups from multiple chronic disease states, a condition defined as polymorbidity. While it is true that aging in and of itself is not a disease, it is, however, an invitation to disease. Approximately 86 percent of the elderly reportedly suffer from one or more chronic diseases or conditions, compared with only 40 percent of those individuals under the age of 65 (71).

Since many of these chronic conditions can be relieved or controlled by medicines, the increased incidence in protracted illness among the aged is often accompanied by simultaneous and concomitant utilization of many drugs on a routine and long-term basis (111).

## Polymedicine

The age of medical specialization is upon us and, as a consequence of polymorbidity, many elderly find themselves dissected by their symptoms (64). The small number of general practitioners reflects the public's specialist-oriented viewpoint (35). This prosecution effectuates coinstantaneous and fragmented health care, including the prescribing of medicines from a variety of different physicians in different health-care facilities. The problem of overprescription of drugs by health care providers, and overutilization by the elderly themselves, can result from inadequate monitoring and coordinating of drug therapies prescribed by several different practitioners treating the same individual simultaneously (48).

## Polypharmacy

The elderly constitute 10 percent of the population in the United States, yet they consume 25 percent of the prescribed drugs (111). According to the Task Force on Prescription Drugs (177), the average number of prescriptions acquired per family in the United States in 1965 was 4.7; whereas the elderly made 9.7 such acquisitions. Drugs constitute the largest personal health expenditure of the elderly, accounting for approximately 20 percent of their out-of-pocket health expenditures (88).

In summary, it should be emphasized that older adults are vulnerable to problems with medicines due to a myriad of physio-

logical, psychological and sociological variables which are further complicated through the interaction of polymorbidity, polymedicine and polypharmacy.

### Need for this Study

The need for medicine education among older adults can be exemplified by the fact that American society tends to be overly reliant on medicines, with the elderly being disproportionate consumers of these medicines.

The practicing physician today has an arsenal of therapeutic agents available to him/her which includes over 1,200 generally available drugs and an additional 6,000 drug combinations (176). Accompanying this tremendous variety of drugs is the finding that the overall number of prescriptions purchased annually is increasing, with the proportion of those obtained by the elderly rising at an even faster rate than that of the general population (71). This finding is extremely noteworthy in view of the fact that geriatric patients are particularly vulnerable to adverse drug reactions and interactions.

The evidence from epidemiologic studies verifies that the chance of encountering an adverse drug reaction or interaction markedly increases as the number of drugs administered to a patient increases (18). The rate of elderly patients who experience adverse reactions to drugs is far greater than the rate seen in younger patients (102).

In testimony before the House Select Committee on Narcotics Abuse and Control in May of 1978, it was revealed that hospital admissions for drug reactions were 40 percent higher among those over age 65 than among the 19-65 age bracket (112).

Addressing joint hearings held by the Senate Subcommittee on Alcoholism and Narcotics and the Senate Subcommittee on Aging, Isbiter reported that our national preoccupation with indiscriminate use of illegal drugs has overshadowed the greatest area of drug abuse and misuse, that being the abuse and misuse of prescription and non-prescription drugs by the elderly (108).

Many studies point to the severity and frequency of medication errors among elderly, non-institutionalized adults (159, 172, 104). Serious medication errors may have significant life-threatening consequences on the older drug user. Deuschle (46) observed that more and more the responsibility for the treatment of disease is being shifted from doctor and nurse to the patient, and that the success of such ambulatory or home health care programs depends upon the physician's ability to accurately ascertain those patients who will, and those patients who will not, take medication as prescribed. Although physicians need to be made more aware of drug problems, there is perhaps a greater need to educate patients about responsible drug use (48).

As more emphasis is placed on the importance of the patient's assuming more responsibility for his health care, it is imperative to design health and medicine education programs to aid the patient

in taking charge of this added responsibility. Sehnert (160) summarizes the importance of this concept in the following quote by health economist, Ginzberg:

Programming the American people to do much more about their own health would be a lot more economical and effective in easing the demands on physicians than producing more of them. Patients themselves are an immense, untapped health manpower resource . . . Unless laymen can be trained to deal with early symptomology - and many ailments require no more than for a citizen of ordinary intelligence to do some very ordinary things - we'll never have enough physicians (160, p. 7).

While attention has been called to the need for educating older adults about drugs and their correct use, no systematic approach has been taken to develop a medicine education curriculum designed expressly for this age group. Basic to such curriculum development is the formulation of general instructional objectives described in terms of specific learning outcomes geared to the idiosyncrasies and exigencies of the elderly.

#### Statement of the Problem

The primary purpose of this investigation was to identify specific medicine education learning outcomes for ambulatory, non-institutionalized older adults. Such learning outcomes would serve as a template for the development of a complete medicine education program that would convey the intent of instruction, provide a guide for selecting subject matter, teaching methods and materials and evaluative instruments.

### Method of Attacking the Problem

A modification of the Delphi survey method was utilized in which two rounds of a questionnaire instrument comprised of specific medicine education learning outcomes were sent to a national expert panel of jurors consisting of 16 individuals representing the disciplines of medicine, pharmacy, nursing and gerontology. These experts were asked to independently rate each of the specific learning outcomes on a six-point, weighted scale relative to their importance for inclusion in a medicine education program for ambulatory, non-institutionalized older adults. A weighted mean value and a percentage agreement index were used to determine which of the specific learning outcomes reached consensus of the expert panel.

### Limitations of this Study

This study is limited:

- 1) To the identification of specific medicine education learning outcomes for ambulatory, non-institutionalized older adults, and is not to be subjected to field testing.
- 2) In that, currently, there is no well-developed and universally accepted theory for curriculum construction.
- 3) By the paucity of research dealing with conceiving and organizing curriculum components designed expressly for older adults.

- 4) To the extent of the usefulness of the Delphi technique as a method for eliciting expert opinion.
- 5) By the judgments of the participants in this study.
- 6) In that the identified, specific medicine education learning outcomes will serve only as a guideline for the development of specific medicine education programs for older adults.

#### Basic Assumptions of this Study

The basic assumptions of this study are as follows:

- 1) Specific medicine education learning outcomes for ambulatory, non-institutionalized older adults can be identified.
- 2) A modification of the Delphi technique can be utilized to determine a consensus regarding specific medicine education learning outcomes.
- 3) Individuals with expertise in drugs, medicine and aging whose judgments are reliable can be identified. The Delphi method has been shown to be more accurate in forecasting future developments than a random survey method (184).
- 4) The majority of the original participants will complete this study.
- 5) The judgments of the expert panel will be representative of the disciplines germane to this study.



### Definition of Terms

Specific terms important to this study are defined as follows:

- 1) Activated patient: A patient who has assumed a greater responsibility than is usually the case for his/her own health care by learning about his/her body and his/her medications, as well as the importance of actively communicating with all his/her health care practitioners.
- 2) Ambulatory, non-institutionalized older adult: an individual, over 60 years of age, who lives independently in the community.
- 3) Behavioral objective: an objective which describes a performance an instructor wants learners to be able to exhibit before he/she considers them competent.
- 4) Consumer: an individual who procures a product or a service.
- 5) Consumer health: refers to decisions about the purchase and use of health products and health services available in society.
- 6) Curriculum: a plan for the education of learners consisting of behavioral objectives, course content, learning experiences and evaluation procedures.
- 7) Delphi technique: a method developed by the Rand Corporation to circumvent problems associated with committees reaching consensus. The technique makes use of an expert panel of jurors and a series of questionnaires with controlled feedback as a method for reaching consensus without face-to-face confrontation.
- 8) Drug: any substance, including food, which, when taken into the body, alters the morphology or function of the organism.
- 9) General instructional objective: an objective which conveys the intent of instruction and, in general terms, describes the types of performances (i.e., knowledge and intellectual abilities and skills) older adults would be expected to demonstrate upon completion of a medicine education program.

- 10) Learning experience: the means which will help the learner achieve the behavioral objective.
- 11) Magic bullet concept: the misconception that a drug is selectively distributed to a very small area of the body without contacting the rest of the body.
- 12) Mean value: is a measure of central tendency and is commonly understood as the arithmetic average.
- 13) Medication error: a complex situation in which the patient takes his medicine in an inappropriate manner.
- 14) Patient compliance: refers to the ability of a patient to accurately follow instructions in a therapeutic regimen designed by a medical practitioner.
- 15) Patient education: educational interventions designed to acquaint patients with various aspects of their condition in order to upgrade the quality of health care.
- 16) Percentage agreement index: the percentage of respondents marking the category "Agree" (5) or "Strongly Agree" (6).
- 17) Polymedicine: refers to receiving coinstantaneous health care from a variety of physicians.
- 18) Polymorbidity: a condition characterized by multiple, chronic diseases.
- 19) Polypharmacy: concomitant administration of a variety of medicines.
- 20) Specific learning outcomes: representative samples of the specific types of behaviors to be used as evidence that the general instructional objective has been achieved by the older adult at the completion of the medicine education program. In other words, specific learning outcomes describe the types of behaviors that older adults would be expected to demonstrate indicating they have satisfactorily achieved the general instructional goals.

## II. REVIEW OF RELATED LITERATURE

The complex issue of drugs and the elderly has only recently begun to receive attention. As a result, there is a dearth of information concerning the development and organization of medicine education programs for older adults. Nevertheless, there is much information available concerning some of the many contributing dimensions of the problem. For the purpose of this study, the review of literature is limited to an examination of the following dimensions of this problem: 1) the aging process and its relationship to disease; 2) reasons for increased incidence of disease; 3) overview of drugs; 4) the aging process and its relationship to drug response; 5) patient compliance and medication errors; 6) adverse drug reactions; 7) activated patient; 8) patient education; 9) learning and aging; 10) teaching the older adult; and 11) behavioral objectives as a basis for curriculum development.

### Introduction

Historically speaking, the recent societal emphasis on drug abuse originated in the drug abuse epidemic of the late 1960's.

Louria states that:

One thing is clear: drug abuse in the United States is increasing at an extraordinary rate. In recent years shibboleth-minded politicians have labeled our society The Affluent Society,

The Great Society, and The New Frontier. As we move into the 1970's it appears that a more appropriate title would be The Intoxicated Society (115, p. 5).

Society's reaction to the drug abuse crisis has been to develop and implement prevention and rehabilitation strategies primarily aimed at the young. When one mentions drug abuse, most individuals envision the youth of the nation misusing drugs in search of a "high" (191). Notwithstanding, there is growing concern about the utilization of drugs by the elderly since they use more drugs than any other age group in our population (101).

The elderly constitute 11 percent of the total population in the United States, yet they consume in excess of 25 percent of all prescription drugs and probably an equal proportion of non-prescription drugs (111). This finding is quite disturbing in view of the fact that aged adults are extremely vulnerable to drug misuse problems. It is becoming more evident that a significant problem exists with the use of drugs by the elderly (71).

Increased concern for the aged and a growing awareness of drug-related problems among those over 65 led the National Institute on Drug Abuse to sponsor a conference on drug use and the elderly. This conference, "Drug Use and the Elderly: Perspectives and Issues" (134), provided a forum for the exchange of dialog among knowledgeable people working in the fields of drug abuse and gerontology. The viewpoints expressed by the speakers and conferees pointed out the complexity of the problem. Some participants cited over-prescription of drugs by health care providers and overutilization

of drugs by the elderly themselves as major contributing factors to the problem. According to this view some of the conferees concluded that:

...many of the aged are highly dependent on a variety of medications, both prescription and over-the-counter (OTC), and professionals in the health care system rely too heavily on drugs for the treatment of geriatric patients. Over-utilization also can result from poorly coordinated drug therapies prescribed by several different doctors treating an individual and from a lack of prescription monitoring (134, p. 1).

However, other conferees believed that drugs were underused instead of overused by some elderly. It was thought that economic, social and physical constraints were responsible for preventing some elderly populations from obtaining adequate medication. Conferees subscribing to this point of view concluded that:

People over 65 frequently take drugs improperly, are not able to afford many needed medications, may have difficulty in opening containers, or due to a lack of transportation do not have access to health care facilities (134, p. 1).

Whether it is overutilization or underutilization, disastrous consequences can occur when drugs are used improperly. No one can deny the necessity and value of drugs in the life of an older adult, but drugs are like a double-edged sword; they have risks as well as benefits. Drugs can ease pain, halt infection and bring about sleep, but drugs can also stupefy, injure and generate serious problems if misused (27). Weg states that:

At any age, the efficiency and safety of a drug depends upon a very complex series of interactions between a chemical, the particular individual and the environment in which the administration of the drug takes place (191, p. 73).

Why do elderly use so many drugs? And why are the elderly vulnerable to drug misuse problems? The answer to these questions requires an examination of the myriad biological, sociological and psychological factors that ascribe to the multi-dimensional nature of this problem.

### The Aging Process and its Relationship to Disease

Aging refers to: 1) those changes in a biological system which occur with passage of time; 2) those changes which begin or are accelerated after maturity; and 3) those processes that render an individual more susceptible to both intrinsic and extrinsic factors that result in death (90). Aging occurs in every body cell, tissue, organ and organ system, and occurs at varying rates among individuals as well as among different systems in the same individual. Rarely does an object, be it animate or inanimate, escape the effects of aging. Kohn states:

It is difficult to conceive of any population that does not age. Progressive alteration occurs in the non-living world in populations of molecules, substances, and objects of all kinds. In living systems we can observe progressive changes in populations of molecules in cells and tissues, and, at higher levels of complexity, in organelles and the cells themselves. Finally, we can recognize aging processes at the level of the intact organism, where they frequently result in debility, and the end point of death (96, p. 2).

Many speculations are offered by the scientific community concerning the etiology of aging. Some of these suppositions are

related while others are not. Comfort (33) listed over 20 different theories of aging encompassing the biological, psychological, and sociological realms. Biologists refer to biological aging as senescence (6). In order for a process to be categorized as senescence it must meet four criteria:

- 1) It must be universal and eventually occur in all organisms of the species in question.
- 2) The changes that constitute senescence must come primarily from within the organism.
- 3) The processes associated with senescence must occur gradually rather than suddenly.
- 4) The changes that mark senescence must occur gradually rather than suddenly (173).

Through the centuries many people have considered the process of aging to be a disease; however, the accepted notion today is quite the contrary. Although there are physiological, anatomical psychological and sociological changes with time, aging is not a disease (190). Nonetheless, one can not refute the fact that morbidity and mortality increase with age.

While aging is not a disease, it is certainly an invitation to disease (64). As one ages certain degenerative changes take place and certain diseases increase in incidence (85). Approximately 86 percent of the elderly reportedly suffer from one or more chronic diseases, compared with only 40 percent of those under 65 (71).

Listed below are the ten most common medical conditions reported by the elderly during health interviews (177):

<u>RANK</u>	<u>CONDITION</u>	<u>RATE</u>
1	Arthritis	33/100
2	Hearing	22
3	Heart	17
4	High Blood Pressure	16
5	Visual Handicaps	15
6	Digestive Diseases	12
7	Chronic Sinusitis	11
8	Mental & Nervous Disorders	10
9	Genito-urinary Tract Problems	8
10	Circulatory Problems	7

Aged individuals exhibit an increased vulnerability to infection. Older people are twice as likely as younger people to be physically disabled and to require hospitalization (190). As chronic conditions accumulate with age, the prevalence of disability in the population increases markedly. The cumulative effects of aging lead to progressively greater limitations in functional capacities, greater likelihood of limitations in the ability to meet behavioral requirements and an increased risk of disability (88).



### Reasons for Increased Incidence of Disease

Atchley (6) speculates that the etiology for the increased susceptibility to illness and disease seen among the aged is due to a decline in the immune response. The functional capacity of the immune system deteriorates with age, thus weakening the individual's resistance to infection. Kart states that:

An older person who is exposed to a particular pathogenic microorganisms for the first time may have a much more difficult time warding off the presence of the disease agent and its devastating effects. Hence, older persons are much more affected by epidemics and as a population reflect higher death rates in association with them (85, p. 25).

The diminished immune capacity associated with age is also reflected in the reduced prevalence of an immune response to the tuberculin skin test in older persons (167). Some investigators suggest that as the immune response declines with age, cancerous cells are able to thrive and prosper since the lymphocytes may fail to recognize such cells as non-self (119).

A second important factor is the role of poor nutrition. Some researchers have found evidence of dietary deficiencies in the aged population (98). Without optimum nutritional reserves, there is a lack of nutrients essential for the production of antibodies and, as a result, the older person is rendered more vulnerable to disease (185).

Third, Pesanti (142) suggests that there are important accompaniments of aging that influence the increased susceptibility of older adults to infection. These accompaniments would include degenerative changes and diseases in the body, associated with old age, that serve to predispose the individual to infection.

Finally, it should be noted that with advancing age older adults become more susceptible to the deleterious effects of stress. The most significant finding is that stress of any kind, whether it be chemical, physical or emotional, is less tolerated by the aging organism (165). Older adults display diminished ability to respond to stress and return to homeostasis (165, 162). Kohn (96) points out that the declining resistance to stress, in the form of disease, is one of the most characteristic features of an aging population. According to Weg:

Characteristically, increased time is needed to return to pre-stress levels. Demands can no longer be adequately met, the reduction in reserve capacity is finally deleterious, and pathology may result. With stress - whether physical, as in exercise, or emotional, as in excitement or fear - the magnitude of displacement is greater, and the rate of recovery is slower with increasing age (190, p. 233).

In general, the United States over the last 50 years has experienced a reduction in the incidence of infectious diseases and an increase in the rate of chronic diseases. Presently, chronic conditions represent the major health problems affecting middle-aged and older adults (85). As pointed out by Cutler and Harootyan:

The control of infectious diseases during this century has been concentrated in the youngest and oldest age groups, where influenza, tuberculosis, and pneumonia take their greatest tolls. With these diseases now well controlled, it is primarily the aged who remain vulnerable to such degenerative diseases as heart disease, cancers, and strokes (38, p. 41).

Chronic diseases are of a protracted nature and are characterized by progressive and irreversible pathologic changes. Etiologies are rarely known and there are no cures. Treatment usually consists of control, maintenance and rehabilitation. Chronic disease may be defined as:

One of long continuance marked usually by no very violent symptoms, sometimes ending in recovery, or else in death through cachexia or an intercurrent attack of acute disease (171, p. 360).

Many chronic conditions can be relieved, or at least controlled, by the proper use of drugs, and it is a well-established fact that older adults experience an increased incidence of chronic disease which is accompanied by a greater use of drugs (111).

### Overview of Drugs

In order to logically proceed to a discussion concerning the aging process and its relationship to drug response, it is important to first provide a brief overview of drugs. The word, drug, means different things to different people. For some individuals it connotes only those substances one secures from a physician; for others it connotes only those substances available illegally on the street.

According to Stedman's Medical Dictionary, a drug is defined as:

A therapeutic agent; any substance other than food, used in the prevention, diagnosis, alleviation, treatment or cure of disease in man and animal (171, p. 378).

It is readily apparent that such a definition does not make provisions for illegal substances or substances that are not used to improve the individual's physical or mental health. And yet, many individuals consider such compounds to be drugs. Probably a more culturally appropriate and simpler definition of a drug would be any chemical compound or substance including food that in some way affects or alters the structure or function of the body as a whole or any of its individual components.

By making use of such a broad definition it then becomes possible to include such substances as ethyl alcohol, caffeine and nicotine as drugs. At any rate it is important to recognize that man's existence in the twentieth century is characterized by much direct and indirect exposure to drugs. Long, Ray, Hafen and Schuman present some interesting findings which help emphasize this very intimate relationship that man enjoys with drugs:

- 1) Approximately two-thirds of the population of the United States use prescription drugs at one time or another. At present, an estimated 75 million Americans are taking one or more drugs on a regular basis... Huge quantities of non prescription drugs are consumed daily. Over 15 million people take aspirin or combination drugs containing aspirin regularly (114, p. 1).

- 2) Coffee is America's national nonalcoholic drink. Americans spent over \$1.4 billion in 1972 for 2.8 billion pounds of coffee made from 9,800 billion coffee beans to be able to make over 150 billion cups of coffee. Sixty-four percent of Americans over age 10 drink coffee daily, while only 51% drink milk, 47% soft drinks, and 27% tea as of winter 1973. In 1972 on a total population basis (all ages) Americans consumed about 36 gallons of coffee, 7 gallons of tea, and 30 gallons of soft drinks (146, p. 110).
- 3) Of the approximately 95 to 100 million Americans who drink, one in ten is now either a serious problem drinker, or a full-fledged alcoholic (72, p. x).
- 4) It is estimated by the U.S. Agricultural Marketing Service that the per capita consumption of cigarettes, all persons aged 15 years and over, in the United States for the year 1976, was 4,110 (158, p. 41).

Despite this propinquity to drugs, the average individual's drug knowledge is very minimal. Drugs, like humans, are complex entities. It is both foolish and naive to assume that simple events will transpire when these two entities come together. An individual's response to a drug varies with the interaction that occurs among a multitude of chemical, environmental and disease factors as well as patient variables (124).

In order for a drug to work in the desired manner it must satisfy the following general criteria: 1) it must be in the appropriate form and appropriately administered, absorbed and distributed; 2) it must be at the appropriate site of action, in the appropriate concentration for the appropriate period of time; and 3) the patient must respond appropriately and the drug

must be appropriately metabolized and eliminated. If any factor interferes with the condign expression of any component in this complex chain of events, the individual's response to the drug may be altered. A closer examination of some of these variables will serve to further sensitize the reader to the impact of such factors on an individual's response to a drug. The following discussion based on a review by Gaeta and Gaetano (64) examines the impact of these variables on an individual's response to a drug:

- 1) Age. - The age of the user will significantly affect the type of reaction produced by a given drug. Many individuals are aware that infants and children can not tolerate adult dosages of many drugs. But many people do not realize that older adults, generally speaking, also require a reduced dosage since the aging body becomes more sensitive to most drugs.
- 2) Dose. - The dose of a drug can play an extremely important role in modifying drug effects. Making use of aspirin as a hypothetical example to illustrate this point, one can observe that when it is taken in therapeutic doses, usually 1-2 tablets every 4 hours, it relieves pain. If, however, larger doses are taken, unpleasant effects such as stomach distress, belching and ringing in the ears may occur.
- 3) Method of Administration. - The manner in which a drug is taken by the user will greatly affect the onset,

intensity and duration of effects. A drug that is taken by intravenous injection will take effect almost immediately since the drug is injected directly into the circulation. On the other hand, a drug taken by oral administration will have to be broken down in the stomach and intestines before it can be absorbed into the circulation. This "stop-off" in the gastro-intestinal tract means the drug will take longer to manifest its effects.

- 4) Mind Set. - The individual's state of mind and expectations can do much to modify drug effects. Many people have suffered unfortunate experiences associated with certain drugs simply because they were psychologically unprepared or only expecting the worst. On the other hand, this variable can work positively as one interesting experiment with poison-ivy sensitive patients amply demonstrated (92).
- 5) Sex. - Females tend to be more susceptible than males to the effects of certain drugs (57). This fact can be partially explained by sex differences in lean/fat ratio as well as sex-related variations in body size.
- 6) Body Size. - In order to help insure optimal concentration and desired effects, the dose of a drug must be adjusted to the body size of the patient. Generally

speaking, when given the same dose of a drug, smaller patients will usually demonstrate higher blood-drug concentrations than larger patients.

- 7) Absorption. - In order for a drug to gain access to its site of action, unless it acts topically, it must be properly absorbed. Ultimately, absorption affects the amount of drug entering the blood circulation. Certain factors, such as food or other drugs, may alter the rate at which a drug is absorbed and ultimately its effectiveness in the body. In order to act a drug must first enter the blood (66).
- 8) Metabolism. - In preparation for most drugs to be adequately eliminated from the body they must first be converted by metabolic processes into a compound that can be excreted (84). If the metabolism of a drug is either enhanced or inhibited, the action of the drug may be altered.
- 9) Excretion. - The primary organ in the body involved in the excretion of a drug is the kidney. A patient with impaired renal function would be very susceptible to adverse drug reactions and this necessitates close supervision by the practitioner. If a drug is not



excreted properly it can accumulate to toxic levels and become a possible threat to life. The kidney, working alone, would be incapable of meeting the demand of eliminating drugs from the body (84). Therefore, the drug must be converted or metabolized principally by the liver to a form that can be readily excreted.

- 10) Idiosyncrasy. - Some pharmacologists refer to idiosyncrasy as a, "genetically determined abnormal reactivity to a drug," (66, p. 437). These highly unique, unusual and eccentric reactions are believed by some investigators to involve inborn errors of metabolism genetically transmitted from parent to offspring.
- 11) Drug Interactions. - When drugs are administered concurrently, they may interact to alter the effectiveness or toxicity of each other. It is well documented that the drug reaction frequency increases as the number of drugs administered increases (124). All drug interactions are not harmful; some may be intended and desired. Due to the heavy consumption of all kinds of chemicals in contemporary American society, it is essential to be aware of the potential danger of mixing drugs.

- 12) Drug-Food Interactions. - Even food can be implicated in bringing about altered responses to drugs. It is a well-known fact that tetracycline antibiotics should not be taken simultaneously with milk or dairy products since the Ca and Fe ions in the milk will form an insoluble compound with the antibiotic.
- 13) Effects of Pathology. - The presence of a disease in an individual may modify the drug response. Take, for example, the feverish patient who is administered morphine and experiences stimulation and excitement instead of pain relief.

It should be quite apparent that an individual's response to a drug can be modified by many factors, present not only in the patient, but in the environment and in the drug as well.

#### The Aging Process and Its Relationship to Drug Response

There is no such thing as a harmless medication (124). In order for a drug to work appropriately and to produce the desired therapeutic effect, a complicated interaction of events must take place between the patient and the drug. Characteristics of the drug, the environment and the patient must be considered if the patient is to receive the greatest benefit with the least risk.

As demonstrated in the previous discussion, the effects of a drug in the body can be modified by many factors, including body weight, volume of distribution, sex, route of administration, rate

of elimination, genetic factors and age (57). Since these factors can be instrumental in altering the patient's response to a drug, it is of utmost importance that the prescribing practitioner understand the whole patient if he is to provide effective and rational treatment (124). All drugs are potentially dangerous, but careful prescribing minimizes the risk and enhances the value of treatment (45).

Aging makes a difference in the action of medication, and drugs make a distinct difference in body functions (61). It is generally recognized by most investigators that the elderly are highly responsive to drugs (12).

The aging process, working in isolation or in conjunction with pathological factors, alters the structure and functional capacity of many organ systems. As a consequence of these alterations in organ systems, the older adult, generally speaking, often requires lower doses of a drug to produce the therapeutic effect (191, 124, 114, 147).

A number of age-related changes in the body are responsible for the variations noted in the magnitude and direction of modifications in drug activity that have been reported to occur with increasing age (11). With advancing age, there is an increasingly divergent response to drug treatment (102). Following is a cursory examination of some of the more prominent age changes in the body that contribute to altered drug response in the aged.

### Decrease in Cell Population

The most prominent changes associated with the aging process are decreased cell population of various tissues and resultant decrease in organ function (147, 190, 96). Riley states some of the reasons why such changes in organ function can also affect drug therapy:

A decrease in organ function can also affect drug therapy by decreasing the rate of metabolic alteration of drugs by the liver or by decreasing the rate of elimination of drugs from the body via the kidneys. Either of these two effects would be expected to elaborate and/or prolong blood drug concentrations and contribute to an unpredictability of response in the elderly (147, p. 37).

### Drug Absorption

The majority of drugs are orally administered as capsules or tablets in solid dosage form. For a drug to work appropriately it must first be effectively absorbed. Drug absorption may well be delayed or impaired in the elderly (102). This poor absorption of drugs in the older adult can be attributed to alterations in the gastro-intestinal tract. Advancing age brings about changes in the gastro-intestinal tract which impair and delay the absorption of drugs (75). Some of these changes are summarized by Bender:

In older individuals, there is a reduction in gastric pH, and this may affect the solubility of some drugs and thus influence their rate of absorption. There is also a reduction

in intestinal blood flow which could also tend to delay or reduce drug absorption. It has been further suggested that the number of absorbing cells in the intestine is decreased with a consequent loss of absorbing surface (11, p. 155).

It would appear that drugs are absorbed less consistently and more erratically in the aged (147).

### Drug Distribution

Increased circulation time, decline in regional blood flow and a decrease in cardiac reserve delay the distribution of drugs in the aged individual (191). Lamy states that:

Increase in extracellular fluids, decrease in total body fluids, decrease in protein binding, changes in apparent volume of distribution and impairment of the mesenteric circulation may all affect the distribution of drugs throughout the body (102, p. 11).

Another characteristic feature of the aging process that affects the distribution of drugs is the accumulation of fat in the aging body. Bender states that:

As an organism ages, much of the functional tissue is replaced by fat. This may occur in the absence of a significant increase in body weight. There are many drugs which are highly lipid soluble, and for this reason, the adipose tissue serves as a major storage site. With the increase in the percentage of body weight contributed by fat, it is possible that the activity of highly lipid soluble substances will be significantly influenced by the increased storage capacity (11, p. 155).

### Drug Metabolism

A primary site of drug metabolism is in the liver. Within this organ exists a system of enzymes known as the microsomal liver enzyme system. These enzymes provide for the biotransformation or breakdown of many drug products. With increasing age the enzymes responsible for drug metabolism decrease in activity (102, 11, 75). It is highly probable that medications are not as efficiently metabolized in the liver of the older adult as compared to the younger adult (102). Riley (147) reports that even minor changes in liver functions associated with aging could effectuate the accumulation of a drug in the body.

### Drug Excretion

The kidneys are the main excretory organs of the body (84). Drugs of low lipid solubility are only partially reabsorbed in the kidney and are readily excreted in the urine. On the other hand, highly lipid soluble drugs are reabsorbed from the tubular fluid. These drugs will have to be metabolized to less lipid soluble compounds so they can be excreted.

Glomerular filtration rate, renal plasma flow and tubular excretory capacity are reduced in the elderly (75, 102, 11). Impairment in either the liver or kidneys will result in high drug concentrations in the blood. Riley reports that:

Decreasing the rate of metabolic alternative or drugs by the liver or decreasing the rate of elimination of drugs from the body via the kidneys can result in elevated and prolonged blood drug concentrations that can contribute to unpredictable responses in the elderly (147, p. 37).

It is important to keep in mind that age related changes in the body may be totally or at least partially responsible for the wide variety of drug responses seen in the aged.

#### Patient Compliance and Medication Errors

In recent years the ambulatory care of numerous chronic conditions has increased. With the development of more highly effective drug therapies, and the shift in hospitals' emphasis from chronic care facilities to acute care facilities, patients have had to assume more responsibility for their own health care at home (163).

To assume that the patient will follow the physician's instructions as laid down in the therapeutic regimen is naive indeed, since many studies have reported a most disturbing frequency of medication errors and patient noncompliance in regard to drug utilization (159, 120, 189, 104, 110).

The hazards of self-medication have never been more apparent than the present. With the resulting increase in the potency of drugs and the number of prescriptions being written, the hazards of self-medication have increased at an alarming rate (124). The percentage of patients making errors in the self-administration

of prescribed medications, with few exceptions, has ranged between 25 and 59 percent (172, p. 463).

Schwartz (159) studied 178 patients, 60 years of age and older, to determine the occurrence and frequency of medication errors, and the types of errors made by such a group of patients. For his investigation, a medication error was defined as a medicine which was:

- 1) taken by the patient but not ordered by the doctor,
- 2) ordered by the doctor but not taken by the patient.
- 3) ordered by the doctor but taken in incorrect doses, or at the wrong time, or with total lack of understanding of its purposes (159).

The finding indicated that medication errors occurred quite commonly among the 178 elderly patients studied. To be more specific, almost 60 percent made medication errors. While some patients made no errors, others made potentially dangerous errors. Following is a summary of the medication errors revealed by Swartz' study (159):

<u>Type of Error</u>	<u>Percent of Patients Making Errors</u>
Omission	47
Inaccurate knowledge	20
Self-medication	17
Incorrect dosage	10
Improper sequencing or timing	6

While no systematic attempt was made to identify the reasons behind these medication errors, comments during patient interviews revealed some interesting data. For instance, in regard to the omission type of error, it was discovered that some patients were



simply unaware that they were supposed to be taking a drug which was prescribed for them. Apparently, this situation stemmed from inadequate communication between the physician and the patient. However, some patients knowingly omitted medication and this seemed to be related to the patient's immediate life situation. These patients were too tired, too ill, too incapacitated or too short of funds to obtain their prescriptions.

Another interesting finding was related to the dosage, sequencing and timing type of error. Patient interviews revealed that some of the errors in this category could be accounted for by poor eyesight and confusion about which instructions belonged to which medicine.

This study also had another interesting dimension in that it drew comparisons between the personal characteristics of error-making patients and error-free patients. Schwartz reported that:

Error-making of any type was found to be equally common among men and women, and occurred as often among patients who read English as among those who did not. In terms of certain other characteristics, however, error-makers differed somewhat from those who were error-free. Error-makers were more likely to be over the age of 75 than under that age; to be widowed, divorced, or separated rather than married or never married; to live alone rather than with others; to have little education rather than much education; to have a large number of diagnoses rather than a few; and to be judged to be coping with their environment poorly rather than well (159, p. 2028).

In another research by Moulding, the research design was so rigid that individual's judged to be "unreliable" were excluded from the study group. Despite this high degree of selectivity, approximately one-third of the "reliable" patients failed to take their medication as directed (133).

Ludin (116) interviewed 50 individuals over the age of 65 and found evidence of hazardous and wasteful practices in their medicine taking behavior. A total of 170 prescription medications (99 different medications) and 146 over-the-counter (OTC) drugs were being taken by this group, with a mean of 3.4 prescription medications and a mean of 2.9 OTC medications per person. While patient knowledge of prescription medications was checked, no attempt was made to measure compliance. The results of the study revealed the 66 percent of the medications used by this population were being taken without adequate instructions and 25 percent of the medications were not being taken as labeled (116).

Boyd et al (25) examined outpatients of a teaching hospital to determine, among other factors, the clinical significance of specific medication errors. The study population consisted of 134 patients who received 380 prescriptions. The data were collected by informal patient interviews in their own homes approximately 7-10 days after a clinic visit in which they received medications. The findings indicated that only 22 percent of the prescription medications being studied were being consumed properly and 31 percent were being misused in such a way that they posed a danger to the patient.

Even though age has not been consistently correlated with the tendency to make errors in the self-administration of medicines, a number of research reports have identified age as affecting the occurrence of medication errors (159, 104, 130, 41). Thus, the importance of age as a potential etiology of medication errors cannot be

arbitrarily dismissed, overlooked or underestimated. This is especially true when one recognizes that a number of factors, which have been positively correlated with non-compliance and medication errors, are very likely to be present in older adults. In order to more thoroughly examine this notion an analysis of patient compliance is necessary.

It is clear that the problem of noncompliance with medical regimens is a substantial one (123). An examination of the literature reveals that noncompliance rates have been reported to range from four percent for a group of tuberculosis outpatients to 92 percent for a group of children treated for streptococcal infections (163). Davis (42), in his review of the literature, estimated that approximately one-third of all patients fail to follow their physicians' medical recommendations.

Failure of a patient to comply with medical recommendations can have disastrous consequences. Seidl et al, (161) reported that for a three-month period in early 1964 at John Hopkins Hospital, 184 adverse drug reactions were seen in 122 out of 714 patients admitted to general medical beds. It was also determined that the major cause of admission for five percent of the patients was adverse drug reactions. Martin reports that:

In the United States alone, some 1,500,000 of the 30,000,000 patients hospitalized annually are admitted because of adverse reaction to drugs. In some hospitals, as high as 20% of the patients are admitted because of drug-induced disease, and during the one year period beginning July 1, 1965 at the Montreal General Hospital 25% of the deaths on the public medical service were the result of adverse drug reactions (124, p. 1).

While the results of some investigations have led to the conclusion that age is probably not significantly related to compliance (117, 136, 43) there are several variables significantly related to compliance among older adults.

The incidence of chronic disease increases with age (185) and, in many cases, these diseases will require life-long treatment and monitoring by various health care practitioners. A number of investigators have found that compliance with medical regimens decreases with the length of time patients are under treatment (20, 60, 80).

Another related finding indicated that when more than one medical recommendation is made, patients are unlikely to follow all of them (117, 41, 60). In terms of medicines specifically, one investigation revealed that more medication dosages were omitted when four doses per day were prescribed than when fewer than four doses per day were prescribed (81). Another report disclosed an increased incidence of serious medication error when patients are taking several different kinds of medications (136).

Due to the high probability that multiple concurrent pathologies will manifest in older adults, one might speculate that older patients would probably be less likely to follow all of their numerous medical recommendations.

In light of the potential seriousness of medication errors, it is appalling that very little organized large scale effort has been made to educate the patient concerning his medicines. Negligence to

this important aspect of total patient care is poignantly addressed by Stewart and Cluff:

In our present health care system primary emphasis is placed on diagnosis and then the prescribing of a certain course of therapy for the patients. What happens from this point on has largely been a matter of chance. Whether the patient takes the medication as directed, or whether he is also taking other medication that may interact has been open to speculation (172, p. 465).

### Adverse Drug Reactions

Contrary to the thinking of many people, there is no such thing as a safe drug. Each medication is like a double-edged sword, with risks and benefits. Successful treatment is a careful balance between the beneficial and harmful effects (69). The potential hazards of medications are dramatically set forth by Martin who states that:

There are no harmless medications. All are potentially hazardous to some extent and all must be prescribed and administered with caution. Otherwise, patients may be seriously injured. Although medications have made major contributions to human health and welfare, in some countries there are almost as many deaths from drugs, including suicides, as there are from automobile accidents (124, p. 1).

The human body is a highly complex and efficient chemical entity. When a drug is introduced into the body a complex series of chemical interactions take place. Hopefully, these interactions will advantageously alter the function or activity of tissue. When such conducive alterations of activity occur the drug is considered

to be sound and useful treatment, because it works in conjunction with the body to help restore health. However, there is always the possibility that the drug can produce an undesired structural or functional change in the body that may endanger the patient. There is always an inescapable element of uncertainty (114).

To help explain this element of uncertainty, one must first understand that all drugs are capable of producing multiple actions in the body. When an individual consumes a drug, two major types of action are possible: 1) desired drug actions; and/or 2) drug reactions.

Desired drug actions are also referred to as therapeutic actions. These actions represent the effects that are wanted and intended, and they are primarily sought after in medication therapy. On the other hand, drug reactions represent additional effects of the drug that are unwanted, unintended and are not primarily sought after in medication therapy.

A hypothetical example will help to illustrate the multiple action of drugs. In the case of an elderly, arthritic patient in severe pain and discomfort due to swollen and inflamed joints, aspirin may be taken because two of its therapeutic effects are analgesia and anti-inflammation. However, aspirin is also capable of producing gastro-intestinal bleeding and ulceration, tinnitus, and, in large enough doses or in hypersensitive individuals, coma and even death.

Successful treatment requires that the physician carefully evaluate the patient and the drug in order to ensure maximum therapeutic effectiveness with little or no undesirable reactions.

As stated by Long:

While the obvious goal of drug therapy is to obtain the greatest relief possible with the least unpleasantness, in many treatment situations it is necessary to accept the minor annoyance of side effects in order to obtain the more important therapeutic effect (114, p. 5).

Drug reactions may be classified into several different categories such as side effect, extension effect and drug interaction. A side effect is simply defined as an effect different from the principal effect of the drug. An extension effect is basically the same as the desired effect or principal effect, except that it is of greater magnitude. Drug interaction refers to the fact that when two or more drugs are administered simultaneously, the effectiveness or toxicity of the drugs involved may be altered. Finally, one must not overlook the category of adverse drug reactions, since the use of any drug is inevitably attended by a potential risk that the patient may react adversely to the chemical.

Adverse drug reactions are those reactions that either result from an exaggerated, but otherwise normal, pharmacological action of a drug, or those reactions that are totally aberrant and unrelated to a drug's normal pharmacological state. These reactions are harmful to the patient and are possibly life threatening. The fact that preventable adverse drug reactions exist cannot be denied. The seriousness of this problem is well documented by Brady:

Adverse drug reactions are a serious health problem for people of all ages. Surveys indicate that three to five percent of hospital admissions are the result of adverse drug reactions. Fifteen to thirty percent of patients experience one or more drug reactions during their hospitalization. The average hospital stay is nearly doubled for those patients who suffer such reactions. A more impressive set of figures from a federal source discloses that drug misadventures cause 30,000 deaths and 1.5 million hospital admissions annually (27, p. 1).

The Boston Collaborative Drug Surveillance Program estimates that about 300,000 people are hospitalized in the United States annually because of drug reactions. As a consequence, adverse drug reactions are one of the ten leading causes of hospitalization in the United States (82). Moreover, between 6,000 and 140,000 die each year as a result of adverse drug reactions (95). This wide range of reported figures reflects the divergent modes of surveillance, complication and interpretation of data, as well as the various populations studied. Reports representing the drug industry usually substantiate the lower death rates. At any rate, it would appear that thousands of people die needlessly each year as a result of their inappropriate use of drugs.

These figures reflect a sad commentary of our times, especially when one recognizes that 70-80 percent of all adverse drug reactions are predictable and, therefore, probably preventable (128).

Investigations have revealed that specific segments of the population are more vulnerable to adverse drug reactions than other segments. For example, adverse drug reactions are more likely to occur in caucasians than in blacks, in females than in males, in



older adults than younger adults and in individuals taking many medicines simultaneously (169).

The previous information cited in reference to specific identifiable risks groups for adverse drug reactions leads this discourse directly back to the elderly. As pointed out earlier, advanced age brings about certain physiological alterations in the body which ultimately affect the older adult's capacity to appropriately utilize and eliminate drugs. People over the age of 60 are more likely to suffer adverse reactions than people under this age. Also, it must be emphasized that the incidence of adverse drug reactions increases with an increase in the number of medications consumed. Brady substantiates this fact in the following statement:

We know that the occurrence of adverse drug reactions is directly related to the number and frequency of drug-dose exposures. We can presume, for this reason, and many others, that the elderly patient is therefore unusually prone to adverse drug reactions and drug interactions (27, p. 1).

As the evidence has demonstrated, adverse drug reactions pose a potential problem for people of all ages; however, the elderly, due to an intimate interplay of physiological, psychological, and sociological variables, are not only very likely to experience drug misadventures, but are also extremely vulnerable to them.

One partial solution to the problem of drug misadventures, particularly among the aged, could be the activation of patients through patient education programs. Just precisely what is an

activated patient and what role can patient education serve in ameliorating drug misadventures? The following discussion addresses these questions.

### Activated Patients

Over the last 10 years an increased interest in consumerism has swept across the United States. The consumer has made his presence known in every sphere of life from automobile safety to food additives. Quite recently, the consumer has directed his energies toward a more responsive health care delivery system.

In the twentieth century, man's knowledge of pathology and the human body increased dramatically with the practice of medicine becoming more scientific. Ironically, this state of affairs resulted in an unhealthy dependence on medication intervention. This dependence, in essence, required the individual to relinquish much of his health responsibility to organized medicine, while, at the same time, also necessitated his acceptance of the authoritarian, curative role of the physician. As Roter states:

The patient in the health care delivery system has been relegated to a passive, compliant role, exempt from all obligations but those related to obtaining competent help and cooperating in the process of getting well (151, 281).

However, the American public has recently grown increasingly impatient with the health care delivery system and its overemphasis on medical technology and the neglect of the patient as a responsible partner in his health care. Despite the vast increase in health

care expenditures and the greatly improved access to care on the part of most Americans, our status with respect to illness, disability, and premature death shows little, if any, signs of improvement (178, p. 8).

The public is fast becoming cognizant of the limitations of therapeutic medicine. The high degree of preventable illness and the shortcomings of medical intervention in the control of serious afflictions is obvious to even the most casual observer. The limitations of therapeutic medicine are exemplified in the following statement:

Consider, for example, the widespread evidence of patient non-compliance with prescribed regimens; the growing evidence of unnecessary surgery and other medication; the increasing realization that technical virtuosity is not necessarily synonymous with effective care, the repeated exposes of miserable care in many nursing homes, now expensively reimbursed under Medicare and Medicaid; the growing public demand for more attention to the humanities and amenities of death and dying; and the renewed interest in euthanasia (178, p. 10).

Today, patients are desiring more personal health information and are demanding an opportunity for more active roles in shaping health care policy. More and more individuals refuse to remain helplessly dependent on health care practitioners, as has been the societal norm in recent years. Sehnert expresses the desire of the consumer in stating that:

As a health purchaser, he wants to know what kind of pills he's taking, and what side effects they have on his body. That doesn't

mean that he wants to bypass the M.D. and be his own doctor all the time. He just wants to be a partner in the things that affect his life - and nothing does, more than his health (160, p. 6).

The central issue herein involves the concept of what may be termed "patient activation". Essentially, this concept demands that the health consumer play an active and authentic role in a health partnership with all his health care practitioners. While this ideal situation involves an active patient in a mutual participation arrangement with health care providers, the fact of the matter is that this situation is rare. Rother points out some of the reasons for this state of affairs:

Attempts have been made to explain this behavior as patient unwillingness to appear ignorant, patient uneasiness in communicating with a (perceived) member of a higher social class, provider reluctance to share control of the interaction, and patient concession to expert authority, among others (151, p. 283).

As Sehnert points out, "it is no small thing to be freed from the 'Yes, Herr Professor' role based on the European tradition that the patient is passive, 'clinical' material and the physician the unquestioned, unchallengeable authority" (160, p. 5).

Yet, if individuals are to promote and maintain personal health, individual action is a necessity, and the health care system should support the efforts of the individual to become an active member of the health care team. After all, who should know more and has the greatest stake in one's health than the individual himself?

The necessity of educated patients serving as active partners in the health care team can be best exemplified by the increased recognition of the impact of personal lifestyle on one's health status. Every year hundreds of thousands of Americans die prematurely from causes directly related to their lifestyle. The relationship between death rates, health status and lifestyle, is becoming increasingly clear (178).

Despite arguments from the health care industry declaring the primary portcullis to optimal health care as lack of financial access, the fact remains that the common denominator in premature death and preventable morbidity is individual lifestyle. As Somers points out:

The primary causes of poor health and premature death in this country cannot be attributed either to lack of access or to shortcomings of the delivery system per se. Health care merely patches up the victims of heart attacks, auto accidents, and attempted murder, usually without affecting the underlying problems of poor diet, poor driving, pent-up violence and other behavioral and environmental threats. A direct attack on the primary causes can be made through determined efforts toward prevention and education (170, p. 52).

The appropriately informed, responsible and participating patient can be an integral and contributing force in the health care team and can do much to help re-establish his health and well-being. Data available from several research projects substantiate this fact. Patients who are actively involved and adequately informed of their own care and therapeutic regimen have fewer hospital readmissions, take their medications essentially without error and, in general, follow the orders of the physician more closely (148).

The informed patient stands to regain his health more quickly, and is less likely to suffer a recurrence of his illness or even unnecessary hospital readmission. The illness is likely to cost both the patient and the community less, and the patient is more likely to be conscientious about follow-up visits (109). Etzwiler emphasizes that:

The most important member of the medical team for health maintenance and chronic disease has been forgotten; i.e., "the patient himself". Effective care of chronic disease and health maintenance cannot be carried out without the cooperation of an informed patient supported by an interested and knowledgeable professional health care group (55, p. 583).

### Patient Education

The Joint Committee on Health Education Terminology defines patient education as:

...those health experiences designed to influence learning which occurs as a person receives preventive, diagnostic, therapeutic and/or rehabilitative services, including experiences which arise from coping with symptoms; referrals to sources of information, prevention, diagnosis and care, and contacts with health institutions, health personnel, family, and other patients (137, p. 67).

The fact that patient education programs are effective is clearly demonstrated in the literature. When patients are taught about various aspects of their condition, and when this teaching is conducted in a concerted, systematic manner, the quality of care

provided by the health care institution is upgraded (28). Moreover, Lesparre states that:

...a program of health education has the potential of reducing morbidity in the community and of easing demands on precious and costly health resources; extended into the largely unexplored field of prevention, health education is, potentially, one of the most valuable means of controlling the waste of human and material resources (109, p. 75).

A representative sample of research conducted in the area of patient education demonstrates the effectiveness of patient education programs. Forty-seven tuberculosis patients receiving out-patient chemotherapy, who were given planned, individual instruction by nurses, committed fewer medication errors at home than patients who did not receive such instruction (74). In an experimental program, a California institution included medication instruction in its rehabilitation program for discharges and reported success and acceptance by the staff as well as the patients (32).

After completing a related educational program, fifty patients with congestive heart failure showed significantly reduced rates of readmission when compared with the patients' prior histories as well as a control group (149).

Bertakis used a technique in which the physician asked the patient to repeat the information that had just been given. In this way the physician was able to reinforce important points and repeat information that the patient had forgotten or misunderstood. The patient-provider interaction averaged no longer than five extra

minutes, yet patient retention of instructions, as well as patient satisfaction, increased significantly (14).

These and many other examples of the effectiveness of patient education point out the importance of the patient as a partner in health care. Effective, efficient preventive health care can only be carried out by an involved and informed patient who is cognizant of his role, his responsibilities and his importance as an accepted member of the health care team (55, p. 583).

McNerney poignantly sums up this ambient phenomenon by describing health education of the public as the missing link in the evolution of health services (126). Consider, for instance, that most individuals receive more complete information pertaining to the operation of an appliance, such as a television, than about the diagnosis of an illness or the therapeutic plan related to successful recovery from that illness. McNerney states that:

It is hard to overstate the importance of this inadequacy in our system, or chain, of health services. If we consider that the ultimate goal of all of us in the health professions and related enterprise is to safeguard and improve health and prolong or enrich life, then it can be said that all the things that are done by all the professionals trained in medical schools and health science centers and hospitals have less to do with achieving the goal than the things people do, or don't do, for themselves (126, p. 13).

Specifically addressing the older patient and his medications, studies point to a higher risk of non-compliance among the elderly due, in part, to the chronic and multiple nature of their illness



and to the simultaneous utilization of many medicines (151). Education of the geriatric outpatient holds great promise for promoting better patient compliance with drug regimens as well as providing for improved effectiveness of therapy.

It must be emphasized that, for people of all ages, no drug is effective unless it is properly prescribed, dispensed and accurately administered (25). Recent studies indicate that improved educational techniques may significantly decrease drug defaulting (104, 120, 163).

In light of the tremendous potential for drug misadventures among older adults, it would be wise for the health care industry to focus on the older patient, and, through educational efforts, guide the patient toward more responsible drug use. The greatest, current potential for improving the health of the American people is to be found in what they do or do not do to and for themselves (62).

While the merit of well-planned and well-organized patient education leaves little doubt, some may balk at the notion of teaching older adults. After all, is it not true that one can not "teach an old dog new tricks?" Nothing could be further from the truth. The following section explores some of the myths behind the belief that older adults can not learn. The discussion also brings to light many non-cognitive factors that could help explain performance deficits in older adults.

Learning and Aging: Noncognitive Causes of  
Performance Deficits in Older Adults

For many years people have considered older adults to be crazy, unintelligent and incapable of learning anything new. It has been a popular belief that decreased learning capacity is a correlate of increased age (195). Although these myths are increasingly held in disregard, adult educators must still reckon with the well-established empirical finding that the aged do less well on learning tasks than do their younger counterparts (24). Nevertheless, if one examines the issue more thoroughly, a different perspective begins to take shape. It becomes obvious that factors other than the allegedly normal senescent alterations in the brain may also contribute to the finding that older adults perform less well than younger adults in measures of intellectual and learning capacity.

The complexity of conducting valid and meaningful research in the area of learning and aging is increasingly being recognized. Differences found between younger adults and older adults are often the product of methodology (17, p. 134).

Most of the studies in the literature correlating aging and learning have been cross-sectional in nature. Cross-sectional studies examine people of different ages at the same point in time. On the contrary, longitudinal studies involve measures taken on the same cohort sample at sundry points in time.

Cross-sectional research reveals age differences, which are differences among people of different ages at a given point in time.

Conversely, longitudinal research reveals age changes. Age changes refer to biological, psychological and social maturation and aging (6, p. 8). The two constructs are not identical, yet much confusion has occurred because some investigators mistakingly inferred age-changes from data revealing age-differences. Okun differentiates the two types of research as follows:

Age differences are observed with cross-sectional designs in which samples born at different times are compared at the same point in time. With the cross-sectional design, age and cohort effects are confounded since the subjects differ not only with respect to age, but also with respect to the social-historical period during which they were born and reared. In contrast, age changes are observed with longitudinal designs in which observations on members of a given cohort are collected on more than one measurement occasion. With the longitudinal design, age and time of measurement are confounded since during the interval between measurement occasions, not only are subjects aging but there are also changes occurring in the state of the environment (139, p. 5).

Since cross-sectional investigations sample subjects from different age cohorts, and longitudinal investigations sample individuals from the same age cohort, comparable outcomes should not be expected. Also, different generations differ with respect to their experiential backgrounds and genetic potentials (7).

Another aspect of the methodological problem associated with research in the area of learning and aging involves the issue of whether or not intelligence tests are unfair to aged subjects. The

widespread use of the Wechsler Adult Intelligence Scale (WAIS) to ascertain cognitive performance may be, in its present state, a grossly inappropriate diagnostic tool for use with older adults.

Some investigators have questioned the validity of intelligence tests. Comfort (34) suggests that intelligence tests do not measure intelligence as much as they measure one's ability to conform to the expectations of the white, middle class school teacher.

Intelligence tests enjoy their greatest use among secondary school counselors who use them to aid in guiding young people into appropriate academic and/or economic pursuits. This factor may operate against the test performance of older adults, since the test design would most likely reflect its appropriateness for use with young adults. Atchley states that:

...most intelligence tests measure achievement in terms of skills currently being emphasized by the educational system, not skills that may have been emphasized in earlier eras. This bias puts older people at a disadvantage (6, p. 51).

To complicate matters, there is, at the present time, no widely accepted definition of learning (4). This lack of a universally acceptable definition of learning has contributed to a variety of contradictory and inconsistent reports in the area of learning and aging. Part of this morass originates from the controversy surrounding the distinction between learning and performance.

Botwinick (1973) draws a distinction between learning as an internal process and performance as an external act. The observer can see only the act and not the process; he must infer that learning ability is poor when he observes little

or no improvement in performance after training. It is possible this conclusion is wrong, because the poor performance may be a result of factors other than the associative machinery, such as poor motivation, lack of confidence, or unfavorable conditions of training (188, p. 127).

In the past, many investigators have concluded that the learning decrements of aged subjects in tests measuring cognitive performance were primarily the result of deficiencies in the associative machinery of the brain. However, in recent years, more and more educational and psychological gerontologists have increasingly accepted the argument that the poor cognitive performance of older adults could be a result of factors other than a breakdown in the associative machinery of the brain. As Walsh states:

It may be the case that older people learn as well as young persons but for noncognitive reasons are unable or unwilling to demonstrate what they have learned (188, p. 127).

The following section is a selective review of some of the commonly cited non-cognitive factors that may contribute to performance deficits in older adults.

### Arousal

For years psychologists have been investigating the relationship between the level of arousal and efficiency of performance. Investigators have concluded that both underarousal and overarousal can impair one's cognitive performance.

If a subject is underaroused, which may be manifested by lethargy or drowsiness, performance efficiency will be low. As the

individual becomes more alert and aroused, performance efficiency will increase until a point of optimum performance is attained. If, however, the subject surpasses the optimal level, and perhaps becomes overly anxious, optimum performance will be interfered with and cognitive performance will drop.

Using the level of free fatty acid as an index of the activation of the autonomic nervous system, investigators studied a group of older adults during a serial learning task and concluded that older adults experienced a performance deficit as a result of overarousal (144).

In another investigation, serial learning procedures were used to determine if situational anxiety could result in performance decrements. With reference to Eisdorfer's investigation, Arenberg and Tchabo commented that:

The argument in over-simplified terms is: (a) the older learner responds less frequently and performs less effectively at a fast pace; but (b) he is capable of responding fast enough at a fast pace; (c) higher and more persistent levels of an index of autonomic arousal are found for old than for young groups during and after learning; therefore, (d) the level of arousal of the old is too high for optimal learning, particularly at a fast pace, resulting in response suppression (4, p. 428).

In an experimental study designed to further test the hypothesis that excessive autonomic arousal was the cause of performance decrements in the elderly, a serial learning task was employed in which older adults were administered either Propranolol or a placebo prior to testing. Results indicated that subjects receiving Propranolol,

a drug used to block autonomic arousal, made fewer errors than the control group (51).

Eisdorfer (50) believes that autonomic factors and performance factors must play a significant role in any attempt to accurately define learning ability in the aged; and deficit learning studies may provide an adequate vehicle for a better understanding of the role of such factors.

### Meaningfulness

Some investigators have argued that older adults perform poorly on learning tasks in laboratory settings because of a disinclination to get involved in the task at hand (164, 78).

Hulicka (77) reported a high rate of drop out with elderly subjects involved in a paired-associate learning task which required matching response words with stimulus letters bearing no logical relationship to each other. However, when the task was made more meaningful, the older adults performed the charge quite willingly. In a later investigation, it was concluded that older people become less involved in a laboratory task when it has less meaning for them (78).

The issue of relevancy or meaningfulness affecting performance on learning tasks is adequately summed up by Bischof:

The block design of the Wechsler Adult Intelligence Scale consists of rearranging tumbled red and white blocks according to a design printed on a card, while an examiner's stop watch is started and stopped. It is questionable

whether an adult subject feels that this activity is really relevant to his capacity to think quickly and accurately (17, p. 135).

### Health

That individual health status influences one's cognitive performance is a well-established fact (52, 139, 17, 77). Unfortunately, the vast majority of investigators make no attempt to identify the health status of their subjects; nor do they attempt to examine the relationship between health and performance variables. The outcome has been an unfair assessment of the older adult's cognitive capacity.

Hulicka (77), making use of four learning memory tasks, compared hospitalized male veterans, ranging in age from 17-85, with community-dwelling, healthy, male subjects aged 17-69. The results revealed that on three of the four tasks, 60 year old, healthy, community-dwelling subjects performed better than 20 year old patients. In another investigation, healthy, elderly men out-performed less healthy, elderly men on a battery of cognitive measures (21).

Indeed, it is unfortunate that many of the early studies examining the connection between aging and learning compared institutionalized elderly subjects with young healthy subjects from universities. As a result of such research, older adults have been unfairly labeled as unintelligent, and it is quite possible that this type of research has contributed to the bias and prejudice, in the form of ageism that is leveled against the old in contemporary American society.



### Cautiousness

Although the attitude of being careful before acting has been found in all adult age groups, there is evidence that it increases with age (17). Numerous studies have found that, particularly in verbal learning situations employing serial learning tasks, errors made by older people tend to be those of omission rather than of responding incorrectly. Okun (139) reports that some investigators have interpreted such findings as indicating that age differences in cognitive performance are, in part, a function of greater cautiousness among older adults.

It would appear that older adults are reluctant to risk being wrong for the sake of being correct (97). A prominent psychologist, working with adults in a laboratory setting, found older subjects, when compared with younger subjects, to be overly cautious and less inclined to take risks (23). Aging adults desire a high chance for success before they will approve a high-risk, higher-reward course of action (16). Comfort has observed that:

One finding in some studies is that older people avoid risk-taking behavior in decision making. Part of this is due to the wiliness of experience, and part to self-defense. They have plenty to lose in a culture which believes that older folk are inept and will fail. Although perfectly able to learn, in a learning situation older people get upset and anxious because of fear of failure. They may in fact appear not to learn because they would rather risk not answering than to give a wrong answer which confirms their own fears and other peoples' prejudices (34, p. 120).

Ostensibly, older adults have learned through life experiences the unpleasantness of taking risks and losing. In a testing situation, with all its inherent risks and anxieties, the poor performance of older adults may more accurately reflect cautiousness rather than a decrement in learning capacity.

### Test Anxiety

Anxiety is a feeling, or affect, of a particularly unpleasant, painful nature which has distinctive physiological features (89).

According to the text, Life and Health, anxiety:

...can affect one physiologically with disturbed breathing, increased heart activity and other circulatory changes, muscular disturbances, and increased sweating. Psychologically it may produce a sense of powerlessness, a presentiment of impending, and almost inevitable danger, a tense and physically exhausting alertness, as if facing an emergency, an all-absorbing apprehension that interferes with solving practical problems, and an irresolvable uncertainty concerning the nature of the threatening evil (36, p. 58).

From the above description it is quite evident that anxiety has the capacity to alter one's learning performance. It has been shown that, up to a certain point, anxiety actually facilitates learning performance. Venture beyond that point and learning performance is impaired.

Some authors have argued that test anxiety may adversely affect the learning performance of older adults (7, 154).

In a free-recall task, test anxiety was correlated with both adult age and memory performance, and the investigator concluded that the older adult's poor performance was partially attributed to anxiety to the test situation (193).

Keeping in mind the extraneous circumstances that can influence the degree of both intrinsic and extrinsic pressure on an aged subject in a testing situation, one can begin to appreciate the duress the older adult experiences. Much of the older adult's self-concept and ego is "on the line" in a testing situation. Consider the ageist belief that advanced age is accompanied by poorer learning performance. This affective distraction can impair the aged subject's performance. If anxiety is reduced or eliminated, the learning performance of elderly subjects increases (155).

### Fatigue

Fatigue may be defined as:

That state following a period of mental or bodily activity characterized by a lessened capacity for work and reduced efficiency of accomplishment, usually accompanied by a feeling of weariness, sleepiness, or irritability; it may also supervene when from any cause energy expenditure outstrips restorative processes (171, p. 457).

Fatigue knows no age or sex limitations and anyone who has ever seriously overtaxed himself knows the repercussions in store for him following exhausting fatigue.

With advancing age there is a gradual, continuous decline in mental and physical energies. While it is true that individuals age at different rates, it is, however, important to bear in mind the generalized physiological changes with age.

First, complex functioning declines in older adults, particularly in the performance of coordinated activities involving a number of connections between nerve and nerve, nerve and muscle and nerve and gland (190).

Second, older adults have a diminished ability to respond to stress, be it physical or emotional, and to return to pre-stress levels. In these two respects one can visualize the correlations among aging, fatigue and performance.

Severe fatigue impairs an older person's sensory processes and by diminishing the sensitivity of his environmental awareness it predisposes him to pre-occupation and thereby temporarily augments whatever undesirable mental propensities of old age he may have...it makes it harder for an older person to perceive or to remember clearly and accurately, to do difficult or constructive work, to see problems in full scope and proportion and to be considerate of his associates (168, p. 25-26).

Some investigators have argued that the effects of fatigue may confound the results of research utilizing long batteries of tests in order to determine the relationship between age and learning performance (139, 37).

Furry and Baltes (63) compared young, middle-aged and older adults who were tested with and without conditions of pretest fatigue.

The test performance of older adults was found to be significantly poorer, and to deviate most, from that of the younger age groups under conditions of pretest fatigue.

### Educational Experience

Education is an important variable to take into account in conducting research on the relationship of aging and cognitive functioning (139, 4). Some investigators have suggested that education level is more important than age in determining cognitive functioning (15).

Okun (139) makes an interesting observation in pointing out that age cohorts differ not only in educational levels but also with regard to the recency of their participation in formalized education. Recent experiences in educational programs, not age, may be an important determinant of learning effectiveness (166).

With each successive generation there has been an increase in the educational level and in the test scores of intellectual functioning (154). Bischoff states that:

...tests of cognitive ability may be unlikelike. Being rigidly timed during test taking, manipulating blocks and mannequins, responding to multiple-choice questions on machine-scored answer sheets are conditions generally not within the experience of older or aged subjects. Being "test wise" may give an undue advantage to younger subjects in a cross-sectional cognitive study (17, p. 136).

While it is true that all of the physical and psychological processes of the body slow down with age (16), adult education

program designers should be cognizant of, and sensitive to non-cognitive factors that may partially, or totally, contribute to the poorer performance of older adults in educational and testing situations. By being aware of ability-extraneous factors (139) and making the necessary modifications, adult educators can design learning milieus more appropriately suited to the older adult. All age groups can learn. Older people can usually learn anything other people can if given more time (6, p. 52).

### Teaching the Older Adult

A review of the literature pertinent to the instruction of older adults revealed a substantial hiatus of data. Recently there has been an increased recognition of the necessity to provide continuing education for adults; however, this acknowledgement has not usually included those adults over the age of 65.

The relative scarcity of data concerning the instruction of older adults may very well be a by-product of the notion that the primary function of education is to prepare young people for careers. Comfort (34) reports that this notion is yet another example of ageism.

Education should be lifelong, and Thomas Jefferson recognized the importance of a lifelong education by emphasizing that continuing education be provided for all without regard to social or economic status (94). The necessity of making provisions for lifelong education

is exemplified by the future-shocked world of today. The world is marked by such rapid change in knowledge, mores and values that the common individual may have problems coping. Atchley observes that:

In modern societies, knowledge changes rapidly. Because we concentrate formal education, especially job preparation, at the beginning of the life course, with each year that passes after graduation our knowledge bases become more and more out-of-date. Yet there is no mechanism for periodically updating knowledge systematically. People whose education and job skills have grown obsolete are treated exactly like those who have never gained an education or job skills and are not encouraged or given the opportunity to begin anew (6, p. 18).

Toffler (179) contends that the primary objective of education must be to increase the individual's copeability. To facilitate survival, the speed and economy with which one adapts to constant change must be increased. Hopkins (76) also promoted the notion that education is a lifelong process and should, therefore, be concerned with life-coping skills and not just the classroom, books and subjects isolated from the larger world.

Pursuing the idea that education must be continuous throughout one's life in order to help the individual develop skills to deal with accelerated change, and the virtual neglect of society to deal with this concern, Comfort writes:

People aren't educated to live, however much mouthing is done by the education industry. They are educated to act as work-oriented kamikazes, one-way projectiles (34, p. 14).

Why has the need for continuing education among older adults lagged so far behind the demonstrated need for remedial action? Palmore and Manton (140) have speculated that ageism could very well explain the lack of educational programs for older adults. Ageism is a form of prejudice, and it involves discrimination leveled by one age group against another (29). Since educators develop curricula and teaching strategies based on their beliefs concerning the nature of the learner, it becomes obvious that ageist dogmas can seriously impair the development, implementation and learning outcomes of any education program for older adults. Marcus speculates that:

Probably the most important aspect of the older-aged learner for the educator, is his concept of himself, which is likely to have been damaged by the experience of coming to be regarded by himself and others as old, with all the invidious concomitants of that idea in our culture (121, p. 3).

In order to conceive education programs to meet the needs of the older adult learner, program designers must thoroughly examine the issues, concerns and needs of this age group and formulate more realistic mind sets. With learners of any age, it is important to ascertain where the learner is in terms of abilities, interests, concerns and needs. Once this task has been accomplished, the program developer can more adequately prepare and organize the most appropriate methods and materials for a particular group.

Teaching older adults is different from teaching young or middle-aged adults. Each adult age group has particular and distinctive problems and concerns, and each has its own unique educational



needs (13). Teaching older adults differs from other types of teaching in the same way that teaching of small children differs from the teaching of adolescents, and the teaching of adolescents differs from the teaching of adults (122). Altman, Smith and Oppenheimer, in their discussion of the educational needs of the older adult, state that:

The unique characteristics of older adults require special consideration in the areas of learning theory and curriculum methods of development. Yet, in implementing educational programs for older people, we cannot simply transpose the educational theories designed for children and younger adults. The older adults' unique developmental and physiological stage in the life cycle requires that we design a pedagogy and methodology reflective of their distinct time and place in society. At present, there exists no pedagogy for older adults, nor has the community of educators and gerontologists addressed themselves to this area (1, p. 3).

Lebel (106) makes use of the term, "gerogogy", and defines it as the art and science of teaching the elderly. He emphasizes that, while the adult education literature abounds with references to the need for special educational approaches in serving the elderly, little has been done except to pay lip-service to the idea. Kasworm expands on this theme when he comments:

Old age does not and should not stop one from learning! However, by the nature of prior life experiences, educational background, life-stage interests, and physiological capabilities, the learning activities pursued by older adults are often different, and should be different, from those pursued by younger adults and children (86, p. 201).

It is apparent that many educators recognize that the older adult learner requires special educational approaches, yet few systematic attempts have been made to delineate guidelines for the adult educator charged with the responsibility of developing educational programs designed expressly for the elderly learner.

What are some of the important considerations to keep in mind when organizing an educational program for older adults? A selective review of some of the pertinent investigations in this area should provide the answer to the question. Bear in mind that while there is a dearth of research in this area, the information that is presently available should sufficiently sensitize program designers to some of the more important elements that must be considered in setting up any educational program for older adults.

### Setting and Climate

Age-related changes during the life span appear to contain implications for developing and utilizing instructional procedures among older adults. Since the educational setting can either facilitate or impede learning, it is critical that program providers make provisions for a learning milieu appropriate for older adults. Inasmuch as the physical comfort of older adults is extremely important, the following suggestions are offered:

- 1) Make sure that the classroom is adequately heated and ventilated within the proper limits.
- 2) Arrange for use of the most suitable furniture.

- 3) Arrange for a suitable and accessible meeting place, particularly one that does not require excessive stair climbing.
- 4) Schedule meetings insofar as possible to best suit the group (73).

Other recommendations include providing for a comfortable seating arrangement, especially in small groups; playing of music at the opening of class or during the breaks; greeting the learners as they enter and serving or providing refreshments (93).

Since the need for light increases with age, increased lighting must be provided, but not so much that it contributes to glare (113). Likewise, there is need for greater power or fullness of voice since hearing loss is quite prevalent in older adults, especially in older men (113). Instructors should pay close attention to volume of the presentation and seating arrangements. Those individuals with hearing impairments should be moved closer to the front of the room and the instructor should speak clearly and at a moderate pace (156).

An appropriate learning climate for older adults should also reflect strong emotional support (24). When supportive, as opposed to challenging instructions are employed, the learning performance of older adults increases (150). Reinforcing older adults for responding incorrectly tends to decrease the number of omission errors and improve performance (107).

Knowles (93) recommends that from the beginning of the class, the instructor be personable and address the learners by name.

Every effort should be made to provide a warm, friendly and supportive environment, and the stage should be set for effective two-way communication between the instructor and the adult learners.

Okun (138), in an excellent review of the literature, summarized the findings of laboratory experimental geropsychological research pertinent to the instruction of older adults, and then proceeded to delineate the explicit implications of the research for adult educators. Much of the following review is based upon the extrapolations of this investigator.

#### Rate of Presentation of Information

In teaching older adults, there is need for slower presentation of information (24, 30). In order to prevent "swamping effects", it is important to limit the amount of information presented in a single session, and, whenever possible, the adult learner should be allowed to proceed at his own rate and given ample time to respond to questions (132).

#### Organization of Information

The learning performance of older adults is enhanced when new information is presented in a highly organized fashion, and efforts have been made to provide the older learner with an explicit scheme to facilitate organization of the material (79, 24). Handouts and summaries can aid the older adult learner in gaining a clearer

understanding of the material, especially when information to be covered is outlined and section headings are employed.

One investigator has demonstrated that the learning performance of older adults is also increased when the subjects are provided with retrieval plans that make use of cues for specific categories of information (105). Finally, it should be noted that educational presentations made to older adults should be concise and succinct, and the instructor should avoid the introduction of irrelevant information and subject matter "fills" that may result in learner confusion (145).

### Meaningfulness of Material

It is a fairly well-established fact that learning performance can be affected by the learner's perception of the relevancy of the task at hand, whether it be an intelligence test or an organized course of study. The more relevant the task the more easily adults will learn and remember the material (24).

The instructor should make every possible effort to assess the concerns and cognitive capabilities of the adult learner in order to insure that the information is meaningful and introduced at the appropriate level (3). Since much of the elderly's formal education experience occurred at a point in time when educational philosophy emphasized tangible constructs instead of abstract ones, it is suggested that concrete examples and illustrations be used in explaining information to the older adult learner.

### Manner of Presenting Information

As the adult human ages, all the body systems become less and less functionally efficient; thus, it is so with the five senses (17). In order to accommodate for sensory losses, particularly in the auditory and visual senses, teaching techniques need to be modified. Botwinick (24) recommends that both visual and aural modes of presentation be employed since the more senses the elderly use the better they learn and remember.

Preparation of educational programs and materials for adult learners should reflect modifications designed to compensate for the decreased sensitivity of the visual and auditory senses.

Written materials should be typed in large print because the ability of the eye to focus on objects at different distances (accommodation) decreases with age (153). It would also be important to bear in mind that as one ages the eye tends to filter out the cooler colors of the spectrum such as the blues, greens and violets; therefore, the most appropriate colors to use in preparing materials for older adults would be yellow, orange and red (156).

In speaking to individuals with hearing loss, it is essential for the instructor to speak slowly and distinctly and not to shout; use gestures which help illustrate the message and be certain to face the person(s), paying close attention to correct enunciation so that lip reading can be facilitated (156).

### Introduction of New Material

Instructional units should be organized so that potentially interfering materials are spaced far enough away from each other to prevent interference. Kay (87) has suggested that retroactive and practice inhibition restrict what and how older subjects learn:

Retroactive inhibition is the difficulty in a learning activity when it follows very closely a similar activity; practice inhibition refers to the lessened ease of learning of the later members of a series following learning of an earlier member (17, p. 147).

Christensen (31) demonstrated that performance of older adults on a learning task was particularly poor when a similar task was introduced shortly after the original learning task. Another investigation concluded that older adults appear to be particularly susceptible to interference effects due to pre-existing, strongly reinforced habits (100). It would appear that instructors must exercise caution and discretion in setting up and implementing classes for older adults in order to minimize the effects of interference on learning.

In summary, it is important that adult educators develop a more realistic rationale for the instruction of older adults. The unique characteristics of this age group require specific teaching methodologies which take into account the distinctive physiological and psychological changes that impact on learning performance. Only when such careful planning has taken place can specialized teaching techniques and effective learning environments be set up to better meet the educational needs of older adults.

Since there is no universally accepted curriculum methodology, particularly one which is appropriate for the older adult learner, attention must be given to designing a curriculum to meet the unique needs of this age group.

### Behavioral Objectives as a Basis for Curriculum Development

According to Tyler, one of the primary problems that a curriculum planner must tackle is the question of what educational purposes or objectives the courses of instruction should seek to attain (182). Before one can undertake such a task, it is imperative that he have a knowledge and understanding of educational objectives. However, this is not a simple task since much confusion exists within the educational world as to the exact nature of an objective. For example, Popham writes:

Some educators use the terms objectives, goals, aims, intents, etc., interchangeably. Others use the terms differently, depending upon the level of generality involved. For instance, goal is used by some to convey a broader instructional intention, while objective is reserved for more limited classroom instruction (143, p. 433).

One aspect of the problem results from the fact that objectives have been used for many different purposes as McNeil points out:

There are many uses for objectives. They can communicate general direction at a policy level, provide a concrete guide for selecting and planning learning opportunities, and set the criteria for evaluating the learner's performance (125, p. 145).



Another aspect of the problem hinges on the curriculum designer's philosophical viewpoint as to the primary role of an objective. Some investigators believe that an objective must specify the exact overt behavior that a learner is to display at the end of a program of instruction, while other investigators surmise that an objective must specify behavior that will indicate whether the objective has been attained.

The result of these digressing philosophical viewpoints has been the promulgation of curriculum documents containing educational objectives stated erroneously. Gronlund lists some of the most common errors in stating objectives as follows:

- 1) Describing teacher behavior rather than student behavior.
- 2) Stating an objective in terms of the learning process rather than a learning product.
- 3) Listing the subject matter to be covered.
- 4) Including more than one type of learning outcome in each general objective (70).

Due to the uncertainty in the art of defining and stating objectives, the program planner involved in curriculum construction often finds himself in a quandry. The most logical point to begin the unraveling of this quagmire is with the work of Ralph Tyler.

Tyler recognized the importance of educational objectives when almost thirty years ago he stated:

If an educational program is to be planned, and if efforts for continued improvement are to be made, it is very necessary to have some conception

of the goals that are being aimed at. These educational objectives become the criteria by which materials are selected, content is outlined, instructional procedures are developed and tests and examinations are prepared (182, p. 14).

As a result of Tyler's achievements and advancements in the area of instructional planning, interest was stirred among college examiners attending the 1948 American Psychological Association Convention in Boston. The group expressed the fact, that since objectives serve as a basis for building curricula and tests and also represent the starting point for most educational research, there was a recognized need for a classification system to organize educational objectives (19). The 1948 meeting was the first of a series of annual meetings of college examiners that were held during the years 1949 to 1953. The final product of these meetings, which were attended by some of the most noted educational authorities of the time, was an educational handbook entitled, The Taxonomy of Educational Objectives (19).

This group of noted educational authorities examined the concept of educational objectives and concluded that:

By educational objectives, we mean explicit formulations of the ways in which students are expected to be changed by the educative process. That is, the ways in which they will change in their thinking, their feelings and their actions. There are many possible changes that can take place in students as a result of learning experiences, but since the time and resources of the school are limited only a few of the possibilities can be realized. It is important that the major objectives of the

school or unit of instruction be clearly identified if time and effort are not to be wasted on less important things and if the work of the school is to be guided by some plan (19, p. 3).

Mager (118) defines an objective as a description of a performance one wants learners to be able to exhibit before one considers them competent. As in the previous definitions, the primary emphasis is on the intended result of instruction rather than the process of instruction itself.

Gronlund's scheme was utilized in the development of the general instructional objectives and specific learning outcomes for this study. His work exemplifies the basic principles of curriculum development professed by such noted educators as Tyler, Mager, and Bloom and associates. Gronlund's guide for preparing educational objectives is discussed in Chapter III.

### III. METHOD OF INVESTIGATION

Data for this study were obtained from a highly select, national, expert panel comprised of authorities representing the disciplines of medicine, pharmacy, nursing and gerontology. Utilizing a modification of the Delphi technique, the members of this panel were asked to judge specific learning outcomes relative to their importance and appropriateness for the achievement of general instructional objectives of a medicine education program for ambulatory, non-institutionalized older adults. To this end, the research design focused on the following six major components: 1) the Delphi technique as a research method; 2) the development of general instructional objectives and specific learning outcomes; 3) the development of the questionnaire instrument; 4) the selection of an expert panel of judges; 5) the treatment of data; and 6) the application and analysis of two rounds of the questionnaire instrument.

#### The Delphi Technique

This study utilized a modification of the classic Delphi technique, a survey method developed by Olaf Helmer and other senior scientists at the Rand Corporation in the early 1960's. The technique is built on the strength of informed, intuitive judgments, and its purpose is to obtain a consensus of expert opinion without bringing the experts together in any kind of a face-to-face confrontation (141). Dalkey explains the rationale for the procedures as follows:

The rationale for the procedures is primarily the age-old adage "Two heads are better than one," when the issue is one where exact knowledge is not available. The procedures have three features:

- (1) Anonymous response - opinions of members of the group are obtained by formal questionnaire.
- (2) Iteration and controlled feedback - interaction is effected by a systematic exercise conducted in several iterations, with carefully controlled feedback between rounds,
- (3) Statistical group response - the group opinion is defined as an appropriate aggregate of individual opinions on the final round. These features are designed to minimize the biasing effects of dominant individuals, of irrelevant communications, and of group pressure toward conformity (39, p. v).

In the Delphi technique an expert committee is carefully selected, and, after acknowledging participation in the study, the committee members are mailed a series of questionnaires. Between each round of the questionnaire an analysis is performed, and organized, controlled feedback is returned to the experts. This procedure makes use of anonymity to rule out coercion by other panelists, and affords the expertstime to think and give an independent opinion. The classic Delphi technique consists of four major steps:

- 1) An expert committee is selected and asked to list opinions on a certain topic (first questionnaire).
- 2) From these lists, a second questionnaire is developed and the respondents are asked to evaluate various items by some criterion such as importance or chance of success. Usually a voting scale such as 1 to 4 or 1 to 5 is included and space provided for the participant to justify his/her decision.
- 3) The second questionnaire is analyzed. Each participant receives a list and summary of the items in the questionnaire and if the respondent's opinion is in the minority for a given item, he is asked to revise his opinion or indicate his reason for remaining in the minority.

- 4) The third questionnaire is analyzed, and again each individual receives the list, an updated summary, minority opinions, and a final chance to revise his opinions (180, p. 27-28).

In this investigation, as is the case with many studies utilizing the Delphi technique, the first step (i.e., asking experts to list opinions on a certain topic) was omitted. Uhl points out the following reasons for this deletion:

- 1) Time is saved and it is often difficult to combine individual lists and devise an adequate, clear set of good statements.
- 2) By designing an instrument, it is possible to write, test, and revise the goal statements. One may also include experts to make sure that statements of value are not omitted.
- 3) The participants' tasks are simplified (184, p. 7).

In addition to the change mentioned above, the Delphi technique, as utilized in this study, was modified in the following respects:

- 1) The study did not report the minority opinion on the second round of the questionnaire, nor did it attempt to coerce the experts in the minority opinion to a more favorable agree rating based on feedback from the first round of the questionnaire.
- 2) Experts were asked to recommend modifications of the original specific learning outcomes as well as to suggest additional ones. Both the modified and the additional specific learning outcomes were rated by the experts in round two of the questionnaire.

- 3) Reasons for agreeing were not solicited, because the intent of this study was to identify the most important specific learning outcomes deemed necessary by the experts to achieve a given general instructional objective, as opposed to any attempt to coerce acceptance of the originally stated specific learning outcomes. Moreover, it was thought impractical to request an expert panel of the caliber selected for this study to provide reasons for agreement due to the sheer number of specific learning outcomes submitted for their judgment.

#### Development of General Instructional Objectives and Specific Learning Outcomes

Gronlund's guide for preparing educational objectives was used in formulating the general instructional objectives and specific learning outcomes for this study (70). This practical guide for preparing instructional objectives emphasizes the stating of instructional objectives as learning outcomes and the defining of these objectives in terms of student behaviors. When instructional objectives are stated in such a manner, the focus is on the student and the types of behaviors he is expected to demonstrate as a result of the program of instruction.

The program designer, making use of this instructional planning process, must perform two important steps in defining learning outcomes:

- 1) Stating the instructional objectives as general learning outcomes.
- 2) Listing under each instructional objective a representative sample of specific learning behaviors that indicates mastery of the objective.

### General Instructional Objectives

General instructional objectives should be succinct, explicit statements that describe instructional intent in terms of the desired learning outcomes. Gronlund emphasizes that:

When developing a list of general instructional objectives for a course (or unit of course work), our aim is to obtain a list of goals to work toward and not a list of specific types of behavior to be attained by all students. To be sure, each general instructional objective will need to be defined further by a sample of the specific types of behavior that characterizes each objective, but at this stage we are focusing only on the stating of general objectives (70, p. 10).

Stating instructional objectives as desired learning outcomes shifts the focus of the program of instruction from the teacher to the student and from the learning process to the learning product. This emphasis edifies the purpose of instruction and affords the program designer a means by which to evaluate the instruction.

Phrasing instructional objectives as learning outcomes is advantageous to the instructional process in the following ways:



- 1) It provides direction for the instructor, and it clearly conveys his instructional intent to others.
- 2) It provides a guide for selecting the subject matter, the teaching methods, and the materials to be used during instruction.
- 3) It provides a guide for constructing tests and other instruments for evaluating student achievement (70, p. 4).

Once a tentative list of general instructional objectives has been drawn up for an instructional program, the curriculum planner must now describe each objective in terms of specific learning outcomes.

### Specific Learning Outcomes

Specific learning outcomes are specific types of behaviors that can be used as evidence that the student has achieved the general instructional objective. Each general instructional objective should be accompanied by only a representative sample of specific learning outcomes, since it would be virtually impossible to list all types of behaviors that would demonstrate attainment of the objective.

Specific learning outcomes are expressed as statements that begin with a verb indicating observable behavior. By describing the specific behavioral reactions the student is to exhibit at the end of an instructional program, the instructor has a means for ascertaining whether or not the learner has attained the general instructional objective.

In summary, Gronlund's procedure for defining instructional objectives in behavioral terms should include the following steps:

- 1) State the general instructional objectives as expected learning outcomes.
- 2) Place under each general instructional objective a list of specific learning outcomes that describe the terminal behavior students are to demonstrate when they have achieved the objectives.
  - a. Begin each specific learning outcome with a verb that specifies definite, observable behavior.
  - b. List a sufficient number of specific learning outcomes under each objective to describe adequately the behavior of students who have achieved the objective.
  - c. Be certain that the behavior in each specific learning outcome is relevant to the objective it describes.
- 3) When defining the general instructional objectives in terms of specific learning outcomes, revise and refine the original list of objectives as needed.
- 4) Be careful not to omit complex objectives simply because they are difficult to define in specific behavioral terms.
- 5) Consult reference materials for help in identifying the specific types of behavior that are most appropriate for defining the complex objectives (70, p. 16-17).

It should be emphasized that the consummate objective in utilizing Gronlund's scheme is to develop and derive a definitive list of general instructional objectives and specific learning outcomes that most concisely indicate the learning outcomes expected from the instruction.

### Sources for Formulating Objectives and Learning Outcomes

Sources for formulating the general instructional objectives and specific learning outcomes for this study included:

- 1) An extensive literature search of professional writings, references and research pertaining to drugs and the elderly, including the physiological, psychological, sociological and economic aspects of the problem.
- 2) A survey of the professional literature relative to curriculum design, particularly with reference to behavioral objectives as a basis for curriculum construction.
- 3) This researcher's experience in:
  - a) Teaching older adults about drugs through workshops, seminars and small study groups in various cities and states throughout the nation.
  - b) Teaching professional groups working with the elderly in various capacities and situations.
  - c) Co-authoring a text dealing with the health and drug problems of the elderly.

### Application of Gronlund's Scheme to this Study

Utilizing Gronlund's scheme, the seven general instructional objectives stated below were formulated. The ambulatory, non-institutionalized, older adult:

- 1) Understands fundamental principles of aging.
- 2) Knows common drug terms.
- 3) Understands fundamental concepts concerning drugs.
- 4) Recognizes that each drug has risks as well as benefits.
- 5) Understands the older adult is vulnerable to problems with drugs.
- 6) Recognizes the importance of being an activated patient.
- 7) Comprehends that older adults are susceptible to fraudulent health practices.

As Gronlund suggests, the above general instructional objectives are defined in behavioral terms, and, as such, are stated as expected learning outcomes. This list of seven general instructional objectives was finalized following a series of revisions and refinements. While some of the objectives at first appeared to be extremely complex, this problem was resolved when it became possible to find a way to define the objective in specific behavioral terms.

For each of the above seven general instructional objectives, representative samples of specific learning outcomes were developed describing the terminal behaviors learners are expected to demonstrate when they have achieved that particular objective. In this manner, a total of 143 specific learning outcomes was formulated for this study. The number of specific learning outcomes were not evenly distributed among the seven objectives inasmuch as some general instructional objectives were more complex than others, thus requiring a greater number of specific learning outcomes to adequately describe the

behavior intended. The number of specific learning outcomes developed for the various seven general instructional objectives ranged from 10 to 25. Careful attention was given to the placement of each specific learning outcome with respect to its relevance to the objective it was intended to describe.

### Development of the Questionnaire Instrument

#### Questionnaire Design

The questionnaire instrument presented the seven major general instructional objectives expressed in behavioral terms. Under each of these seven objectives were listed representative samples of specific learning outcomes a learner is expected to demonstrate as evidence of achievement of that particular behavioral objective. The specific learning outcomes were arranged in such manner to permit the expert panelists to judge each on a six-point rating scale with assigned weighted values relative to their importance and appropriateness for inclusion in a medicine education program for the ambulatory, non-institutionalized older adult. The six-point rating scale, with assigned weighted values, was as follows:

- 1) Strongly Agree (SA) - - - - - 6
- 2) Agree (A) - - - - - 5
- 3) Agree with Reservation (AR) - - - - - 4
- 4) Disagree with Reservation (DR)- - - - - 3
- 5) Disagree (D)- - - - - 2
- 6) Strongly Disagree (SD)- - - - - 1

Noteworthy is the fact that this particular scale has no middle number and thus forces a respondent to choose between 4 (AR) or 3 (DR) if

he/she is somewhat neutral on an item (180, p. 30). For those specific learning outcomes in which a respondent failed to select a response category, a zero (0) was recorded as the response. All zeros were treated as missing data and were not included in the calculations.

The questionnaire was designed to afford the expert panelists the opportunity:

- 1) To give reasons for disagreeing with a particular specific learning outcome.
- 2) To modify any of the original specific learning outcomes.
- 3) To submit additional learning outcomes which were not included in the original list.

#### Pre-Testing and Revising the Questionnaire Instrument

To insure that the questionnaire was clear and concise, it was pre-tested by 15 local professionals representing the various disciplines germane to this study which were distributed as follows: medicine, five; pharmacy, two; nursing, two; gerontology, two; and health education, four (Appendix A). After contact by telephone, the pre-test questionnaire instrument, accompanied by a cover letter, was sent to each of these local professionals explaining the purpose of this investigation and requesting their participation as a pre-test panelist. This pre-test panel was asked to:

- 1) Read the instructions and check for succinctness and clarity.
- 2) Complete the questionnaire and make any necessary modifications to insure that the questionnaire did, in fact,

thoroughly address the task at hand.

- 3) Record the time necessary to complete the questionnaire.
- 4) Constructively criticize the instrument and make suggestions to improve its meaning, content, clarity and organization.

Recommendations of the pre-test panelists resulted in the following changes for improvement of the questionnaire instrument:

- 1) Deleting 20 of the 143 original specific learning outcomes due to inappropriateness or ambiguity.
- 2) Rewording of the instructions for completing the questionnaire.
- 3) Clarifying the meaning and intent of some of the specific learning outcomes.
- 4) Redesigning the questionnaire layout from a vertical to a horizontal orientation to enable the expert panelists to more easily comprehend the organizational structure of the questionnaire instrument and to expedite their completion of the required task.

#### Selection of the Expert Panel

Expert panelists for this investigation were selected primarily because of their recognized expertise in matters pertaining to drugs and the elderly. The selection process employed the following criteria:

- 1) The individual should be actively contributing to the knowledge base relating to drugs and the aged through teaching, research or publication.
- 2) The individual should be acknowledged as a leader in his respective field as determined by past and present professional responsibilities and achievements, professional affiliations, research and publications.
- 3) The individual should have an interest in, or experience with, the effects of drugs on the aged, and be available for the time period required for completion of this study.
- 4) The individual should be recommended by a national or state professional association or organization of which he is a member representing one of the four disciplines germane to this study.

The procedures used in the selection process to determine the membership and formulation of the expert panel were as follows:

Step 1.-A thorough review of the related literature revealed a repetitive frequency in the names of specific researchers reporting on investigations involving drugs and the elderly. Those researchers whose names were consistently cited were placed on a listing of potential expert panelists.

Step 2.-A second, separate preliminary list of potential experts was compiled utilizing the Encyclopedia of Associations as a basic reference. This particular resource contains a chronicling of all professional organizations in the United



States. The names and addresses of the executive directors of those organizations representing the specialties of medicine, pharmacy, nursing and gerontology were ascertained. A letter (Appendix B) was sent to each of these individuals explaining the purpose of this investigation and requesting a list of names of their respective members whose professional expertise in the area of drugs and the elderly would qualify them to serve as an expert panelist for this study.

Step 3.-A final comprehensive list of potential expert panelists was formulated by combining the two preliminary lists of potential experts as described above, and by insuring that each member met the criteria previously stated. This selection process resulted in a list of 27 potential expert panelists representing each discipline as follows: medicine, ten; pharmacy, nine; nursing, six; and gerontology, two.

Step 4.-A letter (Appendix C) was sent to each of the 27 potential expert panelists inviting their participation in this study. The communication explicated the primary intent of this investigation and briefly explained the methodology to be used in obtaining expert opinion without bringing the experts together. The letter of invitation to the experts was accompanied by a response sheet (Appendix D) and a self-addressed, stamped envelope. Immediately upon receipt of an affirmative response, a letter of thanks (Appendix E) was sent to the expert panelist.

A cut-off date of six weeks was established for the invited experts to respond. A total of 16 affirmative responses was obtained within the allotted time frame and the expert panelists were distributed among the four disciplines apposite to this study as follows: medicine, three; pharmacy, eight; nursing, four; and gerontology, one. A listing of the 16 expert committee members appears in Appendix F. A review of this listing indicates the extremely high level of expertise found among the specialists who participated in this investigation. According to Jones (83, p. 107), a carefully chosen expert committee of as few as 10 to 12 individuals is usually sufficient to explore a problem and reach a valid consensus.

### Treatment of Data

The intent of this study was to determine whether or not consensus agreement was reached by an expert panel relative to the importance and appropriateness of various specific learning outcomes for the achievement of seven general instructional objectives of a medicine education program for older adults. Consensus is defined as agreement in opinion, testimony, or belief (129, p. 161).

In consultation with three independent statisticians representing three separate statistical departments or units at Oregon State University, it was determined that a complex, esoteric statistical analysis of the data would detract from the primary

intent of this investigation. Consequently, the following two criteria, both of which must be met, were used to determine whether or not a specific learning outcome reached consensus of the expert panel:

- 1) Mean.—The specific learning outcome had to achieve a mean of 4.80 or above on a scale of one to six, where one corresponded to a "Strongly-Disagree" rating and six to a "Strongly-Agree" rating.
- 2) Percentage Agreement Index.—The specific learning outcome must receive a "Strongly Agree" or "Agree" rating by a minimum of 75 percent of the expert panelists. This value is hereafter referred to as the percentage agreement index.

The mean is a measure of central tendency and is commonly understood as the arithmetic average. The mean varies less from sample to sample selected from the same group than does either the median or the mode (152). Any set of numbers may be made more meaningful by making use of a single number to indicate the middle of the distribution of scores, or the central tendency, and the measure of central tendency used most frequently is the arithmetic mean (187). The mean is derived by employing the following formula:

$$\bar{x} = \frac{x}{N}$$

$\bar{x}$  = Mean  
 $x$  = Sum of all scores  
 $N$  = Total number of scores

The percentage agreement index was used in this study for a more rigorous measure of consensus, since the intent of this investigation was the development of a highly refined list of specific learning outcomes.

### Application and Analysis of the Questionnaire Instrument

#### Processing and Analyzing Questionnaire #1

##### Distribution of Questionnaire #1

The first round of the questionnaire (Appendix G), accompanied by a cover letter (Appendix H), was sent to the 16 expert panelists. The cover letter reiterated the purpose of this study and assured all experts that their comments and answers would be kept confidential, with only summarized results of this study to be used in any subsequent report. The panelists were guaranteed acknowledgment for their participation and were also informed of the estimated time required to complete the task. The panelists were instructed to complete and return the questionnaire within 10 days following its receipt in an enclosed, stamped, self-addressed envelope.

##### Follow Up of Unreturned Questionnaire #1

A cut-off date was established at 21 days after the mailing date of the first questionnaire. This time frame was developed by estimating the approximate time for the questionnaire to reach the experts, completion of the task and the return of the questionnaire.

Experts failing to comply were contacted by telephone and asked to complete and return the questionnaire as soon as possible.

#### Procedures for Analyzing Questionnaire #1

Upon receipt of the 16 completed questionnaires from the expert panelists, the number of responses, the raw distribution of responses, the mean and the percentage agreement index for each specific learning outcome were determined and tabulated (Table 1). Based upon these data, the specific learning outcomes were analyzed and processed as follows:

- 1) Those specific learning outcomes which reached consensus as defined above, and for which no modifications were recommended by the expert panelists, were recorded and required no further processing.
- 2) Those specific learning outcomes which did not reach consensus, and for which no modifications were recommended by the expert panelists, were discarded.
- 3) Those specific learning outcomes which reached consensus, but for which suggestions for changes were made by various expert panelists, were modified to reflect the experts' suggestions and recommendations.

- 4) Those specific learning outcomes which did not reach consensus, but for which suggestions and recommendations were provided by the expert panelists for modification, were reformulated.
- 5) Additional specific learning outcomes submitted by various members of the expert panel were recorded and utilized in the preparation of the second questionnaire.

#### Preparation of Summary Report for Questionnaire #1

A summary report of questionnaire #1 (Appendix I) was prepared to report to the 16 expert panelists the mean and the percentage agreement index for each specific learning outcome and to indicate whether or not the outcome had reached consensus. This report provided the experts a facile assessment of how each specific learning outcome fared among the entire expert panel in the first round of questioning.

#### Preparing, Processing and Analyzing Questionnaire #2

#### Preparation of Questionnaire #2

Questionnaire #2 (Appendix J) included the following:

- 1) Specific learning outcomes which had already reached consensus on the first round of questioning, but which were modified to incorporate the suggestions of the various expert panelists for further refinement.

It was determined that the modifications were significant enough to warrant resubmitting for a second round of judgment. It was also thought that such modified specific learning outcomes might lead to a higher degree of consensus among the expert panelists.

- 2) Specific learning outcomes which did not reach consensus on the first round of questioning, but were modified on the basis of the suggestions and recommendations of the expert panel.
- 3) Additional specific learning outcomes recommended by various expert panelists.

A total of 18 modified specific learning outcomes and 11 additional specific learning outcomes comprised Questionnaire #2. This questionnaire followed the same format as for Questionnaire #1 with the exception that modifications and additions to the specific learning outcomes presented were not elicited. The decision to omit these tasks was based on the extremely high number of specific learning outcomes which reached consensus on the first round of questioning. Questionnaire #2 did, however, request the experts to state reasons for disagreeing with the modified or additional specific learning outcomes.

## Distribution of Questionnaire #2

The second questionnaire was mailed to the expert panelists along with a cover letter (Appendix K), a summary report of the analysis of Questionnaire #1 and an Expert Panelist Data Sheet (Appendix L).

The cover letter thanked the panelists for their comments, recommendations and suggestions for modifying some of the specific learning outcomes and for submitting additional ones. The letter further requested that the panelists complete and return the second round of the questionnaire within 10 days following its receipt in a stamped, self-addressed envelope provided.

The summary report (Appendix I) presented the mean and percentage agreement index for each specific learning outcome which reached consensus, as well as for those which were rejected. The summary report explained to the panelists that of the 123 original specific learning outcomes presented for judgment, 108 (87.8%) had reached consensus on the first round of the questionnaire making it unnecessary to include them in Questionnaire #2. An explanation was also given for including for re-evaluation some of the original specific learning outcomes which had reached consensus, but which had been modified on the basis of suggestions and recommendations of various expert panelists.

The Expert Panelist Data Sheet requested each panelist to indicate how he/she wished his/her name and title to appear as a participant of this study.



### Follow Up of Unreturned Questionnaire #2

The same procedures established for follow up of Questionnaire #1 were utilized in the follow up of Questionnaire #2. Of the original 16 expert panelists who agreed to participate in this study, only two did not return the second round of the questionnaire.

### Analysis of Questionnaire #2

Upon receipt of the 14 completed questionnaires from the expert panelists, the number of responses, the raw distribution of responses, the mean and the percentage agreement index were determined and tabulated (Table 10). Those specific learning outcomes with a mean of 4.80 or above and which were also given an "Agree" or "Strongly Agree" rating by a minimum of 75 percent of the expert panelists (i.e., percentage agreement index) were considered to have reached consensus. Those specific learning outcomes which failed to meet either one or the other of these two criteria were rejected.

### Preparation of Final Summary Report

A final summary report of the major findings of this research (see Lists 1, 2 and 3, Chapter IV) was prepared and sent to each member of the expert panel, accompanied by a letter of thanks and gratitude for his/her participation in this investigation (Appendix M).

Based upon the criteria established in this study for acceptance or rejection, this final summary consisted of: 1) those specific learning outcomes deemed important and appropriate by 14 nationally recognized experts in the field of drugs and the aged for

inclusion in a medicine education program designed expressly for ambulatory, non-institutionalized older adults; 2) those specific learning outcomes reaching 100% consensus; and 3) those specific learning outcomes rejected by the expert panelists.

#### IV. RESULTS AND ANALYSIS

To validate the importance and appropriateness of specific learning outcomes for inclusion in a medicine education program designed expressly for older adults, two rounds of a questionnaire instrument were submitted to 16 expert panelists for their professional judgment. The major findings and analysis of these two rounds of the questionnaire are discussed below.

##### Results of Questionnaire #1

Five weeks after the first questionnaire was mailed to the 16 expert panelists, 16 (100%) had been returned and analyzed statistically (Table 1). The fact that all panelists responded to the lengthy questionnaire instrument, despite heavy professional commitments, is indicative of the relevance and timeliness of this investigation. In fact, one of the expert panelists representing the American Pharmaceutical Association, an elite organization of major pharmaceutical houses in the United States, enclosed a letter with his completed questionnaire praising the insight and design of the research (Appendix N).

Table 1 presents the mean, the percentage agreement index and the raw distribution of responses for each of the 123 specific learning outcomes comprising Questionnaire #1. In addition, Table 1 also indicates those specific learning outcomes which reached consensus and those which were rejected by the experts on the first round of questioning.

TABLE 1  
RESULTS OF QUESTIONNAIRE #1

GENERAL INSTRUCTIONAL OBJECTIVE	CONSENSUS	LEARNING OUTCOME NUMBER	NUMBER OF RESPONSES	RAW DISTRIBUTION OF RESPONSES						MEAN	PERCENTAGE AGREEMENT INDEX <sup>c</sup>
				6(SA)	5(A)	4(AR)	3(DR)	2(D)	1(SD)		
I. UNDERSTANDS FUNDAMENTAL PRINCIPLES OF AGING	A <sup>a</sup>	I-1	16	12	4					5.75	100.00
	A	I-2	16	5	7	4				5.06	75.00
	A	I-3	16	7	7	2				5.30	87.50
	A	I-4	16	6	10					5.37	100.00
	A	I-5	16	5	7	3		1		4.93	75.00
	A	I-6	16	4	10	1		1		4.93	87.50
	A	I-7	16	6	7	2		1		5.00	81.25
	A	I-8	16	8	8					5.50	100.00
	A	I-9	16	6	6	1	1	2		4.81	75.00
	A	I-10	16	9	6	1				5.40	93.75
	A	I-11	16	6	8		2			5.12	87.50
	A	I-12	16	11	4	1				5.60	93.75
	A	I-13	16	11	4	1				5.60	93.75
	A	I-14	16	10	4			2		5.25	87.50
II. KNOWS COMMON DRUG TERMS	A	II-1	16	4	8	3	1			4.93	75.00
	A <sub>b</sub>	II-2	16	2	11	3				5.18	81.25
	R <sub>b</sub>	II-3	16	3	9	2		1	1	4.62	75.00
	R	II-4	16	2	9	3	1	1		4.62	68.75
	A	II-5	16	9	6		1			5.37	93.75
	A	II-6	16	11	4		1			5.56	93.75
	A	II-7	16	8	7	1				5.40	93.75
	R	II-8	16	6	4	4		2		4.75	62.50
	A	II-9	16	6	7	1	1	1		5.00	81.25
	R	II-10	16	3	7	4	1	1		4.68	62.50

TABLE 1. Continued

GENERAL INSTRUCTIONAL OBJECTIVE	CONSENSUS	LEARNING OUTCOME NUMBER	NUMBER OF RESPONSES	RAW DISTRIBUTION OF RESPONSES						MEAN	PERCENTAGE AGREEMENT INDEX <sup>c</sup>
				6(SA)	5(A)	4(AR)	3(DR)	2(D)	1(SD)		
III. UNDERSTANDS FUNDAMENTAL CONCEPTS CONCERNING DRUGS.	A	III-1	16	8	4	3		1		5.12	75.00
	A	III-2	16	10	4	2				5.50	87.50
	R	III-3	16	3	8	4	1			4.81	68.75
	A	III-4	16	4	9	2	1			5.12	81.25
	A	III-5	16	4	8	3		1		4.87	75.00
	A	III-6	16	5	10	1				5.25	93.75
	R	III-7	16	3	6	7				4.75	56.25
	A	III-8	16	4	10	2				5.06	87.50
	A	III-9	16	9	6	1				5.30	93.75
	A	III-10	16	6	7	3				5.06	81.25
	A	III-11	16	5	8	3				5.12	81.25
	A	III-12	16	6	8	1	1			5.18	87.50
	R	III-13	16	3	8	3	1	1		4.68	68.75
	R	III-14	16	3	6	4	1	2		4.43	56.25
	A	III-15	16	12	4					5.75	100.00
	A	III-16	16	13	3					5.81	100.00
	A	III-17	16	10	5		1			5.30	93.75
IV. RECOGNIZES THAT EACH DRUG HAS RISKS AS WELL AS BENEFITS.	A	IV-1	16	11	5					5.68	100.00
	A	IV-2	16	7	7	2				5.30	87.50
	A	IV-3	16	6	6	3				4.93	75.00
	A	IV-4	16	7	7	2				5.30	87.50
	A	IV-5	16	9	6			1		5.37	93.75
	R	IV-6	16	5	5	1	2	2	1	4.43	62.50
	R	IV-7	16	2	4	4	2	3	1	3.81	37.50
	A	IV-8	16	7	6	2			1	4.93	81.25
	A	IV-9	16	7	7	1	1			5.06	87.50
	A	IV-10	16	6	7	2	1			5.18	81.25

TABLE 1. Continued

GENERAL INSTRUCTIONAL OBJECTIVE	CONSENSUS	LEARNING OUTCOME NUMBER	NUMBER OF RESPONSES	RAW DISTRIBUTION OF RESPONSES						MEAN	PERCENTAGE AGREEMENT INDEX <sup>c</sup>
				6(SA)	5(A)	4(AR)	3(DR)	2(D)	1(SD)		
IV. CONTINUED	R	IV-11	16	5	3	2	1	3	2	4.00	50.00
	R	IV-12	16	7	3	4		1	1	4.75	62.50
	A	IV-13	16	5	7	2		2		4.81	75.00
	A	IV-14	16	12	4					5.75	100.00
	A	IV-15	16	13	3					5.81	100.00
	A	IV-16	16	11	4	1				5.60	93.75
	A	IV-17	16	13	3					5.81	100.00
	A	IV-18	16	13	3					5.81	100.00
	A	IV-19	16	12	4					5.75	100.00
	A	IV-20	16	13	3					5.81	100.00
	R	IV-21	16	6	4	2	2	2		4.75	62.50
	A	IV-22	16	10	2	3		1		5.25	75.00
	A	IV-23	16	13	3					5.81	100.00
	A	IV-24	16	11	5					5.68	100.00
	A	IV-25	16	11	4		1			5.56	93.75
	A	IV-26	16	11	4	1				5.62	93.75
	A	IV-27	16	14	2					5.87	100.00
	A	IV-28	16	11	3	2				5.56	87.50
V. UNDERSTANDS OLDER ADULT IS VULNERABLE TO PROBLEMS WITH DRUGS.	A	V-1	16	8	8					5.50	100.00
	A	V-2	16	6	6	2	1	1		4.93	75.00
	A	V-3	16	6	6	3		1		5.00	75.00
	A	V-4	16	4	8	3		1		4.87	75.00
	A	V-5	16	4	9	2		1		4.93	81.25
	A	V-6	16	8	7	1				5.40	93.75
	A	V-7	16	5	11					5.30	100.00
	A	V-8	16	7	9					5.40	100.00
	A	V-9	16	7	9					5.40	100.00

TABLE 1. Continued

GENERAL INSTRUCTIONAL OBJECTIVE	CONSENSUS	LEARNING OUTCOME NUMBER	NUMBER OF RESPONSES	RAW DISTRIBUTION OF RESPONSES							PERCENTAGE AGREEMENT INDEX <sup>c</sup>
				6(SA)	5(A)	4(AR)	3(DR)	2(D)	1(SD)	MEAN	
V. Continued	A	V-10	16	10	6					5.68	100.00
	A	V-11	16	9	7					5.56	100.00
	A	V-12	16	8	6					5.30	87.50
	A	V-13	16	8	7		1			5.37	93.75
	R	V-14	16	8	3	3	1			5.06	68.75
	A	V-15	16	10	4	1	1			5.40	87.50
VI. RECOGNIZES THE IMPORTANCE OF BEING AN ACTIVATED PATIENT.	A	VI-1	16	6	8		1	1		5.06	87.50
	A	VI-2	16	8	7			1		5.30	93.75
	A	VI-3	16	11	4	1				5.60	93.75
	R	VI-4	16	5	6	5				5.00	68.75
	A	VI-5	16	11	5					5.68	100.00
	A	VI-6	16	9	4	2		1		5.25	81.25
	A	VI-7	16	9	4	2		1		5.25	81.25
	A	VI-8	16	10	5	1				5.56	93.75
	A	VI-9	16	8	4	3		1		5.12	75.00
	A	VI-10	16	7	6	2	1			5.25	81.25
	A	VI-11	16	10	6					5.60	100.00
	A	VI-12	16	9	4	2		1		5.25	81.25
	A	VI-13	16	9	4	2		1		5.25	81.25
	A	VI-14	16	8	5	2		1		5.20	81.25
	A	VI-15	16	10	5	1				5.56	93.75
	A	VI-16	16	8	7		1			5.37	93.75
	A	VI-17	16	10	5	1				5.56	93.75
	A	VI-18	16	11	5					5.68	100.00
	A	VI-19	16	10	5	1				5.56	93.75
	A	VI-20	16	10	4	1		1		5.50	87.50
	A	VI-21	16	11	4	1				5.60	93.75

TABLE I. Continued

GENERAL INSTRUCTIONAL OBJECTIVE	CONSENSUS	LEARNING OUTCOME NUMBER	NUMBER OF RESPONSES	RAW DISTRIBUTION OF RESPONSES						MEAN	PERCENTAGE AGREEMENT INDEX <sup>c</sup>
				6(SA)	5(A)	4(AR)	3(DR)	2(D)	1(SD)		
VI. Continued	A	VI-22	16	11	4	1				5.60	93.75
	A	VI-23	16	11	5					5.68	100.00
	A	VI-24	16	10	5	1				5.56	93.75
	A	VI-25	16	9	6	1				5.50	93.75
VII. COMPREHENDS THAT OLDER ADULTS ARE SUSCEPTIBLE TO FRAUDULENT HEALTH PRACTICES.	A	VII-1	16	6	9	1				5.30	93.75
	A	VII-2	16	5	8	2		1		5.00	81.25
	A	VII-3	16	7	9					5.40	100.00
	A	VII-4	16	5	11					5.30	100.00
	A	VII-5	16	6	9	1				5.30	93.75
	A	VII-6	16	7	9					5.40	100.00
	A	VII-7	16	6	10					5.37	100.00
	A	VII-8	16	7	8			1		5.25	93.75
	A	VII-9	16	6	8		1	1		5.06	93.75
	A	VII-10	16	7	8	1				5.30	93.75
	A	VII-11	16	12	4					5.75	100.00
	A	VII-12	16	8	5	2	1			5.26	81.25
	A	VII-13	16	11	5					5.68	100.00
	A	VII-14	16	7	6	2	1			5.06	81.25

<sup>a</sup>Accepted specific learning outcomes<sup>b</sup>Rejected specific learning outcomes<sup>c</sup>Percentage agreement index is defined as the percentage of respondents marking either the category "Agree" (5) or "Strongly Agree" (6).



It should be recalled that a specific learning outcome met consensus of the expert panelists, and therefore was accepted, if it met both of the following two criteria:

- 1) A "Strongly Agree" (6) or "Agree" (5) rating from at least 75 percent of the expert panelists.
- 2) A mean score of 4.80 or greater on a six-point Likert-type scale.

Any specific learning outcome failing to meet both of these criteria was considered to be rejected by the experts. The raw distribution of scores is also given in Table 1 to show the experts' rating of each specific learning outcome as well as a visual representation of the clustering of the experts' responses.

#### Accepted Specific Learning Outcomes

Of the original 123 specific learning outcomes, 108 (87.8%) reached consensus as defined above. Table 2 provides a listing of these learning outcomes accompanied by their respective percentage agreement index and mean, the two analytical criteria used to determine consensus.

#### Percentage Agreement Index

Percentage agreement index refers to the percent of expert panelists marking either the "Agree" (5) or "Strongly Agree" (6) rating on the six-point, Likert-type scale. A detailed inspection of the 108 specific learning outcomes reaching consensus in

TABLE 2  
SPECIFIC LEARNING OUTCOMES REACHING CONSENSUS IN  
QUESTIONNAIRE #1

SPECIFIC LEARNING OUTCOMES	MEAN	PERCENTAGE AGREEMENT INDEX
<sup>a</sup> I-1. Points out that aging is a normal, natural and inevitable process in the life cycle.	5.75	100.00
I-2. Differentiates normal aging from pathological aging.	5.06	75.00
I-3. Distinguishes between chronological age and functional age.	5.30	87.50
<sup>a</sup> I-4. Identifies some factors that contribute to the wide variability of aging in humans.	5.37	100.00
I-5. Summarizes some of the biological changes that contribute to aging.	4.93	75.00
I-6. Summarizes some of the sociological changes that contribute to aging.	4.93	87.50
I-7. Summarizes some of the psychological changes that contribute to aging.	5.00	81.25
<sup>a</sup> I-8. Explains why chronological age is not an accurate predictor of physical condition and behavior.	5.50	100.00
I-9. Points out that people tend to become more unique and not more alike as they grow older.	4.81	75.00
<sup>a</sup> I-10. Explains why older individuals may be more susceptible to disease than younger individuals.	5.40	93.75
I-11. Identifies chronic conditions as being more prevalent than acute conditions in the older adult.	5.12	87.50

TABLE 2. Continued

SPECIFIC LEARNING OUTCOMES	MEAN	PERCENTAGE AGREEMENT INDEX
<sup>a</sup> I-12. Describes health as being more than the absence of disease or infirmity.	5.60	93.75
<sup>a</sup> I-13. States some examples of positive and negative lifestyles that impact on total quality of life.	5.60	93.75
I-14. Identifies some of the health risk factors that may contribute to disease.	5.25	87.50
II-1. Defines a drug in his/her own words as being any substance that affects the function or structure of the organism.	4.93	75.00
II-2. Describes the meaning of habituation to a drug.	5.18	81.25
<sup>a</sup> II-5. States the difference between a prescription drug and a non-prescription drug.	5.37	93.75
<sup>a</sup> II-6. Describes the difference between drug use and misuse.	5.56	93.75
<sup>a</sup> II-7. Defines therapeutic effect in his/her own words as being the intended or desired effect.	5.40	93.75
II-9. States the difference between generic name and brand name drugs.	5.00	81.25
III-1. Explains that all drugs have multiple actions in the body.	5.12	75.00
III-2. Explains how drug action can be unpredictable due to variables in the drug and/or in the patient.	5.50	87.50

TABLE 2. Continued

SPECIFIC LEARNING OUTCOMES	MEAN	PERCENTAGE AGREEMENT INDEX
III-4. Explains the misconception that a drug is selectively distributed to a very small area of the body without contacting the rest of the body.	5.12	81.25
III-5. Generalizes how an orally administered drug is absorbed into the bloodstream.	4.87	75.00
<sup>a</sup> III-6. Explains that a drug is distributed throughout the body via the bloodstream.	5.25	93.75
III-8. Describes how drugs are eliminated from the body.	5.06	87.50
<sup>a</sup> III-9. Discusses four variables that will modify an individual's response to a drug.	5.30	93.75
III-10. Explains how the route of administration of a drug affects its onset of action.	5.06	81.25
III-11. Describes the dangers associated with a drug accumulating in the body.	5.12	81.25
III-12. Explains that various doses of a drug may exert a variety of different actions.	5.18	87.50
<sup>a</sup> III-15. States the obvious goal of drug therapy as obtaining the greatest benefit with the least risk.	5.75	100.00
<sup>a</sup> III-16. Explains that simultaneous use of two or more drugs may alter the effectiveness or toxicity of these drugs.	5.80	100.00
<sup>a</sup> III-17. Explains that simultaneous use of some drugs with certain foods may alter the intended action of the drug.	5.30	93.75

TABLE 2. Continued

SPECIFIC LEARNING OUTCOMES	MEAN	PERCENTAGE AGREEMENT INDEX
<sup>a</sup> IV-1. Indicates that all drugs are capable of producing both desired effects and undesired effects.	5.68	100.00
IV-2. Identifies the major therapeutic effects of some common drugs such as aspirin.	5.30	87.50
IV-3. Identifies the most prevalent side effects of some common drugs such as aspirin.	4.93	75.00
IV-4. Illustrates the benefits that one derives from the 'intelligent use' of drugs.	5.30	87.50
<sup>a</sup> IV-5. Illustrates the potential harm that one suffers from the 'improper use' of drugs.	5.37	93.75
IV-8. Identifies undesirable patient behaviors that can increase the likelihood of adverse drug reactions.	4.93	81.25
IV-9. Explains that it may be necessary to accept the minor annoyance of side effects in order to obtain the desired effect.	5.06	87.50
IV-10. Indicates many side effects are transient, and gradually disappear as the body adjusts to the drug.	5.18	81.25
IV-13. Lists particular types of patients who are in a high risk group for adverse drug reactions.	4.81	75.00
<sup>a</sup> IV-14. Relates some of the hazards associated with self-diagnosis and self-medication.	5.75	100.00
<sup>a</sup> IV-15. Discusses the potential hazard of discontinuing a 'needed medicine'.	5.75	100.00

TABLE 2. Continued

SPECIFIC LEARNING OUTCOMES	MEAN	PERCENTAGE AGREEMENT INDEX
<sup>a</sup> IV-16. Points out the problem associated with refilling a prescription long after the need has passed.	5.60	93.75
<sup>a</sup> IV-17. Describes the potential problems resulting from the sharing of drugs with relatives or friends.	5.80	100.00
IV-18. Concludes undermedication may be just as dangerous as over-medication.	5.80	81.25
<sup>a</sup> IV-19. Summarizes the dangers of retaining outdated drugs.	5.75	100.00
<sup>a</sup> IV-20. Explains the undesirability of stretching a drug to make it last longer than the period for which it was prescribed.	5.80	100.00
IV-22. Evaluates the hazard of adding new drugs to a drug regimen without consulting all physicians providing simultaneous care to the patient.	5.18	75.00
<sup>a</sup> IV-23. Indicates the necessity of carefully reading and understanding the entire label before taking any medicine.	5.80	100.00
<sup>a</sup> IV-24. Explains the peril of giving or taking a drug in the dark.	5.68	100.00
<sup>a</sup> IV-25. Discusses the unsoundness of relying on the advice of a non-medical friend as it pertains to medicines.	5.56	93.75
<sup>a</sup> IV-26. Points out that altered compliance or non-compliance with physicians instructions can dramatically influence the therapeutic effect of a medicine.	5.60	93.75
<sup>a</sup> IV-27. Describes the potential danger of mixing alcoholic beverages with depressant drugs such antihistamines or minor tranquilizers.	5.80	100.00

TABLE 2. Continued

SPECIFIC LEARNING OUTCOMES	MEAN	PERCENTAGE AGREEMENT INDEX
IV-28. Points out that new and unusual symptoms or alterations in a patient's behavior may be drug induced.	5.56	87.50
<sup>a</sup> V-1. Explains some age related physical changes that increase the likelihood of drug problems.	5.50	100.00
V-2. Discusses the potential problems of purchasing drugs from different pharmacies.	4.93	75.00
V-3. Defines polymorbidity in his/her own words as being a condition characterized by multiple, chronic diseases. ,	5.00	75.00
V-4. Defines polymedicine in his/her own words as receiving coinstantaneous health care from a variety of physicians.	4.87	75.00
V-5. Defines polypharmacy in his/her own words as concomitant administration of many medicines.	4.93	81.25
<sup>a</sup> V-6. Discusses how polymorbidity, polymedicine and polypharmacy collectively contribute to drug problems in the older adult.	5.40	93.75
<sup>a</sup> V-7. Differentiates between acute illness and chronic illness.	5.30	100.00
<sup>a</sup> V-8. Points out that chronic illness may require life-long maintenance on drugs.	5.40	100.00
<sup>a</sup> V-9. Discusses how psychological, physiological, and sociological losses can contribute to inappropriate use of medicines.	5.40	100.00

TABLE 2. Continued

SPECIFIC LEARNING OUTCOMES	MEAN	PERCENTAGE AGREEMENT INDEX
<sup>a</sup> V-10. Summarizes how multiple concurrent disorders in the older adult can render therapy more complex.	5.68	100.00
<sup>a</sup> V-11. Points out that personal visual impairments may hinder the correct administration of medicines.	5.56	100.00
V-12. Points out that personal hearing impairments may hinder the correct administration of medicines.	5.30	87.50
<sup>a</sup> V-13. Points out why normal adult dosages of medicine may be more active in the elderly than in the young.	5.37	93.75
V-15. Lists some common types of medication errors frequently seen in older adults.	5.40	87.50
VI-1. Explains the concept of an 'activated patient' in his/her own words.	5.06	87.50
<sup>a</sup> VI-2. Summarizes the benefits accrued from being an 'activated patient'.	5.30	93.75
<sup>a</sup> VI-3. Lists some important questions that should be asked of a physician when a drug is prescribed.	5.60	93.75
<sup>a</sup> VI-5. Discusses the necessity of assuming an active partnership role with one's health care practitioners.	5.68	100.00
VI-6. Designs a scheme to help the patient take medicines more carefully at home.	5.25	81.25
VI-7. Formulates some guidelines for safe use of medicines at home.	5.25	81.25



TABLE 2. Continued

SPECIFIC LEARNING OUTCOMES	MEAN	PERCENTAGE AGREEMENT INDEX
<sup>a</sup> VI-8. Summarizes rights and responsibilities of patients in the health care delivery system.	5.56	93.75
VI-9. Formulates a list of activated patient characteristics.	5.12	75.00
VI-10. Defines a patient profile in his/her own words as being a current updated medical and medication record maintained by one's pharmacist.	5.25	81.25
<sup>a</sup> VI-11. Describes the value of utilizing a pharmacy that employs a patient profile system.	5.60	100.00
VI-12. Role plays obtaining directions from a physician in regard to drug administration.	5.25	81.25
VI-13. Role plays correct interpretation of medicine instructions from physicians.	5.25	81.25
VI-14. Role plays an interaction with a pharmacist in regard to the purchase of a drug.	5.20	81.25
<sup>a</sup> VI-15. Lists some of the guidelines to be followed when selecting and utilizing a pharmacy.	5.56	93.75
<sup>a</sup> VI-16. Justifies the necessity of keeping all medical appointments for follow up examinations.	5.37	93.75
<sup>a</sup> VI-17. Summarizes the significance of medication review on a regular basis.	5.56	93.75
<sup>a</sup> VI-18. Identifies the pharmacist as a valuable resource person for drug information.	5.60	100.00
<sup>a</sup> VI-19. Lists the important information that should be included on a prescription label.	5.56	93.75

TABLE 2. Continued

SPECIFIC LEARNING OUTCOMES	MEAN	PERCENTAGE AGREEMENT INDEX
<sup>a</sup> VI-20. Explains the seriousness of removing a medicine from its original container.	5.50	87.50
<sup>a</sup> VI-21. Discusses the danger of carrying several different drugs in a pill box.	5.60	93.75
<sup>a</sup> VI-22. Explains the advantages of carrying an updated patient health and medicine card in wallet or purse.	5.60	93.75
<sup>a</sup> VI-23. Lists facts that patient should communicate to the doctor concerning health problems.	5.68	100.00
<sup>a</sup> VI-24. Explains some of the signs, symptoms and circumstances which help to determine whether or not a physician should be consulted.	5.56	93.75
<sup>a</sup> VI-25. Discusses some of the pertinent criteria used in the selection of a physician.	5.50	93.75
<sup>a</sup> VII-1. Defines quackery in his/her own words as being a fraudulent health practice.	5.30	93.75
VII-2. Defines quack in his/her own words as a charlatan or a boastful pretender to medical skills.	5.00	81.25
<sup>a</sup> VII-3. Contrasts legitimate health practitioners from quacks.	5.40	100.00
<sup>a</sup> VII-4. Explains how fear contributes to the promotion of health quackery.	5.30	100.00
<sup>a</sup> VII-5. Discusses some of the dangers to the patient resulting from quackery.	5.30	93.75

TABLE 2. Continued

SPECIFIC LEARNING OUTCOMES	MEAN	PERCENTAGE AGREEMENT INDEX
<sup>a</sup> VII-6. Describes why older adults are especially susceptible to fraudulent health practices.	5.40	100.00
<sup>a</sup> VII-7. Describe some common health misconceptions that promote health quackery.	5.37	100.00
<sup>a</sup> VII-8. Lists some of the prominent features which commonly characterize quackery.	5.25	93.75
<sup>a</sup> VII-9. Distinguishes between orthodox and unorthodox medicine.	5.06	93.75
<sup>a</sup> VII-10. Explains 'spontaneous remission' in his/her own words.	5.30	93.75
<sup>a</sup> VII-11. Identifies sources of reliable health information in the community.	5.75	100.00
VII-12. Appraises the purpose of advertising.	5.26	81.25
<sup>a</sup> VII-13. Generalizes that medical science still cannot cure all diseases.	5.68	100.00
VII-14. Distinguishes false claims stated or implied in advertisements or commercials from the true claims.	5.06	81.25

<sup>a</sup>Specific Learning Outcomes rated either "Agree" or "Strongly Agree" by 15 or 16 of the 16 expert panelists.

Questionnaire #1 reveals that 61 (56.5%) received a percentage agreement index of 93.75 or greater. In essence, this finding indicates that over one-half of the accepted specific learning outcomes were rated either "Agree" or "Strongly Agree" by at least 15 of the 16 expert panelists. These specific learning outcomes are identified in Table 2. Further scrutiny of this highly-rated group of specific learning outcomes reveals that 30 (27.8%) achieved 100% agreement among the expert panelists (Table 3). In other words, all 16 experts rated these specific learning outcomes "Agree" or "Strongly Agree."

Table 4 further illustrates the high success rate of the specific learning outcomes reaching consensus in Questionnaire #1 by examining them in relation to the total number of specific learning outcomes submitted to the expert panelists for judgment.

TABLE 3.  
SPECIFIC LEARNING OUTCOMES  
REACHING 100% AGREEMENT  
IN QUESTIONNAIRE #1

SPECIFIC LEARNING OUTCOMES	MEAN	PERCENTAGE AGREEMENT INDEX
I-1. Points out that aging is a normal, natural and inevitable process in the life cycle.	5.75	100.00
I-4. Identifies some factors that contribute to the wide variability of aging in humans.	5.37	100.00
I-8. Explains why chronological age is not an accurate predictor of physical condition and behavior.	5.50	100.00
III-15. States the obvious goal of drug therapy as obtaining the greatest benefit with the least risk.	5.75	100.00
III-16. Explains that simultaneous use of two or more drugs may alter the effectiveness or toxicity of these drugs.	5.80	100.00
IV-1. Indicates that all drugs are capable of producing both desired effects and undesired effects.	5.68	100.00
IV-14. Relates some of the hazards associated with self-diagnosis and self-medication.	5.75	100.00
IV-15. Discusses the potential hazard of discontinuing a 'needed medicine.'	5.75	100.00
IV-17. Describes the potential problems resulting from the sharing of drugs with relatives or friends.	5.80	100.00
IV-19. Summarizes the dangers of retaining outdated drugs.	5.75	100.00

TABLE 3. Continued

SPECIFIC LEARNING OUTCOMES	MEAN	PERCENTAGE AGREEMENT INDEX
IV-20. Explains the undesirability of stretching a drug to make it last longer than the period for which it was prescribed.	5.80	100.00
IV-23. Indicates the necessity of carefully reading and understanding the entire label before taking any medicine.	5.80	100.00
IV-24. Explains the peril of giving or taking a drug in the dark.	5.68	100.00
IV-27. Describes the potential danger of mixing alcoholic beverages with depressant drugs such as antihistamines or minor tranquilizers.	5.80	100.00
V-1. Explains some age related physical changes that increase the likelihood of drug problems.	5.50	100.00
V-7. Differentiates between acute illness and chronic illness.	5.30	100.00
V-8. Points out that chronic illness may require life-long maintenance on drugs.	5.40	100.00
V-9. Discusses how psychological, physiological, and sociological losses can contribute to inappropriate use of medicines.	5.40	100.00
V-10. Summarizes how multiple concurrent disorders in the older adult can render therapy more complex.	5.68	100.00
V-11. Points out that personal visual impairments may hinder the correct administration of medicines.	5.56	100.00
VI-5. Discusses the necessity of assuming an active partnership role with one's health care practitioners.	5.68	100.00

TABLE 3. Continued

SPECIFIC LEARNING OUTCOMES	MEAN	PERCENTAGE AGREEMENT INDEX
VI-11. Describes the value of utilizing a pharmacy that employs a patient profile system.	5.60	100.00
VI-18. Identifies the pharmacist as a valuable resource person for drug information.	5.60	100.00
VI-23. Lists facts that patient should communicate to the doctor concerning health problems.	5.68	100.00
VII-3. Contrasts legitimate health practitioners from quacks.	5.40	100.00
VII-4. Explains how fear contributes to the promotion of health quackery.	5.30	100.00
VII-6. Describes why older adults are especially susceptible to fraudulent health practices.	5.40	100.00
VII-7. Describes some common health misconceptions that promote health quackery.	5.37	100.00
VII-11. Identifies sources of reliable health information in the community.	5.75	100.00
VII-13. Generalizes that medical science still cannot cure all diseases.	5.68	100.00

TABLE 4.  
PERCENTAGE AGREEMENT INDEX OF SPECIFIC LEARNING  
OUTCOMES IN QUESTIONNAIRE #1

PERCENTAGE AGREEMENT INDEX LEVEL	NUMBER OF EXPERT PANELISTS	NUMBER OF SPECIFIC LEARNING OUTCOMES	PERCENT OF TOTAL SPECIFIC LEARNING OUTCOMES
100.00 - 93.75	16-15	61	49.6
93.74 - 75.00	14-12	47	38.2
< 74.99	<11	16	12.2%

On this basis, it can be seen that 108 (87.8%) of the 123 original specific learning outcomes submitted for expert judgment in Questionnaire #1 achieved consensus.

#### Mean Rating

The experts' ratings of each specific learning outcome were assigned a raw score corresponding to the category of agreement/disagreement on the six-point, Likert-type scale checked by each expert. The categories of agreement/disagreement ranged from "Strongly Agree", with a value of six, to "Strongly Disagree" with a value of one. The mean rating was then derived by simply adding the raw scores and dividing the sum by 16. The level of acceptance designated for use in this investigation was a mean rating of 4.80 or greater.



TABLE 5.  
MEAN RATING OF SPECIFIC LEARNING OUTCOMES  
REACHING CONSENSUS IN QUESTIONNAIRE #1

MEAN	PERCENTAGE	NUMBER OF SPECIFIC LEARNING OUTCOMES	PERCENT OF TOTAL SPECIFIC LEARNING OUTCOMES
6.00 - 5.70	95	12	9.75%
5.69 - 5.40	90	37	30.08%
5.39 - 5.10	85	37	30.08%
5.09 - 4.80	80	22	17.88%
<4.79	<79.9	15	12.20%

87.8%

With such a significant number of specific learning outcomes reaching consensus, it is readily apparent that there is an exceptionally high level of agreement among the 16 national experts concerning the specific learning outcomes that would be important and appropriate for inclusion in a medicine education program designed expressly for ambulatory, non-institutionalized older adults.

#### Rejected Specific Learning Outcomes

Of the 123 specific learning outcomes presented in Questionnaire #1, 15 (12.2%) were rejected by the expert panelists. These 15 rejected specific learning outcomes were analyzed in an attempt to ascertain probable reasons for their failure to reach consensus.

For this analysis, the percentage of specific learning outcomes reaching consensus and the percentage of those rejected for each of the seven general instructional objectives were calculated. These data appear in Table 6 in which the seven general instructional objectives are rank-ordered from those with the highest to those with the lowest percentage of rejected specific learning outcomes.

The rejection rate of specific learning outcomes ranged from a high of 40% for general instructional objective II (Knows Common Drug Terms) to a low of 0% for general instructional objectives I (Understands Fundamental Principles of Aging) and VII (Comprehends Older Adults are Susceptible to Fraudulent Health Practices).

General Instructional Objective II:  
Knows Common Drug Terms

The primary intent of general instructional objective II was to familiarize the older adult with selected elementary drug terminology. It was thought that a rudimentary understanding of such nomenclature is necessary for a more complete comprehension of drug information and concepts contained in some of the other six general instructional objectives.

In formulating the specific learning outcomes for this general instructional objective, it was highly suspected that a significant number of these specific learning outcomes would be rejected by the expert panelists. This prediction was based upon the fact that the same fundamental drug terms were defined quite differently by the

TABLE 6.  
PERCENTAGE OF REJECTED SPECIFIC LEARNING OUTCOMES  
IN EACH GENERAL INSTRUCTIONAL OBJECTIVE<sup>a</sup>

GENERAL INSTRUCTIONAL OBJECTIVE	TOTAL NO. OF SPECIFIC LEARNING OUTCOMES	NO. OF REJECTED SPECIFIC LEARNING OUTCOMES	NO. OF ACCEPTED SPECIFIC LEARNING OUTCOMES	PERCENTAGE OF REJECTED SPECIFIC LEARNING OUTCOMES	PERCENTAGE OF TOTAL REJECTED SPECIFIC LEARNING OUTCOMES
II. Knows common drug terms.	10	4	6	40	26.7%
III. Understands fundamental concepts concerning drugs.	17	4	13	24	26.7%
IV. Recognizes that each drug has risks as well as benefits.	28	5	23	18	33.3%
V. Understands older adult is vulnerable to problems with drugs.	15	1	14	7	6.7%
VI. Recognizes the importance of being an activated patient.	25	1	24	4	6.7%
I. Understands fundamental principles of aging.	14	0	14	0	0.0%
VII. Comprehends older adults are susceptible to fraudulent health practices.	14	0	14	0	0.0%

<sup>a</sup>General instructional objectives are rank-ordered from highest to the lowest percentage of rejected specific learning outcomes.

various authors of the major drug reference sources consulted in formulating these specific learning outcomes. This speculation proved to be the case when Questionnaire #1 was analyzed.

Table 7 gives the four specific learning outcomes in general instructional objective II which were rejected by the expert panelists. These four rejected specific learning outcomes represent 40% of the total number of specific learning outcomes for general instructional objective II, the highest rejection rate among the seven general instructional objectives in Questionnaire #1.

Based upon an analysis of the experts' reasons for disagreeing, it would appear that they did not question the importance or the appropriateness of including these rejected specific learning outcomes so much as they criticized the wording of the definitions. This deduction is based upon the fact that the expert panelists suggested a number of modifications which made the definitions more acceptable to their respective professional frame of reference. Nevertheless, it is noteworthy that even with these suggested revisions, there was still much inconsistency among the expert panelists.

This wide variety of experts' definitions pertaining to certain drug constructs verified the existence of divergence of expert opinion concerning some of the most fundamental and elementary principles in the area of drugs. Since it was not the primary intent of this investigation to verify the existence of diversity of expert opinion with reference to drug terminology, no statistical

TABLE 7.

REJECTED SPECIFIC LEARNING OUTCOMES IN GENERAL INSTRUCTIONAL  
OBJECTIVE II: KNOWS COMMON DRUG TERMS

SPECIFIC LEARNING OUTCOME	MEAN	PERCENTAGE AGREEMENT INDEX
II-3. Defines a medicine in his/her own words as being a kind of drug that is used by the body to prevent or cure a disease or a disabling condition.	4.62	68.75
II-4. Defines drug tolerance in his/her own words as being the need to increase the dose in order to achieve the desired effect.	4.62	68.75
II-8. Defines side effect in his/her own words as being a natural and expected action of the drug which accompanies its principal and intended action.	4.75	62.50
II-10. Describes the difference between stimulant drugs and depressant drugs.	4.68	62.50

tests were conducted on this variable. However, an examination of the expert panelists' reasons for disagreeing provided some provocative and stimulating findings.

One interesting finding which is somewhat contradictory to the above conclusion that the specific learning outcomes in general instructional objective II were rejected more for problems with wording, as opposed to importance or appropriateness for inclusion

in a medicine education program for older adults, is found in the experts' comments concerning the following specific learning outcome:

- II-4. Defines drug tolerance in his/her own words as being the need to increase the dose in order to achieve the desired effect.

Most of the expert panelists thought that this learning outcome, as stated, was confusing and misleading, because it appeared to convey the idea that "patient adjustment" of drug dosage is acceptable. This notion was not the intent of this specific learning outcome, but rather to impart the concept that one's body could become tolerant to certain drugs at a pharmacokinetic level. In other words, with repeated administration of certain drugs there is a decreased physiologic response that necessitates an increase in dosage to maintain a given therapeutic effect. This specific learning outcome was not intended to imply that the patient would be responsible for adjusting the dosage, but the experts' point was well taken and the potential for confusion is justified.

Some of the expert panelists took issue with the attempt to differentiate the terms "drug" and "medicine." Their opinion seemed to be that it is unnecessary to differentiate between these two terms. A comparison of the two specific learning outcomes pertaining to a "drug" and a "medicine" may help to convey the intent of this differentiation:

- II-1. Defines a drug in his/her own words as being any substance that affects the function or structure of the organism.
- II-3. Defines a medicine in his/her own words as being a kind of drug that is used by the body to prevent or cure a disease or a disabling condition.

Based upon a seven-month experience coordinating a medicine education program for 3,500 elderly subjects in upstate New York, sponsored by the New York State Office of Drug Abuse Services, this investigator firmly believes in the merit of helping older adults to understand that the term "drug" has a broader interpretation than just referring to illegal substances commonly misused by young people. Many of the older adults contacted during this project entertained this limited interpretation of a drug, necessitating the use of the term "medicine" in place of the term "drug." Note that both of these specific learning outcomes were modified, based upon the expert panelists' recommendations, and were resubmitted in the second round of the questionnaire for further evaluation (see Questionnaire #2, specific learning outcomes II-1 and II-3).

Specific learning outcome II-10, which dealt with the differences between stimulant and depressant drugs, received much criticism from the expert panelists:

- II-10. Describes the difference between stimulant and depressant drugs.

Some of the experts thought that, unless these two categories of drugs are generally confused by older adults, there would be no justifiable reason to emphasize them any more than other drug

categories. Their concern was that this highlighted consideration could mislead older adults into believing that there are only two categories of drug action: i.e., stimulation and depression. One of the physicians commented that this specific learning outcome would be acceptable only in those cases where the patient was receiving depressant- and/or stimulant-type drugs.

The intent of this specific learning outcome was to help the older adult understand that commonly used substances, such as caffeine and nicotine, are stimulants, and alcohol and antihistamines are depressants. Such knowledge could potentially aid the individual in safer drug use, since the drugs listed above are used rather frequently in our population. For instance, it would not be a safe practice for a hypertense patient to continue smoking tobacco and drinking excessive amounts of coffee. Nor would it be safe for a person with allergies, who is taking antihistamines, to consume alcohol. It is obvious that the manner in which this specific learning outcome was written did not adequately communicate this concern to the experts.

General Instructional Objective III:  
Understands Fundamental Concepts  
Concerning Drugs

The specific learning outcomes in general instructional objective III were aimed toward acquainting the older adult with fundamental principles concerning drugs. They were formulated with the belief that basic, elementary pharmacokinetic principles, presented on a level understandable to the elderly, would provide



for a more realistic and holistic conceptualization and understanding of drugs.

Table 8 presents the four specific learning outcomes in general instructional objective III which were rejected by the experts. These four rejected specific learning outcomes represented 24% of the total number of specific learning outcomes in this general instructional objective and 26.6% of the total number of rejected specific learning outcomes in all seven general instructional objectives (see Table 6).

TABLE 8  
REJECTED SPECIFIC LEARNING OUTCOMES IN GENERAL  
INSTRUCTIONAL OBJECTIVE III: UNDERSTANDS  
FUNDAMENTAL CONCEPTS CONCERNING DRUGS

SPECIFIC LEARNING OUTCOME	MEAN	PERCENTAGE AGREEMENT INDEX
III-3. Lists three of the various methods by which drugs can be administered to humans.	5.00	68.75
III-7. Generalizes that the liver is the principal organ for the breakdown of most drugs.	4.75	56.25
III-13. Points out that the period of time a drug remains in the body will affect its ability to produce the desired effect.	4.75	68.75
III-14. Points out that drugs work in conjunction with the body to facilitate restorative processes.	4.43	56.25

A salient inconsistency in the experts' ratings was evident by their rejection of specific learning outcome III-3, but their acceptance of specific learning outcome III-10:

III-3. Lists three of the various methods by which drugs can be administered to humans.

III-10. Explains how the route of administration of a drug affects its onset of action.

Specific learning outcome III-3 achieved a mean rating of 5.00 and a percentage agreement index of 68.75, resulting in rejection. On the other hand, specific learning outcome III-10 was accepted with a mean rating of 5.06 and a percentage agreement index of 81.25. These ratings appear to be somewhat inconsistent in that one must first be aware that there are various methods by which a drug can be administered to humans before any explanation can be offered to explain how these different methods will affect the drug's onset of action.

Specific learning outcome III-7 was designed to acquaint the older adult with the concept that the liver is primarily responsible for metabolizing most drugs so that they can be appropriately eliminated from the body:

III-7. Generalizes that the liver is the principal organ for the breakdown of most drugs.

Based upon an analysis of the experts' reasons for disagreeing, it appears that some of them were concerned with whether or not it is really important for older adults to know elementary pharmacokinetics in order to properly utilize their medicines. Pharmacokinetics deals

with the absorption, distribution, metabolism and excretion of drugs (57). In formulating this specific learning outcome, it was thought that rudimentary pharmacokinetic information is not only important, but essential to the success of a medicine education program designed specifically for older adults. The mere presentation of isolated drug facts is not sufficient to adequately promote safe use of drugs. The individual must be able to conceptualize the total sequence of events which must occur in order for a drug to work appropriately in the body. This can be accomplished only when he/she is provided information that describes, in understandable terms, what happens to a drug from the time it is administered to the time it is eliminated from the body. For example, metabolism is one of the principles that would be included in a discussion of pharmacokinetics. Consider the finding that aged subjects may respond to drugs in a somewhat atypical manner, often because of impaired ability to inactivate (metabolize) or excrete drugs (57). Generally speaking, as a result of this impaired ability to metabolize drugs, older adults will usually require a smaller dose of a drug than will younger adults to produce the desired therapeutic effect (147). To neglect these basic principles of pharmacokinetics appears to be a serious omission in a medicine education program for the elderly, because an elementary understanding of these principles could promote safer use of drugs. This is especially important when one considers older adults' need for drugs in their daily lives. Guttman poignantly

sums up the extent of this need when he states:

...over one-fourth of the elderly population (26.6%) claimed that they can never perform their daily activities without being dependent on their Rx drugs. If we add to this finding those who report that they are sometimes dependent on their Rx drugs (12.7%), then almost two-fifths of the elderly population (39.3%) may be characterized as admitting dependence on Rx drugs for their performance of their regular daily activities (71, p. 30).

An interesting quandary arises relative to the experts' rating of the following specific learning outcome which deals with drug accumulation in the body:

III-13. Points out that the period of time a drug remains in the body will affect its ability to produce the desired effect.

This specific learning outcome achieved a mean rating of 4.75 and a percentage agreement index of 68.75. The quandary arises from the finding that, in spite of being rejected, there was only one expert who commented in the "Reason for Disagreeing" column. This comment conveyed the idea that a sufficient concentration of the drug must remain in the body to produce the desired action. While this statement is true, this was not the intent of this specific learning outcome; rather, its purpose was to familiarize the individual with the concept that when drugs are excreted more slowly than they are absorbed, each succeeding dose will increase the amount of drug remaining in the body. As a consequence, sufficiently high concentrations can be attained and toxic effects produced.

Despite the fact that eight (50%) of the expert panelists agreed with the statement and an additional three (18.8%) "Strongly

Agreed," while only one (6.3%) "Disagreed" and one (6.3%) "Disagreed with Reservation," this specific learning outcome failed to meet the stringent analytical criteria required in this investigation and thus was rejected. Due to the insufficient amount of data, in terms of expert reasons for disagreement, any attempt to identify precisely why rejection occurred is purely conjecture. Probable reasons might be that the specific learning outcome was considered to be: 1) inappropriately worded, resulting in confused interpretation of its primary intent; 2) unessential in aiding the elderly individual to understand his/her medicines more thoroughly; or 3) too technical for an older adult to understand.

The last specific learning outcome failing to reach consensus in this general instructional objective was:

III-14. Points out that drugs work in conjunction with the body to facilitate restorative processes.

This learning outcome achieved a mean rating of 4.43 and a percentage agreement index of 56.25. It received many comments from the expert panelists and their statements varied from "not always," to "all else being equal only if drug is chosen most carefully for a particular individual." It is interesting to note the nature of the physicians' responses to this specific learning outcome. All three of the physicians faulted the word "restorative." One believed that "drugs generally have little, if anything, to do with the restorative process, and the body heals itself." The other two physicians believed essentially that the word "restorative"

implies that a drug will cure a disease, and that this mistaken notion could mislead the older adult since many chronic diseases require life-long maintenance on drug therapy.

General Instructional Objective IV:  
Recognizes that Each Drug has Risks  
as Well as Benefits

The principal intent of general instructional objective IV was to sensitize the older adult to the concept that there is no such thing as a totally safe, risk-free drug. All drugs have multiple actions, and when this fact is considered in conjunction with variables in the patient as well as the environment, it becomes evident that the interaction of these factors may not be exactly as intended or predicted.

The five specific learning outcomes in general instructional objective IV which were rejected by the expert panelists appear in Table 9.

TABLE 9

REJECTED SPECIFIC LEARNING OUTCOMES IN GENERAL INSTRUCTIONAL  
 OBJECTIVE IV: RECOGNIZES THAT EACH DRUG  
 HAS RISKS AS WELL AS BENEFITS

SPECIFIC LEARNING OUTCOME	MEAN	PERCENTAGE AGREEMENT INDEX
IV-6. Defines adverse drug reaction in his/her own words as being an unusual and unexpected response to a drug that is potentially harmful.	4.43	62.50
IV-7. Points out that the occurrence of adverse drug reaction is directly related to number of drugs being taken by the patient.	3.81	37.50
IV-11. Selects from a list of drugs commonly prescribed to the older adult, those drugs that commonly produce serious side effects.	4.00	50.00
IV-12. Points out the intensity of side effects can usually be reduced by adjusting the dose or substituting another drug.	4.75	62.50
IV-21. Generalizes some of the more common early warning signs of a drug reaction.	4.75	62.50

The concept of adverse drug reactions was addressed in specific learning outcomes IV-6 and IV-7, both of which received some of the lowest ratings of all the rejected specific learning outcomes:

- IV-6. Defines adverse drug reaction in his/her own words as being an unusual and unexpected response to a drug that is potentially harmful.
- IV-7. Points out that the occurrence of adverse drug reaction is directly related to number of drugs being taken by the patient.

Based on the comments of the expert panelists, one is led to believe that the phenomenon of adverse drug reactions is an imprecise concept which brings about much disagreement. With reference to specific learning outcome IV-6, three experts pointed out that adverse drug reactions are not necessarily unusual or unexpected. Another expert panelist brought to light a very intriguing interpretation in the statement: "A drug that is potentially helpful may also be reacted to adversely by an individual (idiosyncratically)." Apparently, this expert panel member construed this specific learning outcome to mean that an adverse reaction is a response to a potentially harmful drug. Unfortunately, this is not the interpretation this specific learning outcome was intended to convey. One of its primary purposes was to communicate the idea that adverse drug reactions are unusual and unexpected responses to a drug, a concept postulated by Long (114). The second intent of this learning outcome was to emphasize that these reactions could be potentially harmful to the patient. Apparently, the use of the phrase, "potentially harmful," could very well have contributed to the misinterpretation that only potentially harmful drugs are capable of producing adverse drug reactions. Two other experts thought that the concept of adverse drug reaction is "too complex and sophisticated" to be accurately defined.

Specific learning outcome IV-7 also dealt with adverse drug reactions, but it was more concerned with the ratio of drugs



administered to the frequency of adverse drug reactions. Of the original 123 specific learning outcomes, this particular one achieved the lowest mean rating as well as the lowest percentage agreement index. It, too, generated many comments from the expert panelists. Much of the disagreement faulted the connotation that adverse drug reactions are solely the consequence of polypharmacy. Two expert panelists reported that this specific learning outcome might unduly alarm the older adult who truly needs multiple drug therapy, the consequence being the underuse of rational therapy. Finally, one expert stated: "It can be one medication that causes a serious drug reaction, and many drugs can be ingested at one time without the occurrence of any side effects."

In conclusion, it is interpreted that the experts were trying to emphasize that an adverse drug reaction could very well be induced by some factor other than the drug itself. Such factors would include variables in the patient, the environment, or even inappropriate prescribing practices by some physician(s).

Specific learning outcome IV-11 was rated extremely low by the expert panel members. It received a mean rating of 4.00 and a percentage agreement index of 50.00:

IV-11. Selects from a list of drugs commonly prescribed to the older adult, those drugs that commonly produce serious side effects.

An analysis of the comments made by the expert panelists revealed that a majority of the experts thought that this specific

learning outcome was not only unessential, but practically impossible to attain. One of the physicians thought that it did not make sense for older adults to memorize a list of drugs. Another expert panel member reported that this type of behavior was not necessary or helpful to the patient's regimen and served no real purpose. It was readily apparent, based upon the results of this study, that specific learning outcome IV-11 is inappropriate for inclusion in a medicine education program for older adults.

Specific learning outcome IV-12 yielded a variety of interesting comments from the experts:

IV-12. Points out the intensity of side effects  
can usually be reduced by adjusting the  
dose or substituting another drug.

An examination of these comments led to the conclusion that poor wording of this specific learning outcome probably contributed greatly to a high level of misinterpretation with resulting rejection.

Five of the expert panelists voiced concern that this learning outcome implied that the patient himself/herself could reduce the intensity of drug side effects by substituting another drug, or reducing the dose of the present drug, without medical consultation. Indeed, this was not the purpose of this specific learning outcome, for the undesirability of leaving the patient with such an impression is obvious. The point intended to be conveyed was that one's medical practitioner could adjust the dose or substitute another drug. But, as this specific learning outcome was written, this concept was not adequately communicated. Thus, it was obvious why rejection occurred in this case.

The primary objective of specific learning outcome IV-21 was to familiarize the older adult with some of the early warning signs of a drug reaction:

IV-21. Generalizes some of the more common early warning signs of a drug reaction.

It was hoped that such information would help the patient to understand that unusual or new symptoms, as well as minor but noticeable changes in behavior, may, in fact, be drug induced. With such an understanding the patient would be better equipped to discern potentially harmful reactions and involve his/her physician before the occurrence of disastrous consequences.

Judging from the experts' comments, it would be extremely difficult for an individual to perform the behavior required by this specific learning outcome. Some of the expert panelists thought that it would be extremely difficult to generalize about common early warning signs of a drug reaction, since all drugs would not necessarily produce the same warning signs. Two other expert panelists commented that it would be very difficult to differentiate some of the warning signs of a drug reaction from any other illness. There also appeared to be some concern over the definition of the terms "early warning signs" and "drug reaction." It is apparent that the desired behavior in specific learning outcome IV-21 was considered unrealistic and virtually impossible to achieve.

General Instructional Objective V:  
Understands the Older Adult is  
Vulnerable to Problems with Drugs

The primary purpose of general instructional objective V was to help the older adult identify some of the more prominent factors contributing to older adults' vulnerability to drug misadventures, and then to sensitize them to the role which these factors play in the problem.

Generally speaking, the expert panelists agreed with the importance of such learning outcomes since 14 (93.3%) of the 15 specific learning outcomes for this general instructional objective reached consensus. Furthermore, 6 (40%) of the 15 specific learning outcomes reached 100% agreement among the expert panelists. Only one specific learning outcome in general instructional objective V was rejected:

V-14. States that many older adults consume a disproportionate amount of medicines.

Based on a review of the experts' reasons for disagreeing, it is suspected that poor wording was responsible for the failure of this specific learning outcome to reach consensus. When originally conceived, it was the intent of this specific learning outcome to convey the well-established finding that older adults, while constituting only 10% of the population in the United States, consume in excess of 25% of all manufactured medicines. Most of the confusion appeared to emanate from the nebulous and imprecise nature of the phrase, "disproportionate amount of medicines."

General Instructional Objective VI:  
Recognizes the Importance of Being  
an Activated Patient

General instructional objective VI addressed the concept of activated patients. The main concern in this general instructional objective was to impart to the older adult the importance of the individual patient's assuming a greater role in his/her health care by more active and vigorous involvement with one's health care practitioners. Twenty-four (96%) of the 25 specific learning outcomes in this general instructional objective reached consensus. This high rate of acceptance might be interpreted to reflect the increased awareness among medical and allied health professionals of the need for all individuals to assume greater responsibility for their own health and to learn to utilize their health care resources more appropriately. Rising health care costs, coupled with consumers' demands for more and higher quality health care, have stimulated the development of wellness clinics and the organization of formal departments of health education in health maintenance organizations, public health agencies and hospitals throughout the nation.

Specific learning outcome VI-4 was the only specific learning outcome in this general instructional objective which was rejected:

VI-4. Points out that a "symptom" signals something wrong with the body's machinery or functions.

One of the physicians on the expert panel took issue with the connotation that a symptom signals a malfunction in the body,

especially in the aged adult. This expert felt that the body machinery of an aged individual may not be functioning as well as formerly, but, nevertheless, is still functioning normally for his/her age. Two of the expert panelists questioned the validity of assuming this specific learning outcome to be always true. The primary intent of this learning outcome was to help the older adult become aware of the importance of "listening to one's body." In other words, the greater one's awareness of the normal functioning of his/her body, the more likely he/she will detect pathological aberrations and thus seek medical advice and treatment before the condition worsens.

#### Results of Questionnaire #2

Five weeks after the second questionnaire was mailed to the 16 expert panelists, 14 (87.5%) had been returned and analyzed statistically (Table 10). Questionnaires were not received from two of the 16 expert panelists, and attempts to contact them by telephone, as well as mailgram, failed to solicit their responses. In order to complete the study within the designated time frame agreed upon, the decision was made to proceed with the statistical analysis of the 14 returned questionnaires.

It should be recalled that Questionnaire #1 was designed to provide the experts the opportunity to modify or to add to the original list of 123 specific learning outcomes submitted for rating. Questionnaire #2 (Appendix J) consisted of 29 specific

TABLE 10.  
RESULTS OF QUESTIONNAIRE #2.

	GENERAL INSTRUCTIONAL OBJECTIVE	CONSENSUS	LEARNING OUTCOME NUMBER	NUMBER OF RESPONSES	RAW DISTRIBUTION OF RESPONSES						MEAN	PERCENTAGE AGREEMENT INDEX <sup>c</sup>
					6(SA)	5(A)	4(AR)	3(DR)	2(D)	1(SD)		
I. Understands Fundamental Principles of Aging	A <sup>a</sup>		I-5	14	6	8					5.42	100.00
	A		I-8	14	8	5	1				5.50	92.85
	A <sup>b</sup>		I-11	14	4	9	1				5.21	92.85
	R <sup>b</sup>		I-15	14	4	3	4	2	1		4.50	50.00
II. Knows Com- mon Drug Terms	A		II-1	14	5	8	1				5.21	92.85
	A		II-3	14	4	7	1	2			4.92	78.57
	A		II-8	14	4	8	1		1		5.00	85.71
	R		II-11	14	2	1	6	1	2	2	3.57	21.42
	R		II-12	14	5	1	6	1	1		4.57	42.85
III. Under- stands Fundament- al Con- cepts con- cerning Drugs	A		III-10	14	6	8					5.42	100.00
	A		III-18	14	11	3					5.78	100.00
	A		III-19	14	7	5	2				5.35	85.71
	A		III-20	14	7	5	2				5.35	85.71
IV. Recognizes That Each Drug Has Risks As Well As Benefits	R		IV-6	14	2	7	2	2	1		4.50	64.28
	A		IV-7	14	8	4	1				5.21	85.71
	A		IV-10	14	6	6	2				5.28	85.71
	A		IV-12	14	4	9	1				5.21	92.85
	A		IV-22	14	14						6.00	100.00
	A		IV-29	14	8	4	2				5.42	85.71

TABLE 10. Continued

GENERAL INSTRUCTIONAL OBJECTIVE	CONSENSUS	LEARNING OUTCOME NUMBER	NUMBER OF RESPONSES	RAW DISTRIBUTION OF RESPONSES						MEAN	PERCENTAGE AGREEMENT INDEX <sup>c</sup>
V. Understands Older Adult Is Vulnerable to Problems With Drugs	A	V-13	14	8	8	4	2			5.42	85.71
VI. Recognizes The Importance Of Being An Activated Patient	A	VI-12	14	6	6	2				5.28	85.71
	A	VI-13	14	7	5	1	1			5.28	85.71
	A	VI-23	14	11	2	1				5.71	92.85
	A	VI-25	14	13	1					5.92	100.00
	A	VI-26	14	5	8	1				5.28	92.85
	A	VI-27	14	7	6	1				5.42	92.85
	A	VI-28	14	9	5					5.64	100.00
	A	VI-29	14	10	4					5.71	100.00
Comprehends Older Adults Are Suscept- ible To Fraudulent Health Practices	R	VII-14	14	9	1	3	1			5.28	71.42

<sup>a</sup>Accepted specific learning outcomes.<sup>b</sup>Rejected specific learning outcomes.<sup>c</sup>Percentage agreement index is defined as the percentage of respondents marking either the category "Agree" (5) or "Strongly Agree" (6).



learning outcomes which were recommended by the expert panelists either as modifications of, or additions to, the specific learning outcomes formulated for Questionnaire #1.

Of the 29 specific learning outcomes comprising Questionnaire #2, 18 (62%) were modifications of specific learning outcomes found on Questionnaire #1, while the remaining 11 (32%) represented additional specific learning outcomes suggested by the experts.

In general, the specific learning outcomes in Questionnaire #2 fared well in terms of their acceptability to the expert panelists. Twenty-four (82.8%) of the 29 specific learning outcomes submitted for expert judgment reached consensus (see Table 10).

#### Accepted Modified Specific Learning Outcomes

Eighteen, or approximately two-thirds (62%), of the specific learning outcomes in Questionnaire #2 were modifications of specific learning outcomes from Questionnaire #1. Of the 18 modified specific learning outcomes, 16 (89%) reached consensus. These modified specific learning outcomes and their original versions are presented in Table 11.

A comparison of the mean rating and the percentage agreement index of each modified specific learning outcome with its original version resulted in three rather interesting findings (Table 12).

First, providing the expert panelists the opportunity to modify specific learning outcomes on Questionnaire #1, and

TABLE 11  
MODIFIED SPECIFIC LEARNING OUTCOMES REACHING  
CONSENSUS COMPARED WITH THEIR  
ORIGINAL VERSIONS

ORIGINAL VERSION	EXPERT MODIFICATION
I-5. Summarizes some of the biological changes that contribute to aging.	I-5. Summarizes some of the biological changes associated with aging.
I-8. Explains why chronological age is not an accurate predictor of physical condition and behavior.	I-8. Explains that functional age is a more accurate predictor of physical condition and behavior than is chronological age.
I-11. Identifies chronic conditions as being more prevalent than acute conditions in the older adult.	I-11. Explains in his/her own words the nature of chronic conditions as opposed to acute conditions.
II-1. Defines a drug in his/her own words as being any substance that affects the function or structure of the organism.	II-1. Defines a drug in his/her own words as any substance, other than food, used in the prevention, diagnosis, alleviation, treatment, or cure of disease in man.
II-3. Defines a medicine in his/her own words as being a kind of drug that is used by the body to prevent or cure a disease or a disabling condition.	II-3. Defines a medicine in his/her own words as being a kind of drug that is used by the body to prevent, mitigate or manage a disease or a disabling condition.
II-8. Defines side effect in his/her own words as being a natural and expected action of the drug which accompanies its principal and intended action.	II-8. Defines side effect in his/her own words as being either a natural and expected action or an unwanted action of the drug, which may accompany its principal and intended action.
III-10. Explains how the route of administration of a drug affects its onset of action.	III-10. Explains that the route of administration of a drug can affect its onset, intensity and duration of action.

TABLE 11. Continued

ORIGINAL VERSION	EXPERT MODIFICATION
IV-7. Points out that the occurrence of adverse drug reaction is directly related to number of drugs being taken by the patient.	IV-7. Points out that the adverse drug reaction rate increases as the number of drugs being utilized increases.
IV-10. Indicates many side effects are transient, and gradually disappear as the body adjusts to the drug.	IV-10. Indicates some side effects are transient and gradually disappear as one's body adjusts to the drug.
IV-12. Points out the intensity of side effects can usually be reduced by adjusting the dose or substituting another drug.	IV-12. Points out the intensity of side effects can usually be reduced by having one's physician adjust the dose or substitute another drug.
IV-22. Evaluates the hazard of adding new drugs to a drug regimen without consulting all physicians providing simultaneous care to the patient.	IV-22. Evaluates the hazard of adding new drugs, both prescription and non-prescription, to a drug regimen without consulting one's primary physician and/or pharmacist.
V-13. Points out why normal adult dosages of medicine may be more active in the elderly than in the young.	V-13. Points out that normal adult dosages of some drugs tend to be more active in the elderly than in the young because of the older adults' age-related, impaired ability to inactivate or excrete drugs, or because of other concurrent pathology.
VI-12. Role plays obtaining directions from a physician in regard to drug administration.	VI-12. Role plays obtaining directions from a physician and/or pharmacist in regard to appropriate drug administration.

TABLE 11. Continued

ORIGINAL VERSION	EXPERT MODIFICATION
VI-13. Role plays correct interpretation of medicine instructions from physicians.	IV-13. Role plays correct interpretation of drug instructions from physician and/or pharmacist.
VI-23. Lists facts that patient should communicate to the doctor concerning health problems.	VI-23 Lists facts that patient should communicate to the doctor and/or pharmacist concerning health problems.
VI-25. Discusses some of the pertinent criteria used in the selection of a physician.	VI-25. Discusses some of the pertinent criteria to be considered in selecting a physician and/or a pharmacist.

TABLE 12  
MODIFIED SPECIFIC LEARNING OUTCOMES REACHING CONSENSUS  
IN QUESTIONNAIRE #2

GENERAL INSTRUCTIONAL OBJECTIVE	SPECIFIC LEARNING OUTCOME NO.	MEAN		PERCENTAGE Q#1	AGREEMENT Q#2	CONSENSUS INCREASE	RATING DECREASE
		Q#1	Q#2				
I	I-5	4.93	5.42	75.00	100.00	+	
I	I-8	5.50	5.00	100.00	85.71		-
I	I-11	5.12	5.21	87.50	92.85	+	
II	II-1	4.93	5.21	75.00	92.85	+	
II	II-3	4.62	4.92	75.00	78.57	+	
II	II-8	4.75	5.00	62.50	85.71	+	
III	III-10	5.06	5.42	81.25	100.00	+	
IV	IV-7	3.81	5.21	37.50	85.71	+	
IV	IV-10	5.18	5.28	81.25	85.71	+	
IV	IV-12	4.75	5.21	62.50	92.85	+	
IV	IV-22	5.25	6.00	75.00	100.00	+	
V	V-13	5.37	5.42	93.75	85.71		-
VI	VI-12	5.25	5.28	81.25	85.71	+	
VI	VI-13	5.25	5.28	81.25	85.71	+	
VI	VI-23	5.68	5.71	100.00	92.85		-
VI	VI-25	5.50	5.92	93.75	100.00	+	

then to judge these modifications on Questionnaire #2, resulted in an increase in consensus rating. In over 81% of the cases where expert panelists were given the opportunity to re-rate a specific learning outcome that had been modified by them in round one of the questionnaire, an increase in both the mean rating and percentage agreement index resulted, thus indicating a greater level of consensus (see Table 12).

Second, 3 (75%) of the 4 modified specific learning outcomes, whose original versions had been rejected by the expert panelists in round one of the questionnaire, achieved consensus in round two. These were specific learning outcomes II-8, IV-7, and IV-12. The fourth specific learning outcome in this group, IV-6, was rejected on both questionnaires.

Finally, it is noteworthy that one of the modified specific learning outcomes reaching consensus in questionnaire #2, specific learning outcome IV-22, was the only one in this investigation to achieve absolute consensus among the experts, with a mean rating of 6.00 and a percentage agreement index of 100.00. The original version of this specific learning outcome and its modification are:

IV-22. Evaluates the hazard of adding new drugs to a drug regimen without consulting all physicians providing simultaneous care to the patient (Original Version).

Evaluates the hazard of adding new drugs, both prescription and non-prescription, to a drug regimen without consulting one's primary physician and/or pharmacist (Modified Version).

The expert panelists rejected the original version of this specific learning outcome on two considerations. First, they thought that it was necessary to communicate the notion that even when non-prescription drugs are added to one's drug regimen, it is important to notify one's medical practitioner, and the original version did not communicate this fact. Second, the experts believed that it was unnecessary for the individual to consult all physicians providing simultaneous care before adding a new drug to his/her drug regimen. They thought it more appropriate to consult one's primary physician and/or one's primary pharmacist. This specific learning outcome was rewritten to include these two concerns and as a result it gained the distinction of being the highest rated of all 134 specific learning outcomes submitted to the expert panelists in the two rounds of the questionnaire.

#### Percentage Agreement Index

Of the 16 modified specific learning outcomes reaching consensus in Questionnaire #2, 15 (94%) received a percentage agreement index of 85.71 or greater (see Table 12). Essentially, this finding indicates that the vast majority of these modified specific learning outcomes were rated either "Agree" or "Strongly Agree" by 12 or more of the 14 expert panelists participating in round two of the questionnaire. These specific learning outcomes are identified in Table 11. Further scrutiny of this highly-rated group of specific learning outcomes reveals that 4 (25%) achieved 100% agreement among the expert panelists (Table 13).

TABLE 13  
MODIFIED SPECIFIC LEARNING OUTCOMES  
REACHING 100% AGREEMENT IN  
QUESTIONNAIRE #2

SPECIFIC LEARNING OUTCOME	MEAN	PERCENTAGE AGREEMENT INDEX
I-5. Summarizes some of the biological changes associated with aging.	5.42	100.00
III-10. Explains that the route of administration of a drug can affect its onset, intensity and duration of action.	5.42	100.00
IV-22. Evaluates the hazard of adding new drugs, both prescription and non-prescription, to a drug regimen without consulting one's primary physician and/or pharmacist.	6.00	100.00
VI-25. Discusses some of the pertinent criteria to be considered in selecting a physician and/or a pharmacist.	5.92	100.00

Table 14 further illustrates the high success rate of the modified specific learning outcomes reaching consensus in Questionnaire #2 by examining them in relation to the total number of modified specific learning outcomes submitted for judgment. It is apparent that 9 (50%) of the modified specific learning outcomes in Questionnaire #2 were rated either "Agree" or "Strongly-Agree" by at least 13 of the 14 expert panelists. Another 7 (39%) modified specific learning outcomes were rated either "Agree" or



TABLE 14

PERCENTAGE AGREEMENT INDEX LEVEL OF MODIFIED  
SPECIFIC LEARNING OUTCOMES IN QUESTIONNAIRE #2

PERCENTAGE AGREEMENT INDEX LEVEL	NUMBER OF EXPERT PANELIST	NUMBER OF SPECIFIC LEARNING OUTCOMES	PERCENT OF TOTAL MODIFIED SPECIFIC LEARNING OUTCOMES
100 - 92.85	14-13	9 } 16	50% }
92.84 - 78.57	12-11	7 }	39% }
< 78.56	<10	2	11%

"Strongly Agree" by 11 or 12 of the experts. By combining the "Agree" and "Strongly Agree" percentage agreement index levels found in Table 14, it is evident that 16 (89%) of the modified specific learning outcomes reached consensus.

#### Mean Rating

Table 15 gives the mean percentile level of the total 18 modified specific learning outcomes submitted for expert judgment in Questionnaire #2. Of these, 16 reached consensus and two were rejected because one failed to meet the percentage agreement index criterion and the other failed to meet either of the criteria for acceptance. Of the 16 modified specific learning outcomes reaching consensus in Questionnaire #2, six (37.5%) achieved a mean rating of 5.40 and above, while an additional 11 (68.8%) achieved a mean rating of 5.39 to 4.80. Only one (6.3%) modified specific learning outcome received a mean rating less than the accepted limit of 4.80.

TABLE 15  
MEAN RATING OF MODIFIED SPECIFIC LEARNING  
OUTCOMES IN QUESTIONNAIRE #2

MEAN	PERCENTILE	NUMBER OF SPECIFIC LEARNING OUTCOMES	PERCENT OF TOTAL MODIFIED SPECIFIC LEARNING OUTCOMES
6.00-5.70	95	3	16.7%
5.69-5.40	90	3	16.7%
5.39-5.10	85	8	44.5%
5.09-4.80			
5.09-4.80	80	3	16.7%
< 4.79	< 79.9	1	5.4%

#### Accepted Additional Specific Learning Outcomes

Eleven (38%) of the 29 specific learning outcomes comprising Questionnaire #2 were additional specific learning outcomes recommended by the expert panelists. Table 16 presents a listing of these 11 additional specific learning outcomes and their respective consensus ratings. Eight (73%) of the 11 additional specific learning outcomes reached consensus among the expert panelists.

Only 3 (27%) of the additional specific learning outcomes (I-15, II-11 and II-12) were rejected.

#### Percentage Agreement Index

All 8 of the additional specific learning outcomes reaching consensus in Questionnaire #2 achieved percentage agreement indexes of 85.71 or greater. In other words, 12 or more of the 14 expert

TABLE 16  
 ADDITIONAL SPECIFIC LEARNING OUTCOMES IN  
 QUESTIONNAIRE #2

SPECIFIC LEARNING OUTCOME	MEAN	PERCENTAGE AGREEMENT INDEX	CONSENSUS
I-15. Points out that the population in the United States over the age of 65 is steadily increasing due to many factors such as improved medical care and living and working conditions.	4.50	50.00	R <sup>b</sup>
II-11. Defines idiosyncrasy in his/her own words as any abnormal or peculiar response to a drug that is generally thought to result from an inborn error in the ability to metabolize a drug.	3.57	21.42	R
II-12. Defines a drug allergy in his/her own words as an altered state of reaction to a drug that results from a previous sensitizing exposure and accompanying development of an immunological response.	4.57	42.85	R
III-18. Explains that all drugs have some risks associated with their use.	5.78	100.00	A <sup>a</sup>
III-19. Points out that cigarettes as well as certain foods and beverages such as coffee, tea, and cola contain drugs.	5.35	85.71	A
III-20. Discusses the significance of one's nutritional status in relation to the prescribed dosage and effectiveness of a given drug.	5.35	85.71	A

TABLE 16. Continued

SPECIFIC LEARNING OUTCOME	MEAN	PERCENTAGE AGREEMENT INDEX	CONSENSUS
IV-29. Identifies the most prevalent side effects of the particular drugs he/she is currently using.	5.42	85.71	A
VI-26. Identifies sources in the community where a patient health and medicine card can be obtained.	5.28	92.85	A
VI-27. Identifies resource agencies in the community where patient can go for advice and help in defraying the cost of drug and medical care.	5.42	92.85	A
VI-28. Discusses the importance of properly storing a drug in order to insure its efficacy.	5.64	100.00	A
VI-29. Points out that by asking one's pharmacist, easy to open drug containers may be substituted for child-proof drug containers.	5.71	100,00	A
<sup>a</sup> Accepted specific learning outcomes.			
<sup>b</sup> Rejected specific learning outcomes.			

TABLE 17

ADDITIONAL SPECIFIC LEARNING OUTCOMES REACHING  
100% AGREEMENT IN QUESTIONNAIRE #2

SPECIFIC LEARNING OUTCOME	MEAN	PERCENTAGE AGREEMENT INDEX
III-18. Explains that all drugs have some risks associated with their use.	5.78	100.00
VI-28. Discusses the importance of properly storing a drug in order to insure its efficacy.	5.64	100.00
IV-29. Points out that by asking one's pharmacist, easy to open drug containers may be substituted for child-proof drug containers.	5.71	100.00

panelists participating in round two of the questionnaire judged these specific learning outcomes either "Agree" or "Strongly Agree." In fact, 3 (37.5%) of the accepted additional specific learning outcomes attained 100% agreement among the experts (Table 17).

To further illustrate the success of the accepted additional specific learning outcomes, 5 (62.5%) were rated either "Agree" or "Strongly Agree" by at least 13 of the 14 expert panelists. Another 3 (37.5%) additional specific learning outcomes were rated either "Agree" or "Strongly Agree" by 11 or 12 of the experts (Table 18).

TABLE 18  
PERCENTAGE AGREEMENT INDEX LEVEL OF  
ADDITIONAL SPECIFIC LEARNING  
OUTCOMES IN QUESTIONNAIRE #2

PERCENTAGE AGREEMENT INDEX LEVEL	NUMBER OF EXPERT PANELISTS	NUMBER OF SPECIFIC LEARNING OUTCOMES	PERCENT OF TOTAL ADDITIONAL SPECIFIC LEARNING OUTCOMES
100 - 92.85	14-13	5	45.4%
92.84 - 78.57	12-11	3	27.3%
< 78.56	10	3	27.3%

The combination of the "Agree" and "Strongly Agree" ratings shows that almost three-fourths (73%) of the additional specific learning outcomes reached consensus.

#### Mean Rating

Of the eight additional specific learning outcomes reaching consensus in Questionnaire #2, 5 (62.5%) attained a mean rating of 5.40 and above, while the remaining 3 (37.5%) received a mean rating of 5.35 to 5.28 (Table 19).

#### Rejected Specific Learning Outcomes

Questionnaire #2 was comprised of 29 specific learning outcomes, 18 (62%) of which were modified specific learning outcomes and 11 (38%) were additional specific learning outcomes submitted by the expert panelists. Only 5 (17.2%) of the 29 specific learning outcomes comprising Questionnaire #2 failed to reach consensus.

TABLE 19  
MEAN RATING OF ADDITIONAL SPECIFIC LEARNING  
OUTCOMES IN QUESTIONNAIRE #2

MEAN	PERCENTILE	NUMBER OF SPECIFIC LEARNING OUTCOMES	PERCENT OF TOTAL ADDITIONAL SPECIFIC LEARNING OUTCOMES
6.00 - 5.70	95	2	18.2%
5.69 - 5.40	90	3	27.3%
5.39 - 5.10	85	3	27.3%
5.09 - 4.80	80	0	00.0%
< 4.79	< 79.9	3	27.3%

General Instructional Objective I:  
Understands Fundamental Principles of Aging

Only one specific learning outcome was rejected in this general instructional objective, and it was one which had been recommended by one of the expert panelists:

- I-15. Points out that the population in the United States over the age of 65 is steadily increasing due to many factors such as improved medical care and living and working conditions.

Only one-half of the expert panelists rated this specific learning outcome either "Agree" or "Strongly Agree," resulting in a percentage agreement index of 50.00 and a mean rating of only 4.50. From an analysis of the experts' reasons for disagreeing, one is led to believe that this specific learning outcome is not really important or appropriate for inclusion in a medicine education program for older adults.

One of the experts wanted to know how this specific learning outcome would help older adults, except to inform them that they were one of 22 million adults over age 65. Another panelist stated: "In general, the elderly do not worry about others except in political terms." The remaining comments made by the experts alluded to the fact that knowledge of the information contained in specific learning outcome I-15 would neither help the elderly understand their medicines any better, nor would it enable them to use their medicines more safely.

General Instructional Objective II:  
Knows Common Drug Terms

In Questionnaire #2, as in Questionnaire #1, the specific learning outcomes in general instructional objective II met with much criticism. The reason for the criticism appeared to be the experts' inability to agree upon how specific drug constructs should be defined. Two rejections occurred in this general instructional objective and both were additional specific learning outcomes. The first of these dealt with idiosyncrasy:

II-11. Defines idiosyncrasy in his/her own words as any abnormal or peculiar response to a drug that is generally thought to result from an inborn error in the ability to metabolize a drug.

Idiosyncrasy deals with abnormal mechanisms of drug response which occur in those individuals who have peculiar defects in their body chemistry (114). Those unusual drug responses that have an hereditary basis are categorized under the heading of pharmacogenetics.



In analyzing the experts' reasons for disagreement, it was apparent that some of the panelists thought that idiosyncrasy is not a well-defined concept. Apparently, a precise definition is lacking, because, in the past, the term has been used to refer vaguely either to drug responses which take the form of extremely high or low sensitivity to normal drug dosages, or to drug responses which are qualitatively different from the usual effects.

Another interesting finding pointed out by two of the expert panelists was that idiosyncratic drug responses could be the result of factors other than an inborn error in the ability to metabolize a drug. One would be led to believe that even though the definition of idiosyncrasy used in specific learning outcome II-11 provided latitude for other interpretations concerning the etiology of peculiar and abnormal drug responses, some of the experts still thought the definition was inadequate.

The second rejected specific learning outcome in general instructional objective II treated the concept of drug allergy:

II-12. Defines a drug allergy in his/her own words as an altered state of reaction to a drug that results from a previous sensitizing exposure and accompanying development of an immunological response.

Drug allergy is another example of an adverse drug reaction which is imprecisely defined. Some investigators refer to drug allergy as an adverse drug reaction that results from previous sensitization to a drug or a closely related chemical substance (66). Again, the expert panelists could not reach agreement on a definition.

Some of the expert panelists thought that few older adults would understand the terminology necessary to communicate the concept. One expert thought that an understanding of drug allergy would not likely lead to better drug use by the older adult. This learning outcome was formulated upon the belief that an understanding of drug allergy would be appropriate in a medicine education program since it is a form of adverse drug reaction and can occur at any age. And, as stated in the introduction to the questionnaire instrument, many of the scientific terms appearing in the specific learning outcome were used to facilitate communication among professionals, but could easily be translated and presented in non-technical language understandable to a group of older adults.

Of a total of 15 specific learning outcomes in general instructional objective II submitted to the expert panelists in the two rounds of questioning, 6 (40%) were rejected. Apparently, it is difficult for a group of experts to agree upon a definition of even the most fundamental drug concepts.

General Instructional Objective IV:  
Recognizes that each Drug has Risks  
as well as Benefits

This general instructional objective contained the only specific learning outcome to be rejected on both rounds of the questionnaire. It dealt with the definition of adverse drug reaction:

- IV-6. Defines an adverse drug reaction in his/her own words as those reactions that either result from an exaggerated, but otherwise normal, pharmacological action of a drug, or those reactions that are totally aberrant and unrelated to a drug's normal pharmacological action.

This learning outcome was rejected for the same reason as the previous two discussed above; i.e., the difficulty for experts to agree upon the definition of terms or concepts. The arduousness of getting expert panelists to agree on certain definitions is even more apparent when one considers that the revised version of specific learning outcome IV-6, which was rewritten with expert modifications, was rejected in round two of the questionnaire.

General Instructional Objective VII:  
Comprehends Older Adults Are Suscep-  
tible to Fraudulent Health Practices

In general instructional objective VII, an interesting development occurred with respect to the experts' judgment of specific learning outcome VII-14. This learning outcome reached consensus in the first round of questioning, but some of the expert panelists recommended modifications. Accordingly, it was rewritten and resubmitted for expert judgment in the second round of the questionnaire, but was rejected. The original and revised versions follow:

- VII-14. Distinguishes false claims stated or implied in advertisements or commercials from the the true claims (Original Version).

Distinguishes potentially misleading claims stated or implied in advertisements or commercials from the true claims (Revised Version).

The experts questioned the methodology which would be used to

accomplish the behavior specified in this learning outcome. It appears that the experts did not minimize the importance of specific learning outcome VII-14 so much as they thought it impossible to achieve the required performance from the older adult.

### Major Findings

The preceding analysis of Questionnaires #1 and #2 resulted in the identification of 119 specific learning outcomes deemed important and appropriate for a medicine education program for ambulatory, non-institutionalized older adults as judged by 14 nationally recognized experts in the area of drugs and the elderly. Among these 119 accepted learning outcomes, 37 reached a consensus rating of 100% in terms of the criteria established for this study (see Tables 1 and 10).

From a total of 134 specific learning outcomes (123 original and 11 additional) submitted for judgment in the two rounds of questioning, a total of 18 were rejected by the expert panelists because they were considered either unimportant or inappropriate for a medicine education program for older adults. (The 18 rejected specific learning outcomes do not include the rejected modified learning outcomes.)

For reference convenience, the major findings of this study are presented in the following pages in the form of separate lists which identify: 1) specific learning outcomes reaching consensus

(List 1); 2) specific learning outcomes reaching 100% agreement (List 2); and 3) rejected specific learning outcomes (List 3). In each list, the specific learning outcomes are arranged in relation to their respective general instructional objective, and, as is the case throughout this study, the original number for each learning outcome has been retained for cross reference purposes.

## LIST 1

## SPECIFIC LEARNING OUTCOMES REACHING CONSENSUS

- I. Understands Fundamental Principles of Aging
- I-1. Points out that aging is a normal, natural and inevitable process in the life cycle.
  - I-2. Differentiates normal aging from pathological aging.
  - I-3. Distinguishes between chronological age and functional age.
  - I-4. Identifies some factors that contribute to the wide variability of aging in humans.
  - I-5. Summarizes some of the biological changes that contribute to aging.
  - I-6. Summarizes some of the sociological changes that contribute to aging.
  - I-7. Summarizes some of the psychological changes that contribute to aging.
  - I-8. Explains why chronological age is not an accurate predictor of physical condition and behavior.
  - I-9. Points out that people tend to become more unique and not more alike as they grow older.
  - I-10. Explains why older individuals may be more susceptible to disease than younger individuals.
  - I-11. Explains in his/her own words the nature of chronic conditions as opposed to acute conditions.
  - I-12. Describes health as being more than the absence of disease or infirmity.
  - I-13. States some examples of positive and negative lifestyles that impact on total quality of life.
  - I-14. Identifies some of the health risk factors that may contribute to early aging or disease.

## II. Knows Common Drug Terms

- II-1. Defines a drug in his/her own words as any substance, other than food, used in the prevention, diagnosis, alleviation, treatment, or cure of disease in man.
- II-2. Describes the meaning of habituation to a drug.
- II-3. Defines a medicine in his/her own words as being a kind of drug that is used by the body to prevent, mitigate or manage a disease or a disabling condition.
- II-5. States the difference between a prescription drug and a non-prescription drug.
- II-6. Describes the difference between drug use and misuse.
- II-7. Defines therapeutic effect in his/her own words as being the intended or desired effect.
- II-8. Defines side effect in his/her own words as being either a natural and expected action or an unwanted action of the drug, which may accompany its principal and intended action.
- II-9. States the difference between generic name and brand name drugs.

## III. Understands Fundamental Concepts Concerning Drugs

- III-1. Explains that all drugs have multiple actions in the body.
- III-2. Explains how drug action can be unpredictable due to variables in the drug and/or in the patient.
- III-4. Explains the misconception that a drug is selectively distributed to a very small area of the body without contacting the rest of the body.
- III-5. Generalizes how an orally administered drug is absorbed into the bloodstream.
- III-6. Explains that a drug is distributed throughout the body via the bloodstream.
- III-8. Describes how drugs are eliminated from the body.

- III-9. Discusses four variables that will modify an individual's response to a drug.
- III-10. Explains that the route of administration of a drug can affect its onset, intensity and duration of action.
- III-11. Describes the dangers associated with a drug accumulating in the body.
- III-12. Explains that various doses of a drug may exert a variety of different actions.
- III-15. States the obvious goal of drug therapy as obtaining the greatest benefit with the least risk.
- III-16. Explains that simultaneous use of two or more drugs may alter the effectiveness or toxicity of these drugs.
- III-17. Explains that simultaneous use of some drugs with certain foods may alter the intended action of the drug.
- III-18. Explains that all drugs have some risks associated with their use.
- III-19. Points out that cigarettes as well as certain foods and beverages such as coffee, tea, and cola contain drugs.
- III-20. Discusses the significance of one's nutritional status in relation to the prescribed dosage and effectiveness of a given drug.

IV. Recognizes That Each Drug Has Risks as Well as Benefits

- IV-1. Indicates that all drugs are capable of producing both desired effects and undesired effects.
- IV-2. Identifies the major therapeutic effects of some common drugs such as aspirin.
- IV-4. Illustrates the benefits that one derives from the 'intelligent use' of drugs.
- IV-.5 Illustrates the potential harm that one suffers from the 'improper use' of drugs.



- IV-7. Points out that the adverse drug reaction rate increases as the number of drugs being utilized increases.
- IV-8. Identifies undesirable patient behaviors that can increase the likelihood of adverse drug reactions.
- IV-9. Explains that it may be necessary to accept the minor annoyance of side effects in order to obtain the desired effect.
- IV-10. Indicates some side effects are transient and gradually disappear as one's body adjusts to the drug.
- IV-12. Points out the intensity of side effects can usually be reduced by having one's physician adjust the dose or substitute another drug.
- IV-13. Lists particular types of patients who are in a high risk group for adverse drug reactions.
- IV-14. Relates some of the hazards associated with self-diagnosis and self-medication.
- IV-15. Discusses the potential hazard of discontinuing a 'needed medicine.'
- IV-16. Points out the problem associated with refilling a prescription long after the need has passed.
- IV-17. Describes the potential problems resulting from sharing of drugs with relatives or friends.
- IV-18. Concludes undermedication may be just as dangerous as overmedication.
- IV-19. Summarizes the dangers of retaining outdated drugs.
- IV-20. Explains the undesirability of stretching a drug to make it last longer than the period for which it was prescribed.
- IV-22. Evaluates the hazard of adding new drugs, both prescription and non-prescription, to a drug regimen without consulting one's primary physician and/or pharmacist.
- IV-23. Indicates the necessity of carefully reading and understanding the entire label before taking any medicine.

- IV-24. Explains the peril of giving or taking a drug in the dark.
- IV-25. Discusses the unsoundness of relying on the advice of a non-medical friend as it pertains to medicines.
- IV-26. Points out that altered compliance or non-compliance with physician's instructions can dramatically influence the therapeutic effect of a medicine.
- IV-27. Describes the potential danger of mixing alcoholic beverages with depressant drugs such as antihistamines or minor tranquilizers.
- IV-28. Points out that new and unusual symptoms or alterations in a patient's behavior may be drug induced.
- IV-29. Identifies the most prevalent side effects of the particular drugs he/she is currently using.

V. Understands the Older Adult is Vulnerable to Problems With Drugs

- V-1. Explains some age related physical changes that increase the likelihood of drug problems.
- V-2. Discusses the potential problems of purchasing drugs from different pharmacies.
- V-3. Defines polymorbidity in his/her own words as being a condition characterized by multiple, chronic diseases.
- V-4. Defines polymedicine in his/her own words as receiving coinstantaneous health care from a variety of physicians.
- V-5. Defines polypharmacy in his/her own words as concomitant administration of many medicines.
- V-6. Discusses how polymorbidity, polymedicine and polypharmacy collectively contribute to drug problems in the older adult.
- V-7. Differentiates between acute illness and chronic illness.
- V-8. Points out that chronic illness may require life-long maintenance on drugs.

- V-9. Discusses how psychological, physiological, and sociological losses can contribute to inappropriate use of medicines.
  - V-10. Summarizes how multiple concurrent disorders in the older adult can render therapy more complex.
  - V-11. Points out that personal visual impairments may hinder the correct administration of medicines.
  - V-12. Points out that personal hearing impairments may hinder the correct administration of medicines.
  - V-13. Points out why normal adult dosages of medicine may be more active in the elderly than in the young.
  - V-15. Lists some common types of medication errors frequently seen in older adults.
- VI. Recognizes the Importance of Being an Activated Patient
- VI-1. Explains the concept of an 'activated patient' in his/her own words.
  - VI-2. Summarizes the benefits accrued from being an 'activated patient'.
  - VI-3. Lists some important questions that should be asked of a physician when a drug is prescribed.
  - VI-5. Discusses the necessity of assuming an active partnership role with one's health care practitioners.
  - VI-6. Designs a scheme to help the patient take medicines more carefully at home.
  - VI-7. Formulates some guidelines for safe use of medicines at home.
  - VI-8. Summarizes rights and responsibilities of patients in the health care delivery system.
  - VI-9. Formulates a list of activated patient characteristics.
  - VI-10. Defines a patient profile in his/her own words as being a current updated medical and medication record maintained by one's pharmacist.

- VI-11. Describes the value of utilizing a pharmacist that employs a patient profile system.
- VI-12. Role plays obtaining directions from a physician and/or pharmacist in regard to appropriate drug administration.
- VI-13. Role plays correct interpretation of drug instructions from physician and/or pharmacist.
- VI-14. Role plays an interaction with a pharmacist in regard to the purchase of a drug.
- VI-15. Lists some of the guidelines to be followed when selecting and utilizing a pharmacy.
- VI-16. Justifies the necessity of keeping all medical appointments for follow-up examinations.
- VI-17. Summarizes the significance of medication review on a regular basis.
- VI-18. Identifies the pharmacist as a valuable resource person for drug information.
- VI-19. Lists the important information that should be included on a prescription label.
- VI-20. Explains the seriousness of removing a medicine from its original container.
- VI-21. Discusses the danger of carrying several different drugs in a pill box.
- VI-22. Explains the advantages of carrying an updated patient health and medicine card in wallet or purse.
- VI-23. Lists facts that patient should communicate to the doctor concerning health problems.
- VI-24. Explains some of the signs, symptoms and circumstances which help to determine whether or not a physician should be consulted.
- VI-25. Discusses some of the pertinent criteria to be considered in selecting a physician and/or a pharmacist.

- VI-26. Identifies sources in the community where a patient health and medicine card can be obtained.
  - VI-27. Identifies resource agencies in the community where patient can go for advice and help in defraying the cost of drug and medical care.
  - VI-28. Discusses the importance of properly storing a drug in order to insure its efficacy.
  - VI-29. Points out that by asking one's pharmacist, easy to open drug containers may be substituted for child-proof containers.
- VII. Comprehends Older Adults are Susceptible to Fraudulent Health Practices
- VIII-1. Defines quackery in his/her words as being a fraudulent health practice.
  - VII-2. Defines quack in his/her own words as a charlatan or a boastful pretender to medical skills.
  - VII-3. Contrasts legitimate health practitioners from quacks.
  - VII-4. Explains how fear contributes to the promotion of health quackery.
  - VII-5. Discusses some of the dangers to the patient resulting from quackery.
  - VII-6. Describes why older adults are especially susceptible to fraudulent health practice.
  - VII-7. Describes some common health misconceptions that promote health quackery.
  - VII-8. Lists some of the prominent features which commonly characterize quackery.
  - VII-9. Distinguishes between orthodox and unorthodox medicine.
  - VII-10. Explains 'spontaneous remission' in his/her own words.
  - VII-11. Identifies sources of reliable health information in the community.

- VII-12. Appraises the purpose of advertising.
- VII-13. Generalizes that medical science still cannot cure all diseases.
- VII-14. Distinguishes false claims stated or implied in advertisements or commercials from the true claims.

## LIST 2

## SPECIFIC LEARNING OUTCOMES REACHING 100% AGREEMENT

I. Understands Fundamental Principles of Aging

- I-1. Points out that aging is a normal, natural and inevitable process in the life cycle.
- I-4. Identifies some factors that contribute to the wide variability of aging in humans.
- I-5. Summarizes some of the biological changes associated with aging.
- I-8. Explains why chronological age is not an accurate predictor of physical condition and behavior.

III. Understands Fundamental Concepts Concerning Drugs

- III-10. Explains that the route of administration of a drug can affect its onset, intensity and duration of action.
- III-15. States the obvious goal of drug therapy as obtaining the greatest benefit with the least risk.
- III-16. Explains that simultaneous use of two or more drugs may alter the effectiveness or toxicity of these drugs.
- III-18. Explains that all drugs have some risks associated with their use.

IV. Recognizes that Each Drug has Risks as Well as Benefits

- IV-1. Indicates that all drugs are capable of producing both desired effects and undesired effects.
- IV-14. Relates some of the hazards associated with self-diagnosis and self-medication.
- IV-15. Discusses the potential hazard of discontinuing a 'needed medicine.'
- IV-17. Describes the potential problems resulting from the sharing of drugs with relatives or friends.
- IV-19. Summarizes the dangers of retaining outdated drugs.

- IV-20. Explains the undesirability of stretching a drug to make it last longer than the period for which it was prescribed.
- IV-22. Evaluates the hazard of adding new drugs, both prescription and non-prescription, to a drug regimen without consulting one's primary physician and/or pharmacist.
- IV-23. Indicates the necessity of carefully reading and understanding the entire label before taking any medicine.
- IV-24. Explains the peril of giving or taking a drug in the dark.
- IV-25. Describes the potential danger of mixing alcoholic beverages with depressant drugs such as antihistamines or minor tranquilizers.

V. Understands the Older Adult is Vulnerable to Problems with Drugs

- V-1. Explains some age-related physical changes that increase the likelihood of drug problems.
- V-7. Differentiates between acute illness and chronic illness.
- V-8. Points out that chronic illness may require life-long maintenance on drugs.
- V-9. Discusses how psychological, physiological, and sociological losses can contribute to inappropriate use of medicines.
- V-10. Summarizes how multiple concurrent disorders in the older adult can render therapy more complex.
- V-11. Points out that personal visual impairments may hinder the correct administration of medicines.

VI. Recognizes the Importance of Being an Activated Patient

- VI-5. Discusses the necessity of assuming an active partnership role with one's health care practitioners.



- VI-11. Describes the value of utilizing a pharmacist that employs a patient profile system.
- VI-18. Identifies the pharmacist as a valuable resource person for drug information.
- VI-23. Lists facts that patient should communicate to the doctor concerning health problems.
- VI-25. Discusses some of the pertinent criteria to be considered in selecting a physician and/or a pharmacist.
- VI-28. Discusses the importance of properly storing a drug in order to insure its efficacy.
- VI-29. Points out that by asking one's pharmacist, easy to open drug containers may be substituted for child-proof drug containers.
- VII. Comprehends Older Adults are Susceptible to Fraudulent Health Practices
  - VII-3. Contrasts legitimate health practitioners from quacks.
  - VII-4. Explains how fear contributes to the promotion of health quackery.
  - VII-6. Describes why older adults are especially susceptible to fraudulent health practices.
  - VII-7. Describes some common health misconceptions that promote health quackery.
  - VII-11. Identifies sources of reliable health information in the community.
  - VII-13. Generalizes that medical science still cannot cure all diseases.

## LIST 3

## REJECTED SPECIFIC LEARNING OUTCOMES

I. Understands Fundamental Principles of Aging

- I-15. Points out that the population in the United States over the age of 65 is steadily increasing due to many factors such as improved medical care and living and working conditions.

II. Knows Common Drug Terms

- II-3. Defines a medicine in his/her own words as being a kind of drug that is used by the body to prevent or cure a disease or a disabling condition.
- I-4. Defines drug tolerance in his/her own words as being the need to increase the dose in order to achieve the desired effect.
- II-8. Defines side effect in his/her own words as being a natural and expected action of the drug which accompanies its principal and intended action.
- II-10. Describes the difference between stimulant drugs and depressant drugs.
- II-11. Defines idiosyncrasy in his/her own words as any abnormal or peculiar response to a drug that is generally thought to result from an inborn error in the ability to metabolize a drug.
- II-12. Defines a drug allergy in his/her own words as an altered state of reaction to a drug that results from a previous sensitizing exposure and accompanying development of an immunological response.

III. Understands Fundamental Concepts Concerning Drugs

- III-3. Lists three of the various methods by which drugs can be administered to humans.
- III-7. Generalizes that the liver is the principal organ for the breakdown of most drugs.
- III-13. Points out that the period of time a drug remains in the body will affect its ability to produce the desired effect.

- III-14. Points out that drugs work in conjunction with the body to facilitate restorative processes.

IV. Recognizes that Each Drug Has Risks as Well as Benefits

- IV-6. Defines adverse drug reaction in his/her own words as being an unusual and unexpected response to a drug that is potentially harmful. (Original version in Questionnaire #1.)
- IV-6. Defines an adverse drug reaction in his/her own words as those reactions that either result from an exaggerated, but otherwise normal, pharmacological action of a drug, or those reactions that are totally aberrant and unrelated to a drug's normal pharmacological action. (Modified version in Questionnaire #2.)
- IV-7. Points out that the occurrence of adverse drug reaction is directly related to number of drugs being taken by the patient.
- IV-11. Selects from a list of drugs commonly prescribed to the older adult, those drugs that commonly produce serious side effects.
- IV-12. Points out the intensity of side effects can usually be reduced by adjusting the dose or substituting another drug.
- IV-21. Generalizes some of the more common early warning signs of a drug reaction.

V. Understands the Older Adult is Vulnerable to Problems with Drugs

- V-14. States that many older adults consume a disproportionate amount of medicines.

VI. Recognizes the Importance of Being an Activated Patient

- VI-4. Points out that a 'symptom' signals something wrong with the body's machinery or functions.

VII. Comprehends Older Adults are Susceptible to Fraudulent Health Practices

- VII-14. Distinguishes potentially misleading claims stated or implied in advertisements or commercials from the true claims.

### Summary

The results of this study reveal a high level of agreement among the 14 nationally recognized experts in the area of drugs and the elderly relative to specific learning outcomes considered to be important and appropriate in a medicine education program for ambulatory, non-institutionalized older adults. The mere fact that 14 of the original 16 experts of this caliber were willing to participate as panel members in both rounds of questioning is indicative of the relevance and timeliness of this study. This conclusion is reinforced by the many verbal and written communications with a number of the experts who served on the panel.

A revision of some of the original specific learning outcomes, based upon the recommendations of the expert panelists, resulted in an increased number of learning outcomes reaching consensus in the second round of questioning as well as an increased level of consensus among the majority of those which had already met the criteria for acceptance in the first questionnaire.

While the total rejection rate for all specific learning outcomes was relatively low, the highest rejection rate occurred for those specific learning outcomes which addressed the most fundamental and elementary principles in the area of drugs; i.e., drug terminology and drug concepts. It was difficult to obtain agreement of the experts with respect to these kinds of concerns.

The applications and implications of the accepted specific learning outcomes identified in this investigation are discussed in Chapter V.

## V. SUMMARY AND CONCLUSIONS

### Summary of Problems and Procedures

The primary purpose of this investigation was to identify specific medicine education learning outcomes which are important and appropriate for ambulatory, non-institutionalized older adults. Such specific learning outcomes will serve as a basis for the development of a complete medicine education program which would include appropriate course content, methods, materials and evaluation procedures.

A modification of the Delphi technique was utilized to solicit consensus from a panel of 16 nationally recognized experts in the area of drugs and the elderly. This panel included three medical doctors, eight pharmacists and/or pharmacologists, four geriatric nurses and a biological gerontologist.

A survey-type questionnaire instrument was developed consisting of three major elements: 1) a listing of specific medicine education learning outcomes grouped under seven general instructional objectives; 2) a modification section; and 3) an addition section. The structural segment of the questionnaire was prepared by making use of Gronlund's guide for formulating general instructional objectives and specific learning outcomes on a behavioral basis (70), whereas the content segment was based on an intensive literature review of professional references pertaining to the area of drugs and the elderly, this researcher's professional experience in this area

and the suggestions, recommendations and refinements obtained from a pre-test panel comprised of professional counterparts of the expert panelists.

The expert panelists were asked to indicate their agreement or disagreement on a six-point, Likert-type scale concerning the appropriateness and importance of specific learning outcomes for inclusion in a medicine education program designed expressly for community-dwelling, older adults. These specific learning outcomes were grouped under one of the following seven general instructional objectives to which they relate: 1) understands fundamental principles of aging; 2) knows common drug terms; 3) understands fundamental concepts concerning drugs; 4) recognizes that each drug has risks as well as benefits; 5) understands the older adult is vulnerable to problems with drugs; 6) recognizes the importance of being an activated patient; and 7) comprehends older adults are susceptible to fraudulent health practices.

In addition to rating each specific learning outcome, the expert panelists were asked to recommend modifications or additions to the original list of 123 submitted for their judgment. These modified and additional specific learning outcomes were used to develop round two of the questionnaire instrument which was completed by 14 of the original 16 participating experts.

In both questionnaires the six agreement-disagreement categories utilized for rating each specific learning outcome were assigned numerical values of one through six, where one represented

"Strongly Disagree" and six, "Strongly Agree." The mean and the percentage agreement index were calculated for each specific learning outcome. The modified version of the Delphi technique utilized in this investigation required that a specific learning outcome receive both a mean of 4.80 or above and a "Strongly Agree" or "Agree" rating by a minimum of 75 percent of the expert panelists (percentage agreement index) to be considered as having reached consensus.

### Major Findings and Conclusions

#### Specific Learning Outcomes Reaching Consensus

A total of 137 different specific learning outcomes were submitted to the expert panel in the two rounds of questioning. Of this number, an astonishing 119 (86.8%) specific learning outcomes reached consensus among the expert panelists, and almost one-third (31%) of these accepted specific learning outcomes reached a consensus rating of 100% in terms of the criteria established for this study. It is speculated that this high degree of success in identifying specific medicine education learning outcomes may be attributed to the following four factors:

- 1) The timeliness and relevance of this investigation.
- 2) The extensive and thorough review of the related literature.

- 3) The suggestions, recommendations and refinements obtained from the pre-test panelists and doctoral committee members in the formulation of the specific learning outcomes.
- 4) The practical experience of this investigator in coordinating a seven-month medicine education program for older adults in Broome County, New York.

#### Rejected Specific Learning Outcomes

Only 20 (14.4%) specific learning outcomes were rejected by the experts in the two rounds of questioning and two of these were modified versions of specific learning outcomes found in Questionnaire #1. A limited number of specific learning outcomes were rejected because the expert panelists thought them to be unimportant or inappropriate for inclusion in a medicine education program for older adults; whereas a greater number were rejected because the experts were unable to agree on fundamental drug terminology and concepts. The difficulty in obtaining consensus among the expert panelists in these fundamental areas is even more apparent when one considers that the expert panelists represented four different professional disciplines. It would be safe to assume that each professional discipline has evolved its own esoteric, "discipline-specific" language that would convey fundamental principles and constructs. The problem of obtaining agreement on certain drug terminology and drug constructs appears, therefore, to be the result of the diversified technical and professional training of the



experts as well as their various levels of expertise in this area.

### Assessment of the Delphi Technique

The modified version of the Delphi technique utilized in this investigation was useful and successful in identifying specific learning outcomes for a medicine education program designed expressly for older adults. It also provided for solicitation of expert recommendations for modifying and adding specific learning outcomes. As a result, the original listing of specific learning outcomes was expanded and made more precise by the expert panelists. This resulted in a greater number of specific learning outcomes reaching consensus as well as an increase in the consensus level for those modified outcomes which had reached consensus on the first round of questioning, but were modified to incorporate the experts' recommendations and resubmitted for expert rating in the second questionnaire.

The level of participation by the expert panelists was excellent. All 16 members of the panel participated in the completion of Questionnaire #1, and 14 (89%) of the panelists completed Questionnaire #2. This finding is significant when one considers the caliber of the expert panelists and the heavy demands on their professional time and expertise.

### Applications and Implications

Following are the applications and implications of this investigation:

- 1) The 119 specific medicine education learning outcomes identified in this investigation (see List 1) can serve as a basis for the development and implementation of consumer education programs emphasizing safe use of medicines for older adults by providing program and curriculum developers with a guide for the selection of appropriate content, methods, materials and evaluation procedures. With such a large number of specific learning outcomes to be used as evidence that a given general instructional objective has been met, program planners are afforded the opportunity to choose those specific learning outcomes which best meet the unique needs of a specific target population of "medicine-using," older adults.
- 2) The 23 specific medicine education learning outcomes achieving 100% agreement among the experts (see List 2) represent an exceptionally high level of consensus, and thus can be selectively utilized in the development of consumer medicine education

programs where limited time or resources preclude the use of the longer listing of specific learning outcomes.

- 3) The identified specific learning outcomes can provide a framework for the development and implementation of inservice workshops or seminars for professionals and paraprofessionals working with the elderly. Such workshops or seminars should familiarize these groups with the complex, multi-dimensional problem of drug misadventures among older adults and suggest plans for remediation.
- 4) Similarly, the major findings of this study may be utilized in the professional preparation of gerontologists, adult educators, health educators and medical and allied health personnel to sensitize them to the unique vulnerability of the older adult to drug misadventures and their professional roles in medicine education for the elderly.
- 5) Pamphlets, primers for the older adults, textbooks for professionals and paraprofessionals and other various audio-visual materials can be developed from the identified specific learning outcomes. Content outlines are easily derived from the organizational scheme used in formulating and presenting the specific learning outcomes. These

outlines should be useful in laying the groundwork for the production of the above-mentioned materials.

- 6) Patient education materials, written in lay language and emphasizing healthy and safe use of medicines by older adults, can be developed from the identified specific learning outcomes. In addition to their use in educational settings, potential distribution points for such materials would be waiting rooms in hospitals and clinics, physicians' offices, pharmacies, public health and welfare agencies, home health agencies, senior citizen centers, meal sites for the elderly, insurance agencies and social security offices. These materials would also be useful in supplementing established patient education programs in hospitals, clinics, public health agencies and health maintenance organizations as well as in developing new patient education programs.

#### Relevance and Timeliness of This Study

In June, 1975, the National Institute on Drug Abuse (134) sponsored a conference to promote a better understanding of the important and complex issue of drug misuse among the elderly. One of

the specific recommendations resulting from the conference discussions called for the immediate initiation of consumer education programs emphasizing healthy and safe use of drugs by the elderly. Despite this recommendation, an extensive literature search during the years 1978-79 revealed only isolated reports describing attempts to develop and implement such consumer education programs.

Currently, complete and integrated medicine education programs for the elderly are practically non-existent, and efforts toward their development are extremely limited. In view of the increasing number of elderly persons in our population, the increased amount of chronic illness among the aged requiring life-long medication maintenance and the vulnerability of older adults to drug misadventures, the timeliness and appropriateness of this study are apparent. Due to the relative paucity of medicine education programs in this country, notwithstanding the empirically substantiated need for such programs, the specific learning outcomes identified in this investigation can be a valuable contribution toward the organization and implementation of medicine education programs for the older adult.

The timeliness and relevance of this investigation are further verified by the participation and excellent cooperation of 16 national experts in the area of drugs and the elderly and the high level of agreement among them in identifying the specific medicine education learning outcomes.

### Recommendations for Further Study

Recommendations for additional study related to the further development of medicine education programs designed expressly for older adults are:

- 1) Additional research based on the specific learning outcomes identified in this investigation should be undertaken to determine the methods, materials and evaluative procedures necessary for developing and implementing a complete medicine education program designed expressly for older adults.
- 2) Following the development of all the curriculum components of a medicine education program for older adults, the complete program should be field tested with target groups of elderly individuals to determine its total effectiveness as well as the effectiveness of its various components.
- 3) A study of older adults themselves should be undertaken to identify their perception of medicine education problems and needs which are not being met by existing resources.
- 4) A need identified by this research is related to the absence of a resource book, or document, consisting of definitions of drug terminology and concepts that would be acceptable to the various

professional disciplines concerned with the health, education and welfare of the elderly.

A study should be conducted to produce such a resource, not only for its value in practical application, but also for use by other investigators studying various components of a medicine education program for consumers irrespective of the target population.

- 5) Additional research replicating this investigation should be undertaken with an expanded expert panel. Such an expanded panel should include representatives from the disciplines of health education and adult education. These additional panelists would add a significant dimension to the study by complimenting the high degree of technical expertise in the area of drugs with educational expertise to insure that the specific learning outcomes were indeed educationally sound and practical.

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## APPENDICES

APPENDIX A

PRETEST PARTICIPANTS



## PRETEST PARTICIPANTS

Carl L. Anderson, Dr. P.H., Professor Emeritus, Department of Health,  
Oregon State University, Corvallis, Oregon.

Kenneth Briggs, Ed.D., Associate Professor, Department of Health,  
Central Washington University, Ellensburg, Washington.

Daniel D. Brown, Graduating Senior, School of Pharmacy, Oregon  
State University, Corvallis, Oregon.

John K. Ellis, Ph.D., Professor, Department of Health and Director  
Health Care Administration Program, Oregon State University,  
Corvallis, Oregon.

Eileen Farmer, LPN, Nurse, Corvallis Manor Nursing Home, Corvallis,  
Oregon.

Susan C. Gaeta, A.A., Nurses Assistant, Corvallis Manor Nursing  
Home, Corvallis, Oregon.

Allan E. Gilbert, MD, Corvallis Clinic, Corvallis, Oregon.

Jay F. Kent, MD, Corvallis Clinic, Corvallis, Oregon.

Arthur Koski, Ed.D., Professor and Head, Department of Health,  
Oregon State University, Corvallis, Oregon.

Lewis J. Krakauer, MD, Corvallis Clinic, Corvallis, Oregon.

Craig B. Leman, MD, Corvallis Clinic, Corvallis, Oregon.

Donald Milham, R.Ph., Kirkwood Pharmacy, Kirkwood, New York.

Clara Collette - Pratt, Ph.D., Director Gerontology Program and  
Assistant Professor, Department of Family Life, Oregon  
State University, Corvallis, Oregon.

Noel B. Rawls, MD, Corvallis, Oregon.

Vicki Schmall, Ph.D., Associate Professor, Department of Family  
Life and Extension Gerontology Specialist, Oregon State  
University, Corvallis, Oregon.

APPENDIX B

LETTER TO PROFESSIONAL ORGANIZATIONS

## LETTER TO PROFESSIONAL ORGANIZATIONS

Dear Executive Director:

Let me begin by introducing myself. My name is Michael J. Gaeta and I am a doctoral candidate in the Department of Health Education at Oregon State University. I am currently in the process of formulating my doctoral dissertation in the area of "Medicine Education for Non-Institutionalized Senior Citizens."

I would like to enlist your support in this endeavor by asking you to send to me the names of any members in your organization with a special interest in the area of medicines and the elderly who might be willing to serve on a validation committee. The purpose of such a committee will be to help insure the validity and relevancy of my medicine education program.

Once I receive the list of prospective validators from your organization I intend to contact these people individually so that I might ascertain their willingness and interest in helping me to validate this program.

I would greatly appreciate any assistance that you might be able to provide for me. Thank you for your time and have a nice day.

Sincerely,

Michael J. Gaeta  
Doctoral Candidate  
Department of Health Education  
Oregon State University

mls

APPENDIX C

LETTER TO DELPHI PANEL REQUESTING PARTICIPATION

## LETTER TO DELPHI PANEL REQUESTING PARTICIPATION

As a doctoral candidate in the Department of Health at Oregon State University, I am conducting research to help fill the need for medicine education among the elderly. The primary intent of this investigation will be the, "Identification of Medicine Education Learning Outcomes for Ambulatory, Non-Institutionalized Older Adults."

The complex issue of drugs and the elderly has justifiably received increased attention and concern during the last few years. Due to a myriad of biological, psychological and sociological factors, the older adult displays a high vulnerability for problems with drugs. The need for developing consumer education programs for the aged, emphasizing proper utilization of medicines, was recognized by conferees attending the 1975 Conference on Drug Use and the Elderly sponsored by the National Institute on Drug Abuse.

Because of your recognized expertise in matters relating to drugs and the elderly I am asking if you would be willing to serve on a Delphi Panel to assist in the process. You are one of a select group of individuals in the nation representing the disciplines of medicine, pharmacy, nursing or gerontology who has been invited to assist in the formulation of learning objectives for a medicine education program designed expressly for older adults.

All panel members for this investigation were chosen on the basis of their national reputation as active contributors to the knowledge base in the area of drugs and the elderly, and upon the official recommendations of officers in charge of various professional associations and organizations.

The Delphi technique, which is built on the strength of informed intuitive judgment, is intended to get expert opinion without bringing the experts together in a face-to-face confrontation. Your primary task as a member of this expert panel would involve judging a list of learning outcomes three different times; specifically, you will be asked to react to the importance of 75 learning outcomes, to comment, to suggest additions and/or deletions, and to return the materials to me. After receiving the first completed set of materials from you, I will analyze the data and formulate a second set of revised learning outcomes based upon the recommendations and suggestions of all panel members. The process will be repeated and a third set of revised learning outcomes will be developed for your review. Each review session should not require an excessive amount of your time (30-60 minutes).

We would be highly honored and most pleased if you would be able to participate in this study. Enclosed is a self-addressed envelope in which I am asking you to return the attached response sheet at your earliest convenience. Thank you for your time.

Sincerely,

Michael J. Gaeta  
Doctoral Candidate  
Department of Health  
Oregon State University

mls

Encls.

APPENDIX D

DELPHI PANEL PARTICIPATION RESPONSE SHEET

## DELPHI PANEL PARTICIPATION RESPONSE SHEET

## RESPONSE SHEET

RE: Participation as Delphi panel member: "Identification of Medicine Education Learning Outcomes for Ambulatory, Non-Institutionalized Older Adults."

Please check one of the following and return to me in the enclosed self-addressed envelope.

I will be able to participate as a panel member.

☐

I will not be able to participate as a panel member.

☐

I would like further information regarding the role of a panel member for this study.

☐

SIGNATURE:

Thank you,

Michael J. Gaeta  
Doctoral Candidate  
Department of Health  
Waldo Hall #307  
Oregon State University  
Corvallis, Oregon 97331



APPENDIX E

LETTER OF THANKS TO DELPHI PANEL

## LETTER OF THANKS TO DELPHI PANEL

Dear :

Thank you for agreeing to participate as an expert panel member in my dissertation, "The Identification of Medicine Education Learning Outcomes for Ambulatory, Non-Institutionalized Older Adults."

At the present time the questionnaire is being pre-tested for clarity by local physicians, pharmacists, pharmacologists, nurses and university faculty members. This process should be completed shortly and the projected target date for mailing the first round of the questionnaire is February 15th.

I am very excited about this research project and I am also extremely honored to be working with such highly respected experts. Thank you for taking time from your busy schedule to share your expertise!

Sincerely,

Micahel J. Gaeta  
Doctoral Candidate  
and Teaching Assistant

mls

APPENDIX F

EXPERT PANEL MEMBERS

## EXPERT PANEL MEMBERS

- Betty S. Bergersen, Ed.D., Professor of Nursing, Graduate Program, Wichita State University, Wichita, Kansas.
- Klea D. Bertakis, M.D., M.P.H., Department of Family and Community Medicine, University of Utah Medical Center, Salt Lake City, Utah.
- Alex Comfort, M.D., D.Sc., Fellow at the Institute for Higher Studies in Santa Barbara; Professor in the Department of Pathology, University of California Medical School Irvine, California, and Lecturer, Department of Psychiatry, Stanford University, California.
- James W. Cooper, Ph.D., R.Ph., Associate Professor and Assistant Clinical Professor, School of Pharmacy, University of Georgia, Medical College of Georgia, Athens, Georgia.
- Donald A. Holloway, Pharm. D., R.Ph., Pharmacist, The Methodist Retirement Homes, Durham, North Carolina, and Professor, Department of Pharmacy, Duke University Medical Center, Durham, North Carolina.
- Samuel H. Kalman, Director of Education, Professional Affairs Division, American Pharmaceutical Association, Washington, D.C.
- Peter P. Lamy, Ph.D., F.C.P., Professor and Director, Institutional Pharmacy Programs and Chairman, Department of Pharmacy Practice and Administrative Sciences, School of Pharmacy, University of Maryland, Baltimore, Maryland.
- Paul W. Lofholm, Pharm. D., Director of Pharmacy Services, Ross Valley Medical Clinic, Greenbrae, California.
- Dorothy V. Lundin, R.N., M.S., Instructor, School of Nursing, University of Minnesota, Minneapolis, Minnesota.
- <sup>a</sup>Elizabeth A. Neeley, M.N., Instructor, School of Nursing, Syracuse University, Syracuse, New York.
- William Simonson, Pharm. D., Assistant Professor, School of Pharmacy, Oregon State University, Corvallis, Oregon.
- Walter F. Stanaszek, Ph.D., Associate Professor of Clinical Pharmacy, College of Pharmacy, University of Oklahoma, Oklahoma City, Oklahoma.

Ronald B. Stewart, M.S., Associate Professor and Associate Chairman,  
Department of Clinical Pharmacy, College of Pharmacy, University  
of Florida, Gainesville, Florida.

Arthur Ulene, M.D., Medical Consultant - NBC Today Show, New York,  
New York.

Nancy Rollins Venners, R.N., President and Founder, Geriatric  
Nurses Association of Oregon, Portland, Oregon.

<sup>a</sup>Ruth Weg, Ph.D., Associate Director for Training, Ethel Percy  
Andrus Gerontology Center, University of Southern California,  
Los Angeles, California.

<sup>a</sup>Did not complete round two of the questionnaire instrument.

## APPENDIX G

## DELPHI QUESTIONNAIRE #1

THE IDENTIFICATION OF MEDICINE EDUCATION  
LEARNING OUTCOMES FOR AMBULATORY,  
NON-INSTITUTIONALIZED OLDER ADULTS

INSTRUCTIONS FOR COMPLETING THE QUESTIONNAIRE

This is the first of three rounds of the questionnaire in this study. You are asked to:

1. Read each specific learning outcome and rate each as to its importance/ appropriateness for consideration in developing a medicine education program for older adults. This rating is accomplished by checking one of the following categories of agreement or disagreement:
  - SA - strongly agree
  - A - agree
  - AR - agree with reservation
  - DR - disagree with reservation
  - D - disagree
  - SD - strongly disagree
2. If you are in disagreement with a specific learning outcome, briefly state your reason in the space provided: Reasons for Disagreeing.
3. Please note that space has been provided at the end of each section for you to add specific learning outcomes that may have been overlooked; or to modify the existing learning outcomes.

In stating the specific learning outcomes, scientific terms are used purely as a means of professionally communicating 'concepts' that would be covered in a program of medicine instruction for older adults. In such a program these concepts would be presented in lay language and at a level of understanding germane to the target group.

#### DEFINITIONS OF TERMS USED IN THIS STUDY

1. General Instructional Objectives: A general instructional objective describes in 'general terms' the types of performance (i.e., knowledge, understanding, comprehension, etc.) older adults would be expected to demonstrate at the completion of the medicine education program. In other words, general instructional objectives describe the intent of instruction.
2. Specific Learning Outcomes: Specific learning outcomes are representative samples of the 'specific types of behavior' that are to be used as evidence that the general instructional objective has been achieved by the older adult at the completion of the medicine education program. In other words, specific learning outcomes describe the types of behavior that older adults would be expected to demonstrate indicating they have satisfactorily achieved the general instructional goals.
3. Magic Bullet Concept: The misconception that a drug is selectively distributed to a very small area of the body without contacting the rest of the body.
4. Activated Patient: A patient who has assumed a greater responsibility for his/her own health care by learning about his/her body and his/her medications, as well as the importance of actively communicating with all his/her health care practitioners.
5. Polymorbidity: A condition characterized by multiple, chronic diseases.
6. Polymedicine: Receiving coinstantaneous health care from a variety of physicians.
7. Polypharmacy: Concomittant administration of a variety of medicines.



GENERAL INSTRUCTIONAL OBJECTIVE I: UNDERSTANDS FUNDAMENTAL PRINCIPLES OF AGING

<u>Specific Learning Outcomes</u>	<u>Strongly agree</u>	<u>Agree</u>	<u>Agree with reservation</u>	<u>Disagree with reservation</u>	<u>Disagree</u>	<u>Strongly Disagree</u>	<u>Reason for Disagreeing</u>
I-1. Points out that aging is a normal, natural and inevitable process in the life cycle.	SA	A	AR	DR	D	SD	
I-2. Differentiates normal aging from pathological aging.	SA	A	AR	DR	D	SD	
I-3. Distinguishes between chronological age and functional age.	SA	A	AR	DR	D	SD	
I-4. Identifies some factors that contribute to the wide variability of aging in humans.	SA	A	AR	DR	D	SD	
I-5. Summarizes some of the biological changes that contribute to aging.	SA	A	AR	DR	D	SD	
I-6. Summarizes some of the sociological changes that contribute to aging.	SA	A	AR	DR	D	SD	
I-7. Summarizes some of the psychological changes that contribute to aging.	SA	A	AR	DR	D	SD	
I-8. Explains why chronological age is not an accurate predictor of physical condition and behavior.	SA	A	AR	DR	D	SD	

GENERAL INSTRUCTIONAL OBJECTIVE I: UNDERSTANDS FUNDAMENTAL PRINCIPLES OF AGING (Continued)

Specific Learning Outcomes

	<i>Strongly agree</i>	<i>Agree</i>	<i>Agree with reservation</i>	<i>Disagree with reservation</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<u>Reason for Disagreeing</u>
I-9. Points out that people tend to become more unique and not more alike as they grow older.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
I-10. Explains why older individuals may be more susceptible to disease than younger individuals.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
I-11. Identifies chronic conditions as being more prevalent than acute conditions in the older adult.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
I-12. Describes health as being more than the absence of disease or infirmity.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
I-13. States some examples of positive and negative lifestyles that impact on total quality of life.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
I-14. Identifies some of the health risk factors that may contribute to early aging or disease.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	

GENERAL INSTRUCTIONAL OBJECTIVE I: UNDERSTANDS FUNDAMENTAL PRINCIPLES OF AGING (Continued)

Modification Section (include item number)

Addition Section

GENERAL INSTRUCTIONAL OBJECTIVE II: KNOWS COMMON DRUG TERMS

Specific Learning Outcomes

II-1. Defines a drug in his/her own words as being any substance than affects the function or structure of the organism.

Strongly agree	Agree	Agree with reservation	Disagree with reservation	Disagree	Strongly Disagree
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Reason for Disagreeing

SA A AR DR D SD

II-2. Describes the meaning of habituation to a drug.

SA A AR DR D SD

II-3. Defines a medicine in his/her own words as being a kind of drug that is used by the body to prevent or cure a disease or a disabling condition.

SA A AR DR D SD

II-4. Defines drug tolerance in his/her own words as being the need to increase the dose in order to achieve the desired effect.

SA A AR DR D SD

II-5. States the difference between a prescription drug and a non-prescription drug.

SA A AR DR D SD

II-6. Describes the difference between drug use and misuse.

SA A AR DR D SD

GENERAL INSTRUCTIONAL OBJECTIVE II: KNOWS COMMON DRUG TERMS (Continued)

<u>Specific Learning Outcomes</u>	<i>Strongly agree</i>	<i>Agree</i>	<i>Agree with reservation</i>	<i>Disagree with reservation</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<u>Reason for Disagreeing</u>
II-7. Defines therapeutic effect in his/her own words as being the intended or desired effect.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
II-8. Defines side effect in his/her own words as being a natural and expected action of the drug which accompanies its principal and intended action.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
II-9. States the difference between generic name and brand name drugs.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
II-10. Describes the difference between stimulant drugs and depressant drugs.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	

Modification Section (Include Item Number)

Addition Section

GENERAL INSTRUCTIONAL OBJECTIVE III: UNDERSTANDS FUNDAMENTAL CONCEPTS CONCERNING DRUGS

Specific Learning Outcomes

- III-1. Explains that all drugs have multiple actions in the body.
- III-2. Explains how drug action can be unpredictable due to variables in the drug and/or in the patient.
- III-3. Lists three of the various methods by which drugs can be administered to humans.
- III-4. Explains the misconception that a drug is selectively distributed to a very small area of the body without contacting the rest of the body.
- III-5. Generalizes how an orally administered drug is absorbed into the bloodstream.
- III-6. Explains that a drug is distributed throughout the body via the bloodstream.

	Strongly agree	Agree	Agree with reservation	Disagree with reservation	Disagree	Strongly Disagree	Reasons for Disagreeing
III-1.	SA	A	AR	DR	D	SD	
III-2.	SA	A	AR	DR	D	SD	
III-3.	SA	A	AR	DR	D	SD	
III-4.	SA	A	AR	DR	D	SD	
III-5.	SA	A	AR	DR	D	SD	
III-6.	SA	A	AR	DR	D	SD	

GENERAL INSTRUCTIONAL OBJECTIVE III: UNDERSTANDS FUNDAMENTAL CONCEPTS CONCERNING DRUGS (Continued)

<u>Specific Learning Outcomes</u>	<u>Strongly agree</u>	<u>Agree</u>	<u>Agree with reservation</u>	<u>Disagree with reservation</u>	<u>Disagree</u>	<u>Strongly Disagree</u>	<u>Reason for Disagreeing</u>
III-7. Generalizes that the liver is the principal organ for the breakdown of most drugs.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
III-8. Describes how drugs are eliminated from the body.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
III-9. Discusses four variables that will modify an individual's response to a drug.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
III-10. Explains how the route of administration of a drug affects its onset of action.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
III-11. Describes the dangers associated with a drug accumulating in the body.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
III-12. Explains that various doses of a drug may exert a variety of different actions.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
III-13. Points out that the period of time a drug remains in the body will affect its ability to produce the desired effect.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	

GENERAL INSTRUCTIONAL OBJECTIVE III: UNDERSTANDS FUNDAMENTAL CONCEPTS CONCERNING DRUGS (Continued)

<u>Specific Learning Outcomes</u>	<u>Strongly agree</u>	<u>Agree</u>	<u>Agree with reservation</u>	<u>Disagree with reservation</u>	<u>Disagree</u>	<u>Strongly Disagree</u>	<u>Reason for Disagreeing</u>
III-14. Points out that drugs work in conjunction with the body to facilitate restorative processes.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
III-15. States the obvious goal of drug therapy as obtaining the greatest benefit with the least risk.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
III-16. Explains that simultaneous use of two or more drugs may alter the effectiveness or toxicity of these drugs.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
III-17. Explains that simultaneous use of some drugs with certain foods may alter the intended action of the drug.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	



GENERAL INSTRUCTIONAL OBJECTIVE III: UNDERSTANDS FUNDAMENTAL CONCEPTS CONCERNING DRUGS (Continued)

Modification Section (Include Item Number)

Addition Section

GENERAL INSTRUCTIONAL OBJECTIVE IV: RECOGNIZES THAT EACH DRUG HAS RISKS AS WELL AS BENEFITS

<u>Specific Learning Outcomes</u>	<u>Strongly agree</u>	<u>Agree</u>	<u>Agree with reservation</u>	<u>Disagree with reservation</u>	<u>Disagree</u>	<u>Strongly Disagree</u>	<u>Reason for Disagreeing</u>
IV-1. Indicates that all drugs are capable of producing both desired effects and undesired effects.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-2. Identifies the major therapeutic effects of some common drugs such as aspirin.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-3. Identifies the most prevalent side effects of some common drugs such as aspirin.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-4. Illustrates the benefits that one derives from the 'intelligent use' of drugs.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-5. Illustrates the potential harm that one suffers from the 'improper use' of drugs.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-6. Defines adverse drug reaction in his/her own words as being an unusual and unexpected response to a drug that is potentially harmful.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-7. Points out that the occurrence of adverse drug reaction is directly related to number of drugs being taken by the patient.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	

GENERAL INSTRUCTIONAL OBJECTIVE IV: RECOGNIZES THAT EACH DRUG HAS RISKS AS WELL AS BENEFITS (Continued)

<u>Specific Learning Outcomes</u>	<u>Strongly agree</u>	<u>Agree</u>	<u>Agree with reservation</u>	<u>Disagree with reservation</u>	<u>Disagree</u>	<u>Strongly Disagree</u>	<u>Reason for Disagreeing</u>
IV-8. Identifies undesirable patient behaviors that can increase the likelihood of adverse drug reactions.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-9. Explains that it may be necessary to accept the minor annoyance of side effects in order to obtain the desired effect.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-10. Indicates many side effects are transient, and gradually disappear as the body adjusts to the drug.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-11. Selects from a list of drugs commonly prescribed to the older adult, those drugs that commonly produce serious side effects.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-12. Points out the intensity of side effects can usually be reduced by adjusting the dose or substituting another drug.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-13. Lists particular types of patients who are in a high risk group for adverse drug reactions.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	

GENERAL INSTRUCTIONAL OBJECTIVE IV: RECOGNIZES THAT EACH DRUG HAS RISKS AS WELL AS BENEFITS (Continued)

Specific Learning Outcomes

IV-14. Relates some of the hazards associated with self-diagnosis and self-medication.

Strongly agree  
Agree  
Agree with reservation  
Disagree with reservation  
Disagree  
Strongly Disagree

Reason for Disagreeing

SA A AR DR D SD

IV-15. Discusses the potential hazard of discontinuing a 'needed medicine'.

SA A AR DR D SD

IV-16. Points out the problem associated with refilling a prescription long after the need has passed.

SA A AR DR D SD

IV-17. Describes the potential problems resulting from the sharing of drugs with relatives or friends.

SA A AR DR D SD

IV-18. Concludes undermedication may be just as dangerous as over-medication.

SA A AR DR D SD

IV-19. Summarizes the dangers of retaining outdated drugs.

SA A AR DR D SD

IV-20. Explains the undesirability of stretching a drug to make it last longer than the period for which it was prescribed.

SA A AR DR D SD

GENERAL INSTRUCTIONAL OBJECTIVE VI: RECOGNIZES THAT EACH DRUG HAS RISKS AS WELL AS BENEFITS (Continued)

<u>Specific Learning Outcomes</u>	<u>Strongly agree</u>	<u>Agree</u>	<u>Agree with reservation</u>	<u>Disagree with reservation</u>	<u>Disagree</u>	<u>Strongly Disagree</u>	<u>Reason for Disagreeing</u>
IV-21. Generalizes some of the more common early warning signs of a drug reaction.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-22. Evaluates the hazard of adding new drugs to a drug regimen without consulting all physicians providing simultaneous care to the patient.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-23. Indicates the necessity of carefully reading and understanding the entire label before taking any medicine.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-24. Explains the peril of giving or taking a drug in the dark.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-25. Discusses the unsoundness of relying on the advice of a non-medical friend as it pertains to medicines.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-26. Points out that altered compliance or non-compliance with physicians instructions can dramatically influence the therapeutic effect of a medicine.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	

GENERAL INSTRUCTIONAL OBJECTIVE IV: RECOGNIZES THAT EACH DRUG HAS RISKS AS WELL AS BENEFITS (Continued)

Specific Learning Outcomes

IV-27. Describes the potential danger of mixing alcoholic beverages with depressant drugs such as antihistamines or minor tranquilizers.

Strongly agree	Agree	Agree with reservation	Disagree with reservation	Disagree	Strongly Disagree
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Reason for Disagreeing

SA   A   AR   DR   D   SD

IV-28. Points out that new and unusual symptoms or alterations in a patient's behavior may be drug induced.

SA   A   AR   DR   D   SD

Modification Section (Include Item Number)

Addition Section

GENERAL INSTRUCTIONAL OBJECTIVE V: UNDERSTANDS THE OLDER ADULT IS VULNERABLE TO PROBLEMS WITH DRUGS

<u>Specific Learning Outcomes</u>	<u>Strongly agree</u>	<u>Agree</u>	<u>Agree with reservation</u>	<u>Disagree with reservation</u>	<u>Disagree</u>	<u>Strongly Disagree</u>	<u>Reason for Disagreeing</u>
V-1. Explains some age related physical changes that increase the likelihood of drug problems.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
V-2. Discusses the potential problems of purchasing drugs from different pharmacies.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
V-3. Defines polymorbidity in his/her own words as being a condition characterized by multiple, chronic diseases.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
V-4. Defines polymedicine in his/her own words as receiving coinstantaneous health care from a variety of physicians.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
V-5. Defines polypharmacy in his/her own words as concomitant administration of many medicines.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
V-6. Discusses how polymorbidity, polymedicine and polypharmacy collectively contribute to drug problems in the older adult.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	

GENERAL INSTRUCTIONAL OBJECTIVE V: UNDERSTANDS THE OLDER ADULT IS VULNERABLE TO PROBLEMS WITH DRUGS.  
(Continued)

Specific Learning Outcomes

V-7. Differentiates between acute illness and chronic illness.

SA   A   AR   DR   D   SD

V-8. Points out that chronic illness may require life-long maintenance on drugs.

SA   A   AR   DR   D   SD

V-9. Discusses how psychological, physiological, and sociological losses can contribute to inappropriate use of medicines.

SA   A   AR   DR   D   SD

V-10. Summarizes how multiple concurrent disorders in the older adult can render therapy more complex.

SA   A   AR   DR   D   SD

V-11. Points out that personal visual impairments may hinder the correct administration of medicines.

SA   A   AR   DR   D   SD

V-12. Points out that personal hearing impairments may hinder the correct administration of medicines.

SA   A   AR   DR   D   SD

*Strongly agree*  
*Agree*  
*Agree with reservation*  
*Disagree with reservation*  
*Disagree*  
*Strongly Disagree*

Reason for Disagreeing



GENERAL INSTRUCTIONAL OBJECTIVE V: UNDERSTANDS THE OLDER ADULT IS VULNERABLE TO PROBLEMS WITH DRUGS  
(Continued)

<u>Specific Learning Outcomes</u>	<u>Strongly agree</u>	<u>Agree</u>	<u>Agree with reservation</u>	<u>Disagree with reservation</u>	<u>Disagree</u>	<u>Strongly Disagree</u>	<u>Reason for Disagreeing</u>
V-13. Points out why normal adult dosages of medicine may be more active in the elderly than in the young.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
V-14. States that many older adults consume a disproportionate amount of medicines.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
V-15. Lists some common types of medication errors frequently seen in older adults.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	

Modification Section (Include Item Number)

Addition Section

GENERAL INSTRUCTIONAL OBJECTIVE VI: RECOGNIZES THE IMPORTANCE OF BEING AN ACTIVATED PATIENT

Specific Learning Outcomes

VI-1. Explains the concept of an 'activated patient' in his/her own words.

Strongly agree	Agree	Agree with reservation	Disagree with reservation	Disagree	Strongly Disagree
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Reason for Disagreeing

SA   A   AR   DR   D   SD

VI-2. Summarizes the benefits accrued from being an 'activated patient'.

SA   A   AR   DR   D   SD

VI-3. Lists some important questions that should be asked of a physician when a drug is prescribed.

SA   A   AR   DR   D   SD

VI-4. Points out that a 'symptom' signals something wrong with the body's machinery or functions.

SA   A   AR   DR   D   SD

VI-5. Discusses the necessity of assuming an active partnership role with one's health care practitioners.

SA   A   AR   DR   D   SD

VI-6. Designs a scheme to help the patient take medicines more carefully at home.

SA   A   AR   DR   D   SD

VI-7. Formulates some guidelines for safe use of medicines at home.

SA   A   AR   DR   D   SD

GENERAL INSTRUCTIONAL OBJECTIVE VI: RECOGNIZES THE IMPORTANCE OF BEING AN ACTIVATED PATIENT  
(Continued)

<u>Specific Learning Outcomes</u>	<u>Strongly agree</u>	<u>Agree</u>	<u>Agree with reservation</u>	<u>Disagree with reservation</u>	<u>Disagree</u>	<u>Strongly Disagree</u>	<u>Reason for Disagreeing</u>
VI-8. Summarizes rights and responsibilities of patients in the health care delivery system.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-9. Formulates a list of activated patient characteristics.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-10. Defines a patient profile in his/her own words as being a current updated medical and medication record maintained by one's pharmacy.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-11. Describes the value of utilizing a pharmacy that employs a patient profile system.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-12. Role plays obtaining directions from a physician in regard to drug administration.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-13. Role plays correct interpretation of medicine instructions from physician.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-14. Role plays an interaction with a pharmacist in regard to the purchase of a drug.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	

GENERAL INSTRUCTIONAL OBJECTIVE VI: RECOGNIZES THE IMPORTANCE OF BEING AN ACTIVATED PATIENT  
(Continued)

<u>Specific Learning Outcomes</u>	<u>Strongly agree</u>	<u>Agree</u>	<u>Agree with reservation</u>	<u>Disagree with reservation</u>	<u>Disagree</u>	<u>Strongly Disagree</u>	<u>Reason for Disagreeing</u>
VI-15. Lists some of the guidelines to be followed when selecting and utilizing a pharmacy.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-16. Justifies the necessity of keeping all medical appointments for follow up examinations.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-17. Summarizes the significance of medication review on a regular basis.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-18. Identifies the pharmacist as a valuable resource person for drug information.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-19. Lists the important information that should be included on a prescription label.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-20. Explains the seriousness of removing a medicine from its original container.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-21. Discusses the danger of carrying several different drugs in a pill box.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-22. Explains the advantages of carrying an updated patient health and medicine card in wallet or purse.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	

GENERAL INSTRUCTIONAL OBJECTIVE VI: RECOGNIZES THE IMPORTANCE OF BEING AN ACTIVATED PATIENT  
(Continued)

<u>Specific Learning Outcomes</u>	<i>Strongly agree</i>	<i>Agree</i>	<i>Agree with reservation</i>	<i>Disagree with reservation</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<u>Reason for Disagreeing</u>
VI-23. Lists facts that patient should communicate to the doctor concerning health problems.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-24. Explains some of the signs, symptoms and circumstances which help to determine whether or not a physician should be consulted.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-25. Discusses some of the pertinent criteria used in the selection of a physician.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	

Modification Section (Include Item Number)

Addition Section

GENERAL INSTRUCTIONAL OBJECTIVE VII: COMPREHENDS OLDER ADULTS ARE SUSCEPTIBLE TO FRAUDULENT HEALTH PRACTICES.

<u>Specific Learning Outcomes</u>	<u>Strongly agree</u>	<u>Agree</u>	<u>Agree with reservation</u>	<u>Disagree with reservation</u>	<u>Disagree</u>	<u>Strongly Disagree</u>	<u>Reason for Disagreeing</u>
VII-1. Defines quackery in his/her own words as being a fraudulent health practice.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VII-2. Defines quack in his/her own words as a charlatan or a boastful pretender to medical skills.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VII-3. Contrasts legitimate health practitioners from quacks.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VII-4. Explains how fear contributes to the promotion of health quackery.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VII-5. Discusses some of the dangers to the patient resulting from quackery.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VII-6. Describes why older adults are especially susceptible to fraudulent health practices.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VII-7. Describe some common health misconceptions that promote health quackery.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	

GENERAL INSTRUCTIONAL OBJECTIVE VII: COMPREHENDS OLDER ADULTS ARE SUSCEPTIBLE TO FRAUDULENT HEALTH PRACTICES.  
(Continued)

<u>Specific Learning Outcomes</u>	<u>Strongly agree</u>	<u>Agree</u>	<u>Agree with reservation</u>	<u>Disagree with reservation</u>	<u>Disagree</u>	<u>Strongly Disagree</u>	<u>Reason for Disagreeing</u>
VII-8. Lists some of the prominent features which commonly characterize quackery.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VII-9. Distinguishes between orthodox and unorthodox medicine.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VII-10. Explains 'spontaneous remission' in his/her own words.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VII-11. Identifies sources of reliable health information in the community.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VII-12. Appraises the purpose of advertising.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VII-13. Generalizes that medical science still cannot cure all diseases.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VII-14. Distinguishes false claims stated or implied in advertisements or commercials from the true claims.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	

GENERAL INSTRUCTIONAL OBJECTIVE VII: COMPREHENDS OLDER ADULTS ARE SUSCEPTIBLE TO FRAUDULENT HEALTH PRACTICES.  
(Continued)

Modification Section (Include Item Number)

Addition Section



APPENDIX H

COVER LETTER - DELPHI QUESTIONNAIRE #1

## COVER LETTER - DELPHI QUESTIONNAIRE #1

Thank you for agreeing to participate as an expert panel member in this investigation. The purpose of this study is to identify specific learning outcomes which will serve as the basis for the future development of a medicine education program for older adults.

Enclosed is the first of three rounds of the questionnaire designed to identify specific medicine education learning outcomes for ambulatory non-institutionalized older adults. Subsequent rounds of the questionnaire will incorporate the recommendations of the expert panel.

The questionnaire is divided into seven areas corresponding to the seven general instructional objectives identified for use in this investigation. The objectives are as follows:

- Section I: Understands fundamental principles of aging.
- Section II: Knows common drug terminology.
- Section III: Understands fundamental concepts concerning drugs.
- Section IV: Recognizes that each drug has risks as well as benefits.
- Section V: Understands the older adult is vulnerable to problems with drugs.
- Section VI: Recognizes the importance of being an activated patient.
- Section VII: Comprehends that older adults are susceptible to health and medicine quackery.

Based upon a pre-test of the questionnaire, estimated average time for this task is approximately 50 minutes. Your answers and comments will be kept confidential and only summarized results of this study will be used in subsequent reports. This dissertation and any future report, based on the results of this study, will acknowledge the expert panel participants.

When you have completed the questionnaire please return to me in the enclosed, self-addressed, stamped envelope. It would be extremely helpful if you could return your completed questionnaire within ten days.

Your willingness to serve as a member of the expert committee for this investigation is greatly appreciated.

Sincerely,

Michael J. Gaeta  
Doctoral Candidate  
and Teaching Assistant

## APPENDIX I

### SUMMARY REPORT - QUESTIONNAIRE #1

GENERAL INSTRUCTIONAL OBJECTIVE I: UNDERSTANDS FUNDAMENTAL PRINCIPLES OF AGING

<u>Specific Learning Outcomes</u>	<u>MEAN</u>	<u>PERCENTAGE AGREEMENT INDEX</u>	<u>CONSENSUS</u>
I-1. Points out that aging is a normal, natural and inevitable process in the life cycle.	5.75	100.00	A
I-2. Differentiates normal aging from pathological aging.	5.06	75.00	A
I-3. Distinguishes between chronological age and functional age.	5.30	87.50	A
I-4. Identifies some factors that contribute to the wide variability of aging in humans.	5.37	100.00	A
I-5. Summarizes some of the biological changes that contribute to aging.	4.93	75.00	A
I-6. Summarizes some of the sociological changes that contribute to aging.	4.93	87.50	A
I-7. Summarizes some of the psychological changes that contribute to aging.	5.00	81.25	A
I-8. Explains why chronological age is not an accurate predictor of physical condition and behavior.	5.50	100.00	A
I-9. Points out that people tend to become more unique and not more alike as they grow older.	4.81	75.00	A
I-10. Explains why older individuals may be more susceptible to disease than younger individuals.	5.40	93.75	A

GENERAL INSTRUCTIONAL OBJECTIVE I: UNDERSTANDS FUNDAMENTAL PRINCIPLES OF AGING (Continued)

<u>Specific Learning Outcomes</u>	<u>MEAN</u>	<u>PERCENTAGE AGREEMENT INDEX</u>	<u>CONSENSUS</u>
I-11. Identifies chronic conditions as being more prevalent than acute conditions in the older adult.	5.12	87.50	A
I-12. Describes health as being more than the absence of disease or infirmity.	5.60	93.75	A
I-13. States some examples of positive and negative life-styles that impact on total quality of life.	5.60	93.75	A
I-14. Identifies some of the health risk factors that may contribute to disease.	5.25	87.50	A

GENERAL INSTRUCTIONAL OBJECTIVE II: KNOWS COMMON DRUG TERMS

<u>Specific Learning Outcomes</u>	<u>MEAN</u>	<u>PERCENTAGE AGREEMENT INDEX</u>	<u>CONSENSUS</u>
II-1. Defines a drug in his/her own words as being any substance that alters the function or structure of the organism.	4.93	75.00	A
II-2. Describes the meaning of habituation to a drug.	5.18	81.25	A
II-3. Defines a medicine in his/her own words as being a kind of drug that is used by the body to prevent or cure a disease or a disabling condition.	4.62	75.00	R
II-4. Defines drug tolerance in his/her own words as being the need to increase the dose in order to achieve the desired effect.	4.62	68.75	R

GENERAL INSTRUCTIONAL OBJECTIVE II: KNOWS COMMON DRUG TERMS (Continued)

<u>Specific Learning Outcomes</u>	<u>MEAN</u>	<u>PERCENTAGE AGREEMENT INDEX</u>	<u>CONSENSUS</u>
II-5. States the difference between a prescription drug and a non-prescription drug.	5.37	93.75	A
II-6. Describes the difference between drug use and misuse.	5.56	93.75	A
II-7. Defines therapeutic effect in his/her own words as being the intended or desired effect.	5.40	93.75	A
II-8. Defines side effect in his/her own words as being a natural and expected action of the drug which accompanies its principal and intended action.	4.75	62.50	R
II-9. States the difference between generic name and brand name drugs.	5.00	81.25	A
II-10. Describes the difference between stimulant drugs and depressant drugs.	4.68	62.50	R

GENERAL INSTRUCTIONAL OBJECTIVE III: UNDERSTANDS FUNDAMENTAL CONCEPTS CONCERNING DRUGS

<u>Specific Learning Outcomes</u>	<u>MEAN</u>	<u>PERCENTAGE AGREEMENT INDEX</u>	<u>CONSENSUS</u>
III-1. Explains that all drugs have multiple actions in the body.	5.12	75.00	A
III-2. Explains how drug action can be unpredictable due to variables in the drug and/or in the patient.	5.50	87.50	A
III-3. Lists three of the various methods by which drugs can be administered to humans.	4.81	68.75	R
III-4. Explains the misconception that a drug is selectively distributed to a very small area of the body without contacting the rest of the body.	5.12	81.25	A
III-5. Generalizes how an orally administered drug is absorbed into the bloodstream.	4.87	75.00	A
III-6. Explains that a drug is distributed throughout the body via the bloodstream.	5.25	93.75	A
III-7. Generalizes that the liver is the principal organ for the breakdown of most drugs.	4.75	56.25	R
III-8. Describes how drugs are eliminated from the body.	5.06	87.50	A
III-9. Discusses four variables that will modify an individual's response to a drug.	5.30	93.75	A
III-10. Explains how the route of administration of a drug affects its onset of action.	5.06	81.25	A

GENERAL INSTRUCTIONAL OBJECTIVE III: UNDERSTANDS FUNDAMENTAL CONCEPTS CONCERNING DRUGS (Continued)

<u>Specific Learning Outcomes</u>	<u>MEAN</u>	<u>PERCENTAGE AGREEMENT INDEX</u>	<u>CONSENSUS</u>
III-11. Describes the dangers associated with a drug accumulating in the body.	5.12	81.25	A
III-12. Explains that various doses of a drug may exert a variety of different actions.	5.18	87.50	A
III-13. Points out that the period of time a drug remains in the body will affect its ability to produce the desired effect.	4.68	68.75	R
III-14. Points out that drugs work in conjunction with the body to facilitate restoration processes.	4.43	56.25	R
III-15. States the obvious goal of drug therapy as obtaining the greatest benefit with the least risk.	5.75	100.00	A
III-16. Explains that simultaneous use of two or more drugs may alter the effectiveness or toxicity of these drugs.	5.81	100.00	A
III-17. Explains that simultaneous use of some drugs with certain foods may alter the intended action of the drug.	5.30	93.75	A



GENERAL INSTRUCTIONAL OBJECTIVE IV: RECOGNIZES THAT EACH DRUG HAS RISKS AS WELL AS BENEFITS

<u>Specific Learning Outcomes</u>	<u>MEAN</u>	<u>PERCENTAGE AGREEMENT INDEX</u>	<u>CONSENSUS</u>
IV-1. Indicates that all drugs are capable of producing both desired effects and undesired effects.	5.68	100.00	A
IV-2. Identifies the major therapeutic effects of a common drug such as aspirin.	5.30	87.50	A
IV-3. Identifies the most prevalent side effects of a common drug such as aspirin.	4.93	75.00	A
IV-4. Illustrates the benefits that one derives from the 'intelligent use' of drugs.	5.30	87.50	A
IV-5. Illustrates the potential harm that one suffers from the 'improper use' of drugs.	5.37	93.75	A
IV-6. Defines adverse drug reaction in his/her own words as being an unusual and unexpected response to a drug that is potentially harmful.	4.43	62.50	R
IV-7. Points out that the occurrence of adverse drug reaction is directly related to number of drugs being taken by the patient.	3.81	37.50	R
IV-8. Identifies undesirable patient behaviors that can increase the likelihood of adverse drug reactions.	4.93	81.25	A
IV-9. Explains that it may be necessary to accept the minor annoyance of side effects in order to obtain the desired effect.	5.06	87.50	A

GENERAL INSTRUCTIONAL OBJECTIVE IV: RECOGNIZES THAT EACH DRUG HAS RISKS AS WELL AS BENEFITS

<u>Specific Learning Outcomes</u>	<u>MEAN</u>	<u>PERCENTAGE AGREEMENT INDEX</u>	<u>CONSENSUS</u>
IV-10. Indicates many side effects are transient, and gradually disappear as the body adjusts to the drug.	5.18	81.25	A
IV-11. Selects from a list of drugs commonly prescribed to the older adult, those drugs that commonly produce serious side effects.	4.00	50.00	R
IV-12. Points out the intensity of side effects can usually be reduced by adjusting the dose or substituting another drug.	4.75	62.50	R
IV-13. Lists particular types of patients who are in a high risk group for adverse drug reactions.	4.81	75.00	A
IV-14. Relates some of the hazards associated with self-diagnosis and self-medication.	5.75	100.00	A
IV-15. Discusses the potential hazard of discontinuing a 'needed medicine'.	5.81	100.00	A
IV-16. Points out the problem associated with refilling a prescription long after the need has passed.	5.60	93.75	A
IV-17. Describes the potential problems resulting from the sharing of drugs with relatives or friends.	5.81	100.00	A
IV-18. Concludes undermedication may be just as dangerous as overmedication.	5.81	81.25	A

GENERAL INSTRUCTIONAL OBJECTIVE IV: RECOGNIZES THAT EACH DRUG HAS RISKS AS WELL AS BENEFITS (Continued)

<u>Specific Learning Outcomes</u>	<u>MEAN</u>	<u>PERCENTAGE AGREEMENT INDEX</u>	<u>CONSENSUS</u>
IV-19. Summarizes the dangers of retaining outdated drugs.	5.75	100.00	A
IV-20. Explains the undesirability of stretching a drug to make it last longer than the period for which it was prescribed.	5.81	100.00	A
IV-21. Generalizes some of the more common early warning signs of a drug reaction.	4.75	62.50	R
IV-22. Evaluates the hazard of adding new drugs to a drug regimen without consulting all physicians providing simultaneous care to the patient.	5.25	75.00	A
IV-23. Indicates the necessity of carefully reading and understanding the entire label before taking any drug.	5.81	100.00	A
IV-24. Explains the peril of giving or taking a drug in the dark.	5.68	100.00	A
IV-25. Discusses the unsoundness of relying on the advice of a non-medical friend as it pertains to drugs.	5.56	93.75	A
IV-26. Points out that altered compliance or non-compliance with physicians instructions can dramatically influence the therapeutic effect of a drug.	5.62	93.75	A
IV-27. Describes the potential danger of mixing alcoholic beverages with depressant drugs such as antihistamines or minor tranquilizers.	5.87	100.00	A

GENERAL INSTRUCTIONAL OBJECTIVE IV: RECOGNIZES THAT EACH DRUG HAS RISKS AS WELL AS BENEFITS (Continued)

<u>Specific Learning Outcomes</u>	<u>MEAN</u>	<u>PERCENTAGE AGREEMENT INDEX</u>	<u>CONSENSUS</u>
IV-28. Points out that new and unusual symptoms or alterations in a patient's behavior may be drug induced.	5.56	87.50	A

GENERAL INSTRUCTIONAL OBJECTIVE V: UNDERSTANDS THE OLDER ADULT IS VULNERABLE TO PROBLEMS WITH DRUGS

<u>Specific Learning Outcomes</u>	<u>MEAN</u>	<u>PERCENTAGE AGREEMENT INDEX</u>	<u>CONSENSUS</u>
V-1. Explains some age related physical changes that increase the likelihood of drug problems.	5.50	100.00	A
V-2. Discusses the potential problems of purchasing drugs from different pharmacies.	4.93	75.00	A
V-3. Defines polymorbidity in his/her own words as being a condition characterized by multiple, concurrent chronic diseases.	5.00	75.00	A
V-4. Defines polymedicine in his/her own words as receiving coinstantaneous health care from a variety of physicians.	4.87	75.00	A
V-5. Defines polypharmacy in his/her own words as concomitant administration of many medicines.	4.93	81.25	A
V-6. Discusses how polymorbidity, polymedicine and poly-pharmacy collectively contribute to drug problems in the older adult.	5.40	93.75	A
V-7. Differentiates between acute illness and chronic illness.	5.30	100.00	A
V-8. Points out that chronic illness may require life-long maintenance on drugs.	5.40	100.00	A
V-9. Discusses how psychological, physiological, and sociological losses can contribute to inappropriate use of drugs.	5.40	100.00	A

GENERAL INSTRUCTIONAL OBJECTIVE V: UNDERSTANDS THE OLDER ADULT IS VULNERABLE TO PROBLEMS WITH DRUGS  
(Continued)

<u>Specific Learning Outcomes</u>	<u>MEAN</u>	<u>PERCENTAGE AGREEMENT INDEX</u>	<u>CONSENSUS</u>
V-10. Summarizes how multiple concurrent disorders in the older adult can render therapy more complex.	5.68	100.00	A
V-11. Points out that personal visual impairments may hinder the correct administration of drugs.	5.56	100.00	A
V-12. Points out that personal hearing impairments may hinder the correct administration of drugs.	5.30	87.50	A
V-13. Points out that normal adult dosages of medicine may be more active in the elderly than in the young.	5.37	93.75	A
V-14. States that many older adults consume a disproportionate amount of medicines.	5.06	68.75	R
V-15. Lists some common types of medication errors frequently seen in older adults.	5.40	87.50	A

GENERAL INSTRUCTIONAL OBJECTIVE VI: RECOGNIZES THE IMPORTANCE OF BEING AN ACTIVATED PATIENT

<u>Specific Learning Outcomes</u>	<u>MEAN</u>	<u>PERCENTAGE AGREEMENT INDEX</u>	<u>CONSENSUS</u>
VI-1. Explains the concept of an 'activated patient' in his/ her own words.	5.06	87.50	A
VI-2. Summarizes the benefits accrued from being an 'activated patient'.	5.30	93.75	A
VI-3. Lists some important questions that should be asked of a physician when a drug is prescribed.	5.60	93.75	A
VI-4. Points out that a 'symptom' signals something wrong with the body's machinery or functions.	5.00	68.75	A
VI-5. Discusses the necessity of assuming an active partnership role with one's health care practitioners.	5.68	100.00	A
VI-6. Designs a scheme to help oneself take medications more carefully at home.	5.25	81.25	A
VI-7. Formulates some guidelines for safe use of medicines at home.	5.25	81.25	A
VI-8. Summarizes rights and responsibilities of patients in the health care delivery system.	5.56	93.75	A
VI-9. Formulates a list of activated patient characteristics.	5.12	75.00	A
VI-10. Defines a patient profile in his/her own words as being a current updated medical and medication record maintained by some pharmacists.	5.25	81.25	A

GENERAL INSTRUCTIONAL OBJECTIVE VI: RECOGNIZES THE IMPORTANCE OF BEING AN ACTIVATED PATIENT (Continued)

<u>Specific Learning Outcomes</u>	<u>MEAN</u>	<u>PERCENTAGE AGREEMENT INDEX</u>	<u>CONSENSUS</u>
VI-11. Describes the value of utilizing a pharmacy that employs a patient profile system.	5.60	100.00	A
VI-12. Role plays obtaining directions from a physician/pharmacist in regard to drug administration.	5.25	81.25	A
VI-13. Role plays correct interpretation of medicine instructions from physician/pharmist.	5.25	81.25	A
VI-14. Role plays an interaction with a pharmacist in regard to the purchase of a drug.	5.20	81.25	A
VI-15. Lists some of the guidelines to be followed when selecting and utilizing a pharmacy.	5.56	93.75	A
VI-16. Justifies the necessity of keeping all medical appointments for follow up examinations.	5.37	93.75	A
VI-17. Summarizes the significance of medication review on a regular basis.	5.56	93.75	A
VI-18. Identifies the pharmacist as a valuable resource person for drug information.	5.60	100.00	A
VI-19. Lists the important information that should be included on a prescription label.	5.56	93.75	A
VI-20. Explains the seriousness of removing a medicine from its original container.	5.50	87.50	A



GENERAL INSTRUCTIONAL OBJECTIVE VI: RECOGNIZES THE IMPORTANCE OF BEING AN ACTIVATED PATIENT (Continued)

<u>Specific Learning Outcomes</u>	<u>MEAN</u>	<u>PERCENTAGE AGREEMENT INDEX</u>	<u>CONSENSUS</u>
VI-21. Discusses the danger of carrying several different drugs in a pill box.	5.60	93.75	A
VI-22. Explains the advantages of carrying an updated patient health and medicine card in wallet or purse.	5.60	93.75	A
VI-23. Lists facts that patient should communicate to the doctor concerning health problems.	5.68	100.00	A
VI-24. Explains some of the signs, symptoms and circumstances which help to determine whether or not a physician should be consulted.	5.56	93.75	A
VI-25. Discusses some of the pertinent criteria used in the selection of a physician.	5.50	93.75	A

GENERAL INSTRUCTIONAL OBJECTIVE VII: COMPREHENDS OLDER ADULTS ARE SUSCEPTIBLE TO FRAUDULENT HEALTH PRACTICES.

<u>Specific Learning Outcomes</u>	<u>MEAN</u>	<u>PERCENTAGE AGREEMENT INDEX</u>	<u>CONSENSUS</u>
VII-1. Defines quackery in his/her own words as being a fraudulent health practice.	5.30	93.75	A
VII-2. Defines quack in his/her own words as a charlatan or a boastful pretender to medical skills.	5.00	81.25	A
VII-3. Contrasts legitimate health practitioners from quacks.	5.40	100.00	A
VII-4. Explains how fear contributes to the promotion of health quackery.	5.30	100.00	A
VII-5. Discusses some of the dangers to the patient resulting from quackery.	5.30	93.75	A
VII-6. Describes why older adults are especially susceptible to fraudulent health practices.	5.40	100.00	A
VII-7. Describe some common health misconceptions that promote health quackery.	5.37	100.00	A
VII-8. Lists some of the prominent features which commonly characterize quackery.	5.25	93.75	A
VII-9. Distinguishes between orthodox and unorthodox medicine.	5.06	93.75	A
VII-10. Explains 'spontaneous remission' in his/her own words.	5.30	93.75	A
VII-11. Identifies sources of reliable health information in the community.	5.75	100.00	A

GENERAL INSTRUCTIONAL OBJECTIVE VII: COMPREHENDS OLDER ADULTS ARE SUSCEPTIBLE TO FRAUDULENT HEALTH PRACTICES (Continued)

<u>Specific Learning Outcomes</u>	<u>MEAN</u>	<u>PERCENTAGE AGREEMENT INDEX</u>	<u>CONSENSUS</u>
VII-12. Appraises the purpose of advertising.	5.26	81.25	A
VII-13. Generalizes that medical science still cannot cure all diseases.	5.68	100.00	A
VII-14. Distinguishes false claims stated or implied in advertisements or commercials from the true claims.	5.06	81.25	A

APPENDIX J

DELPHI QUESTIONNAIRE #2

THE IDENTIFICATION OF MEDICINE EDUCATION  
LEARNING OUTCOMES FOR AMBULATORY,  
NON-INSTITUTIONALIZED OLDER ADULTS

QUESTIONNAIRE #2

## DEFINITION OF TERMS USED IN THIS STUDY

1. General Instructional Objectives: A general instructional objective describes in 'general terms' the types of performance (i.e., knowledge, understanding, comprehension, etc.) older adults would be expected to demonstrate at the completion of the medicine education program. In other words, general instructional objectives describe the intent of instruction.
2. Specific Learning Outcomes: Specific learning outcomes are representative samples of the 'specific types of behavior' that are to be used as evidence that the general instructional objective has been achieved by the older adult at the completion of the medicine education program. In other words, specific learning outcomes describe the types of behavior that older adults would be expected to demonstrate indicating they have satisfactorily achieved the general instructional goals.
3. Magic Bullet Concept: The misconception that a drug is selectively distributed to a very small area of the body without contacting the rest of the body.
4. Activated Patient: A patient who has assumed a greater responsibility for his/her own health care by learning about his/her body and his/her medications, as well as the importance of actively communicating with all his/her health care practitioners.
5. Polymorbidity: A condition characterized by multiple, chronic diseases.
6. Polymedicine: Receiving coinstantaneous health care from a variety of physicians.
7. Polypharmacy: Concomittant administration of a variety of medicines.

THE IDENTIFICATION OF MEDICINE EDUCATION  
LEARNING OUTCOMES FOR AMBULATORY,  
NON-INSTITUTIONALIZED OLDER ADULTS.

INSTRUCTIONS FOR COMPLETING THE QUESTIONNAIRE

This is the second round of the questionnaire in this study. Due to the fact that 90% of the Specific Learning Outcomes contained in the first round of the questionnaire achieved a high level of consensus, this task will require significantly less time. You are asked to:

1. Read each Specific Learning Outcome and rate each as to its importance/appropriateness for consideration in developing a medicine education program for older adults. This rating is accomplished by checking one of the following categories of agreement or disagreement:

SA - strongly agree  
A - agree  
AR - agree with reservation  
DR - disagree with reservation  
D - disagree  
SD - strongly disagree

2. If you are in disagreement with a specific learning outcome, briefly state your reason in the space provided: Reasons for Disagreeing.

In stating the specific learning outcomes, scientific terms are used purely as a means of professionally communicating 'concepts' that would be covered in a program of medicine instruction for older adults. In such a program these concepts would be presented in lay language and at a level of understanding germane to the target group.



GENERAL INSTRUCTIONAL OBJECTIVE 1: UNDERSTANDS FUNDAMENTAL PRINCIPLES OF AGING

	Strongly Agree	Agree	Agree with reservation	Disagree with reservation	Disagree	Strongly Disagree	
<u>Modified Specific Learning Outcomes</u>							<u>Reason for Disagreeing</u>
I-5. Summarizes some of the biological changes associated with aging.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
I-8. Explains that functional age is a more accurate predictor of physical condition and behavior than is chronological age.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
I-11. Explains in his/her own words the nature of chronic conditions as opposed to acute conditions.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
<u>Additional Specific Learning Outcomes</u>							<u>Reason for Disagreeing</u>
I-15. Points out that the population in the United States over the age of 65 is steadily increasing due to many factors such as improved medical care and living and working conditions.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	

GENERAL INSTRUCTIONAL OBJECTIVE 11: KNOWS COMMON DRUG TERMS

Modified Specific Learning Outcomes

II-1. Defines a drug in his/her own words as any substance, other than food, used in the prevention, diagnosis, alleviation, treatment, or cure of disease in man.

SA   A   AR   DR   D   SD

II-3. Defines a medicine in his/her own words as being a kind of drug that is used by the body to prevent, mitigate or manage a disease or a disabling condition.

SA   A   AR   DR   D   SD

II-8. Defines side effect in his/her own words as being either a natural and expected action or an unwanted action of the drug, which may accompany its principal and intended action.

SA   A   AR   DR   D   SD

Additional Specific Learning Outcomes

II-11. Defines idiosyncrasy in his/her own words as any abnormal or peculiar response to a drug that is generally thought to result from an inborn error in the ability to metabolize a drug.

SA   A   AR   DR   D   SD

*Strongly Agree*  
*Agree*  
*Agree with reservation*  
*Disagree with reservation*  
*Disagree*  
*Strongly Disagree*

Reasons for Disagreeing

Reasons for Disagreeing

GENERAL INSTRUCTIONAL OBJECTIVE II: KNOWS COMMON DRUG TERMS (Continued)

<u>Additional Specific Learning Outcomes</u>	<div>Strongly Agree</div> <div>Agree</div> <div>Agree with reservation</div> <div>Disagree with reservation</div> <div>Disagree</div> <div>Strongly Disagree</div>	<u>Reason for Disagreeing</u>
11-12. Defines a drug allergy in his/her own words as an altered state of reaction to a drug that results from a previous sensitizing exposure and accompanying development of an immunological response.	<div>SA</div> <div>A</div> <div>AR</div> <div>DR</div> <div>D</div> <div>SD</div>	

GENERAL INSTRUCTIONAL OBJECTIVE III: UNDERSTANDS FUNDAMENTAL CONCEPTS CONCERNING DRUGS

Modified Specific Learning Outcomes

- III-10. Explains that the route of administration of a drug can affect its onset, intensity and duration of action.

Strongly Agree	Agree	Agree with reservation	Disagree with reservation	Disagree	Strongly Disagree
----------------	-------	------------------------	---------------------------	----------	-------------------

Reason for Disagreeing

SA A AR DR D SD

Additional Specific Learning Outcomes

- III-18. Explains that all drugs have some risks associated with their use.

Reason for Disagreeing

SA A AR DR D SD

- III-19. Points out that cigarettes as well as certain foods and beverages such as coffee, tea, and cola contain drugs.

SA A AR DR D SD

Discusses the significance of one's nutritional status in relation to the prescribed dosage and effectiveness of a given drug.

SA A AR DR D SD

GENERAL INSTRUCTIONAL OBJECTIVE IV: RECOGNIZES THAT EACH DRUG HAS RISKS AS WELL AS BENEFITS

<u>Modified Specific Learning Outcomes</u>		<i>Strongly Agree</i>	<i>Agree</i>	<i>Agree with reservation</i>	<i>Disagree with reservation</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<u>Reason for Disagreeing</u>
IV-6.	Defines an adverse drug reaction in his/her own words as those reactions that either result from an exaggerated but otherwise normal pharmacological action of a drug, or those reactions that are totally aberrant and unrelated to a drug's normal pharmacological action.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-7.	Points out that the adverse drug reaction rate increases as the number of drugs being utilized increases.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-10.	Indicates some side effects are transient and gradually disappear as one's body adjusts to the drug.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-12.	Points out the intensity of side effects can usually be reduced by having one's physician adjust the dose or substitute another drug.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
IV-22.	Evaluates the hazard of adding new drugs, both prescription and non-prescription, to a drug regimen without consulting one's primary physician and/or pharmacist.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	

GENERAL INSTRUCTIONAL OBJECTIVE IV: RECOGNIZES THAT EACH DRUG HAS RISKS AS WELL AS BENEFITS (Continued)

Additional Specific Learning Outcomes

IV-29. Identifies the most prevalent side effects of the particular drugs he/she is currently using.

Strongly Agree	Agree	Agree with reservation	Disagree with reservation	Disagree	Strongly Disagree
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Reason for Disagreeing

SA   A   AR   DR   D   SD

INSTRUCTIONAL OBJECTIVE V: UNDERSTANDS THE OLDER ADULT IS VULNERABLE TO PROBLEMS WITH DRUGS.

Modified Specific Learning Outcomes

- V-13. Points out that normal adult dosages of some drugs tend to be more active in the elderly than in the young because of the older adults' age-related, impaired ability to inactivate or excrete drugs, or because of other concurrent pathology.

Strongly Agree	Agree	Agree with reservation	Disagree with reservation	Disagree	Strongly Disagree
----------------	-------	------------------------	---------------------------	----------	-------------------

Reason for Disagreeing

SA   A   AR   DR   D   SD

GENERAL INSTRUCTIONAL OBJECTIVE VI: RECOGNIZES THE IMPORTANCE OF BEING AN ACTIVATED PATIENT

<u>Modified Specific Learning Outcomes</u>	<u>Strongly Agree</u>	<u>Agree</u>	<u>Agree with reservation</u>	<u>Disagree with reservation</u>	<u>Disagree</u>	<u>Strongly Disagree</u>	<u>Reason for Disagreeing</u>
VI-12. Role plays obtaining directions from a physician and/or pharmacist in regard to appropriate drug administration.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-13. Role plays correct interpretation of drug instructions from physician and/or pharmacist.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-23. Lists facts that patient should communicate to the doctor and/or pharmacist concerning health problems.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-25. Discusses some of the pertinent criteria to be considered in selecting a physician and/or a pharmacist.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
<u>Additional Specific Learning Outcomes</u>							<u>Reason for Disagreeing</u>
VI-26. Identifies sources in the community where a patient health and medicine card can be obtained.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	
VI-27. Identifies resource agencies in the community where patient can go for advice and help in defraying the cost of drug and medical care.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	



GENERAL INSTRUCTIONAL OBJECTIVE VI: RECOGNIZES THE IMPORTANCE OF BEING AN ACTIVATED PATIENT (Continued)

<u>Additional Specific Learning Outcomes</u>	<u>Strongly Agree</u>	<u>Agree</u>	<u>Agree with reservation</u>	<u>Disagree with reservation</u>	<u>Disagree</u>	<u>Strongly Disagree</u>	<u>Reason for Disagreeing</u>
VI-28. Discusses the importance of properly storing a drug in order to insure its efficacy.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>A</u>	<u>SD</u>	
VI-29. Points out that by asking one's pharmacist, easy to open drug containers may be substituted for child proof drug containers.	<u>SA</u>	<u>A</u>	<u>AR</u>	<u>DR</u>	<u>D</u>	<u>SD</u>	

GENERAL INSTRUCTIONAL OBJECTIVE VII: COMPREHENDS OLDER ADULTS ARE SUSCEPTIBLE TO FRAUDULENT HEALTH PRACTICES

Modified Specific Learning Outcomes

VII-14. Distinguishes potentially misleading claims stated or implied in advertisements or commercials from the true claims.

Strongly Agree	Agree	Agree with reservation	Disagree with reservation	Disagree	Strongly Disagree
----------------	-------	------------------------	---------------------------	----------	-------------------

Reason for Disagreeing

SA   A   AR   DR   D   SD

APPENDIX K

COVER LETTER - DELPHI QUESTIONNAIRE #2

## COVER LETTER - DELPHI QUESTIONNAIRE #2

Dear :

I would like to sincerely thank you for your excellent comments and recommendations in rating the first round of the questionnaire. I found the comments to be most helpful in edifying many of the Specific Learning Outcomes.

An analysis of the first round of the questionnaire revealed that a significant number of the Specific Learning Outcomes achieved consensus. These outcomes are labeled as, "Consensus Reached," and are accompanied by a weighted numerical rating based on a six-point scale, with 6 being the highest possible rating. This rating was computed on the basis of all sixteen questionnaires and should provide you with an indication of how each objective fared in the first round of review.

Of the 123 Specific Learning Outcomes contained in the first round of the questionnaire, 108 (87.8%) reached a high enough level of agreement among the sixteen expert panelists to be categorized as having reached a significantly high degree (.80 ) of consensus. It will not be necessary for you to re-evaluate these Specific Learning Outcomes. A summarized report of round one of the questionnaire is included for your information and can be found in the accompanying plastic folder.

The second round of the questionnaire consists of modified and additional Specific Learning Outcomes suggested by the expert panelists. Some of the modified Specific Learning Outcomes reached consensus on the first round, but are resubmitted with the suggested changes for re-evaluation.

Your answers and comments will be kept confidential and only summarized results of this study will be used in subsequent reports. This dissertation and any future report based on the results of this study will acknowledge the expert panel participants.

When you have completed the questionnaire please return to me in the enclosed, self-addressed, stamped envelope. It would be extremely helpful if you could return your completed questionnaire within ten days.

It is a great honor for me to be working with such recognized experts, and I appreciate your willingness to serve as an expert panelists for this investigation.

Sincerely,

Michael J. Gaeta, Doct. Cand.

## APPENDIX L

## EXPERT PANELISTS' DATA SHEET

EXPERT PANELIST - DATA SHEET

In order to insure that the data I have on each expert panelist is current and accurate, I would like to ask you to provide the following information. This information will be cited in the appendix section of the dissertation.

Your name and title as you would like it to appear in the dissertation:

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Please include this data sheet with the second round of the questionnaire and return to me in the enclosed, self-addressed stamped envelope. Thank you.

APPENDIX M

FINAL LETTER OF THANKS TO EXPERT PANELISTS

## FINAL LETTER OF THANKS TO EXPERT PANELISTS

Dear :

I would like to sincerely thank you for the time you spent sharing your expertise as an expert panelist for the identification of medicine education learning outcomes for ambulatory older adults. Your efforts have done much to help lay the fundamental groundwork that is necessary for the development of a complete medicine education curriculum designed expressly for this age group.

In this investigation two analytical criteria were utilized to determine consensus among 16 national experts concerning specific learning outcomes deemed important and or appropriate for inclusion in a medicine education program for older adults. These two criteria were: 1) a mean score of 4.80 or greater and, 2) a "Strongly Agree" or "Agree" rating by a minimum of 75% of the panelists. Making use of these two criteria, 119 specific learning outcomes reached consensus and 37 of these achieved 100% agreement (100% of the panelists rating "Strongly Agree" or "Agree").

For your convenience the results of this investigation have been organized and submitted in the form of three separate lists: 1) Specific Learning Outcomes Reaching Consensus; 2) Specific Learning Outcomes Reaching 100% Agreement and; 3) Specific Learning Outcomes Rejected.

In addition to the lists of results, a listing of the expert panelists who took part in this investigation is enclosed for your information. A quick review of the names of these individuals will verify an extremely high caliber of expertise in the area of drugs and the elderly.

Finally, I would again like to extend my deepest gratitude and thanks for the time you took out of your busy schedule to aid me in this investigation. I thoroughly enjoyed the experience of working with you.

Sincerely,

Michael J. Gaeta  
Doctoral Candidate and  
Teaching Assistant  
Department of Health  
Oregon State University



APPENDIX N

LETTER FROM KALMAN

## AMERICAN PHARMACEUTICAL ASSOCIATION

The National Professional Society of Pharmacists

March 19, 1979

Michael J. Gaeta  
Doctoral Candidate  
Department of Health  
Oregon State University  
Corvallis, Oregon 97331

Dear Michael:

Enclosed please find the completed questionnaire. It is very well designed and shows that you have an extraordinary insight into the needs of patients regarding their medications and how to properly take them.

I trust that my comments make sense in the context of your objectives. If they do not, please do not hesitate to call me and I will be more than happy to discuss my "reasoning" with you.

Good luck. Look forward to receiving round two.

Sincerely,  
**Redacted for Privacy**

Samuel H. Kalman  
Director of Education  
Professional Affairs Division

SHK:lk  
enclosure