

A BEGINNING SWIMMING CURRICULUM GUIDE  
FOR THE OLDER ADULT

By

KRISTIN LEE VERMILLION

Bachelor of Science  
Oklahoma State University  
Stillwater, Oklahoma  
1968

Master of Education  
Central State University  
Edmond, Oklahoma  
1973

Master of Education  
Central State University  
Edmond, Oklahoma  
1974

Submitted to the Faculty of the Graduate College  
of the Oklahoma State University  
in partial fulfillment of the requirements  
for the Degree of  
DOCTOR OF EDUCATION  
May, 1983

Thesis  
19830  
V526b  
cop. 2



Copyright

by

Kristin Lee Vermillion

May, 1983

1168794 |

A BEGINNING SWIMMING CURRICULUM GUIDE  
FOR THE OLDER ADULT

Thesis Approved:

*Betty M. Edgley*  
Thesis Adviser

*Betty Abernethy*

*Thomas Claman*

*Gene Huff*

*Norman N. Surka*

Dean of the Graduate College

## AKNOWLEDGMENTS

I would like to express my sincere appreciation to Dr. Betty Edgley for her invaluable assistance as my dissertation adviser. She was always available with support and professional guidance. Without her patience this dissertation would have been much more difficult to complete. I am very grateful to Dr. Betty Abercrombie for offering her extensive knowledge of aquatics. Thanks to Dr. Thomas Karman for serving on my committee and for his input. Thanks also to Dr. Gene Acuff; his course, "Sociology of Aging," was instrumental in my selection of a topic in this exciting world of the aged.

And, finally, a special thanks to my wonderful husband Jon, whose lasting encouragement and support in our educational adventure has made this all worthwhile.

## TABLE OF CONTENTS

| Chapter  | Page |
|--|------|
| I. INTRODUCTION . . . . .                            | 1    |
| Statement of the Purpose . . . . .                   | 5    |
| Need for the Study . . . . .                         | 5    |
| Methods and Procedures . . . . .                     | 6    |
| Limitations. . . . .                                 | 6    |
| II. SELECTED REVIEW OF THE LITERATURE . . . . .      | 8    |
| Physiological Changes. . . . .                       | 9    |
| Importance of Fitness and Exercise . . . . .         | 12   |
| Psychological and Sociological Implications. . . . . | 14   |
| Trainability of Older Adults . . . . .               | 23   |
| Fitness Programs . . . . .                           | 35   |
| Benefits of Swimming . . . . .                       | 45   |
| III. CURRICULUM GUIDE FOR THE OLDER ADULT. . . . .   | 50   |
| General Objectives . . . . .                         | 52   |
| Land Exercises . . . . .                             | 52   |
| Standing Position . . . . .                          | 53   |
| Water Exercises. . . . .                             | 56   |
| Back-to-Wall. . . . .                                | 57   |
| Side-to-Wall. . . . .                                | 58   |
| Standing Water Drills - Chest-Deep Water. . . . .    | 59   |
| Face-to-Wall. . . . .                                | 61   |
| Kickboard Skills. . . . .                            | 62   |
| Beginning Swimming Skills. . . . .                   | 62   |
| Level I . . . . .                                    | 62   |
| Level II. . . . .                                    | 62   |
| Level III . . . . .                                  | 63   |
| Level IV. . . . .                                    | 64   |
| Level V . . . . .                                    | 65   |
| Methodology. . . . .                                 | 65   |
| Individualistic Approach. . . . .                    | 65   |
| Glossary of Terms. . . . .                           | 69   |
| IV. CONCLUSIONS AND RECOMMENDATIONS . . . . .        | 85   |
| Conclusions. . . . .                                 | 85   |
| Recommendations. . . . .                             | 88   |
| BIBLIOGRAPHY . . . . .                               | 89   |

## CHAPTER I

### INTRODUCTION

Never in the history of Western civilization have so many people lived for so long (Turner and Helms, 1982). Whether we use age 65 or 70 as the beginning stage of old age, American society has more older inhabitants than ever before.

According to Lawrence (1982), within the next four years, 25% of all Americans will be over the age of 60. By 1990, this figure will approach 28%; 30% by the year 2000; and in 2020, approximately one out of three Americans will be classified as a senior citizen.

Turner and Helms (1982) listed a few statistics which illustrate what is referred to as the elderly population explosion:

1. At the turn of the century the average life expectancy was 47 years; today it is nearing 75 years.
2. More than 10% of Americans are over 65. At the turn of the century, only three percent reached this age.
3. Over 4,000 Americans are retiring daily.
4. Since 1960, the elderly population has increased by 35%; the overall population has grown by 19%.
5. The more industrialized nations in the world show the greatest increases in the aged population. Besides America, Europe, Scandinavia, and Japan exhibit the most significant gains.

6. Many individuals turning 65 today can expect to live an average of 15 more years and should experience good health for 10 of those years.

It is necessary to recognize that many persons have false stereotypes about the older American adult, and these stereotypes are detrimental to this segment of the population. In an effort to dispute these stereotypes, the National Council on Aging has listed some basic concepts of aging:

1. Aging is universal.
2. Aging is normal.
3. Aging is variable; the way in which each person ages is unique. The process is influenced by the individual's life pattern of work or activity, rest, human associations, diet, exercise, and mental attitude.
4. Dying is inevitable, a fact which is hard to accept for most people.
5. Aging and illness are not necessarily coincidental. It is possible to enhance one's chances for a healthy old age through improved living habits.
6. Older people can and do learn. Learning patterns may change and the speed of learning may diminish, but the basic capacity still exists.
7. Older people want to remain self-directing. The idea that they need to be told what to do is highly inaccurate.
8. Older people are vital human beings. They have certain incapacities such as arthritis, but they can develop existing capacities to lead a productive, rewarding life (Kraus, 1978).



Although it is not completely understood why people age, it is known "that practically no one dies of old age" (Harris and Cole, 1980, p. 126). Aging is not a disease. Aging simply increases the chances that a person may die of any one of a number of diseases.

Aging is a lifelong process, according to Fontana (1977), and one to which we are all inexorably subjected:

Some of us may attempt to retard aging, forestall it, correct it, but it ruthlessly carries on. Growing old is socially determined by the matrix of one's economic, industrial, and social complex, by one's own decisions; it is the seeing oneself as 'old,' and being so labeled by others at some time in one's life (p. 24).

A large population in southern California was studied by Belloc and Breslow (as cited in Buxbaum and Micheli, 1979), and it was found that a contributor for a more productive and longer life was exercising. Aerobic activities, such as walking, swimming, and dancing were suggested for older adults.

Aerobic exercises increase the heart and lung activity for a period of time sufficient enough to benefit the body. Cardiovascular fitness is the main purpose of an aerobic program. Aerobic capacity is the maximum amount of oxygen that the body can process at any given time. It depends upon an ability to: (1) rapidly breathe large amounts of air; (2) forcefully deliver oxygen to all parts of the body; and (3) effectively deliver large volumes of blood. Examples of aerobic exercises include swimming, running, and walking (Cooper, 1978).

Many health problems of the older adult can be attributed to atrophy and misuse of the motor and vital systems of the body due to lack of proper and regular recreation and exercise. Decrements due to

aging and accelerated by inactivity have been well documented for several years (Heitmann, 1982).

Physically active individuals differ from sedentary persons in many aspects, according to Montgomery (1976). Active persons usually have lower blood pressure and heart rate levels, both at rest and during submaximal exercise, compared with sedentary individuals. Physically active persons usually exhibit fewer cardiac arrhythmias and have a higher functional work capacity (Montgomery, 1976).

Montgomery (1976) continued by saying that physical activity can be a preventative measure. Physical activity is beneficial for healthy subjects and certain cardiovascular impaired persons because of improved efficiency of the human organism from both a physiological and psychological viewpoint. Physiologically, physical activity prepares the organism to withstand the stress of an illness. Psychologically, physical activity exerts favorable effects on the quality of one's life. It may not add "years to your life," but it may add "life to your years" (Montgomery, 1976, p. 90).

If leisure activity is to be meaningful for the older adult, he or she must choose activities that are appropriate in terms of personal and cultural values, and take into consideration economic and physical constraints. In anticipation of retirement with its departure from an occupational role and social identity of work relationships, the older adult may, either alone or with family or friends, pursue an activity that is enjoyable, interesting, and meaningful to him or her. It may be helpful for the older adult who has retired, if the activity affords the individual an opportunity to develop a social

identity and to enhance self-esteem and self-concept (Neuhaus and Neuhaus, 1982).

Some activities offer hope for better health and emphasis on action and the need for physical exercise to keep the body in condition. Older individuals are participating more in such physical activities as golf, swimming, folk dancing, jogging, and fishing.

According to Katz (1981), Collis and Kirchhoff (1974), and Buxhaum and Micheli (1979), swimming has the most aerobic as well as physical benefit for the older adult. A beginning swimming curriculum guide, therefore, will be designed by the author in an attempt to provide a progressive and sequential activity program for the older adult.

#### Statement of the Purpose

The purpose of this study is to develop a beginning swimming curriculum guide for the older adult. Beginning swimming skills, in addition to water exercises, will be included.

#### Need for the Study

The activity of swimming allows the individual freedom of movement in the water. The therapeutic benefits from the water can aid the individual enormously. Older persons who have a reduced range of motion and other conditions can maneuver efficiently within the water.

More and more older persons are participating in various swimming programs throughout the country. The number of individuals participating has increased to such an extent that there is a need for a curriculum guide. Although there are other curriculum guides for

swimming, there is no guide for the older adult. Therefore, there exists a need for a swimming curriculum guide for the older adult with adaptations based on the physiological, psychological, and sociological aspects of aging.

#### Methods and Procedures

1. The researcher reviewed the literature related to the basic concepts of aging, the physiological, psychological, and sociological aspects of aging.

2. The researcher reviewed the literature regarding the importance of fitness and exercise.

3. The researcher reviewed the literature related to studies concerning the trainability of older adults.

4. The researcher reviewed the literature related to the various activity programs for older adults.

5. The researcher reviewed the literature related to the benefits of swimming.

6. Based on this information, the researcher designed a beginning swimming curriculum guide for the adult over 60 years of age, which was developed by the following design: (a) philosophy, (b) objectives, (c) learning experiences (content), (d) methods and techniques, and (e) evaluative processes.

7. The researcher presented future recommendations for further research.

#### Limitations

This study was limited by the fact that very little material

concerning the older adult and swimming is currently available. Some adults will have disabilities and lack of range of motion so the skills cannot be carried out as described.

## CHAPTER II

### SELECTED REVIEW OF THE LITERATURE

The literature relating to the following facts was reviewed: facts illustrating the basic concepts of aging; the physiological, psychological, and sociological aspects of aging; the importance of fitness and exercise; studies concerning the trainability of older adults; the various activity programs for older adults; and the benefits of swimming.

Birren and Renner (1977) stated that an individual is involved in three processes of aging:

1. Biological Age - referring to life expectancy;
2. Psychological Age - referring to the adaptive behavioral capacities of the individual; and
3. Social Age - referring to the social roles of his group and society for someone of his age.

These three "ages of mankind" interact, and the processes must be interdependent to some extent, but within limits--one may be old in body and young in spirit.

There are several changes the older adult experiences. Some of these changes may influence the type of activity in which he chooses to participate. Physiological changes are one type of change that the older adult must meet.

## Physiological Changes

One of the most noticeable changes in old age occurs in the skin. It may become dry and lose its elasticity. Compounding the loss of skin's elasticity is a thinning of the epithelium, which is the outer layer of the tissue covering the body's free surfaces, and of subcutaneous fatty layers. Multiple factors, including sex, race, and state of nutrition determine the amount of fat in the subcutaneous layers of the skin (Neuhaus and Neuhaus, 1982).

Older women experience little impairment biologically as they age. Menopause occurs with the cessation of menstruation, usually between the ages of 45 and 50. Certain myths have surrounded menopause, including a fear of insanity, the ending of sexual desire and attractiveness, and the myths of inevitable depression, adverse physical symptoms, and defeminization. It is generally concluded that most women experience minimal physical problems (Butler and Lewis, 1982).

Graying of hair is a familiar sign of aging. This is a result of pigment cells failing and a thinning of scalp hair and hair on the extremities.

The size of the heart does not generally change with age; however, the amount of blood that it pumps does increase.

The capability of the heart rate to compensate in response to stress also diminishes. With advancing age, the resistance of the flow of blood progressively increases and systolic blood pressure tends to be higher (Harris and Cole, 1980, p. 129).

According to Neuhaus and Neuhaus (1982), lung structure significantly changes in the aged and affects control of ventilation and exercise capacity. The aged lungs lose their elasticity. "There is a

decline of water absorption into the lungs, a 50% loss of blood vessel elasticity, a resultant decrease in lung elasticity, and a change in the volume pressure behavior of the lungs" (Neuhaus and Neuhaus, 1982, p. 47).

The vital capacity of the lungs, which is the total amount of oxygen an individual can breathe in and out in a single breath, is reduced with age. At age 70, this vital capacity is reduced to less than 50% of what it was at age 30. The change is related to the muscles weakening in the rib cage and the decreased elasticity of the lungs (Harris and Cole, 1980).

According to the April, 1977, Physical Fitness Research Digest report, the average man, based on grip strength tests, reaches his strength peak at age 17 and maintains this level to about age 45, and then declines about 15% over the next 20 years. A similar pattern is found for women, except the strength peak occurs with the beginning of puberty.

Although strength and muscle size decrease with age, as do endurance and agility, the extent and rate of such losses vary among aging individuals (Neuhaus and Neuhaus, 1982). Although the total mass of muscle fibers progressively reduces, the size of the muscles seem to decline much more slowly in those persons who are physically active (Harris and Cole, 1980).

As people age, pressures on the joints cause a slow and progressive remolding of those articular surfaces related to the use of the joints and to weight bearing. A change occurs in the cartilage cells, causing them to begin to deteriorate. Cells begin to multiply in an attempt to repair the damage and as the process expands and extends,



bone cells proliferate to form additional bony spurs and ridges where the bone and cartilage unite. An X-ray examination indicates less cartilage and new bone formation occurs in irregular places. This is called osteoarthritis (Blacker and Wekstein, 1979).

Osteoarthritis is a normal part of aging, and consequently, most older adults have some joint discomfort. The knees, hips, and spine, which bear much of the body's weight, are common areas of discomfort. The fingers are also subjected to enormous pressure.

One of the most pronounced changes associated with advanced age is the impairment of movement (Sigereth, 1970). Movement can be impaired and instability may result from difficulty in balance, decrease in flexibility, or range of joint motion.

Modern conveniences and energy saving devices compound the problem of physical limitations by directing people away from the daily activity they need (Munns, 1981). Hypokinesia, which is a low amount of movement and exercise along with an inadequate energy expenditure, has an adverse effect on individuals of all ages (Kraus and Raab, 1961). Lifelong habits of inactivity combined with impaired movement and reinforced with society's "slow down and take it easy" advice to older persons result in a large number of them developing the hypokinetic syndrome (Munns, 1981).

These are some of the many physiological changes that occur with aging, and very little can be done to alter them. Exercise is the closest thing to an "anti-aging pill" available. It acts like a miracle drug, and is free for the doing (Hrachovec, 1973).

## Importance of Fitness and Exercise

According to Aiken (1978), the importance of regular physical exercise, regardless of stage in life, cannot be overemphasized. Many individuals who do not realize that

immobility can cause serious physical disorders are stricken by illness at a time in life when they are not even thinking about old age. Enforced limitations on one's activities can increase the rate of both physical and mental deterioration. For example, in studies conducted by N. D. Mankovsky of the Soviet Institute of Gerontology, it was found that a 50 to 60 year old person who is put to bed for three weeks and prevented from moving will show many of the same symptoms as a heart attack patient (Aiken, 1978, p. 167).

Schaie and Geiwitz (1982, p. 364) wrote that "exercise of one's physical and mental capacities not only makes disease less likely, it also prevents the ravages of disuse." They advocate "use it or lose it" as a primary message derived from their study of biological aging. They continued by saying:

We are not yet able to extend the normal life span by any significant amount. But what we can do is to try to maintain a fully functioning system as long as possible; by keeping oneself physically and mentally active, and also by compensating for minor deficits in eyesight and hearing with eyeglasses, hearing aids, and the like; it is very nearly possible to achieve this ideal (p. 365).

According to Montgomery (1976, p. 89), "functional deterioration, which is usually associated with increasing age, may be delayed in individuals who are chronically active." For example, physical training may counteract the decline in maximal aerobic power that is usually associated with aging. This variable is currently accepted as the best single indicator which reflects the condition of the cardiovascular system (Montgomery, 1976).

Wantz and Gay (1981, p. 30) stated that

the literature does not indicate that regular exercise and high levels of physical fitness will stop the aging process, but many of the degenerative diseases that are associated with chronological age can be delayed or averted (p. 30).

According to Bortz (1980):

Perhaps the most striking way of establishing the relationship between physical exercise and the aging process is to study the effects of inactivity. Whenever a person of whatever age is confined by enforced rest, an array of changes occur--all of them bad (p. 51).

Involitional bone loss, which is the reduction of skeletal mass with aging, contributes to the susceptibility of bone to fractures in the elderly (Iskrant and Smith, 1969). According to Cohn, Vaswani, and Zanzi, bone loss begins at a slow rate around the fourth decade and accelerates around the time of menopause in women and slows in later life. It appears clear that in order to prevent occurrence of a bone mass that is susceptible to fracture, efforts should be directed at increasing bone gain during the phase of skeletal growth, as well as preventing involitional bone loss (Aloia, 1981).

A study by Whedon, Dietrick, and Schorr (1949) indicated that immobilization and weightlessness clearly result in accelerated bone loss. The astronauts, during the Gemini IV, V, and VII flights, lost bone mineral (Mack et al., 1967).

Smith and Reddan (1976), of the University of Wisconsin, observed the effect of physical activity on bone in a female nursing home population. At three month intervals during a 36 month period, the mineral content of the distal third of the radius was determined by the photon absorptometry method on 40 subjects, ages 69 through 95

years. Twenty of the subjects participated in light-to-moderate physical activity, with emphasis in the upper extremities, for 30 minutes three times a week. The 20 control subjects made no change in their activities. The exercising subjects had a 4.2% increase in their bone mineralization; the control subjects lost 2%. The conclusion made in this study was that the physical activity program slowed bone loss in the aged subjects and even promoted bone accretion. These findings suggest that physical activity could influence the prevention and rehabilitation of fractures.

According to Lamb (as cited in Keelor, 1976), bones that are not used tend to decalcify. If a leg is put in a cast, the leg bone loses calcium; consequently, the size of the muscle also decreases.

#### Psychological and Sociological Implications

Loss is a predominant theme in characterizing the emotional experiences of older people, according to Butler and Lewis (1982). Losses in every aspect occurring in late life compel people to expend enormous amounts of emotional and physical energy in grieving and resolving grief, adapting to the changes that result from the losses, and recovering from the stresses that are inherent in these processes. Older people are confronted by multiple losses, which may occur simultaneously as the death of a spouse, older friends, colleagues, relatives, and the decline of physical health; loss of status and participation in society, and for many the loss of economic security (Butler and Lewis, 1982).

It is in the social realm of an elderly person's life that the most clearly age-specific patterns can be seen, for the older

individuals find themselves the eldest group in the population with two, three, or perhaps four generations below them. Many have grown children and grandchildren. The older person faces the prospect of losing his or her spouse; women outnumber men of their age (Butler and Lewis, 1977). The older person's relative position in any society tends to be influenced favorably by several institutional factors:

1. Ownership of property and control over the opportunities of the young.
2. Command of strategic knowledge and skills.
3. Strong religious and sacred traditions.
4. Strong kinship and extended family bonds.
5. A low productive economy.
6. High mutual dependence and reciprocal aids among society members (Butler and Lewis, 1977).

Goodstein (1981) stated that the elderly face multiple stresses across social, psychological, and biological parameters. Under social stresses he listed these six:

1. Family-cultural stresses - there are fewer children and they are farther away.
2. Employment stresses - the security based on ability to do productive work is no longer felt by the elderly; retirement is of special interest.
3. Commercial stresses - there is a national addiction to youth in marketing practices.
4. Logistical stresses - transportation is difficult for the elderly.

5. Financial stresses - inflation has been especially hard on the elderly.

6. Discriminatory stresses - individual prejudices toward the elderly exist and they are given false stereotypes.

The psychological stresses included:

1. Mastery - the elderly have revised coping styles to adjust for increasingly overwhelming outside requirements.

2. Coping style - each person may have a tried and true conditioned response to stress.

3. Generation gap - among these stresses include the difficulty that younger relatives have in understanding the aging process besides having some crucial problems of their own.

4. Fears - many are worried about their productivity, health, sense of independence, fears of insanity, and death, as well as losing the interest of others.

5. Love cues - the lack of touching and attention via nonverbal "love cues" is easy for the elderly to detect; of equal stress are verbal and written communications that lack honesty.

6. Self-image - often the elderly have an aversion to youth, and may resent youth as the youth fear aging; the elderly may believe the stereotypes of old age to be true, causing further stress.

7. Death of family and friends - there is an obvious major loss of security and companionship, and more subtle is that the elderly person may now anticipate loss of self.

8. Relocation - there is a definite meaning attached to losing the familiar and facing the unsure new environment.

9. Money - this loss certainly affects the availability of goods and care, but also in our society it represents the status and identity of the individual.

10. Retirement - a sense of gratification may also be lost besides money.

11. Attractiveness - appearance may have been important to the person and stress can be very apparent when the physical changes begin to occur.

12. Visual and auditory acuity - the importance of sensory cues to an individual for orientation and ability to process data besides daily activities can be extremely stressful.

13. Prestige - the elderly are not only retired from jobs but from memberships in decision-making bodies; they often assume "honor-ary" membership and the implication to them is that their opinions are no longer valid.

14. Cognition - many elderly people will tolerate the loss of ability in different organs and body parts until a loss is recognized in brain function itself--this may lead to further stress.

The biological stresses include:

1. Illness and accidents - the elderly are prone to all the vicissitudes of disease and trauma of any other age group.

2. Physiologic aging - this inevitably occurs in body organs, musculoskeletal systems, central nervous system, biochemical and metabolic pathways, what is often unappreciated is that aging can occur at different rates in different people of the same age, as well as at different rates among organs in the same individual.

3. Medications - the elderly tend to collect large numbers of medications from myriad sources; it may represent a symbolic gift from the physician; the elderly's increased sensitivity to medications make it essential that proper written instructions as well as careful monitoring all prescribed activity.

4. Iatrogenic biologic stresses - the very stereotypes of aging which imply senility and old age, such as anorexia, weakness, fatigue, confusion, irritability, and so forth; failure to diagnose and treat the cause of such misperceptions is a major iatrogenic stress.

The feelings of social loss are tremendous. Mandatory retirement puts many out of the work force when they would prefer working. Income becomes reduced. Children and grandchildren may live far away. This social isolation can be devastating.

The controversial "disengagement theory" in gerontology evolved from aging studies in Kansas City conducted by the University of Chicago Committee on Human Development in the late fifties (Cummings and Henry, 1961). This theory postulated that older people and society mutually withdraw from each other as part of normal aging, and that this withdrawal is characterized by psychological well-being on the part of the older individual (Butler and Lewis, 1977).

Later, the disengagement theory was modified by Havighurst (1963) in a series of papers beginning in 1963, using the same data. Disengagement was redefined as a process rather than a theory of optimum aging and as only one of many possible patterns of aging. Of 88 subjects studied, all but 18 fell into the following groups:

1. The integrated, who were high on most positive personality variables.



2. The "defended" group, who were aggressive and full of energy.
3. The passive-dependent group.
4. The unintegrated group who were low on almost all personality measures.

These categories were common to both men and women. There were two groups of men: one group was introspective, timid, stable, and high on super-ego control but lacking in internalization of institutional values; the other group was fearful of failure and becoming dependent on others. One group of women had feelings of inferiority and self-doubt and was overcontrolled and dissatisfied. Another group of women similarly was self-doubting but competitive and aggressive.

Havighurst et al. (1963), from Holland, Italy, Germany, and the United States, conducted a cross-national study of steelworkers and retired teachers to test and expand the findings of the Kansas City studies. Out of all this has come the current and prevailing view that activity rather than disengagement produces the most agreeable climate for the older person. The "activity theory" maintains that older people should remain active as long as they are able to do so. When certain activities and associations have to be given up, for example, employment, substitutes need to be found. The older person's personality is a key element in shaping reactions to biological and social changes; an active rather than a passive role is important for mental health and satisfaction (Butler and Lewis, 1977).

According to Lawrence (1982), psychological tests and individual interviews with hundreds of older exercising patients showed that, besides positive physical changes, exercise evokes definite measurable psychological improvements. Other studies showed similar results in

older patients with specific mental disorders, both long-term problems and those associated with aging such as memory lapses, disorientation, depression,, and other signs of true or misidentified senility (Lawrence, 1982).

The effects of exercise on anxiety have been investigated in several studies (Burton, 1976; deVries and Adams, 1972; Driscoll, 1976; Folkins et al., 1972; Jette, 1970; Morgan, 1973; Morgan and Hammer, 1974; Morgan and Pollock, 1976; Morgan, Roberts, and Feinerman, 1971; Popejoy, 1968). Morgan (1973) reported:

The actual influences of physical activity on anxiety states is quite important since ten million Americans are reported to suffer from anxiety neurosis. Furthermore, between 10 and 30 percent of those patients seen by general practitioners and internists are anxiety neurotics . . . and therefore, this disease represents one of modern man's major health problems (p. 114).

There is controversy as to the effect of exercise on anxiety (Wiswell, 1980). In fact, there is a suggestion that exercise may induce anxiety as a result of elevated lactate production (Pitts, 1969, 1971; Pitts and McClure, 1967). In Morgan's (1973) review of this controversy, several studies were cited, and there is some corroboration of the above mentioned hypothesis as well as some refutation. However, most of the work by Morgan and coworkers would refute such a claim (Morgan et al., 1971; Morgan, 1973; Morgan and Hammer, 1974). An important factor to consider in this context, according to Wiswell (1980), is that exercise does not need to be of such intensity to induce lactate production in order to bring about reduced anxiety in older subjects.

It is interesting to note that exercise had acute effects on the reduction of anxiety (Wiswell, 1980. deVries and Adams (1972) reported

that acute exercise of low intensity was effective in reducing muscle action potentials in older individuals. In this study, the acute effects of exercise were compared with the neuropharmacologic effects of the tranquilizer, meprobamate. The results indicated that acute exercise was more effective in the reduction of neuromuscular tension, in the muscle groups investigated, than was the drug.

Tredway (1978) reviewed and studied acute and chronic exercise effects on mood, hypothesizing that exercise would probably have a greater effect on expressions of mood than on more stable personality characteristics. Chronic mood effects were assessed before and after a 15-week exercise program by the State-Trait Anxiety Inventory, the Self-Rating Depression Scale, and the Mood-State Inventory. The results of her study suggest positive effects of exercise on mood, but the type of exercise intervention (aerobic conditioning, calisthenics, and shuffleboard) did not have a major, chronic, significant effect. Driscoll (1976) studied the acute effects of physical exertion and a positive image procedure to reduce anxiety in college students before an important examination. Anxiety was reduced successfully in individual exercise and psychotherapy sessions as well as together in groups.

Morgan et al. (1970) studied the relationship between depression and physical fitness measures in 67 male professors. In the first phase of the study, the level of depression was correlated with the results of a physical examination, structural recall of sleep, activities, and dietary consumption. No significant results were observed. In Phase II of the study, 34 more subjects were added and participated in one of five exercise groups (circuit training, swimming, jogging, bicycle ergometer, or treadmill control). Their findings indicated that for

the total group, fitness, which was measured by predicted maximal oxygen consumption, was not directly related to depression. When the data for the most depressed subjects were analyzed, a significant improvement in depression resulted. It was interesting also that 85% of the subjects indicated that they "felt better" as a result of the exercise. Holmes (1968) similarly observed the reduction in chronic health complaints as a result of physical training. This study was in direct support of the findings of Morgan et al. (1970) that most individuals, middle-aged and older, participating in regular exercise programs do, in fact, feel better. Morgan and Pollock (1976) concluded:

. . . sedentary individuals who embark on training programs consistently experience an improved sensation of well-being following both acute and chronic exercise; this enhanced perception of well-being is associated with decrements in anxiety and depression in those subjects who are initially anxious or depressed; and changes in behavioral states such as anxiety and depression or psychological traits such as extroversion or neuroticism seldom occur in those individuals who score within the normal range from the outset (p. 3).

Morgan and Pollock reported a significant reduction in depression within a group of 19 depressed subjects over a six week endurance training period. Similar changes in a group of non-depressed subjects were not observed.

A major benefit of exercise with regard to mental health, according to Wiswell (1980), is the potential ability to assist the older individual in coping with stress, either physical or emotional. The manner in which the reduction of stress is caused is not clearly understood. One may hypothesize that any of the following mechanisms may be in operation to assist the organism in the maintenance of

homeostasis when exposed to stressful situations:

1. Regular endurance activity may increase the efficiency and coordination of efferent signals from the brain. This change may be obtained by improvements in nerve conduction velocity and/or increase receptor responsivity to similar levels of electrical and/or biochemical stimulation.

2. Regular exercise may influence cellular metabolic processes and therefore require lower secretion rates of specific hormones.

3. Chronic exercise has the effect of improving peripheral vascular circulation and reducing, in part, vascular resistance. It may be that the increased vasculature serves as a buffer system by which stressor substances are utilized, thus reducing the effects of endocrine hypersecretion during stressful situations and exercise.

4. Acute effects of mild exercise which would increase hormone utilization and/or relaxation technique which would reduce hormone secretion could influence one's state of arousal, thereby affecting psychomotor efficiency (Wiswell, 1980).

Although the studies on physical fitness and mental health do not yield consistent results, it is apparent that physical defects, illness, and systematic dysfunction are related to poor mental health and social maladjustment. Therefore, if exercise has a positive effect on the improvement of physical health, these changes may result in improved mental health (Wiswell, 1980).

#### Trainability of Older Adults

Since the middle 1960's, considerable evidence has become available which strongly suggests that older adults who have been

sedentary most of their lives can improve their aerobic capacity.

"This is not to say that older men and women can achieve the same levels of aerobic capacity as the young, but only that their relative gains are not likely to be much different from those of the young" (deVries, 1976, p. 47).

Barry et al. (1966) formed two groups of elderly subjects with average ages of 70 and 72--an experimental group of five men and three women and a control group of five. The experimental group trained on bicycle ergometers followed by brief conditioning exercises conducted three times a week for three months; rest periods were interspersed in the bicycling. When retested at the initial work load, a reduction in circulatory stress was shown, as evidenced by decreases in work pulse, postexercise systolic blood pressure, and blood lactate concentration. In a second report from this same experiment, improvements were reported in agility, muscular endurance, hand-movement speed, imaging, and visual discrimination.

In a study by Hartlet et al. (1969) of middle-aged men aged 38-55 years, average improvement in aerobic capacity of 14% was found to result from 8-10 weeks of endurance training which consisted of jogging two to three half hours per week.

A study was done by deVries (1970) on 112 men ranging in age from 52 to 88. The men participated in a training program consisting of calisthenics, jogging, and either stretching exercises or aquatics for one hour, three days a week. The walk-run regimen was regulated at a heart rate of 145 beats per minute. The subjects were pretested; subgroups were retested at 6, 18, and 42 weeks of exercise. The most significant findings were related to the oxygen transport system:

oxygen pulse and minute ventilation at heart rate 145 improved by 29.4 and 35.2%, respectively; vital capacity increased by 19.6%. Significant improvements were also found for percentages of body fat, physical work capacity, and both systolic and diastolic blood pressures. The controls did not improve on any of these measures.

In this same study, seven men were placed on a modified exercise program due to various cardiovascular problems. This group exercised in the same manner as the previous study, except they substituted a progressive walking program for the jogging and were restricted to a maximum heart rate of 120 instead of 145, which prevailed for the normal group. This group exercised for six weeks, at which time their improvement showed a similar pattern to that of the harder working normal subjects at six weeks.

In the first of two studies conducted by Stamford (1972), exercise and control groups were formed of eight to nine geriatric patients in ambulatory wards of a state hospital. The exercise group worked out daily on a treadmill at 70% maximum heart rate, five days a week for 12 weeks; the length of the exercise sessions gradually increased from 6 to 20 minutes. Although the level of training was not high, significant decreases in heart rate and blood pressure occurred, with these training effects taking place in the latter weeks of training.

In Stamford's (1973) second study, geriatric patients were grouped as chronically institutionalized (minimum of 20 years), recently hospitalized (less than one year), and control. Except for the control group, the subjects exercised five days a week on a treadmill for 18 weeks in the following method:

1. The first six weeks, the intensity was 50% of the maximum heart rate for 15 minutes.

2. The second six weeks, the intensity was the same but the duration was 30 minutes.

3. The last six weeks, the intensity was 60% of the maximum heart rate for 15 minutes.

After six weeks of training, the chronically institutionalized patients showed a significant training effect, as demonstrated by a reduced heart rate for a given exercise load and by a reduction in systolic blood pressure and oxygen pulse. The recently admitted group showed no training effects for the first 12 weeks. With increased training intensity during the last six weeks, both exercise groups made significant physical fitness improvements. The control group showed no improvements throughout the study.

In one of the few studies involving old women, Adams and deVries (1973) had 17 subjects, aged 52-79, the average age being 65.9, participate in a vigorous three month exercise program for one hour, three times a week. The exercise program consisted of calisthenics, jogging, and stretching movements. The jogging intensity was regulated by a heart rate of 145 beats per minute, which represented about 60% of the maximum. Six controls were also pre and posttested. The trainability of the cardiovascular system was demonstrated by the improvement in physical work capacity and the resting heart rate. The improvements were of a similar order in magnitude as those commonly reported for young females, but not of the magnitude in men.

Spirduso (1980) reviewed and discussed psychomotor speed in aged individuals and the relationships that seemed to exist among physical



fitness and various areas of psychomotor speed. Individuals who participate in frequent physical activity were consistently shown to have higher physical work capacity values (oxygen consumption/kg./min.) than their sedentary peers and were said to be more physically fit. Spirduso (1980) stated:

The significantly faster neuromuscular responses of highly trained individuals when compared to untrained individuals has suggested a relationship existing between exercise and psychomotor speed. Certainly evidence that highly fit individuals respond very quickly to stimuli and that aerobic training regimes decrease response latency, provides a basis for anticipating that persons who exercise might maintain neuromuscular response speed throughout the aging process (p. 852).

Spirduso (1980) also stated that the correlationship evidence suggested a relationship exists between physical fitness and psychomotor speed. When highly physically fit groups were compared with sedentary low-fit groups, whether they were athletes or non-athletes, their reaction times and movement times were faster. When low-fit groups underwent physical training regimes, their reaction times became faster. However, it was indicated that there were problems in the studies, and Spirduso suggested that the results from studies showed changes in reaction time and that training needed to be viewed with caution, inasmuch as it was well established that reaction time and movement time decreased with practice over test days, as shown by Clarkson and Kroll (1978) and Kroll (1969).

Despite the problems and the indirectness of the behavioral evidence, Spirduso (1980) believed the relationship between exercise and psychomotor speed in aged individuals appeared robust enough for continued study. There is indirect evidence to indicate that aging of the human organism can be substantially postponed by exercise.

Physically trained individuals may maintain a better capacity to cope with daily environmental hazards as demanded in emergency situations. "Dignity in aging depends on confidence and a strong self-image, both of which are substantially enhanced through psychomotor efficiency and control" (Spirduso, 1980, p. 863).

According to Yasgur (1975), the variability in motor skill performance among older persons is amazing. Certain individuals over 55 have attained remarkable achievements in activities such as swimming, diving, track and field, racquetball, softball, and other athletic competitions. A few notable records show that men in their sixties can throw a discus over 100 feet; 55-year-old sprinters can break the 20 second mark for 200 meters; and women can establish records in swimming, running, and field events. These kinds of performances, by an exceptional group of older individuals, have been demonstrated in the Senior Olympics Program under the auspices of Senior International, which stages annual games for amateur athletes.

There are many older individuals who do not possess adequate locomotion and motor skills necessary for activities. The variability of personal functioning ranges from minimum levels of fitness such as climbing stairs without exhaustion to the superb Senior Olympics performance.

Certainly, not every older adult can or will be highly physically trained or compete in competitive activities, but they can be an active participant and reach high levels of fitness. The literature abounds with this belief.

Lamb (as cited in Keelor, 1976), who is a cardiologist, internist, and Chief of Clinical Science Division of the United States Air

Force School of Aerospace Medicine, said that many of the problems in older people which are attributed to aging are the direct result of disuse. "Disuse of bodily systems not only affects skeletal muscles but can affect the heart muscle, decreasing the heart's capacity. It can affect the lung's capacity and almost every bodily system" (Keelor, 1976, p. 8).

Klump (as cited in Keelor, 1976), Chairman (Emeritus) of Winthrop Laboratories, believes that immobilization causes physical and circulatory deterioration and has done much work in the area of longevity. Klump also stated that, based on loss of motivation and interest, and to a large extent because of the fear psychosis against exercise and exertion, older Americans reduced their physical activities to a level of disastrous effects. He continued by stating that atrophy from disuse accentuated the lessened capacity of older persons to react to stress. He believes that such avoidable atrophy is a contributing factor in the death of older persons subjected to accidents, shock, operations, deprivation, stress, and prolonged illnesses (Keelor, 1976).

Radd (as cited in Keelor, 1976), Executive Director of the National Association for Human Development in Washington, D.C., believes that it is critical to raise the awareness level of older adults of the role which health education can play in upgrading health and in reversing the degenerative process. She believes that health education motivates individuals to take the information and do something with it. To do this, the aging population, as well as the general public, must be made aware of the profound difference between health information (disseminating facts) and health education (persuading

people to develop positive lifestyles). Many people confuse health information with health education. "Health information" is simply facts. "Health education" bridges the gap between health information and health practices. It is a process which positively influences attitudes, knowledge, and practices pertaining to one's personal family and community health. Unless older people are motivated through health education concerning the importance of physical activity as a therapeutic measure, they are unlikely to experience any improvement in functional capability, Radd concluded (as cited in Keelor, 1976).

Studies at the Duke University Center for the Study of Aging revealed that if aging persons maintain a meaningful social role, it kept them physically active and intellectually stimulated. These studies indicated that physical activity was the predictive factor, and that fewer illnesses and fewer earlier deaths were noted among those who were on their feet and active. "They also emphasized that aging appeared to be more a product of sedentary lifestyle than it was of age" (Keelor, 1976, p. 11).

Elrick (as cited in Keelor, 1976), who specializes in metabolic diseases and aging problems, is Chief of the Endocrine and Diabetics Clinic at the University of California, San Diego, and has engaged in research on exercise, diet, and longevity to determine why some individuals and population groups are able to maintain vigor of mind and body with advancing age. He has been involved in studies that were done in Ecuador, the Caucasus, Hunzaland, and California. According to Elrick, the population groups studied were chosen because they had the reputation of being exceptionally long-lived. Although documentation of the aged in Hunzaland and the Caucasus was lacking, it seemed

clear to Elrick and colleagues that there were large numbers of older individuals (over 75) who were exceptionally vigorous in mind and body. In Ecuador, the documentation was much better because of the existence of baptismal records. They found 46 men and women the age of 75 in a village with a population of 819. All of them were unusually vigorous, both physically and mentally.

The long-lived people in the three population groups cited above had some characteristics in common:

1. They all engaged in many hours of vigorous physical exertion daily; primarily farming, using hand tools, and doing much walking up and down hill in the course of their work as well as carrying heavy objects long distances.

2. Their diet was generally much lower in calories, animal (saturated) fats, cholesterol, and salt than the usual American diet.

3. They were generally slender, had well developed muscles, and a vigorous, youthful appearance.

4. Blood cholesterols (115-185 mg%) and triglycerides (50-100 mg%) done on the Ecuadorian group were much lower than those of the average American of similar age.

5. High blood pressure and cardiovascular diseases were virtually absent.

Harris (as cited in Keelor, 1976), President of the Center for the Study of Aging, Clinical Associate Professor of Medicine, Albany Medical College, is an avid advocate of physical activity. At the 1976 Senate Subcommittee on Aging, he renewed his advocacy of physical activity. He is firmly convinced that regular exercise can play a major role in the prevention of premature aging. Hypertension,

hardening of the arteries, and other circulation disturbances were found in his patients who had a long history of inactivity and emotional stress. Other advocates are Kraus, Stiles, Conrad, and Breslow (as cited in Keelor, 1976).

Some long-term benefits of fitness that have been documented over the years include the following:

1. Reduced risk factors associated with coronary heart disease through increased respiratory endurance, reduced triglyceride levels, blood cholesterol reduction, increased red blood cells and blood volume, improved myocardial vascularization, and collateral circulation development (Clarke, 1977).

2. Reduced risk of developing hyperkinetic diseases such as diabetes, ulcers, low back pain, and emotional difficulties (Kraus, 1965; Kraus and Raab, 1961).

3. Reduced body fat and increased lean body mass (Mayer, 1968).

4. Psychosocial problems are reduced; people who exercise regularly appear to have reduced tension, improved general learning potential for a given intelligence level, and positive self-concepts, and are more confident, self-sufficient, and more controlled (Clarke, 1977; Cureton, 1963).

5. Positive changes occur in human growth hormone (HGH) and cortisol levels; generally, training effects increase levels of HGH, especially in older and unfit individuals; cortisol levels increase only under stressful exhaustive exercise (Shephard and Sidney, 1975).

A survey conducted by the President's Council on Physical Fitness and Sports (1974) indicated that approximately 45% of the 110 million individuals over the age of 22 in this country do not engage in

physical activity for the purpose of exercise. The results further indicated that 63% of those who do not exercise regularly feel they get enough exercise, while only 53% of those who exercise regularly are satisfied with their amount of exercise. A major reason for lack of compliance to regular exercise in older adults is the negative attitude they have, as well as their relatives and often health professionals concerning the benefits and risks of such programs.

Conrad (1976) characterized these attitudes as follows:

1. They believe their need for exercise diminishes and eventually disappears as they grow older.
2. They vastly exaggerate the risks involved in vigorous exercise after middle-age.
3. They overrate the benefits of light, sporadic exercise.
4. They underrate their own abilities and capacities.

Many older people do not feel they need to exercise; however, this is not the case. Experts in the medical field concur that the single most important way to accelerate the aging process is to be sedentary. The need for exercise does not diminish with age; the intensity of exercise and maximal potential for exercise decreases, but the need does not. Actually, more than 20% of regularly exercising adults exercise at the suggestion of their physician (Wiswell, 1980).

Older people who have been inactive for years can participate in exercise programs. A research project was conducted by Berlin (1960) as long ago as 1960. Her study was planned to determine the following:

1. The educability of senior citizens as learners of swimming, unique learning problems, response to teacher direction, practice needs and efforts, motivation problems, and attention span.

2. Class organization methods.

3. Appeal of the activity to the participants, interest, desire to learn, and physical effects.

4. General effects of participation.

The age range of the participants was 59-79. The mean age was 69.5. In many respects, the older subjects were comparable to other age groups. Only one major characteristic--slowness--distinguished the subjects of this project. This slowness was physical.

Berlin (1960) evaluated the project by making some of the following specific observations:

1. Swimming skills comparable to those included in a beginning course can be successfully developed by senior citizens in a period of time longer than the learning time for college-aged students.

2. There was a marked increase in endurance following regular once-a-week participation, regardless of the degree of improvement in the performance of specific combined strokes.

3. There was no problem motivating older age learners of swimming after establishing good rapport.

4. The exercise value of swimming seemed to be very stimulating and desired by the senior citizen participants.

5. Various claims of "relief from arthritis," "lessened stiffness," and greater range of joint mobility were reported by the participants.



This project clearly demonstrated that older people can and do learn, as well as make progress.

Older persons may not expect to perform at the levels they once performed when they were young, but their performance can improve, says Wantz and Gay (1981). Carefully planned programs of exercise can help improve problems such as heart conditions, arthritis, obesity, and diabetes, as researched by deVries (1970); The Arthritis Foundation (1976); Getchell (1979); Briggs and Calloway (1979); and Leach (1981).

#### Fitness Programs

"Active People Over 60" is a program of health information and fitness activities including nutrition education for older Americans. This program is being enthusiastically received across the country. Developed by the National Association for Human Development in cooperation with the President's Council on Physical Fitness and Sports under a grant from the Administration on Aging, it led to a nationwide introduction of the program in 1977.

The program's goal is to reduce premature institutionalization of the elderly and alter sedentary lifestyles by acquainting older people with the health benefits which can be derived from regular fitness activities. Its legislative base is the 1975 Amendments to the Older Americans Act which broadened the definition of social services to include services designed to enable older persons to attain and maintain mental and physical well-being through programs of regular physical activity and exercise.

Other organizations which are aiding in program implementation include:

1. American Alliance for Health, Physical Education, Recreation and Dance is undertaking a nationwide campaign to recruit volunteers from among its active and retired members to assist in training exercise leaders.

2. Retired Senior Volunteers Program has many senior volunteers receiving training to become activity leaders.

3. National Recreation and Park Association and its local affiliates are selecting recreation specialists to serve as resource persons and activity leaders for introduction communities.

4. Both the American Association of Homes for the Aging and the American Health Care Association have representatives participating in regional and local workshops.

5. The American Association of Retired Persons and National Retired Teachers Association are highlighting health education and fitness activities in their communications to members and assisting in initiating the NAHD program in communities where they have chapters.

6. The Adult Education Association of the United States of America is developing continuing education programs for older persons in health education and fitness activity. In addition, junior and community colleges are providing facilities and staff to conduct local workshops and initiate regular exercise activity programs for older persons.

7. The Jewish Welfare Board--including the YMHA, YWHA, and Jewish Community Centers--and the YMCA and YWCA networks, are implementing and expanding fitness programs in their facilities, as well as assisting

in training exercise leaders. Other Protestant and Catholic service organizations are similarly emphasizing fitness programs within their regular activities.

The Franklin Pierce Center in Flint, Michigan, provides several hundred older persons a wide variety of activities. Among these are physical conditioning programs, golf, and a bicycle club. The Atwater Senior Center, operated by the New Haven, Connecticut, Department of Parks and Recreation, is another similar operation. This center is fairly typical of programs operated by both public and voluntary agencies in communities around the United States.

A program "Live All Your Life" has been developed by the Westchester County Department of Parks, Recreation and Conservation of White Plains, New York, designed for senior adults. It incorporates exercises created by the National Association for Human Development in cooperation with the President's Council on Physical Fitness and Sports. The program's goals are to "educate, inform, motivate, and enlist the support and participation of older persons in physical activities tailored especially for them" (Lederer, 1978, p. 40).

"Use it or lose it" is the slogan that has been echoing through South Dakota's senior citizen centers in recent years. More than 1,500 people 60 years of age and over are participating in the South Dakota Physical Fitness for Seniors Project. This project has been instrumental in establishing physical fitness programs in over 70 senior citizen centers in the state of South Dakota (Hattlestad, 1979).

The program developed at Colby Community College, Colby, Kansas, is divided into four parts: relaxation, flexibility and stretching

exercises, interval training activities, and aerobic activity, to music. This senior citizen class meets twice a week for 45 minutes, and a variety of activities are conducted to achieve the objectives.

Recently, the seventh annual "Post Fun 'n Fitness Golden Age Games" was held in Sanford, Florida. Hundreds of "Super Seniors" over 55 competed in activities such as swimming, running, cycling, basketball, tennis, track and field, plus 20 other events. In 1980, over 2,000 people entered from the United States, Puerto Rico, and Canada, and a record number of approximately 3,000 competitors participated in 1981. These "Golden Age Games" sparked the development of the Illinois "Senior Olympics" in 1977. The Recreation Department and the Illinois Department on Aging decided to sponsor such a program for the elderly interested in sports and physical fitness. Golf, biking, swimming, running, tennis, archery, track and field events were among the events held. Two competitive age groups for both men and women were set up as follows: 55 to 64 inclusive, and 65 and over (Kamm, 1979). In West Virginia, a program called "Preventicare" was established for the older adult. It consisted of low-level mobility exercises to improve circulation, digestion, and respiration; to strengthen and tone the muscles, and to improve motion in all the joints. The major emphasis was on the peripheral circulation and only cardiorespiratory exercises that kept the heart rate below 120 beats per minute were used. The program was developed primarily for individuals over the age of 60, and all participants were required to obtain a physician's approval (Frankel and Richard, 1976).

In California, the "Life Begins at Sixty Super Marathon" is an annual event. In 1972, seven men, ages 60 to 72 ran in relays from

Hollywood, California, to Las Vegas, Nevada (290 miles) in 44 hours and 6 minutes.

A program called "Let Me Light Your Bunsen Burner" was developed in College Park, Maryland. The program includes a variety of beginning physical activities. The objectives were:

1. To enhance mobility, flexibility, agility, strength, hand-eye/eye-foot coordination, tactile awareness, depth perception, and endurance.
2. To enhance body image and self-concept.
3. To develop an awareness of latent and suppressed capabilities (Santoro, 1979).

Although the number of older adults participating in physical activity during the early 1970's was somewhat small, many sports organizations claim an upsurge in their membership of older men and women (Field, 1982). Currently, there are several of these sports organizations in operation. Some of them are:

1. United Cycling Federation; formerly the Amateur Bicycle League of America from 1925-75; it conducts national open road championships from 55-80 kilometers, as well as a Time Trial Championship of 25 miles for veteran men; veteran women are also eligible for a road championship of 20-35 kilometers and a Time Trial Championship of 25 miles.
2. The United States Volleyball Association, which sponsors a senior division for men and women with age divisions starting at 35 for the former and 30 for the latter.
3. United States Master's Swimming, which sponsors a Master's Swimming Championship meet each year.

4. The United States Tennis Association. The age classes for men are 35, 40, 45, 50, 55, 60, 65, 70, 75, and 80+, while for women they are 35, 40, 45, 50, 55, 60, 65, and 70.

5. Sunfish Sailing. This organization has five year age groups beginning with 40 and continuing through 75+; they have sponsored senior competition since 1974 and recently had 97 competitors at their eighth annual competition.

6. National Field Archery Association; they have programs for over 55; Golden Bowmen and Golden Bow Women have both indoor and outdoor, sectional, and national championships annually.

7. American Bowling Congress, which sponsors a senior league for these categories: (a) 70+, (b) 65-69, (c) 60-64, (d) 55-59.

8. Field Hockey Association of America, Inc. Both men and women are engaged to participate in this rugged activity for a lifetime.

9. United States Golf Association conducts three senior national gold championships: (a) the Senior Amateur, since 1955; (b) the Senior Women's Amateur, since 1962; and (c) the Senior Open, inaugurated in 1980.

10. United States Handball Association is very rigorous in its sponsorship of competition for older participants; the association conducts state tournaments in every state, leading to regional championships which culminate in an annual Master's national winner. The classifications are: Master - 49-49; Golden Master's - 59-59; and Super Master's - 60+.

11. United States Racquetball Association. Regional and national championships are sponsored for these age patterns: 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, and 65+.

12. National Association of Amateur Oarsmen, operating a Master's national championship since 1979 in single sculls, double sculls, and four with coxswain; age groupings are: 27-31, 32-37, 38-44, 45-51, 52-59, and 60+ for singles; doubles age classes are: 27-39, 40-49, and 50+.

13. Amateur Softball Association. A senior division is not sponsored, but many cities encourage leagues for older men.

14. United States Squash Racquets Association, Inc. sponsors singles championships for men 50-54, 55-59, and 60+.

15. The Inter-Lake Yachting Association. Any age may participate.

16. Amateur Athletic Union. This group, in addition to the organizations referred to above, has contributed greatly to the advancement of athletic competition among older men and women; another emerging cluster in the 1980's will comprise a nationwide amalgamation of "Senior Citizens," "Senior Olympics," "Golden Olympics," and similar groups. A few examples are:

17. Illinois Senior Olympics, which sponsors an annual competition--men and women 55+ are encouraged to participate regardless of their state of residence; some events are swimming and track.

18. Indiana Senior Olympics, which sponsors competition. Events are basketball, bowling, swimming, bike races, tennis, rowing, softball throw, dancing, track and field events.

19. Rhode Island Senior Olympics, open only to state residents, men 40+ and women 40+; 300 participated in 1981; the oldest was an 82-year-old mile walker.

20. Golden Olympics. The first was held in 1979 with 240 participants; this was doubled the following year. Ages are 55-59,

60-64, 65-69, 70-74, 75-79, and 80+. Some events are: track and field, swimming, bridge, croquet, horseshoes, tennis, walking, riflery, checkers, and chess.

21. Senior Sports International, Inc. This group has organized archery, badminton, basketball, bowling, swimming, softball, gymnastics, track and field, and a variety of others; the goals of the program are to promote physical fitness through daily exercise and to provide group activities with the physical and social needs of the community.

22. The National Senior Sports Association is interested in encouraging sports participation by older persons at affordable resorts. The Association publishes a Senior Sports newsletter and magazine, and offers instructional clinics and materials.

23. The President's Council on Physical Fitness and Sports has been conducting conferences recently for state Councils on Health and Fitness to stimulate interest in athletic competition among older adults (Field, 1982).

A program involving water exercises as well as synchronized swimming was begun for older Americans by Finucan (as cited in Hamilton, 1979), at the Anaheim Family Young Men's Christian Association (YMCA), Anaheim, California, in 1974. The program is called "Geritol Follies" and it has rapidly increased in number and popularity.

As the benefits of exercise become more and more recognized and supported, so do the other various exercise programs. The older adult population is increasing their involvement in exercise and many of these programs.



In the area of swimming, a program called "Master's Swimming" was developed by Arthur (as cited in Stern, 1980). This program is for competition and has grown enormously since it first began.

Counsilman (1977) has written extensively about swimming. He is a Master Swimmer participant and has set records in the 50-54 age group. Much of his writing involves competitive swimming training and the teaching of swimming, and he is a dedicated supporter of the benefits of swimming. At 58, he swam the English channel (Reiter, 1980).

A group in San Francisco, California, called the "South End Rowing Club," swims between one and five miles daily. The members are in their 60's, 70's, and even 80's, and participate for fitness (Jones, 1977).

Baltimore's Waxter Center began the "Over 60 Crowd" program, which consists of a series of exercises as well as activities such as swimming, bowling, aerobics, yoga, folk dancing, badminton, volleyball, square and ballroom dancing, and exercise classes. Swimming is an important part of the fitness program at this Center. The swimming pool functions as both a therapeutic and recreational facility. Water exercises as well as swimming lessons are conducted. Arthritic members benefit from the activity greatly, as the buoyancy makes the movement easier. Membership is open to all Baltimore City residents, and current membership is nearly 14,000. Over 500 individuals a month participate in the total program. Deaf, blind, and frail elderly members and nursing home residents are among the participants (Hoffberger, 1980).

The Fitness Challenge . . . In the Later Years (President's Council on Physical Fitness and Sports, 1973) was prepared by the President's Council on Physical Fitness and Sports and the Administration on Aging and published by the latter. It is a printed exercise program for older Americans and among the many new such publications.

Katz (1978) conducted a study with older adults and swimming to test the effectiveness of a beginning swimming program for teaching older adult non-swimmers. The three main objectives were to:

1. Determine whether and the degree to which a program specifically designed for older adult non-swimmers facilitates new skill acquisition.

2. Provide information about the potential impact that learning to swim may have on other areas in the older adult's life, including physical well-being, social benefits, and general self-confidence.

3. Provide information about the kinds of practical factors that should be considered when working with the older adult.

The sample population consisted of 16 subjects ranging in age from 62-72 and was designed as a case study.

Each student was evaluated on his ability to perform 30 ongoing and 20 final skills. Results were presented in tabular form. Instructors' final evaluations indicated that 85% of the skills were performed well without assistance. Students also evaluated themselves. Some of the skills were:

1. Breathing skills - breath holding, rhythmic breathing.
2. Supine skills -back float, back glide.
3. Prone skills - prone float, prone glide, crawl stroke.
4. Deep water skills - treading.

Katz (1978) made the following conclusions based on the results mentioned above:

1. Older adults can be taught fundamental swimming skills.
2. Older adults can benefit both physically and socially from learning to swim and seem to show an overall increase in self-confidence.
3. Practical considerations in teaching basic swimming to older adults included the need to arrange transportation as well as the maintenance of comfortable surroundings. Use of a structured and sequenced program enhances the effectiveness of the techniques used to teach beginner level skills. It appeared that the program's success was partly due to the fact that it was specifically designed to meet the needs of the older adults.

There have been few publications in book format about swimming and the older adult; however, the literature is increasing, with various articles related to the senior citizen and exercise. The American Alliance for Health, Physical Education, Recreation and Dance published Strokes and Strokes by Heckathorn (1980). This publication deals with information and techniques involved with teaching swimming to the victims of stroke, as well as information for program development.

The American Red Cross (1977) published a book, Adapted Aquatics, which provides information on teaching swimming to the physically handicapped.

#### Benefits of Swimming

According to Collis and Kirchoff (1974), experimental studies have shown that vigorous swimming involves virtually all the major

muscle groups of the body. The water provides a continuous resistance against which the muscles have to work, thereby providing a balanced development of the musculature of both the upper and lower body that is unmatched by any other activity.

Regular swimming will develop the strength of your heart, the size of your lungs, the efficiency of your circulatory system, your general muscle tone, and can be the vehicle to restore lost vigor and strength (Collis and Kirchoff, 1974, p. 73).

Buxhaum and Micheli (1979, p. 107) wrote that "swimming is a close to perfect antidote to the ailments and stresses caused by urban life." Relatively free of the effects of gravity, a superb venture, and a stimulus to many essential muscle groups, swimming offers its participants a way of getting superior muscular and cardiovascular results.

Very high oxygen uptake scores have been recorded in swimmers. The aerobic principle involving many muscle groups in a sport is particularly well served by swimming. "One fact, however, that sets swimming apart from all other sports is the effect of water pressure on the breathing mechanism. This leads to a slightly less free expansion of the lungs during exertion" (Buxham and Micheli, 1979, p. 108).

Cooper (1978) rated swimming a close second to running when he compared exercises for their ability to provide physical fitness. Cooper stated that an advantage of swimming for most people is that it is much more enjoyable than running.

Arthur (as cited in Stern, 1980), Dean of the Medical School of the University of Oregon, was the person probably most responsible during the last decade for encouraging the development of swimming for physical fitness. In the late 1960's, Arthur was engaged in research

that measured the effect of exercise for coronary disease prevention. A swimmer himself, he became convinced that vigorous swim training was the ideal exercise for cardiovascular conditioning, particularly for the middle-aged and older adult. He also concluded that a competitive program could be easily tolerated by older swimmers and that it could provide an important stimulus to encourage higher levels of fitness. Arthur then persuaded the Amateur Athletic Union to sponsor Master's Swimming Meets in 1971. In a decade of steady expansion, the program has more than justified Arthur's expectations. More than 6,000 swimmers are now in competition and there are Master's Swim Clubs in every major region in the country. The oldest participant is 88 years of age.

Katz (1981), who has been involved with swimming for many years and who has worked with older adults and swimming, lists several advantages and benefits of swimming:

1. Swimming gives an individual stronger, firmer muscles; it is the single best exercise for toning the arms, shoulders, waistline, hips, and legs all at once.

2. It increases flexibility; swimming's long, sinuous motions, along with increased range of movement that the body has in the water, actually elongates the muscles while strengthening them; swimming will loosen up the person, both in the water and out.

3. It is easy on the muscles and bones; one of the benefits of swimming is that it gives the swimmer all of the pleasures and assets of exercising without the troublesome and often painful side effects that other sports can have on the musculoskeletal system; it is the whole body, all-around exercise that builds endurance and balanced

muscle strength, without jarring the bones and muscles; because the resistance of the water actually helps the swimmer exercise their muscles, and because the movements are relatively slow and rhythmic, and because the swimmer is not likely to collide with other people or with equipment--the average swimmer has virtually no injuries to worry about; the fact that swimming puts little strain on the joints, is especially good for arthritic persons or persons with bad backs.

4. It aids physical therapy; the water's buoyancy also makes swimming an excellent therapeutic exercise; it gradually and gently relaxes and rehabilitates muscles and joints that have atrophied or stiffened; swimming is a sport that can be enjoyed by the injured and by the handicapped.

5. It helps the swimmer enjoy other sports and other people; the swimmer's new-found energy and endurance will allow him or her to enjoy dry-land activities such as tennis and dancing.

6. Swimming slows down the clock; lack of exercise is the most important factor in premature aging; the body actually thrives on use; regular exercise can add years to one's life.

Studies reported in the literature seem to agree that swimming is an activity that has value and benefit for the older adult. Although many older adults have not had early experience of swimming, it appears relatively easy for them to learn the necessary techniques. It is therefore the intention of the author to develop a beginning swimming curriculum guide for the older adult in an attempt to facilitate the acquisition of fundamental swimming skills and to provide appropriate water exercises. By this acquisition, the older adult may develop a

desire to continue the activity and thereby improve his or her health, longevity, and perhaps most of all, life satisfaction.

### CHAPTER III

#### CURRICULUM GUIDE FOR THE OLDER ADULT

There are some physiological changes that occur with age. These changes may affect some older adults' ability and performance in the water. The size of the heart does not dramatically change with age, but the amount of blood that it pumps increases. With advancing age, the resistance of the flow of the blood increases and systolic blood pressure tends to be higher (Harris and Cole, 1980). The structure of the lungs changes as aging occurs and they begin to lose their elasticity. There is a 50% loss of blood vessel elasticity (Neuhaus and Neuhaus, 1982). The vital capacity of the lungs is reduced with age. At age 70, this vital capacity is reduced to less than 50% of what it was at age 30 (Harris and Cole, 1980). Strength, muscle size, endurance, and agility all decrease with age. The extent and rate of the losses may vary considerably among aging individuals (Neuhaus and Neuhaus, 1982). A major physiological change associated with advanced age is the impairment of movement (Sigereth, 1970). The buoyancy of the water makes movement much easier, and older adults with movement impairment can experience remarkable success.

As these changes occur, the individual may experience fatigue somewhat sooner than at earlier times. Older adults may require more time to exercise or perform a skill in the water, but they should be able to function fairly well, depending on individual characteristics.



There are some psychological changes that occur with aging, as well as physiological. Some of these psychological changes may affect the older individual's ability and attitude in the water.

One such change may be a reduction in self-concept and/or self-image. At one time, physical appearance may have been very important to the person, and as aging occurs, his or her self-concept may be affected (Goodstein, 1981). This change in appearance may also be reflected in how the older individual perceives his or her image in a bathing suit. The older person may have been a good swimmer at one time and he or she may now discover they are not as adept in the water or that they may have even developed a fear of the water. A feeling of inadequacy may result and affect their swimming ability. A fear of catching a cold or of being hurt may also exist for the older individual. These are very real fears and should be understood by the instructor.

The purpose of this study is to develop a beginning swimming curriculum guide for the older adult. Beginning swimming skills, in addition to land and water exercises, will be included. This curriculum is uniquely designed for the older adult. Based on the physiological and psychological changes of aging discussed, special emphases and modifications are directed toward the skills and exercises presented. This is an individualized curriculum guide and is not a cure-all for all conditions. The instructor should refer to the teaching tips given later in this chapter and the literature review in Chapter II before commencing with this curriculum. The time frame for this program is totally dependent on the condition and/or purpose of the individual or individuals in the class.

### General Objectives

The individual will:

1. Improve cardiovascular endurance.
2. Improve in individualized skill development.
3. Improve flexibility, circulation, strength, muscle tone, and coordination.
4. Improve general well-being.
5. Benefit from the social interaction of the activity.
6. Increase the level of self-confidence.
7. Gain sufficient knowledge of the body to appreciate the need for physical activity.

### Land Exercises

The following land exercises are suggested for the participants before they enter the water. It is important for them to warm up their muscles properly to alleviate any possible injuries. Many of these exercises can be performed sitting down, or supported by a wall or another individual. These exercises can be modified to the condition of the participant.

These exercises may also be performed in the water and may be interspersed among the water exercises as well. Arthritic, handicapped, amputees, as well as other such individuals are able to engage in many of the land exercises and water exercises. The number of exercises performed may certainly vary, but they nevertheless should find many of the exercises beneficial.

The progression for the land exercises begins with the head and neck and progresses down to the feet and ankles. This is a standard

progression rather than in order of difficulty, and may be modified at the instructor's discretion.

### Standing Position

#### Head and Neck

1. Touch ear to shoulder, alternating left and right.
2. Bend head back as far as possible.
3. Bend head forward until chin touches chest.
4. Roll head from front to side, to back, and repeat.

#### Shoulders

##### Arm Circles:

1. Extend arms horizontally sideways, palms down.
2. Stretch arms outward elbows straight.
3. Rotate arms from the shoulders, making small circles.
4. Repeat, making large circles.

##### Arm Swings:

1. Swing arms forward, then backward.
2. Arms at sides, palms down, swing arms out to shoulder level and back.
3. Swing arms above head and down to side.
4. Swing arms side to side.

##### Stretch and Reach:

1. Extend one arm at a time above head.
2. Reach as high as possible--alternate arms.
3. This may also be performed against a wall.

#### Shoulder Hunch:

1. Lift right shoulder as high as possible with right hand sliding upward along the right side of the body.
2. Repeat with the left shoulder.
3. Repeat with both shoulders.

#### Shoulder Twist:

1. Extend arms horizontally sideways, palms facing forward.
2. Twist around to the left, then right.
3. Repeat, with arms above head, at sides.

#### Back

1. Bend forward at the hips--hands on hips.
2. Bend sideward--hands on hips.
3. Bend backward--hands on hips.
4. Twist shoulders forward and backward until the spine hands on hips.

#### Hips and Legs

##### Knee Stretches:

1. Grasp knee with hands--pull toward chest.
2. Repeat--alternating knees.

##### Leg Stretches:

1. Holding onto a stable support such as a wall--grasp the top of the foot--right hand to right foot, and pull upward, bending the knee.
2. Repeat, alternating feet.

## Hands, Fingers, and Wrists

### Hand Rotations:

1. Grasp right wrist with left hand and slowly rotate right hand making large complete circles clockwise and counterclockwise.
2. Keep palm down.
3. Repeat with opposite hand.

### Wrist Rotations:

1. Make a fist with the right hand.
2. Rotate the wrist clockwise and counterclockwise.
3. Repeat with the opposite hand.

### Finger Stretching:

1. Palm of the right hand faces down.
2. Using the left hand, gently force the fingers back toward the forearm.
3. Place the left hand on top and force fingers down.
4. Repeat with the opposite hand.

### Finger Flexion and Extension:

1. Arms extended forward.
2. Make a fist with the right hand--then extend the fingers.
3. Repeat with the opposite hand.

### Finger Abduction and Adduction:

1. Arms extended forward.
2. Palms facing down.
3. Spread fingers wide apart and back together.
4. Repeat with opposite hand.

### Feet and Ankles

#### Ankle and Foot Rotations:

1. Cross right leg over opposite knee.
2. Rotate foot slowly, making large circles.
3. Repeat, alternating feet.

#### Ankle Flexion and Extension:

1. Right leg is extended.
2. Flex ankle toward shin--then extend.
3. Repeat alternating legs and ankles.

### Water Exercises

The water exercises in this section have been specifically organized. This organization has taken into account the participant's body position in the water and that relationship to the side of the pool. These exercises may require more time than is available. If that is the case, the instructor may wish to select a few from each position and modify them as to the type.

If the major goal is for the participant to achieve a level of accomplishment, this should in turn be reflected by some measurable results, such as the participant feeling better, losing inches, enjoying the activity, and/or increasing self-confidence. The participant should be made aware that although these exercises improve flexibility, circulation, strength, muscle tone, coordination, and some amount of stamina, cardiovascular endurance is a primary goal, and that is more effectively attained by continuous rhythmic swimming.

The uniqueness of this guide is that older adults with a reduced range of motion as a result of arthritis, a stroke, or other similar

conditions should be able to perform many of the exercises and skills, although the exercises may be modified. An additional aspect of this uniqueness is that the guide should adequately provide the instructor with a complete curriculum of beginning swimming skills and water exercises.

### Back-to-Wall

Arms in Gutter. (It is suggested that frequently the participants may need to relax their arms by performing figure eights underwater due to fatigue or stiffness from holding onto the gutter or pool wall.)

1. Single leg lifts - Lift leg and pull down, leading with heel, then toe--alternating legs.
2. Double leg lifts - Lift both legs at once and pull down, leading with heel first, then toe--alternating heel and toe.
3. Bent knee twist - Bring knees to chest, twist knees side to side, touching pool wall.
4. Body twists - Extend legs forward, twist to the left, then right.
5. Single leg circles - Extend legs forward, circle clockwise, then counterwise, repeat alternating legs.
6. Double leg circles - Extend legs forward, circle clockwise, then counterwise.
7. Hip twists - Standing position, twist hips to left as far as possible, trunk facing forward, repeat to right.

8. Raised knee hip twist - Standing position, raise right knee and twist to left as far as possible, repeat alternating knees and directions.

9. Vertical scissors - Extend legs forward, pull one leg down, touching bottom, and as leg raises, pull other leg down, repeat.

10. Horizontal scissors - Extend legs forward, swing legs far apart and bring together, crossing one leg on top of other, repeat crossing in front of opposite leg.

11. Forward bicycle - Extend legs forward and do a bicycle motion.

12. Leg swings - Raise right leg forward and swing to left, then right, repeat alternating legs.

13. Body swings - Extend legs forward and swing body to left, feet touching pool wall, then swing body back to right and repeat.

14. Knee-to-chest twist - Bring right knee to chest and grasp calf with both arms pulling toward chest, repeat with left knee.

15. Back flutter kicking - Extend legs forward and flutter kick.

#### Side-to-Wall

1. Leg kicks - Raise left leg sideward, pulling vigorously downward and repeat with opposite leg.

2. Leg swings - Raise left leg forward and swing counterclockwise, touching foot to pool wall behind, repeat alternating legs.

3. Leg circles - Raise leg sideward, circle clockwise then counterclockwise, repeat with opposite leg.

4. Side bicycle - Extend legs sideward and bicycle, repeat on opposite side.



5. Left side flutter kicking - Lying on left side and holding onto the gutter with right hand, left hand braced on pool wall, flutter kick.

6. Right side flutter kicking - Lying on right side and holding onto gutter with left hand braced on pool wall, flutter kick.

7. Inner and outer thigh scissor - Lying on right side, raise left leg to surface and bring right leg upward to left leg and scissor horizontally and repeat, alternating legs.

#### Standing Water Drills - Chest-Deep Water

1. Squats in water - Back straight, hands on hips, squat in water (chest or shallow), bending knees - squat to neck level.

2. Arm circles - Make large circles with left arm clockwise, then counterclockwise and repeat with opposite arm.

3. Horizontal arm circles - Extend arms horizontally and both circle clockwise, then counterclockwise.

4. Arm swings - Extend arms forward underwater, swing arms backward until hands meet.

5. Toe raises - Raise upward on toes, repeat, accelerate.

6. Toe bounce - Hands on hips, feet together, jump as high as possible with a bouncing movement.

7. Side stretcher - Left arm at side, right arm over head, slowly stretch by bending to the left, repeat and alternate sides.

8. Use of a kickboard - Place both hands on the board and submerge it until arms are straight.

9. Side hop - Hands on hips, jump sideward until feet are apart, repeat with feet crossing in front of each other.

10. Arm-knee stretch - Raise left knee and at same time touch right hand to knee, repeat and alternate knees.
11. Waist twists - Hands behind neck, raise left knee and touch right elbow to left knee, repeat and alternate knees.
12. Standing crawl - Bend forward at waist and perform crawl stroke.
13. Walking forward - Let arms swing forward and backward, elbows bent, walk briskly forward.
14. Walking backward - Let arms swing forward and backward, elbows bent, walk backward.
15. Jogging in water - Let arms swing forward and backward, elbows bent, jog in place, then through the water.
16. Bobbing - Take a breath, in tuck position, submerge, push off the bottom and return to a standing position, repeat.
17. Bobbing - alternating legs - Take a breath, submerge with right leg in a squatting position with the right foot on bottom of pool and left leg extended backwards, push off bottom and reverse the position of the legs, repeat and alternate legs.
18. Bobbing - alternating legs sideward - Take a breath, submerge with right leg in a full squatting position, right foot on bottom of pool and left leg extended sideward, push off bottom reversing position of the legs and repeat alternating legs.
19. Bobbing with left hand right leg - Take a breath and submerge with left leg drawn up and right foot on bottom of pool - push upward off right leg, thrust, repeat and alternate legs.

20. High bobbing - Take a breath, in tuck position and submerge as deep as possible, push off bottom and return to a high standing position, repeat.

### Face-to-Wall

#### Hands in Gutter

1. Leg kicks - Bring right knee to chest, thrust backward, repeat and alternate legs.
2. Leg circles - Extend right leg backward, circle clockwise, then counterclockwise, repeat and alternate legs.
3. Hip swings - Walk up wall, swing right hip up and touch wall, then left, repeat.
4. Hip raises - Prone position, raise hips to a count of five, relax, repeat.
5. Body swing - Prone position, swing body around from right to left, touching pool wall, repeat in opposite direction.
6. Ankle circling - Prone position, circle ankles left, then right, repeat.
7. Shallow flutter kicks - Prone position, shallow flutter kicks, ankles flexible, kick from hip, knees relaxed.
8. Deep flutter kicks - prone position, deep flutter kicks.

### Deep-Water

1. Tread water - Vertical position, tread water using large motions with arms, gradually progress to five minutes.
  - a. Tread water - using just arms.
  - b. Tread water - using just legs.

2. Sculling V sit - Back-lying position, raise feet out of water while hips are lowered and point toes.

### Kickboard Skills

1. Prone position - Grasp the kickboard, extend arms forward, flutter kick the distance of the pool. If the width of the pool is conducive for kicking, have the participants begin with this distance first and gradually increase.

2. Back position - Grasp the kickboard behind the head while on the back, flutter kick the pool length or width.

3. Kick variations -

- a. Scissor kick
- b. Inverted scissor kick
- c. Whip kick
- d. Inverted whip kick

### Beginning Swimming Skills

#### Level I

##### Breath Control

1. Breath holding
2. Bobbing
3. Rhythmic breathing

#### Level II

##### Basic Skills

1. Jellyfish float

2. Prone float
3. Back float
4. Prone glide
5. Prone glide with kick
6. Back glide
7. Back glide with kick
8. Sculling
9. Leveling off from a vertical position
10. Crawl stroke - standing position
  - a. Arm action
  - b. Breathing

### Level III

#### Survival Skills

1. Turning over
2. Changing direction
3. Treading water
4. Survival floating
5. Jump into deep water
6. Safety procedures
  - a. CPR training
  - b. First-aid training
  - c. Mouth-to-mouth resuscitation

Level IVCombined Skills

1. Changing positions
2. Supine float with a partner
3. Supine kick with a partner
4. Prone float with a partner
5. Prone kick with a partner
6. Prone kick with a kickboard
7. Supine kick with a kickboard
8. Combined stroke on the back
  - a. Back glide with a kick
  - b. Begin sculling
9. Combined stroke on the front
  - a. From a front crawl with a flutter kick
  - b. Turn over and perform the back crawl
10. Combined stroke on the side
  - a. From a sidestroke
  - b. Turn over and perform the back crawl
11. Combined stroke on the back
  - a. From an elementary back crawl stroke
  - b. Turn over and perform a crawl stroke
12. Combined stroke on the front
  - a. From a breast stroke
  - b. Turn over and perform an inverted breast stroke

Level VBasic Strokes

1. Beginner stroke
2. Crawl and/or trudgen
3. Elementary back crawl
4. Back crawl
5. Sidestroke
6. Breast stroke
7. Inverted breast stroke

## Methodology

Individualistic ApproachTeaching Tips

1. When working with participants who have a cardiac condition, more frequent rest periods may be helpful, as well as using more resting strokes in the swimming skill area.
2. The use of flotation devices such as kickboards may be beneficial.
3. The temperature of the water will affect the success of the participant; warm water can increase the range of motion in the extremities; the temperature should be 84-88 degrees.
4. Establish a good rapport with the participants at the beginning.
5. Allow the participants to experience success early in the program; this will also aid in motivation.

6. Many participants are involved in the program for social benefits; this aspect should not be neglected.
7. Participants need to feel that their efforts and performance will not be in jest.
8. The instructor should emphasize the positive values of swimming such as the improvement of general fitness and a sense of well-being.
9. A humanistic instructor will have better success by exhibiting respect, consideration, and courtesy toward the participants.
10. The instructor should recognize the need for understanding individual participant's fears.
11. The instructor should engage in as much individualized teaching as possible.
12. Individualized objectives may need to be established by the instructor and the participant and this should be allowed and encouraged.
13. Similar age groups may be more appealing to adults; ability grouping may also be a consideration in organizing the class.
14. Emphasize and encourage regular endurance swimming, gradually increasing the distance.
15. When working with swimming skills, allow the participant time to practice after instruction.
16. The instructor may give the participants a certificate or some other type of award as he or she accomplishes each level of skill. Awards can be very motivating for the participant.
17. Some participants have hearing problems. This will be compounded by poor pool acoustics. Therefore, the instructor should have good volume and diction.



18. The instructor should encourage the participants to progress at their own rate of speed.

19. A book entitled Strokes and Strokes by Heckathorn (1980) may be helpful if the participants are stroke victims or have extremely reduced motion.

20. The National Red Cross publication Adapted Aquatics (1977) contains information concerning the teaching of swimming to those with a variety of impairments and disabilities. Designed primarily for children, it does have some information relevant to adults.

#### General Suggestions for Exercising

1. The participant should have a complete physical examination and the approval of a physician before participating.

2. Exercises should be started gradually beginning with a minimum number of repetitions gradually increasing over a period of time until the goal is reached. The gradual approach will aid in alleviating some soreness and muscle strain.

3. To be effective, exercises should be performed regularly, at least three times a week.

4. The participants should not over exert. They should be able to repeat the exercises the next day without undue stiffness or soreness.

5. Some muscle soreness is a natural result of exercise, and repeating the exercise the next day is the most effective way to cure it.

6. If the participants experience pain that may not be associated with muscle stretching, they should discontinue the exercise;

this pain may be caused by the participants improperly performing the exercise or skill.

7. Be aware of signs of overexertion by the participants such as severe breathlessness, dizziness, tightness or chest pain, loss of muscle control or nausea; they should immediately cease the activity.

8. The instructor should be trained in CPR; a telephone should be available and the emergency number known.

9. Unless the exercise specifically states to do so, the participants should not hold their breath, but breathe normally.

10. Emphasize the proper technique and as full a range of motion as possible.

11. Every exercise period should begin with warm-ups, and gradually progress into more vigorous exercising, ending with a cooling down period.

12. The exercise period should be enjoyable. Music may be added for variety.

13. Plan a definite time for the exercise-activity sessions that is suitable for all.

14. Allow and encourage the participants to communicate with you as to how they feel during the exercise-activity session.

15. If more aerobic activity is desired than is attained from the exercising, add more jogging-running in the pool. Begin in the shallow water and progress to the deep water. Have the participants use their arms more as they enter into deeper water. A more difficult exercise providing an increase in aerobic benefit has the participants sliding through the water from side to side.

Evaluation. Evaluation is a method by which the participant's progress is measured. The participants will have certain expectations as to what accomplishments and goals they want to attain. Depending on the purpose of the program, evaluation procedures will vary from individual to individual or class to class. An important evaluative goal for the older adult is positive reinforcement.

Through individual observation, the instructor may evaluate each participant. Likewise, the participants may evaluate themselves and their progress, or the instructor and participant may interact with each other to discuss their observations and evaluations.

In the water exercise area it is suggested that the goal for the participants is a minimum of five repetitions of each exercise and a maximum of 20. As the older participant continues the exercise program, the number of exercises performed should increase.

The Beginning Swimming Skills are divided into five levels of accomplishment, with Level I being the least difficult and progressively becoming more difficult through Level V. As the participant accomplishes the skills in each level, he or she progresses to the next level. When Level V is reached, the participant should strive to perform the various strokes by gradually increasing the distance achieved. Beyond Level V it is advised that the older adult swimmer work on continuous rhythmic swimming, alternating the strokes. Continuous rhythmic swimming will improve the cardiovascular system.

#### Glossary of Terms

Breath Holding - The swimmer inhales, submerges the face, and maintains this position for several seconds.

Bobbing - Bending at the knees, the swimmer lowers himself or herself until the water is above the head; they then exhale through the nose or mouth; they recover to a full standing position to inhale and repeat the procedure.

Rhythmic Breathing - Breathing in a series or in a specific rhythm; inhaling through the mouth as the face is turned to the side and exhaling underwater after the face is turned downward.

Jellyfish Float - From a standing position in about chest-deep water, the swimmer bends forward and places the hands on the thighs; they then take a breath and bend forward further so that the face is submerged and the hands are slid down to the ankles.

Prone Float - Lying extended in a prone position and supported by having the hands on the bottom, the swimmer takes a breath, places the face in the water, and slowly lifts the hands from the bottom and extends the arms in front of the head. The prone float may also be taught by having the swimmer stand in chest-deep water, and gently push from the bottom or the side of the pool into a prone float position; recovery is accomplished by drawing the knees under the body, pushing down with the arms, and, when the body has shifted from the horizontal to the vertical, straightening the legs, lifting the head, and coming to a standing position.

Back Float - This skill should first be attempted with either the instructor or a partner assisting; standing in chest-deep water, the helpers place their hands lightly under the swimmer's shoulder blades; the swimmer should submerge until the shoulders go just below the surface; they then gently lie back in the water until the ears are

submerged, arms are extended and relaxed along the sides, and the feet are extended.

Prone Glide - For an individual who has mastered the prone float position, initial propulsion consists of adding a push by the feet from the bottom or the side of the pool; a glide along the surface follows as the swimmer holds their breath, keeping the face in the water.

Prone Glide With Kick - The kick glide is done by starting with the prone glide and adding the kick as soon as the gliding momentum is underway; the kick used is the flutter kick.

Back Glide - The swimmers start this skill as if they were starting a back float; in chest-deep water, the swimmer submerges until the shoulders are in the water and then gently lies back, with the chin tucked in slightly and arms extended and relaxed along the sides; they then give an easy push against the bottom which should give enough momentum to enable the body to glide a few feet along the surface of the water.

Back Glide With Kick - Starting with the back glide, the kick is initiated as soon as the body reaches the stretched-out glide position and while there is still momentum from the push; the kick is the same as in the back crawl.

Sculling - A method of using the hands and arms in paired movements to propel or support a swimmer in the water in a prone, supine, or vertical position; the palms exert equal and constant pressure against the water during their continuous movements away from the long axis midline of the body and back to the midline; the continuous pressing actions of the hands provide constant positive

force against the water; when sculling, the hands are flat (not cupped), the fingers are together, and the thumbs are alongside the forefingers; the hands remain underwater during all movements. Two basic hand positions are used in all sculling: during the press away from the midline of the body, the thumb sides of the hands (trailing edges) are slightly lower than the little finger sides of the hands (leading edges). During the inward pressing actions, the thumb sides of the hands (leading edges) are slightly higher than the little finger sides of the hands (trailing edges). The forces created by the sculling actions of the hands must be a direction opposite to the desired path of movement of the body; to keep the body in a stationary horizontal or vertical position, the hands are kept parallel (flat) to the surface of the water (flat scull). With the body in the supine position and the arms extended along the sides of the body, the body is moved in the direction of the head by elevating (extending) the hands about 45 degrees at the wrists (standard scull). A body in the supine position is moved toward the feet by lowering the arms slightly, flexing the wrists, and lowering the hands about 90 degrees (reverse scull).

Supine Position - To maintain the body in a horizontal, stationary position, the hands rotate slightly to place the thumbs down and the hands press outward 12 to 15 inches; the hands then rotate to place the little fingers slightly lower than the thumbs and the hands press back to the hips. The outward and inward movements are continuous and provide a lifting effect for the body, since most of the forces from the actions of the hands are directed downward (flat scull).

Prone Position - Moving the body in the direction of the head is accomplished by extending the arms along the sides of the body and angling the hands downward about 90 degrees; the thumb sides of the hands (trailing edges) point toward the feet slightly during the outward scull, and the little finger sides of the hands (trailing edges) point toward the feet slightly during the inward scull; water is forced sideways and toward the feet during these actions (canoe scull).

Vertical Position - Sculling in the vertical position is used when treading water and for recreational purposes; with the body in an upright position, the arms are bent slightly and extended in front of the chest; the flat scull is used to help support the body in the desired position.

Leveling Off Form a Vertical Position - From a vertical position, the swimmer brings the legs upward toward the surface and at the same time gently lies back on the water into a level position.

Crawl Stroke - Standing position:

a. Arm action - The hand enters the water approximately in front of the shoulder and is angled downward; the hand pulls and presses backward near the centerline of the body to about the thigh--without pause, the arm is lifted with the shoulder, letting the elbow bend, and the hand stays behind the elbow; the shoulder carries most of the action as the arm recovers over the water and with the hand below and outside of the elbow; the hand then enters first, about in front of the shoulder and, after being extended forward and downward, is ready to start the full cycle again.

b. Breathing - The swimmer leans forward and places the side of the face in the water so that the ear is submerged; he or she then inhales quickly through the mouth, rotates the head to the face down position, and exhales; the breathing should be continuous and rhythmical.

Turning Over - To turn from the crawl stroke onto the back, the swimmer stops stroking and turns the head away from the forward extended arm; a breath is taken as soon as the mouth clears the surface of the water; the head continues to turn followed by the body and the other arm turning in the same direction; at the completion of the turnover, the arms are either alongside of or extended outward from the sides of the body; the head is back with the ears in the water and the hips are near the surface; during the turnover, the arms are kept under the surface.

Changing Director - While swimming the beginner stroke or the crawl stroke, the swimmer reaches in the direction they want to go with the forward arm and turns the head in the same direction; repeated stroking enables them to make a simple, wide turn.

Treading Water - A skill designed to support the body in an upright position in deep water with the head kept out of the water; treading water is accomplished by using one of several kicks combined with a sculling motion of the hands; the four kicks generally used are modifications of the scissors or breaststroke kicks. All of the kicks are shortened. The most commonly used kick is the single scissors; this kick, employed when performing the sidestroke, is modified for treading water so that it is slightly wider and finishes the downward thrust without the legs straightening and coming together. The double



scissors kick is an alternating scissors action using the same movements as the single scissors kick; this action can be compared to pedaling a bicycle. There are two ways of utilizing a breaststroke kick while treading water; the first method is as described in the elementary back crawl; the leg action becomes little more than a continuous outward and downward rotation of the lower legs. An alternate breaststroke leg action called a "rotary" or "egg beater" kick. This is essentially a continuous, rhythmical, alternating action of the legs.

Survival Floating - The primary objective of survival floating is to allow an individual to remain afloat in deep water with minimum effort. There are five steps:

1. Resting position - The swimmer starts with the lungs filled with air and holds his or her breath, letting the arms and legs dangle; the face is in the water with a part of the head at the surface; the swimmer rests and floats in a nearly vertical position for a few seconds; the breath should not be held to the point that the swimmer becomes uncomfortable.

2. Preparing to exhale - While maintaining this body and head position, the swimmer slowly and leisurely recovers or lifts the arms in front of the shoulders to about shoulder height; if leg action is also to be used, the legs slowly separate into position for a modified scissors kick.

3. Exhalation - The exhalation begins as the chin is being lifted toward the surface and ends when the mouth clears the water; the exhalation may be through the mouth or the nose; the eyes should

be opened to help gauge and judge the level of the chin in relation to the surface of the water.

4. Inhalation - As soon as the head is vertical and the mouth is clear of the water, the swimmer slowly sweeps the hands away from each other and brings the legs together, the easy pressing actions of the arms and the legs keeps the chin at the surface and allows time for ample air to be breathed in through the mouth; these actions should not be vigorous enough to lift the chin out of the water.

5. Return to the resting position - The swimmer allows the arms and the legs to move back slowly to their free dangling positions, with the face down in the water and the body nearly vertical, and then relaxes; the swimmer rests in this position until ready to exhale and then repeats the cycle.

Jump Into Deep Water - During the entry, the body should be straight and nearly vertical, with the eyes closed to prevent possible injury to them; the arms may be along the sides of the body or extended over the head; when the downward momentum has stopped, the swimmer leans forward, opens the eyes, and then levels off and swims to safety using the crawl stroke or any other comfortable stroke.

Changing Positions - In a prone position the swimmer changes to a supine position; reverse the positions and alternate other positions.

Supine Float With a Partner - With the aid of a partner, the swimmer performs a supine float.

Supine Kick With a Partner - Same as the supine float with a partner, except the swimmer adds a flutter kick.

Prone Float With a Partner - The swimmer is in a prone, horizontal position and performs a prone float with a partner assisting.

Prone Kick With a Partner - Same as above except a flutter kick is added.

Prone Kick With a Kickboard - The swimmer grasps a kickboard with each hand and extends the arms out in front; they then perform a flutter kick.

Supine Kick With a Kickboard - The swimmer is in a supine position with the kickboard grasped in each hand and the arms extended behind the head; then a flutter kick is performed.

Beginner Stroke -

**Body Position:** The body is in the prone position, almost horizontal to the surface of the water. The body is straight, the head is aligned with the body, and the hips and legs are just below the surface of the water.

**Arm Action:** All movements of the arms are performed underwater and in opposition to each other. As one arm is recovering, the other arm is pulling. The swimmer is constantly sliding forward on one extended arm while the other arm is pulling and pressing backward. The arm action begins with one arm extended forward of the corresponding shoulder and the other arm extended backward along the side of the body. As the forward hand starts to pull, the opposite hand begins to recover. The palm of the hand and the forearm press backward along the midline of the body to about the thigh. During this action, the arm is bent and the elbow is kept higher than the hand but is lower than the shoulder. The opposite arm recovers by lifting the elbow slightly as the hand is drawn forward along the side of the body. As the hand nears the armpit, the elbow drops slightly, and the fingers lead the arm to a fully extended position forward of its shoulder.

After reaching full extension, the hand then starts its pulling action as the opposite arm starts to recover.

**Leg Action:** The leg action is called a flutter kick, which is an alternating up and down movement of the legs. The legs are kept nearly straight and the ankles and feet are relaxed and flexible. The kick originates from the hips and the legs and feet are kept under the surface at all times.

**Breathing:** Breathing may be performed in more than one way. Ideally, rhythmic breathing occurs on one side of the body. A detailed description is discussed under the crawl. Because of the difficulty in mastering rhythmic breathing, it is acceptable for the beginning swimmer to lift the mouth just clear of the water as the forward extended arm begins to pull. As soon as a breath is taken, the face is placed back into the water and exhalation occurs. A disadvantage of this method of breathing is that lifting the head causes the hips and legs to drop, and this affects good body position.

#### American Crawl -

**Body Position:** A prone horizontal position with the water at hairline level.

**Arm Action:** At the entry, the fingers lead as the hand enters the water in front of the shoulder; the elbow bends out of the water, and the arm is angled forward and downward. The palm is turned backward near the centerline of the body as the elbow bends. The arm pull continues until the hand is just above hip level. The recovery takes place above the water and the amount of elbow bend will vary.

**Leg Action:** The leg action is a flutter kick which is an alternating up and down action of the legs with the kick originating from

the hip. The knee and the ankle remain relaxed. The kick should be steady to prevent fatigue.

**Breathing:** Breathing, coordinated with the arms, occurs with the swimmer turning the head to the desired side to inhale through the mouth. It should occur as the arm on the breathing side is starting the last half of the press backward and the opposite arm has just entered the water and is starting to extend downward. After the inhalation through the mouth, exhalation is done in the starting position and should be through the nose and mouth slowly. Breathing should be rhythmical and continuous.

Back Crawl -

**Body Position:** Supine position, with the water at about ear level. The hips should be just below the surface and the legs fully extended.

**Arm Action:** The hand enters the water, little finger leading, in line with the shoulder, arm straight. The swimmer rolls slightly on the long axis of the body with the hand pressing to make the catch. The arms then sweep outward and backward until about the shoulder level. At this point, flexion begins in the elbow, and the hand pushes and then rotates so that the palm finally pushes downward at full extension; this will lift the shoulder nearer the surface and will facilitate arm recovery. The recovery is made by this lifting of the shoulders, allowing the arm to follow almost perpendicular to the surface and back to the point of entry. **Leg Action:** The leg action is an inverted flutter kick that comes from the hips. The knee and ankles are relaxed. On the upward kick, there is greater flexion at the knee.

Elementary Back Crawl -

Body Position: Supine position and the swimmer is submerged except for the head. The head is submerged to about the level of the ears. The back is almost flat, with the legs and hips slanted down slightly lower than the head and shoulders. All arm and leg action is performed beneath the surface of the water. The arms are fully extended at the side, palms touching the thigh, and the legs fully extended.

Arm Action: In the glide or resting position, the hands are drawn slowly along the sides by flexing the elbows, and the hands and elbows remain close to the body throughout this movement in order to reduce resistance. When the hands reach a position at the armpits, they are fully extended, still below the surface, to a point slightly above shoulder level. At this extended position the palms are facing backward, and the arms are ready for the start of the propulsive phase. The palms and inside of the arms then press simultaneously back toward the feet in a broad, sweeping movement until the hands return to the extended position at the thighs. The arms are now in the glide position of the stroke.

Leg Action: In the starting or gliding position, the legs are together, fully extended. The recovery is begun by flexing the knees and ankles so that the heels drop down and move back toward the hips. The feet are then rotated so that the toes are pointing to the side. During this action, the knees are slightly spread and the feet are rotated to a position outside the knees. At this point, the feet are spread wider than the knees. The recovery action should be made slowly. The thrust is made by pressing backward and upward as the

inside of the lower leg and foot is pressing back against the water. The legs finish the full extension until the feet are back into the glide position. The entire leg action is performed in one continuous and flowing movement that ends with the legs coming together in the extended position.

Sidestroke -

**Body Position:** The body lies in a side horizontal position with the back flat. The legs are fully extended, toes pointed, trailing, and together. The head is cradled against the water, aligned with the body and rotated just enough so that the nose and mouth are clear of the water. In the glide position, the lower arm is fully extended below the surface and beyond the head. The upper arm is extended along the side, with the hand at the thigh.

**Arm Action:** During the glide the lower arm is extended palm downward, and the swimmer is riding on this extended arm. To start the positive action, the elbow is flexed so that the palm and inside of the arm start pressing backward almost directly toward the feet. As the arm and hand have pressed back to a point just past the shoulder, the palm continues to press back, with the elbow staying fairly close to the body. In a smooth, easy, and continuous motion the arm is kept close to the body, with the hand, palm down, leading the elbow and arm to the original extended position. The upper arm is recovered from its extended position at the thigh by drawing the hand to a point approximately in front of the shoulder. In the recovery, the arm is kept close to the body to keep resistance to a minimum. The wrist is slightly flexed in a position that allows the hand to then press

almost directly backward and downward as the elbows extend, bringing the arm to the position at the thigh.

**Leg Action:** The action described is called a scissors kick. From the extended position, with both legs together and in line with the body, the recovery is started by flexing the hips, knees, and ankles, keeping the heels in line with the back. The legs are then separated in a flexed position, with the top leg extending laterally forward with the ankle hooked and the lower leg moving to a position about three-quarters extended to the rear. Without stopping, both legs start the positive action by pressing backward and then inward to the centerline. The calf of the top leg presses backward and then finishes as the ankle extends to the centerline. The lower leg straightens at the knee as the instep presses vigorously backward and inward. Both legs start the positive action at the same time, with the legs ending together and fully extended for the glide position.

**Trudgen** - The trudgen is an adaptation of the crawl stroke. The arm action and breathing are the same as in the crawl. To execute the trudgen stroke, the swimmer performs a shorter scissors kick as he or she rolls to breathe and press backward with the propelling arm. A swimmer who rotates his or her head to the left would time the positive action of the kick as the right arm is recovered forward. Following this leg action, the legs would then trail for the remainder of the stroke cycle.

**Breaststroke** -

**Body Position:** The body should be in a prone horizontal position with the back flat. The arms are extended in front of the head with the hands together and palms downward. The legs are extended, with



the hips and feet just below the surface. The head is positioned so that the water level is about at the hairline.

**Arm Action:** From the starting position, the action begins by pressing the palms diagonally downward to just outside the shoulders. With the elbows high, the arms press almost directly backward in a continuous movement, with the palms not going beyond the elbows. During this action, the palms and inside of the arms press back toward the feet. During the final part of the arm action, the hands are brought fairly close together in a rounded motion and lead the elbows in the recovery to the extended position, palms down and slanting downward.

**Leg Action:** The legs are together and fully extended in line with the trunk and just below the surface. The recovery begins by drawing the heels, which are slightly apart, toward the trunk and just below the surface. When the heels have been drawn to a point almost over the knees, the feet are rotated so that the ankles are hooked and toes are pointing to the side. During this action, the knees will spread slightly and the feet are rotated to a position outside the knees. The hips, knees, and ankles are then extended, without pause, which bring the feet a little outward and backward through an arc. In this backward action, the sole, instep, and inside of the calf will be pressing almost directly backward against the water, and the resulting pressure against the water provides the major propelling force. The kick is completed with the extension of the ankles into a streamlined position.

**Coordination:** The arms begin the action, and the legs begin to recover as the arms are pressing through the final part of the positive

action. The legs kick as the arms are recovered to their extended position. A moderate glide follows but should not be prolonged to a point where forward momentum is lost.

Inverted Breaststroke - The starting and gliding position is a supine horizontal position, with a flat back. Arms are fully extended in front of the head, with the hands together and palms up and slightly under the surface. The legs are also extended with the hips and feet just below the surface. The head is submerged to about the level of the ears, which allow for free breathing. From the extended position, the hands are pressed backward all the way to the side for the positive action. The recovery should be gentle and underwater to maintain body balance and position. The hands are drawn along the sides to a position below the armpits, at which point the fingers lead, palms turned up, and the hands are slid behind the ears to the fully extended gliding position. The leg action is the same as in the elementary back crawl. The coordination follows a press (arm action), kick (leg action), and glide. The arms will be pressed back almost to the sides before the legs start to recover. The positive leg action is executed as the arms are being extended behind the head. A moderate glide follows.

## CHAPTER IV

### CONCLUSIONS AND RECOMMENDATIONS

#### Conclusions

The purpose of this study was to design a beginning swimming curriculum guide for the older adult with land exercises and water exercises included.

As more Americans are living longer, the number of older adults is rapidly increasing. The elderly want to continue to be involved in the various aspects of life. As society is becoming more aware of this, additional opportunities are being provided.

As the benefits and importance of exercise and physical fitness become more acknowledged and supported, older adults are electing to participate in a variety of physical activities. Many older people have arthritis, bursitis, and cardiovascular diseases; as well as the typical conditions that accompany the aging person, and swimming is extremely helpful. This curriculum guide was uniquely designed to benefit these types of conditions.

Swimming has been supported in the literature by Katz (1981), Buxhaum and Micheli (1979), Collis and Kirchhoff (1974), and others as one of the most beneficial of all activities and considered by many to be the best activity for older individuals. The rhythmic motion of the water and its therapeutic benefits are especially helpful. Every

major muscle group in the body is involved in swimming, and the injuries sustained from the water are practically non-existent.

The curriculum guide can be helpful for all older adults who are participants in swimming. Older adults who are residents of senior citizen homes, nursing homes, or retirement villages can benefit from this curriculum. Young Men's Christian Associations, Young Women's Christian Associations, colleges and universities, fitness centers, senior citizen centers, and hospitals are among the various organizations that may have a need for this type of curriculum guide.

In utilizing this swimming guide, it is extremely important that each participant receive as much individual instruction as possible. It is hoped that each person attain as many of the objectives as possible.

The purpose of the land exercises is to warm-up properly. Many injuries occur as a result of a lack of proper warm-up. The participant may become fatigued after performing only a few of the land exercises, especially if it has been a long period of time since they have been active. If that is the case, a slower pace may be preferred. Participants with a reduced range of motion may find some of the land exercises to be more difficult to perform. If this occurs, they should perform the exercise to the best of their ability.

The water exercise section contains many different types of exercises. A rather long period of time will be required if all the water exercises are performed. If the class is organized to include land and water exercises, as well as swimming skills, the number of water exercises may be reduced and a few from each position be selected.

If the class participants have any impairments, such as reduced range of motion, arthritis, bursitis, or other conditions, modifications of the exercises may need to occur. The participant should perform the exercises to the best of their ability. The buoyancy of the water makes movement much easier.

The swimming skill section consists of many various types of skills. If the class is conducted for primarily recreation, this content may be too instructional. A progressive sequential development was an objective.

The various skills were sequenced by the degree of difficulty in order that the accomplishment of one skill can make the execution of another skill easier. Most of the swimming skills can be performed by the participant even though they may be impaired. Modifications may need to be taught but nevertheless, the skill should be experienced by the participant to some degree.

The swimming skills are focused primarily toward the attainment of cardiovascular fitness, but flexibility, muscle tone, coordination, and strength are also included. There may be some participants, due to their physical condition, who are unable to achieve proficiency in the various strokes and/or distance swimming. If that is the case, the other objectives stated may be their goal to attain.

A very important goal is for the participant to experience success, which in turn may increase enjoyment of the activity and help him or her reinforce interest. Participating in an activity with others can lead to increased social interaction and enjoyment.

Evaluation can be most valuable to determine the value of the program and to determine if the objectives have been met; however,

this should not be the emphasis. This curriculum is designed to utilize both formal or informal evaluation. Some participants will self-evaluate as they experience and perform each skill. There may be some individuals who will prefer that the instructor assist in evaluating their progress and performance. Some instructors may choose to give a pre and posttest to the participants. In that method, both the instructor and the participant can know the skill level of each participant and work from that point. Regardless of the type of evaluation, the participant should benefit. Even in recreational swimming, there should be a certain degree of informal evaluation.

#### Recommendations

It is suggested that some method of comparing this curriculum guide to other existing programs be conducted. This comparison may be a useful means of evaluating the content, which in turn could result in more appropriate modifications and additions.

Another recommendation is that a specific group of participants be taken through the content of the curriculum guide. Their performance and progress would then be evaluated. This evaluation may lead to other modifications. An example of such a group would be arthritic participants or individuals with cardiovascular disease.

An additional recommendation would be to send the curriculum guide to aquatic experts around the country and implement their comments and suggestions. This input should aid in the usefulness of the guide.

Another recommendation would be to develop an intermediate and advance swimming curriculum guide for the older adult, or to add such material to this guide.

## BIBLIOGRAPHY

- Adams, G. M., and deVries, H. A. Physiological effects of an exercise training regimen upon women aged 52 to 79. Journal of Gerontology, 1973, 28(1), 50-55.
- Aiken, L. Later Life. Philadelphia: W. B. Saunders Co., 1978.
- Aloia, J. F. Exercise and skeletal health. Journal of the American Geriatrics Society, 1981, 19, 104-196.
- American National Red Cross. Adapted Aquatics. Garden City, New York: Doubleday and Co., Inc., 1977.
- American National Red Cross. Swimming and Water Safety. Washington, D.C., 1968.
- The Arthritis Foundation. Arthritis: the Basic Facts. Atlanta: Arthritis Foundation, 1976.
- Barry, A. J. et al. The effects of physical conditioning on older individuals. I. Work capacity, circulatory-respiratory function, and work electrocardiogram. Journal of Gerontology, 1966, 21, 182-190.
- Berlin, P. The learning of swimming by senior citizens. (A research project co-sponsored by the United Automobile, Aircraft, and Agricultural Implement Workers of America Recreation Department and Wayne State University, Division of Health and Physical Education, and the Department of Parks and Recreation of the City of Detroit.) Conducted between February and July of 1960 at the East Side Retired Workers' Center in Detroit, Michigan, 1960.
- Birren, J., and Renner, V. Concepts and Issues of Mental Health and Aging. In J. E. Birren and R. B. Sloane (Eds.), Handbook of Mental Health and Aging. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1980, 3-33.
- Blacker, M. M. and Wekstein (Eds.). Your Health After 60. New York: E. P. Dutton, 1979.
- Bortz, W. M. Effect of exercise on aging--effect of aging on exercise. Journal of the American Geriatrics Society, 1980, 28, 49-51.
- Briggs, G. M. and Calloway, D. H. Bogert's Nutrition and Physical Fitness (10th ed.). Philadelphia: J. B. Saunders, 1979.

- Burton, E. C. Relationship between trait and state anxiety, movement satisfaction, and participation in physical education activities. Research Quarterly for Exercise and Sport, 1976, 47, 326-331
- Butler, R., and Lewis, M. Aging and Mental Health (2nd ed.). St. Louis: C. V. Mosby, 1977.
- Butler, R., and Lewis, M. Aging and Mental Health (3rd ed.). St. Louis: C. V. Mosby, 1982.
- Buxhaum, R., and Micheli, L. J. Sports for Life. Boston: Beacon Press, 1979.
- Clarke, H. (Ed.) Exercise and aging. Physical Fitness Research Digest, Series 7, President's Council on Physical Fitness and Sports, Washington, D.C., April, 1977 2, 1-27.
- Clarkson, P. M., and Kroll, W. Practice effects on fractionated response time related to age and activity level. Journal of Motor Behavior, 1978, 10, 275-286.
- Cohn, S. H. et al. Effect of aging on bone mass in adult women. American Journal of Physiology, 1976, 230(1), 143-148.
- Collis, M. and Kirchhoff, B. Swimming. Boston: Allyn and Bacon, Inc., 1974.
- Conrad, C. C. When you're young at heart. Aging, 1976, 258, 11-13.
- Cooper, K. The New Aerobics. New York: Bantam Books, 1970.
- Cooper, K. Aerobics. New York: Evans, 1978.
- Counsilman, J. E. The Complete Book of Swimming. New York: Athenaeum, 1977.
- Cummings, E., and Henry, W. E. Growing Old: the Process of Disengagement. New York: Basic Books, Inc., 1961.
- Cureton, T. K. Improvement of psychological states by means of exercise fitness programs. Journal of Association for Physical and Mental Rehabilitation, 1963, 17(1), 14.
- deVries, H. A. Physiological effects of an exercise training regimen upon men aged 52-88. Journal of Gerontology, 1970, 25, 325-336.
- deVries, H. A. Physiology of Exercise and Aging. In D. Woodruff and J. E. Birren (Eds.), Aging: Scientific Perspectives and Social Issues. New York: D. Van Nostrand Co., 1975, 257-276.
- deVries, H. A. Research review: fitness after fifty. Journal of Physical Education, Recreation and Dance, 1976, 47, 47-49.



- deVries, H. A., and Adams, G. M. Electromyographic comparison of single doses of exercise and meprobamate as to effects on muscular relaxation. American Journal of Physical Medicine, 1972, 51(3), 130-141.
- Driscoll, R. Anxiety reduction using physical exertion and positive images. Psychological Record, 1976, 26, 87-94.
- Field, D. A. Opportunities for senior athletes. Journal of Physical Education, Recreation and Dance, 1982, 53(6), 81-83.
- Folkins, C. H. et al. Psychological fitness as a function of physical fitness. Archives of Physical Medicine and Rehabilitation, 1972, 43, 503-508.
- Fontana, A. The Last Frontier. Beverly Hills, California: Sage Publications, 1977.
- Frankel, L. J., and Richard, B. B. Be Alive as Long as You Live: Mobility Exercises for the Older Person. Charleston, West Virginia: Preventive Publications, 1976.
- Getchell, B. Physical Fitness a Way of Life (2nd ed.). New York: John Wiley, 1979.
- Goodstein, R. K. Inextricable interaction: social, psychologic, and biologic stresses facing the elderly. American Journal of Orthopsychiatry, 1981, 51(2), 219-229.
- Hamilton, R. They can swim circles around you. 50 Plus, 1979, 19, 30-33.
- Harris, D., and Cole, W. E. Sociology of Aging. Boston: Houghton Mifflin Co., 1980.
- Hartley, L. H. et al. Physical training in sedentary middle-aged and older men: III cardiac output and gas exchange at submaximal and maximal exercise. Scandinavian Journal of Clinical and Lab Investigation, 1969, 24, 335-344.
- Hattlestad, N. W. Improving the physical fitness of senior adults: a statewide approach. Journal of Physical Education, Recreation and Dance, 1979, 50(7), 29-31.
- Havighurst, R. J. Successful aging. In R. H. William, C. Tibbitts, and W. Donahue (Eds.), Processes of Aging. New York: Atherton Press, 1973.
- Heckathorn, J. Strokes and Strokes. Reston, Virginia: American Alliance for Health, Physical Education, Recreation and Dance, 1980.
- Heitmann, H. M. Older adult physical education: research implications for instruction. Quest, 1982, 34, 34-42.

- Higdon, H. Fitness After Forty. Mountain View, California: World Publications, 1977.
- Hoffberger, K. S. Activities for over sixty. Journal of Physical Education, Recreation and Dance, 1980, 51(1), 26-27.
- Holmes, H. Z. Effects of training on chronic health complaints of middle-aged men. (Unpub. doctoral dissertation, University of Illinois, 1968.)
- Hopp, R. H. Enjoying the Active Life After Fifty. Brattleboro, Vermont: Stephen Greene Press, 1974.
- Hrachovec, J. Keeping Young and Living Longer. Los Angeles: Sherbourne Press, 1973.
- Iskrant, A. P. and Smith, R. W. Osteoporosis in women 45 years and over related to subsequent fractures. Public Health Report, 1969, 84, 33.
- Jette, M. A study of long-term physical activity in sedentary middle-aged men. (Unpub. doctoral dissertation, University of Illinois, 1969.) Dissertation Abstracts International, 1969, 30, 283A, University Microfilm No. 70-00, 889.
- Jones, D. San Francisco's swimming demons. Modern Maturity, 1977, 20(2), 52.
- Kamm, A. Senior Olympics. Journal of Physical Education, Recreation and Dance, 1979, 50(7), 32-33.
- Katz, J. The effectiveness of the modified progressive swimming (m.p.s.) program for teaching older adults fundamental swimming skills. (Unpub. doctoral dissertation, Columbia University, 1978). University Microfilms International, 1978, 7924363.
- Katz, J. Swimming for Total Fitness. Garden City, New York: Doubleday and Co., Inc., 1981.
- Keelor, R. Physical fitness and health: highlights of the senate subcommittee on aging hearing. Aging, 1976, 258, 6-11.
- Kraus, H. Backache, Stress and Tension: Their Cause, Prevention, and Treatment. New York: Simon and Schuster, 1965.
- Kraus, H., and Raab, W. Hypokinetic Disease. Springfield: C. C. Thomas, 1961.
- Kraus, R. Therapeutic Recreation Service Principles and Practices (2nd ed.). Philadelphia: J. B. Saunders, 1978.
- Kroll, W. Quality of simple reaction time and the psychological refractory period. Research Quarterly for Exercise and Sport, 1969, 40, 105-114.

- Lawrence, R. M. The elixir of youth. Running and Fitness, 1982, 14(5), 105-114.
- Leach, R. E. Rx exercise: effects and side effects. Hospital Practice, 1981, 16, 72a-72w.
- Lederer, W. Senior adults get physically fit. Parks and Recreation, 1978, 40-42.
- Leviton, D., and Santoro, L. C. (Eds.) Health, Physical Education, Recreation and Dance for the Older Adult: A Modular Approach. Reston, Virginia: American Alliance for Health, Physical Education, Recreation and Dance, 1980.
- Linder, E. C., Harpas, L., and Samberg, S. Therapeutic Dance/Movement Expressive Activities for Older Adults. New York: Human Sciences Press, 1979.
- Lindsey, R., Jones, B., and Whitley, A. Body Mechanics. Dubuque, Iowa: William C. Brown Co. Publishers, 1979.
- Mack, P. B. et al. Bone demineralization of foot and hand of Gemini-Titan IV, V and VII astronauts during orbital flights. American Journal of Rentgenology, 1967, 100(3), 503-511.
- Mayer, J. Overweight: Causes, Costs, and Control. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1968.
- Montgomery, D. L. Physical activity as preventative medicine. McGill Journal of Education, 1976, 11, 89-90.
- Moran, J. M. Leisure Activities for the Mature Adult. Minneapolis: Burgess Publishing Co., 1979.
- Morgan, W. P. Influence of acute physical activity on state anxiety. Proceedings of the National College of Physical Education Association, 1973, 76, 113-120.
- Morgan, W. P., and Hammer, W. M. Influence of competitive wrestling upon state anxiety. Medicine and Science in Sports, 1974, 6, 58-61.
- Morgan, W. P., and Pollock, M. L. Physical activity and cardiovascular health: psychological aspects. Ergopsychology Laboratory Report, 1976, 26, 1-15.
- Morgan, W. P., Roberts, J. A., Brand, F. R., and Feinerman, A. D. Psychological effects of chronic physical activity. Medicine and Science in Sports, 1970, 2, 213-217.
- Morgan, W. P., Roberts, J. A., and Feinerman, A. D. Psychological effect of acute physical activity. Archives of Physical Medicine and Rehabilitation, 1971, 52, 422-425.

- Munns, K. Effects of Exercise on the Range of Joint Motion in Elderly Subjects. In E. L. Smith and R. C. Serfass (Eds.), Exercise and Aging: the Scientific Basis. Hillside, New Jersey: Enslow Publishers, 1981.
- Neuhaus, R. H., and Neuhaus, R. H. Successful Aging. New York: John Wiley and Sons, 1982.
- Pitts, F. N. Biochemical factors in anxiety neurosis. Behavioral Sciences, 1971, 16, 82-91.
- Pitts, F. N. The biochemistry of anxiety. Scientific American, 1969, 220, 69-75.
- Pitts, F. N. and McClure, J. N. Lactate metabolism in anxiety neurosis. New England Journal of Medicine, 1967, 277, 1329-1336.
- Pollock, M., Wilmore, J., and Fox, M. III. Health and Fitness Through Physical Activity. New York: John Wiley and Sons, 1978.
- Popejoy, D. I. The effects of physical fitness program on selected psychological and physiological measures of anxiety. (Unpub. doctoral dissertation, University of Illinois at Urbana-Champaign, 1967.) Dissertation Abstracts International, 1967, 28, 4900-A, University Microfilm No. 68-08, 196.
- President's Council on Physical Fitness and Sports. Aquadynamics. U.S. Government Printing Office, Washington, D.C., 1977.
- President's Council on Physical Fitness and Sports. Exercise and aging. Physical Fitness Research Digest, 1977, 7(2), 1-22.
- President's Council on Physical Fitness and Sports. The Fitness Challenge . . . in the Later Years. Washington, D.C.: Administration on Aging, 1973.
- President's Council on Physical Fitness and Sports. National Fitness Research Digest (Series 3), 1977, 7(2), 1-22.
- Reiter, M. His swim program can help you. 50 Plus, 1980, 20(4), 23-26.
- Rosenberg, M. Sixty-Plus and Fit Again. Exercises for Older Men and Women. New York: M. Evans and Co., Inc., 1977.
- Santoro, L. Let me light your bunsen burner. Paper presented at the Second Workshop on Aging at the AAHPERD Convention, New Orleans, Louisiana, March, 1979.
- Schaie, K. W., and Geiwitz, J. Adult Development and Aging. Boston: Little, Brown and Co., 1982.

- Shephard, R. J., and Sidney, K. H. Effects of physical exercise on plasma growth hormone and cortisol levels in human subjects. In J. H. Wilmore and J. F. Keogh (Eds.), Exercise and Sports Science Review, vol. 3. New York: Academic Press, 1975, 1-30.
- Sigersteth, P. O. Flexibility. In H. J. Montoye (Ed.), An Introduction to Measurements in Physical Education. Indianapolis: Phi Epsilon Kappa Fraternity, 1970.
- Smith, E. L., and Reddan, W. Proceedings: physical activity--a modality for bone accretion in the aged. American Journal Roentgenology, 1976, 126(4), 1297.
- Spirduso, W. W. Physical fitness, aging, and psychomotor speed: a review. Journal of Gerontology, 1980, 35(6), 850-865.
- Stamford, B. A. Effects of chronic institutionalization on the physical working capacity and trainability of geriatric men. Journal of Gerontology, 1973, 28(1), 441-446.
- Stamford, B. A. Physiological effects of training upon institutionalized geriatric men. Journal of Gerontology, 1972, 27, 451-455.
- Stern, S. The new wave in swimming. The New York Times Magazine, June, 1980, 129, 84-93.
- Stewart, G. Everybody's Fitness Book: a Simple, Safe, and Sane Approach to Personal Fitness. Garden City, New York: Doubleday and Co., Inc., 1980.
- Torney, J. A., and Clayton, R. D. Teaching Aquatics. Minneapolis: Burgess Publishing Co., 1981.
- Tredway, V. A. Acute and Chronic Effects of Exercise Upon Women and Men, Aged 52 to 85. (Unpub. doctoral dissertation, University of Southern California, 1978.)
- Turner, J., and Helms, D. B. Contemporary Adulthood. New York: Holt, Rinehart and Winston, 1982.
- Wagenvoord, J. The Swim Book. New York: Bantam Books, 1980.
- Wantz, M. S., and Gay, J. E. The Aging Process: a Health Perspective. Cambridge, Massachusetts: Winthrop Publishers, Inc., 1981.
- Whedon, G. D., Dietrick, J. E., and Shorr, E. Modification of the effects of immobilization upon metabolic and physiological functions of normal men by the use of an oscillating bed. American Journal of Medicine, 1949, 6, 684-711.
- Wiswell, R. A. Relaxation, exercise, and aging. In J. Birren and R. Sloane (Eds.), Handbook of Mental Health and Aging. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1980, 943-958.

Yasgur, S. The senior olympics: games for adults who won't quit.  
Geriatrics, 1975, 1, 120-125.

2  
VITA

Kristin Lee Vermillion

Candidate for the Degree of

Doctor of Education

Thesis: A BEGINNING SWIMMING CURRICULUM GUIDE FOR THE OLDER ADULT

Major Field: Higher Education

Minor Field: Health, Physical Education, and Recreation

Biographical:

Personal Data: Born in Pawnee, Oklahoma, on July 2, 1946.  
Parents are Mr. and Mrs. Robert H. Harry of Oklahoma City,  
Oklahoma.

Education: Graduated from Northwest Classen High School in  
Oklahoma City, Oklahoma, in 1964; received a Bachelor of  
Science degree in Physical Education from Oklahoma State  
University, Stillwater, Oklahoma, in May, 1968; received a  
Master of Education degree in Physical Education from Cen-  
tral State University, Edmond, Oklahoma, in May, 1973; re-  
ceived a Master of Education degree in Counseling Psychology  
from Central State University, Edmond, Oklahoma, in May,  
1974; completed requirements for the Doctor of Education  
degree at Oklahoma State University in May, 1983.

Professional Experience: Student teacher at Hefner Junior High  
School, Oklahoma City, Oklahoma, during the spring semester,  
1968; high school physical education teacher in the Houston  
Independent School District from 1968-72; physical education  
teacher in the Oklahoma City Public School System from 1974-  
78; administrative assistant in the Oklahoma City Public  
School System from 1978-80; graduate teaching assistant at  
Oklahoma State University from August, 1980 to May, 1983;  
member of the American Alliance for Health, Physical Educa-  
tion, Recreation and Dance; member of the Association for  
the Study of Higher Education; member of the Oklahoma Asso-  
ciation of Health, Physical Education, Recreation and Dance;  
member of the Graduate Student Council at Oklahoma State  
University; member of the Curriculum Committee for the  
School of Health, Physical Education and Leisure Sciences at  
Oklahoma State University during the academic year, 1982-83.