

*THE EFFECT OF A SELF-CARE EDUCATION PROGRAM  
ON A MILITARY MEDICAL BENEFICIARY POPULATION*

THESIS

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Captain, USAF

AFIT/GCA/LAS/95S-10

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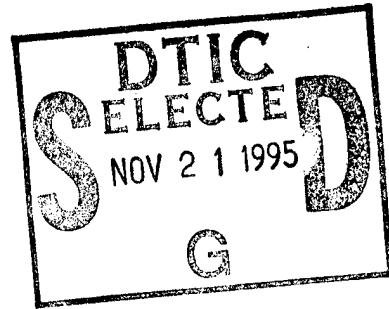
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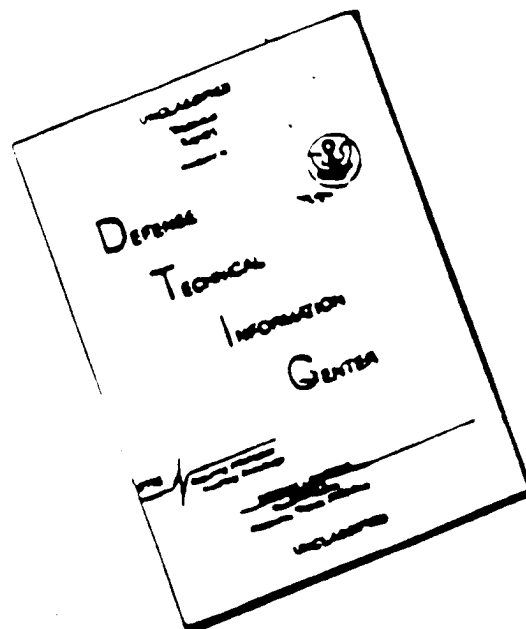
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Presented to the Faculty of the Graduate School of Logistics  
and Acquisition Management of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the  
Requirements for the Degree of  
Master of Science in Cost Analysis

Christopher S. Svehlak, B.A.  
Captain, USAF

September 1995

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## Table of Contents

	Page
Acknowledgments .....	ii
List of Figures .....	vii
List of Tables.....	viii
Abstract.....	ix
I. Introduction .....	1-1
Background.....	1-1
Costs .....	1-1
Theories.....	1-2
Definitions .....	1-3
Implications .....	1-4
Relevance to the Military Services.....	1-4
Relevance to the Air Force.....	1-5
Problem Statement .....	1-6
Investigative Questions.....	1-6
Scope and Approach .....	1-7
Overview .....	1-8
II. Literature Review .....	2-1
Chapter Overview .....	2-1
Why Self-Care? .....	2-1
Difficulty in Definitions .....	2-2
Growing Appeal.....	2-3
Demand for Medical Care.....	2-5
Volume.....	2-5
Resources .....	2-6
Attacking the Problem.....	2-6

	Page
Applicable Studies.....	2-8
Summary.....	2-17
<b>III. Methodology.....</b>	<b>3-1</b>
Chapter Overview.....	3-1
Background on Wright-Patterson Medical Center.....	3-1
Description of Self-Care Program.....	3-2
Experimental Design Description.....	3-3
Validity Concerns.....	3-3
Statistical Tests of Significance.....	3-6
Sampling Procedures.....	3-8
Training the Trainers.....	3-10
Training the Responders.....	3-10
Marking the Data.....	3-11
Self-Care Books.....	3-12
Sample Groups.....	3-12
Subset Delineations.....	3-15
Clinic Information.....	3-15
Visitation Data Collection.....	3-16
Data Analysis.....	3-17
Visits.....	3-17
Costs.....	3-18
Summary.....	3-20
<b>IV. Results &amp; Analysis.....</b>	<b>4-1</b>
Chapter Overview.....	4-1
Preparing the Visitation Data for Analysis.....	4-1
Descriptive Statistics.....	4-2
Mean Plots.....	4-2
Box and Whisker Plots.....	4-4
Examination of Variance.....	4-6

	Page
Variance and Normality Checks .....	4-7
Implications of Extreme Variance in One Group.....	4-9
Exploration Using Other Measurements .....	4-9
Kruskal-Wallis Test.....	4-9
Data Transformation .....	4-11
Summary.....	4-11
V. Conclusions .....	5-1
Chapter Overview .....	5-1
Investigative Questions Answered .....	5-1
Impact of Study Constraints .....	5-3
Length of Post-Test Period .....	5-3
Seasonal Influence on Visitation Rates .....	5-4
Potential for Self-Selection Bias .....	5-4
Visitation Rates for the Non-Responders.....	5-5
Possible Explanations for the Data Findings.....	5-5
Air Force Goal: Healthier People.....	5-6
Current Health Promotion Efforts .....	5-6
Incentives to Avoid Treatment .....	5-7
Suggestions for Future Research on Self-Care .....	5-7
Summary.....	5-8
Appendix A: Example of Postcard Invitation .....	A-1
Appendix B: Self-Care Briefing Script and Overhead Slides.....	B-1
Appendix C: Example of Monthly <i>Taking Care</i> Newsletter.....	C-1
Appendix D: Descriptive Statistics for Group Subsets.....	D-1
Appendix E: Additional Box and Whisker Plots .....	E-1
Appendix F: Chi-Square Distribution Statistics for Group Subsets .....	F-1
References.....	REF-1

	Page
Vita .....	V-1

## List of Figures

Figure	Page
3-1. Graphical Portrayal of Sample Groups and Sizes .....	3-13
3-2. Timeline for Study Periods .....	3-17
4-1. Mean Plots for Groups Compared by Household Gain Scores.....	4-3
4-2. Mean Plots for Groups Compared by Person Gain Scores.....	4-4
4-3. Box and Whisker Plots of Groups Compared by Household Gain Scores .....	4-5
4-4. Box and Whisker Plots of Groups Compared by Person Gain Scores .....	4-5

## List of Tables

Table	Page
2-1. Summary of Applicable Studies on Self-Care Methods (1976-1992).....	2-14
3-1. FY95 WPMC Costs Per Outpatient Visit at Selected Clinics.....	3-18
3-2. Itemization of Self-Care Study Costs.....	3-19
4-1. Mean and Standard Deviation Data for Groups.....	4-2
4-2. Results of Cochran's and Bartlett's Tests.....	4-8
4-3. Selected Results of the Chi-Squared Test on Groups.....	4-8
4-4. Selected Results of the Kruskal-Wallis Test on Groups and Subsets.....	4-10



**Abstract**

Previous research in the area of self-care has focused on medical beneficiaries in a wide range of settings, but the current or former members of the United States Armed Services have largely been ignored. This research concentrates on designing, implementing, and reporting on a study of the impact of a self-care education program on a military beneficiary population. Specifically, retired and active-duty households, whose medical records are maintained by the Wright-Patterson Air Force Base Medical Center, were systematically randomly sampled and invited to participate in the study. Those households who responded were given their choice of a self-care book, and half of those received a monthly health lifestyle magazine. All households were monitored for outpatient visitation frequency at four selected "gateway" clinics to the hospital. A pre-test/ post-test design was employed. Gain scores were computed and compared against a sequentially randomly selected control group, and differences were analyzed first using analysis of variance techniques, then using non-parametric measurements in an attempt to correct for variance and sample normality discrepancies.

Results indicate that the conclusion cannot be made statistically that the households receiving the self-care education intervention behaved any differently than those households who were given no intervention. Therefore, cost savings cannot be computed for the program. However, the trend of the data does seem to indicate a decreased demand for outpatient services among those families receiving the experimental treatment.

***THE EFFECT OF A SELF-CARE EDUCATION PROGRAM  
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**I. Introduction**

**Background**

Costs. Spending for health care has skyrocketed in recent years. For example, health care spending comprised four percent of the United States gross national product in 1947 (Volpp & Schwartz, 1994:1370), about seven percent in 1970, and a little over nine percent in 1980 (Sullivan, 1992:801). In 1990, 12.2 percent of the gross national product, or \$666 billion, was consumed by health care spending (Sullivan, 1992:801). Costs approached \$838 billion in 1992 (Fries and others, 1993:321), and rose to 14% of the GNP in 1993 (Sullivan, 1992:801). If this upward-spiraling trend in health care spending continues, the costs are forecast to reach \$1.6 trillion by the year 2000 (Clinton, 1992:804).

The military services are not immune from the rapid increases in health care spending. Goldberg and others note that "the increase in (military) medical expenditures largely parallels that observed in the civilian sector" (1994:I-2). In the fiscal year 1989 United States Department of Defense budget, approximately \$12 billion was allocated for medical purposes (Carlucci, 1989:283). In FY91, medical expenditures grew to about \$14 billion, a 16% increase (Goldberg and others, 1994:I-2). Yet more growth in medical costs can be seen in the President's FY 1994 budget. In it, approximately \$15.1 billion is allocated to DoD medical care (Aspin, 1994:118). At the Wright-Patterson Air Force Base Medical Center (WPMC) located in Dayton, OH, approximately \$37.9 million was obligated in fiscal year 1989. In fiscal year 1994, the WPMC expended approximately

\$69.6 million, an 83% increase. For fiscal year 1995, the WPMC is budgeting \$59.1 million, a 15% decrease over 1994 (Eichbaum, 1995).

Attempts have been made to identify and separate the cost drivers of health care expenditures. One report claims that general price inflation accounts for 42% of the growth, and notes that the second highest driver (at 32%) is increasing volume and intensity of services. Other factors are an aging population and medical price increases beyond general inflation. However, the report asserts that only one factor--the volume and intensity of services--is within the capacity of health reformers to change (Volpp and Schwartz, 1994:1372).

During the 1992 presidential elections, health care was a topic generating heated debate between the two main candidates. George Bush repeatedly stressed that individuals must accept more personal responsibility for health maintenance (Sullivan, 1992:803). In an attempt to contain health care expenditures, Bill Clinton outlined a health care reform package. Part of this proposal addresses the need for individual health education (Clinton, 1992:806).

Theories. Green and Kreuter state that "health education provides the consciousness-raising, concern-arousing, action-stimulating impetus...aimed primarily at the voluntary actions people can take on their own" (1991:14). Behavioral theory is often referenced to explain why educating consumers in self-management is a viable approach to reducing demand for health care services. Controlling one's environment is a basic human motive, and this desire can be applied to individual health care (Lau, 1993:45). By empowering health care consumers with basic medical information, individuals have a greater sense of control over their lives, as well as enhancing their self-esteem ("Self-Care Program Saves," 1994:108). The power of health care education is released by providing the consumer access to good health information and emphasizing the financial incentives for using it (Wise, 1994:21-21). Self-management evolves when the individual realizes the

determinants of health are "ones over which he or she can exert personal control" (Green & Kreuter, 1991:4). Removing the mysticism from self-help can effectively promote personal coping skills and positively impact self-efficacy (Blair, 1993:248). It is in this theoretical framework that the self-care movement is grounded, designed to educate individuals on self-care behaviors and the appropriate use of health care services (Green and Kreuter, 1991:7).

Definitions. Many definitions for self-care were found in the literature. One definition concerns that of social control.

Self-care is a process whereby a lay person can function on his/her own behalf in health promotion and prevention and in disease detection and treatment. (Levin, 1978:171)

Others explain that self-care involves placing basic health information in the hands of consumers to stimulate active participation in their own health care (O'Reilly, 1994:201). Self-care programs have emerged to empower consumers with information to help them make more informed health care decisions ("Self-Care Program Saves," 1994:108). Self-care has been described as a "maintenance-oriented solution to the contemporary social and economic woes of society in general and the health care delivery system in particular" (Northrup, 1993:64).

Defining the role of self-care is important when linking it to health care. Some writers have stressed the importance of providing health care concepts and skills that are meaningful to a layperson's perceived needs and preferences. This education is theoretically limited "only by the individual's motivation, competence, economic resources, and by the availability of technology" (Silten and Levin, 1979:202). Once equipped with adequate self-management information, choosing the most effective and least costly care and visiting a professional health care provider become easier decisions for the individual to make (Lorig and others, 1985:1044).

Implications. The implications of self-care are numerous and attractive for health institutions. One report states that "putting more and better information in the hands of consumers and encouraging more active consumer participation in the care-delivery process is definitely the way to go" (O'Reilly, 1994:202). Only in the last two decades has self-care been actively explored through research and found attractive as a mechanism to reduce health care demand and for cutting health care costs (Ferguson, 1980:13-14). However, many authors express concern over the extent to which individuals should be allowed to use self-care, the individual perceptions of hidden agendas on behalf of medical establishments promoting self-care (Levin, Katz, & Holst, 1979:37,77), and the legal ramifications if something goes wrong (Wise, 1994:24). A notable limitation in the literature is the lack of research and exploration of self-care as it pertains to military hospitals.

Relevance to the Military Services. Military hospitals, also known as military treatment facilities, operate under a dual health care mission. The first and foremost reason for their existence is "to provide medical services and support to the armed forces during military operations" (Aspin, 1994:118). A secondary mission is to provide continual health care to "members of the armed forces, their family members, and others entitled to DoD medical care" (Aspin, 1994:118). The number of beneficiaries eligible to receive direct medical care at one of the 140 worldwide DoD treatment facilities approaches 8.2 million (Aspin, 1994:118). To illustrate DoD medical care usage policy, active duty military personnel have priority to receive treatment at DoD medical facilities, while retired military personnel can also obtain medical services, but only on a space-available basis (Goldberg and others, 1994:I-3). Exact military medical benefit entitlements are outlined in Air Force Instruction 36-3001, and will be discussed later.

Also available to eligible beneficiaries is the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS). Enrollment in this plan is automatic for other

than active duty uniformed military members. Offered by the Federal Government, CHAMPUS is an insurance for active-duty dependents, retirees, and retiree dependents who may need or desire to use medical services offered by civilian hospital facilities (Dodd, 1995:26). CHAMPUS allows an individual to purchase health care from the civilian sector and have the Government subsidize a substantial portion of the medical costs. However, "compared to the U.S. population at large, military beneficiaries under age 65 (excluding active-duty personnel) make heavy use of both inpatient and outpatient services (at military treatment facilities)" (Reischauer, 1994:71-72).

Relevance to the Air Force. Airman magazine quoted Lieutenant General (Dr.) Edgar R. Anderson, Jr., Air Force surgeon general, as stating, "The Air Force has been in preventive medicine probably longer than any civilian agency" (Lowe, 1995:22). Some statistics can help illustrate the volume of medical services rendered. About 4.5 outpatient visits per person per year were made in 1992 by U.S. civilians under age 65. This compares to a rate of about 6.7 visits per person for military beneficiaries under age 65 living in the U.S. (Reischauer, 1994:72). Evidence of visitation frequency can be seen locally at the Air Force's Wright-Patterson Medical Center. In FY90, approximately 470,000 outpatient visits were made. Compare this to the 483,738 visits in FY94 (Erickson, 1995). The increasing demand on military medical treatment facilities for health care has caught the eye of many administrators and raised discussions concerning ways to stem the flow. Forced to balance declining personnel levels and reduced funding against rising service requirements, medical officers are looking at relatively new approaches to reduce demand. For the Air Force, "future efforts will teach people how to take better care of themselves" (Lowe, 1995:22).

## **Problem Statement**

As a way to counteract the rising resource requirements, the Health Promotions Branch at Headquarters, Air Force Materiel Command, has asserted that, in addition to improving care delivery efficiency and trimming the associated costs, military medical facilities must attempt to reduce demand. They have recommended that the WPMC immediately implement a self-care program as an avenue to reduce demand for health care (HQ AFMC/SGPZ, 1994). The WPMC Commander has charged the Wellness Center and Tri-Care Flight offices to examine the effectiveness of a self-care education program on beneficiaries eligible to patronize the WPMC.

In particular, the WPMC Commander is interested in knowing which segments of the beneficiary population respond most favorably to a self-care intervention, and what impact this has on the WPMC from a cost standpoint. The WPMC senior staff have formulated two basic hypotheses for the self-care program: (1) The number of unnecessary emergency room, primary care, pediatric care, and flight medicine visits can be reduced by putting basic health and medical information in the hands of beneficiaries, and (2) if the unnecessary utilization rates are reduced, the cost of care at WPMC can be reduced by servicing more patients in-house and eliminating some off-base patient care referrals. As it is used here, "unnecessary" is defined as those visits that could have been self-treated without the assistance of medical professionals.

## **Investigative Questions**

This research will attempt to answer the following investigative questions:

- 1) Does a self-care education program reduce visitation rates for a military medical beneficiary population?
- 2) For what beneficiary household type (retiree or active-duty) does the program have the most impact?

3) What are the corresponding estimated cost savings associated with any reduction in visitation demand?

### **Scope and Approach**

This research effort is restricted to the population of beneficiaries eligible to utilize the WPMC. Air Force Instruction 36-3001, Issuing and Controlling Identification Cards, outlines the eligibility criteria for entitlements to medical care in civilian facilities and medical care in uniformed service medical treatment facilities (Department of the Air Force, 1994:32). The WPMC beneficiary population for this study will include retirees, their spouses and children, and dependent spouses and dependent children of active duty military personnel. The WPMC Tri-Care Flight determined that active duty military personnel should be excluded from participation in this study. According to local commander policy, active duty military personnel are required to seek medical attention through the "sick call" program. Therefore, a self-care book might have less impact.

A systematic sampling of the identified WPMC beneficiary population will be made. Postcard invitations will be sent requesting the recipient to attend an education seminar and pick up a self care book. For this study, three books will be utilized: Taking Care of Your Child: A Parent's Guide to Medical Care, Take Care of Yourself: The Complete Guide to Medical Self-Care, and Taking Care of Today and Tomorrow: A Resource Guide for Health, Aging, and Long Term Care (see References section for complete bibliographies).

Visitation rates for both the experimental and control groups will be recorded for the emergency room, primary care, pediatric care, and flight medicine clinics. The WPMC senior staff identified these clinics as the main "gateways" for obtaining health care at the WPMC. They noted that the study population will likely pass through one of these clinics if health care is sought.



## **Overview**

This chapter has provided a background development and introduction to the research topic covered in this thesis, as well as the scope and approach that will be used. A synopsis of the literature published on self-care, to include previous research efforts, theoretical framework, and general applications, is contained in chapter two. In chapter three, the methodology for the study is presented and discussed. Data collection and analysis procedures are covered in chapter four. Finally, chapter five presents the findings, results, and conclusions of the study.

## II. Literature Review

### **Chapter Overview**

Tracing its roots to the early Greek society, the practice of non-professional health care has been around for centuries (Northrup, 1993:60). From home-concocted remedies to reliance on family and friends for medical advice, caring for oneself takes a variety of forms. This self-care extends beyond the confines of a one-sentence definition; on the contrary, a review of the literature suggests a myriad of explanations and examples. However, it appears that agreeing to a common definition has not received nearly as much attention compared to that given to the growing trend to utilize self-care to combat the rising costs of health care. Numerous studies explore the potential for self-care to reduce reliance on the professional medical care system, thus effecting a reduction in costs.

### **Why Self-Care?**

As explained by Williamson and Danaher, before the advent of modern medicine, "if a member of a family fell ill...there was little that could be done beyond nursing the sick person, seeking the Lord's intercession, and quarantining the household" (1978:12). Historically, the relatively limited number of professional practitioners coupled with the distance that a sick person would have to travel to see one likely necessitated self-care. Kemper, Lorig, and Mettler illustrate this point, explaining that during the Babylonian era, sick people were transported to the marketplace where opinions on treatment were solicited from a passerby (1992:29). Social reform and massive lifestyle changes in the nineteenth century, and later the redistribution of resources and development of health centers in the twentieth century, fueled the American public's use of health services (Green & Kreuter, 1991:6). Consider that today, even with the modern day technological

advances in medicine, approximately "65 to 85 percent of all health/medical care is performed outside the professional sector" (Silten & Levin, 1979:203).

Williamson and Danaher offer a possible explanation for the widespread appeal of self-care: "Unless they are completely alone in the world, most people would opt to discuss their symptoms with other lay people before going to a doctor" (1978:51). Levin, Katz, and Holst are not surprised by the prevalence and endurance of self-care in society. "Self-care skills can accrue, become assimilated as coping skills, and (be) passed on to others through the process of socialization. Thus, over time, self-care skills can have a multiplier effect" (1979:26).

### **Difficulty in Definitions**

A difficulty in reviewing the literature was finding a common definition for self-care. As related by Kemper, Lorig, and Mettler, "No definition of medical self-care has been universally accepted" (1992:30). Although this is a source of confusion in discussing self-care, some thoughts on the scope and application of self-care will be presented to give the reader a greater appreciation for the wide interpretations that exist. Levin, Katz, and Holst discuss self-care as an intentional behavior that an individual takes to promote health or to treat illness (1979:31,43). Another writer offers a conservative viewpoint, regarding it as "giving care to oneself that ideally should be given by health care professionals" (Northrup, 1993:61). In broad terms, Silten and Levin describe self-care as "the process by which individuals and groups take control over those factors in their environment that are important to them" (1979:199). Blair points to outcome expectancy and self efficacy theories as influencing an individual's motivation to perform self-treatment (1993:245). Another effort proposed a relationship with a psychological construct, health locus of control, as it pertains to a patient's self-management (Barlow, Macey & Struthers, 1993:155). Regardless of the exact definition, this thesis will follow the premise offered

by Green and Kreuter regarding self-care: "Individuals can govern their own behavior and control the determinants of their own health up to a point, and should be allowed to do so" (1991:4).

### **Growing Appeal**

While the public use of health services was encouraged during the 1960's, the era of cost containment in medical care emerged in the 1970's. Not only were attempts made to trim the pricing of medical care, but the demand side was examined also (Green & Kreuter, 1991:6-7). One proposal to reduce demand included "education of the public in self-care and appropriate use of health services, possibly to reduce utilization" (1991:7). Thus we see self-care attracting attention in the mid 1970's as "an instrument for achieving the overall goals of health policy" (Northrup, 1993:65). Levin, Katz, and Holst offer some explanations as to why self-care has recently entered the spotlight. They state, "Primary health care appears to be one of the domains most accessible to lay activity...one least successfully dominated by professional expertise" (1979:20). They further suggest that self-care is an emergent social movement, paralleling the wave of consumerism such that society is seeking to lesson its dependence on all kinds of service professionals (1979:31). Linn and Lewis confirm the existence of a self-care movement, but they remark that "the rationale for self-care chosen by a group often reflects the more general economic, social, or political concerns of its members" (1979:184). Adding some cautionary words of advice, one author hedges that "(you must) be sure that you don't self-treat when you really need medical attention" (Fiske, 1995:110).

Perhaps the greatest factor to usher in self-care is that of economics, as a response to the rapidly rising costs of medical care (Golaszewski and others, 1992:1170). The medical community is looking to self-care for many reasons, one of which is conservation of professional health resources (Levin, Katz, and Holst, 1979:25). By shifting the

decisions for health care to the consumer, time and money can be saved (Wise, 1994:21). Many agree with this statement, explaining that empowering people to make their own decisions will not only enhance individual self-esteem, but will also prove effective in controlling health care costs ("Self-Care Program Saves," 1994:108).

It is clear that health costs have reached worrisome levels. McNerney illustrates the problem:

...concern with (health care) costs has become so widespread in both the public and private sectors that it is now a motivating force behind many legislative proposals and decisions about purchasing health services by groups and by individuals. (1980:1088)

An analysis of the increase in costs over the last three decades indicates a dangerous, spiraling trend. The statistics tell the story best: in 1947, health care expenditures averaged about 4% of the gross national product (Volpp, 1994:1370); in 1970, the costs had climbed to approximately 7 percent of the GNP; in 1980, 9 percent; and in 1990, 12.2 percent or, in dollar terms, approximately \$666 billion (Sullivan, 1992:801). Fries and others noted the continuing trend and commented on the magnitude of the expenditures in comparison to that spent on health care in other countries around the globe: "Health care costs in the United States exceed 14 percent of the gross domestic product, far more than in any other nation" (1993:321).

Political candidates thrust the health care crisis to the forefront of their agendas in the 1992 presidential elections. The Bush Administration published its Healthy People 2000 plan to urge "acceptance of more personal and family responsibility for health maintenance" (Sullivan, 1992:803). The Bush platform also campaigned that "any strategy for constraining health care costs must include a plan to reduce the need for medical intervention" (1992:803). Likewise, Bill Clinton's plan also acknowledged the skyrocketing health care costs, stating that "health care spending per person has tripled in the past 12 years, increasing from \$1,059 in 1980 to \$3,057 (in 1992)." Furthermore, he

forecasts that, if left unchecked, the cost could balloon to \$5,700 for every man, woman, and child in America by the year 2000 (1992:804). Clinton's campaign promoted an enhancement of preventive and primary care, as well as personal responsibility as solutions. He echoed the thoughts of Bush, further stressing that:

An intensified health education system must be designed to educate and encourage the American people to change behavior that results in ill health and high costs. The right to affordable health care...must be accompanied by the responsibility to maintain our own health and to use the system wisely. (Clinton, 1992:806)

### **Demand for Medical Care**

Volume. To illustrate the volume of health care utilization in America, consider that "on an average day, 3.5 million people seek care from a doctor, and an additional 870,000 people are hospitalized under the care of one" (Blenton & Edwards, 1991:149). Military hospital visits also indicate the volume of services rendered. For the three-month period January 1 - March 31, 1994, worldwide fixed military medical facilities within the Department of Defense tended to over 11.1 million outpatient visits. Singling out the Air Force for the same period of time, almost 3.5 million patients were seen (DoD, March 1994:15). For the following quarter, ending 30 June 1994, the DoD total was 10.8 million outpatient visits, the Air Force accounting for 3.3 million of those (DoD, June 1994:15). This yields a 6-month outpatient total of 21.9 million visits for DoD, 6.8 million for the Air Force.

Upon closer examination of these demand numbers, outpatient visits by United States active duty uniformed personnel accounted for approximately 37% of the total outpatient visits in DoD, or 31% for the Air Force. Focusing on the Air Force, it can be conservatively stated that roughly two out of every three outpatient visits are attributed to other than active duty personnel (DoD, June 1994:15). Other than active duty personnel consist of retired military members and their dependents, dependents of military and other

uniformed or deceased personnel, and other beneficiaries. For the Wright-Patterson Medical Center, outpatient visits totalled 483,738 for FY94. Of that number, approximately 80% is attributed to other than military personnel (Erickson, 1995).

Resources. The physical resources required to handle this patient volume are understandably massive. However, an interesting discovery was made concerning innovations to the budgeting process for military medical treatment facilities.

Historically, patterns of care provision and use of resources determined the DoD health care budgets. Reischauer succinctly states the overt flaw with this system:

This budgetary process rewarded hospital commanders with larger budgets if they provided more health care and thus offered few incentives to curb the delivery of unnecessary and inappropriate health care. (1994:71)

With expenditures for DoD health care exceeding \$15 billion in fiscal year 1994 (Aspin, 1994:118), the ramifications of this ill-sighted budgeting process are serious (Reischauer, 1994:71). Conversely, under the newly implemented capitation budgeting strategy, DoD medical centers are presented with monetary incentives to control expenditures. Under capitated budgeting, "resources are allocated based on responsibility to provide health services to a defined population for a fixed funding amount per user of services" (Aspin, 1994:119). Thus, hospital commanders are encouraged to provide only necessary and appropriate care (Reischauer, 1994:71). However, some foresee problems regarding DoD's system-wide approach to implementing capitated budgeting. Reischauer notes that "to the extent that inefficiencies are part of the current medical care system, capitation thus may tend to perpetuate them" (1994:71).

### **Attacking the Problem**

There is little doubt that the health-care reform bugle has been sounded, with proponents touting self-care as the answer. The question remains, however, how self-care can best address the issue of reducing the demand on and cost of the health care system.

Irrespective of political environment, Levin, Katz, and Holst suggest that "strengthening self-care...seems to represent a basic thrust toward a more adequate, more accessible, more dignified, and possibly more effective mode of using health resources" (1979:43). Levin offers a unique perspective pertaining to the willingness and motivation of the medical establishments to welcome self-care. He poses this interesting question:

Is it counterproductive, from a practical financial standpoint, for hospitals, which derive the greatest part of their resource from inpatient care, to urge courses of action for people which, if followed, may conceivably reduce hospital income? (Levin, 1978:171)

Some point out criticisms of self-care, stating that health professionals may see it as an attack on their territory (Levin, Katz, & Holst, 1979:77). Furthermore, worries prevail that self-care may be carried too far, presenting the appearance to consumers that medical facilities may use it as a "pacification tactic to reduce public demand for more or better personal health services" (Levin, Katz, & Holst, 1979:77). From this viewpoint, laypersons may feel that self-care is "co-opted by the health establishment" (1979:77). Another author worries about the legal ramifications of self-care if adverse conditions develop (Wise, 1994:24). However, Silten & Levin see self-care promoting "the layperson as the primary caregiver who can draw upon professional assistance in a supplementary way" (1979:202).

More debate is generated over the extent to which self-care should be utilized. Some writers assert that individual self-care actions could include self-diagnosis, taking no action, seeking advice, self-medication, restricting activity, or consulting books (Kemper, Lorig, & Mettler, 1993:31). Silten and Levin advocate that no bounds should be placed around self-care, allowing the individual to decide how far to push the envelope (1979:202). Pertaining to the self-care boundaries, Williamson and Danaher urge responsible individual action (1978:101). To ensure that this individual action is responsible, guided, and competent, some authors isolate health education as being a



necessary ingredient (Ballin & Johnson, 1994:2485). Fries and others seem to agree, writing that health education will, in turn, reduce demand, decrease the frequency of medical procedures, and cut costs (1993:322).

### **Applicable Studies**

Until now, the discussion has revolved around self-care as a theoretical solution to reduce demand and cut costs. However, one must ask to see proof that supports the allegations that self-care is a potential "golden egg" for the health crisis in America. Common ailments and minor illness were the targets of many early studies in self-care. In 1976, Buck, Simpson, and Stewart studied 264 patient-initiated consultations. Family physicians were asked to "imagine that their patients had a (self-care) manual which described the treatment" and then to record "the probable disposition of the complaint if the patient had used the manual" (1976:43). While the study does rely primarily on the perception of doctors after evaluation, it did conclude that up to 21 percent of the visits might have been avoidable if patients had access to a self-care manual.

In 1979, Berg and LoGerfo retrospectively compared actual visits against common illness self-care algorithms suggested by the book Take Care of Yourself (Author's note: this book is used in this thesis effort). Families were asked to keep illness diaries, and the authors made determinations as to "whether the criteria for seeing a physician were met and whether a physician visit was recorded" (1979:535). After a four-year observation period, the 149-family sample indicated mixed results. The authors conclude that "adherence to some commonly promulgated self-care algorithms may increase rather than decrease the number of physician visits" (1979:535). The two limiting factors of this study appear to be the time period (actual study was done in 1969, but not reported until 1979) and the study group (young, with few chronic illnesses, belonging to a prepaid group practice).

In 1979, Estabrook examined a cold self-care center in a pre-paid program with a large outpatient service (Estabrook, 1979). The Center was established to help the consumer self-diagnose a cold and subsequently make an informed decision on treatment. While the Center was found to have little impact on self-medication behavior, the study postulates that it did "(positively) affect care-seeking behavior...and was demonstrated to have a favorable impact on clinic costs" (Estabrook, 1979:1139).

Overseas in Great Britain, a study was conducted concerning minor illness management (Morrell, Avery, & Watkins, 1980). A booklet using cartoons to explain symptoms such as sore throat, vomiting, runny nose, and coughing was distributed to mothers of young families in a general practice setting. The authors found that 74% of the patients in the sample referred to the booklet, and they concluded that "the results of this study do seem to show a consistent change in consulting behaviour by those patients who received the educational booklet" (1980:771).

Later that same year, Anderson, Morrell, Avery, and Watkins did a follow-up study on the booklet to detail the effect of it on the families receiving it (1980). Examining the participants three months after the end of the year-long study, the authors note that the results are somewhat disappointing--the expectation was not met that the experimental group mothers would know more about the symptoms than the control group. They did offer some explanations for this behavior, such as a deterioration of knowledge over time and/or an unintended "non-specific effect" of the booklet.

In another effort to reduce physician visits for colds, Roberts and others tested self-care instructions and a health education plan in a randomized, controlled, blinded clinical trial (Roberts and others, 1983). This study was conducted in a fee-for-service clinic over a six-month period. It reported that using "a symptom-based algorithm...the subsequent rate of visits for upper respiratory tract infections classified as unnecessary using the algorithm was 44% lower in the test as compared with the control group"

(1983:1986). A 15% decrease in the rate of unnecessary visits was noted with no impact on the upper respiratory tract infection rate.

Stergachis and others examined colds and flu and looked for any effect that a self-care minimal intervention might have (Stergachis and others, 1990). The intervention consisted of a four-page self-care pamphlet for upper respiratory infection care, randomly mailed on two separate occasions to patients assigned to panels of 22 primary care physicians. Results in this study indicated that the self-care pamphlet "did not influence ambulatory visits, drug utilization, or telephone consultations" (1990:27), and "has little effect in predominantly white, middle-class populations receiving care from managed health care systems" (1990:28).

While previous studies had employed pamphlets as intervention tools, Moore, LoGerfo, and Inui tested a self-care book that guides patient behavior (Moore, LoGerfo, & Inui, 1980). The study adopted a randomized prospective design. They used the book titled, Take Care of Yourself: A Consumers Guide to Medical Care. (Author's note: This book is but one of three used in this thesis.) The effort, however, concluded that the book had no significant effect on visitation rates, despite high self-reported usage levels. Of particular note from this study is that it "did uncover a positive effect of the book, both on attitude toward self-care and on confidence in management of medical problems" (Moore, LoGerfo, & Inui, 1980:2320).

As a attempt to contain health costs, health maintenance organizations (HMO) began attracting attention in the late 70s and early 80s. Kemper designed a self-care program involving ten two-hour workshop sessions for families enrolled in a HMO (Kemper, 1982). Medical records were analyzed to determine any utilization impact and cost of in-clinic and referral visits. In this study, Kemper reveals a particularly noteworthy "acid" test for evaluating self-care: "The primary question regarding self-care programs is whether, in the long run, their participants benefit, either by better health or by lower

medical expenses" (1982:715). The study reported that self-care knowledge increased and per-visit costs decreased, although no significant impact was found on the frequency of or total cost for clinic visits.

Further research concerning self-care and HMO populations is provided by Vickery and others (1983). The effects of self-care educational interventions were tested in a prospective, randomized, controlled trial to determine any effect on ambulatory care utilization. The primary written interventions included Take Care of Yourself, Taking Care of Your Child, and Life Plan for Your Health. (Author's note: The first two books are used in this thesis effort.) These books were reinforced by an individual counseling session and monthly newsletters and brochures. A telephone information service was also offered. The observational period was one year after application of intervention. Three experimental groups were used: book only, book plus telephone service, and book plus telephone service plus individual counseling. Vickery and others concluded that:

Statistically significant decreases in total medical visits and minor illness visits were found in each of three experimental groups as compared with a control group. These decreases averaged 17% and 35%, respectively. (1983:2952)

It is interesting to note that the telephone information service was not utilized, similar to the finding in the study by Stergachis and others (1990), previously discussed. Concerning any cost reductions facilitated by a self-care program, Vickery and others claimed a 2.5 - 3.5 to 1 ratio in savings for each dollar spent on the education program.

Vickery (with different co-authors) also published a similar study a few years later with similar results (Vickery and others, 1988). In this effort, however, the trial was conducted within an HMO Medicare population. Likewise, educational interventions included the Taking Care series of books coupled with monthly newsletters. This study also reported weak, nearly nonexistent usage of the telephone information service. Findings did reflect a 15% decrease in total medical visits and a decrease in follow-up

visits, pre-entry versus post-entry. Of significant mention is Vickery's claim that "medical visit decreases resulted in a savings of \$36.65 per household in the experimental group for a benefit-cost ratio of \$2.19 saved for every dollar spent on intervention" (Vickery and others, 1988:580).

In a randomized controlled trial conducted in Denmark, an attempt was made to describe illness-behavior connected with minor illness in young children and assess the effect of an information booklet on this audience (Hansen, 1990). One hundred families in a group practice setting were randomly split into a study group and control group. The author concluded that "families which received the booklet reported significantly more self-treatments (and) demanded significantly fewer consultations" (1990:150).

While a couple of the studies mentioned thus far attempted to isolate a particular age group for self-care, Nelson and others spearheaded a study to evaluate the impact of self-care education on an elderly population (Nelson and others, 1984). The intervention consisted of thirteen two-hour classes combined with ongoing reinforcement activities. Findings illustrated that learned self-care behavior was sustained for one year, heightening participants' knowledge and confidence. However, the study reported that "the net level of physician visits was not influenced by the program--both test and comparison groups averaged slightly over five visits per person per year" (1984:1361). The study did ascertain that "elders trained in self-care are likely to attempt changing behaviors" (1984:1362).

Smits and Kee also targeted elderly participants to measure receptiveness to self-care (1992). The population contained independently living persons age 65 and older. A scale using items in a Likert format was administered to measure self-concept and self-care. Smits and Kee report a significant relationship between the two, although the results may be tempered by the fact that a small sample was used. The study suggests that

"psychosocial interventions that enhance an older person's self-concept may be expected to improve self-care" (1992:18).

Identifying another unexplored population segment, Lorig and others examined the effect of a workplace health education program on outpatient visits in a quasi-experimental staggered intervention trial (1985). Sampling from 22 California employers, the participants attended a presentation, received either Take Care of Yourself or Taking Care of Your Child self-care books, and completed questionnaires. A film was shown during the presentation illustrating proper and improper use of the books. After monitoring the households for 15 months, the results pointed to a 17% decrease in visitation rates; per person, the reduction was 7.2% or 0.8 visits. Stratifying participants by age and educational level, reductions were seen for all groups. Lorig and others conclude that "a minimal, low-cost workplace health education intervention can in some cases significantly reduce outpatient visit rates without causing harm" (1985:1044).

Further exploring the benefit-to-cost aspect of self-care, Golaszewski and others analyzed a worksite health promotion program (1992). A major insurance company adopted the Taking Care program for all of its employees. Interventions included health risk appraisals, medical reference text, a monthly newsletter, an initial video introduction presentation, and periodic company reminders promoting the program. Five years of data were collected on program costs for personnel, capital expenses, materials, and rent. This was compared to program benefits during the same period, as quantified by health care cost savings, increased productivity, decreased absenteeism, decreased life-insurance claims, and any income generated by the program. Golaszewski and others concluded that the company realized a net positive return on its health promotion investment, postulating a 3.4 to 1 benefit-to-cost ratio.

A listing of applicable self-care studies, along with a brief description and notable conclusions, is located at Table 2-1 below:

**TABLE 2-1. SUMMARY OF APPLICABLE STUDIES ON SELF-CARE METHODS  
(1976-1992).**

<b>Author(s)</b>	<b>Year</b>	<b>Description/Design</b>	<b>Results</b>
Buck, Simpson & Stewart	1976	7 family practices, 264 patient-initiated consultations; physician's opinion given on likelihood of visit had self-care book been available	<ul style="list-style-type: none"> <li>• Up to 21% of visits could have been avoided or deferred</li> <li>• Half of visits totally avoidable, but self-treatment required</li> </ul>
Berg & LoGerfo*	1979	149 families under group health care plan recording 3,929 illnesses in diaries; illnesses compared against eight self-care book algorithms to determine if visitation criteria was met and frequency of visits	<ul style="list-style-type: none"> <li>• Increased visits noted for 5 algorithms; no change for 2, and decreased for 1</li> <li>• Some common care algorithms may increase number of visits</li> </ul>
Estabrook	1979	Self-selected sample of 178 consumers; received self-care advice concerning common cold; physician visits recorded against control group	<ul style="list-style-type: none"> <li>• Little impact on self-medication behavior</li> <li>• Increased knowledge of care-seeking criteria</li> <li>• Favorable cost impact</li> </ul>
Morrell, Avery & Watkins	1980	999 individuals in 284 families in group practice; self-care cartoon booklet distributed to help them manage common symptoms of illness; patient records reviewed for visits	<ul style="list-style-type: none"> <li>• 74% referred to booklet</li> <li>• Visitation rate lower for 5 of 6 symptoms studied</li> <li>• Consistent change in consulting behavior</li> </ul>
Anderson, Morrell, Avery & Watkins	1980	Follow-up on Morrell and others, done 15 months later; mothers in 98 families queried about self-care knowledge, consultation of booklet, and visits	<ul style="list-style-type: none"> <li>• 76% consulted booklet</li> <li>• Decrease in requests for care for symptoms covered in booklet</li> <li>• No proof of deterioration of knowledge over time</li> </ul>

Moore, LoGerfo & Inui*	1980	699 HMO households; self-care book distributed and seminar presented on usage; patient records reviewed for visitations, pre- and post-test; questionnaires determined appeal and use of book	<ul style="list-style-type: none"> <li>• 84% reported reading some of the book</li> <li>• 38% reported using book to diagnose health</li> <li>• 55% reported more confidence in taking care of their health problem</li> <li>• No significant decrease in number of physician visits</li> </ul>
Kemper	1982	218 HMO households with children; conducted series of 2-hour workshops and distributed self-care handbook; visitation (pre- and post-test), cost, and book usage data were tracked	<ul style="list-style-type: none"> <li>• 24% fewer referrals to specialists</li> <li>• \$55.48 less cost per household using book</li> <li>• 81% reported reading the handbook</li> <li>• 83% reported improved health care</li> </ul>
Roberts & others	1983	877 families at a family practice clinic; common cold educational packet distributed and briefing given; clinic visits monitored	<ul style="list-style-type: none"> <li>• Total visits were 29% fewer in test group</li> <li>• 44% fewer unnecessary visits vs. control group</li> <li>• 15% fewer necessary visits vs. control group</li> </ul>
Vickery & others*	1983	1635 HMO households; given various combinations of self-care book, monthly newsletter, telephone information service, and individual counseling; pre- and post-test visits determined; visit costs evaluated	<ul style="list-style-type: none"> <li>• Total medical visits declined by 17% 10-14%</li> <li>• Minor illness visits decreased by 35%</li> <li>• Decrease in utilization resulted in savings ratio of \$2.50 to \$3.50 per dollar spent on program</li> </ul>



Nelson & others	1984	330 senior citizens; given multiple briefings and self-care books; interviews conducted; self-reported visitation data	<ul style="list-style-type: none"> <li>• 20% fewer bed-days</li> <li>• Group exposed to self-care made 76% more attempts to improve health lifestyle</li> <li>• No change in visits</li> </ul>
Lorig & others*	1985	7349 employees in a workplace setting; given seminar, self-care books, and monthly newsletters; visits monitored for households, pre- and post-test	<ul style="list-style-type: none"> <li>• 7.2%, or 0.8 visits per person, overall reduction</li> <li>• One segment had 17% reduction in visits</li> <li>• One segment had 2.2% increase in visits</li> </ul>
Vickery & others*	1988	1009 Medicare households; combinations of self-care books, lifestyle brochures, and educational packages given; questionnaire administered; visits monitored for households, pre- and post-test; costs tracked	<ul style="list-style-type: none"> <li>• 15% decrease in total ambulatory visits</li> <li>• Savings of \$36.65 per household, benefit cost ratio of \$2.19 per dollar spent on program</li> <li>• 35% used the books</li> <li>• 75% used the other intervention materials</li> </ul>
Hansen	1990	98 families with children in 3 group practices; given a self-care booklet; self-reported illnesses and illness-behavior tracked	<ul style="list-style-type: none"> <li>• 51% reported some self-treatment using booklet</li> <li>• 50% fewer home visits</li> <li>• 32% fewer patient-initiated consultations</li> </ul>
Stergachis & others	1990	790 HMO households; given booklet on colds & flu, reinforced by advice nurses; medical records reviewed for pre- and post-test visitation data	<ul style="list-style-type: none"> <li>• 40% reported use of the booklet</li> <li>• 2% improvement in appropriateness of visits</li> </ul>
Golaszewski & others*	1992	36,000 employees and retirees of an insurance company; analysis of benefit-to-cost ratio of a major health promotion program	<ul style="list-style-type: none"> <li>• 3.4 benefit-to-cost ratio estimated for program</li> <li>• However, no definitive conclusion as to value of a work-site health promotion program</li> </ul>

Smits & Kee	1992	48 senior citizens; scale used to measure self-concept and self-esteem	<ul style="list-style-type: none"> <li>• Significant relationship between self-care and total self-concept</li> </ul>
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(\* Note: Study utilized one or more editions of the Taking Care book series, the same books being used in this thesis effort.)

## Summary

In this chapter, the discussion has revolved around self-care as a theoretical solution to reduce patient visitation demand on medical services and cut the corresponding health care costs. Throughout many of the articles found during a review of the literature, a variety of populations were subjected to different combinations of self-care interventions and researched to determine the effectiveness of a self-care educational/promotional program. If anything, the literature review demonstrates that a self-care approach can lead to better personal health-conscious behavior. However, as a few studies concluded, improving personal care habits and/or consulting applicable self-care books and illness algorithms may not necessarily imply lowered physician visits. While results were mixed concerning the self-care methods actually decreasing visitation rates, in most cases the cost savings from such health promotion programs were found to be significant. It is hoped that similar positive results will be achieved by this thesis effort. The next chapter will discuss in detail the foundation of the methodology for the self-care study.

### **III. Methodology**

#### **Chapter Overview**

This chapter will examine the structure and processes involved in the study of a self-care education program on a military beneficiary population. The population sampling method and subsequent separation into groups are discussed. Next, the procedures for distribution of educational materials are detailed. Processes used for tracking visitation frequency among the groups are reported, and the proposed method of data analysis is explained.

#### **Background on Wright-Patterson Medical Center**

The Wright-Patterson Medical Center (WPMC), located on Wright-Patterson Air Force Base in Dayton, Ohio, has approximately 80,000 patient records located in the Outpatient Records division (Butler, 1995). According to the WPMC Business Plan, information obtained from the Defense Medical Information System indicates a beneficiary population of 51,341 within a 40-mile catchment area (Dodd, 1995:1). The WPMC estimates that it provides medical services to an estimated 20,900 households located within a 40-mile catchment area (Bradley, 1994:4). The catchment area is the radius outward from the WPMC from which the majority of military medical beneficiaries originate. The WPMC is a 301-bed hospital offering tertiary medical care. The WPMC employs 1,959 personnel composed of 1,398 military, 415 civilian, and 126 residents (Erickson, 1995). Air Force Regulation 36-3001 outlines the medical entitlement eligibility criteria for utilizing Air Force medical treatment facilities (Department of the Air Force, 1994).

The 20,900 families served by WPMC comprise the population from which the sample was taken for this study. Patient records are kept both manually and electronically

in the Composite Health Care System (CHCS) computer database. The active-duty patients are entered into CHCS upon in-processing at Wright-Patterson AFB. Military retirees are entered into CHCS upon official transfer of their military records to the WPMC. When the active-duty member or retiree's records are received at WPMC, the corresponding records for the individual's entire family are simultaneously entered into CHCS and become additions to the beneficiary base. Upon active-duty permanent change of station or a retiree's departure from the area, an entry is made into CHCS reflecting the new location of their medical records.

### **Description of Self-Care Program**

The WPMC commander and senior staff were faced with rising demand for medical care and reduced funding to provide it. It was their opinion that approaches to reducing demand should be studied. Further impetus to embark upon a demand-reduction effort came down organizational channels to WPMC from Headquarters, Air Force Material Command, in the form of a tasking. HQ AFMC/SGPZ directed all medical units under its control to implement a medical care reduction process using the Taking Care program (1994). The Taking Care program was developed and is currently managed by the Center for Corporate Health, Inc., a national leader in health education, dedicated to helping people become healthier, wealthier, and wiser consumers of health care. Its Taking Care Program was the winner of the C. Everett Koop National Health award.

They explain that their Taking Care program

is a comprehensive program that specifically recognizes the power and responsibility of the individual with respect to health and medical care, and is dedicated to supporting and improving individual decision-making in these areas. ("Guide for the Program Leader," 1994)

Before the WPMC Commander committed extensive funding to this program, he agreed to allow the author, with the help of the Air Force Institute of Technology, to design,

implement, and report on a trial causal study of the program. He asked that visitation information and any differences in medical treatment costs be reported by classification of household--active-duty or retiree. Such is the topic, purpose, and intent of this thesis effort.

### **Experimental Design Description**

The design of this experiment was dictated in large part by the actual self-care program implementation plans as specified by the sponsor, the Wright-Patterson Medical Center commander. Thus, it is acknowledged that some academic accuracy and structure is sacrificed in favor of replicating the actual application of the program as closely as possible within this thesis effort. Its purpose is to determine if any causal relationship exists between use of the self-care books by a military medical beneficiary population and a reduction in outpatient visits at the WPMC.

The groups used in this thesis are explained as follows. Those households receiving intervention for the period 17 November 1994 to 17 July 1995 comprise the experimental group, denoted by the letter "E". Within the experimental group, the households receiving the education session plus book are coded "E1", while those receiving the same plus a monthly self-care newsletter are coded "E2". The control group households, sequentially selected at random out of CHCS and having no intervention whatsoever, are denoted by the letter "C". The number of visits per household and average visits per person by household were computed for each group.

Validity Concerns. A pre-test/post-test with control group design is used to determine differences in visitation rates. This type of experimental design takes the following form, where R represents a randomly selected group, O stands for an observation at a certain point in time ( $O_1$  is pre-test observation,  $O_2$  is post-test, etc.), and

X represents the intervention or experimental treatment (b = self-care book, b+m = book plus monthly magazine).

R <sub>E1</sub>	O <sub>1</sub>	X <sub>b</sub>	O <sub>2</sub>
R <sub>E2</sub>	O <sub>3</sub>	X <sub>b+m</sub>	O <sub>4</sub>
R <sub>C</sub>	O <sub>5</sub>		O <sub>6</sub>

Campbell and Stanley state that such a true experimental design as is used here neatly controls for all threats to internal validity, namely history, maturation, instrumentation, regression, selection, and mortality effects (1963:13). Each of these threats will now be discussed.

Threats to Internal Validity. Internal validity refers to “the ability of a research instrument to measure what it is purported to measure” (Cooper & Emory, 1995:149). Some aspects of internal validity deserve mention here, as they pertain to this thesis effort.

History can impact internal validity when specific events occur between measurements. To assure comparability, all of the experimental households were exposed to identical education sessions and given their choice of a self-care book.

Maturation occurs within a participant over a period of time. Because the passage of time affects both experimental and control group households, any effects are expected to be mitigated. To measure the effects of intervention (the education session, self-care book, and magazine), it was necessary to deny the control group access to such. For the entire period of study, the WPMC kept unissued self-care books under lock and key in the basement, and no other self-care education or intervention programs were conducted. Additionally, experimental households were told that they would remain anonymous.

Instrumentation affects validity when changes take place in the measuring instrument, observers, or scorers. Identical briefings were given to at least one member of each experimental household. Additionally, for this study, the WPMC CHCS was used to

collect visitation data, and no major or minor changes were made in the WPMC admittance policies during the entire period. Furthermore, there were no instances of unauthorized access to the CHCS system during this study.

Regression refers to the selection of groups based on extreme scores. Systematic and sequential sampling techniques, without regard to visitation frequency, insured representativeness in both the experimental and control groups.

Biases in selection which, if present, would confound internal validity, were avoided by employing sound random sampling techniques. These techniques are explored in detail in the subsequent major sub-section discussing sampling procedures.

Mortality, or loss of participants, was handled by comparing pre-test and post-test information on household type and size. If any changes in household type (active-duty versus retired) or size (number of members) were found, visit rates per person were adjusted accordingly for the affected period. However, it is not known whether any experimental households refused to use the self-care book after the initial session.

Threats to External Validity. External validity threats involving the intervention treatment and some other variable, are also adequately addressed by such an experimental design (Campbell & Stanley, 1963:16). Cooper and Emory state that external validity refers to the ability of research findings "to be generalized across persons, settings, and times" (1995:149). Campbell and Stanley caution that "Generalization always turns out to involve extrapolation into a realm not represented in one's sample," thus causing external validity problems that "are not logically solvable in any neat, conclusive way" (1963:17). Because of this, assumptions have to be made about the representativeness of the samples, that the households are reasonably close in behavior to the entire Department of Defense military medical beneficiary population.

Another area of concern is that of the pre-test period. The assumption is made that all groups were not aware of the self-care experimental treatment prior to the study start date, and the control group was not aware of it for the entire study duration.

The last area of concern for external validity is that of the interaction of selection and the experimental treatment. While it is true that the samples were randomly selected within the WPMC, Campbell and Stanley propose that “we want to know that the interaction of characteristics with experimental treatments is negligible” (1963:19). Therefore, an assumption must be made that the characteristics of the WPMC and the health patterns of its beneficiaries are no different from any other DoD medical facility.

Statistical Tests of Significance. The tests of significance in this thesis follow the suggestions given by Campbell and Stanley. They explain that

The most widely used acceptable test is to compute for each group pretest-posttest gain scores and to compute a  $t$  (t-statistic) between experimental and control groups on these gain scores. (1963:23)

The  $t$ -statistic is best suited for relatively small sample sizes, and has relevance in this case when subsets are small in size. A necessary condition for use of the formal analysis of variance testing, as well as the  $t$ - and  $F$ -statistics, is that the groups have relatively equal variances and are distributed normally. In this thesis, a gain score equals the post-test visits minus the pre-test visits.

The visits are measured in two ways: (1) by household per month, and (2) by average per person per month. In this manner, the visitation rates are placed on an equal measurement basis, that of visits per month, facilitating the handling of the different measuring periods (6 1/2 months for pre-test, 8 months for post-test). The gain score calculation is illustrated below.



Number of Post-Test Visits Per Month, 17 Nov 1994 to 17 July 1995	Minus	Number of Pre-Test Visits Per Month, 1 Apr 1994 to 16 Nov 1994	Equals	Gain Score (can be positive, zero, or negative)
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A one factor, repeated measure design, with 3 levels (E1, E2, and C) is employed for purposes of analysis of variance (ANOVA) testing. The response variable is the gain score. Therefore, the statistical hypothesis to be tested is:

Null hypotheses  $H_0: \mu_{E1} = \mu_{E2} = \mu_C$   
 Alternate hypothesis  $H_A: \text{Visitation means are different}$

For the principles of ANOVA to apply, Pfaffenberger and Patterson offer some guidance.

The statistical test for the hypothesis...is based on the requirement that the populations corresponding to the...treatments have the same variance and the same relationship between the variance of a sample mean and the population variance. (1977:369)

For this thesis, Reynolds explains that these criteria are likely to be met by the randomization of the control and experimental groups (1995). ANOVA is employed to test for equal variance and normality between the three groups using the gain score.

The sample size of the experimental group is 419 households out of a population of 20,900. The 419 households voluntarily responded to the mailed postcard invitation to attend the education session and choose the appropriate self-care book. In this sense, they can be considered to be self-selected, that of a convenience subject sample. The statistic used to test the null hypotheses is the F-test, with multiple range tests at an alpha level of .05 ( $\alpha = .05$ ). If the null hypothesis is rejected, there is evidence to suggest that the self-care books have an impact on visitation rates. However, if variances and sample distributions are found to be non-normal, non-parametric measures are to be applied. Chi-square distribution testing, Cochran's test, and Bartlett's test are used to determine

equality of variances. The Kruskal-Wallis test is a non-parametric measurement and is used to determine whether the samples are drawn from the same populations.

### **Sampling Procedures**

The WPMC Clinical Investigations Branch and the Tri-Care Flight, upon consultation with the WPMC Internal Review Board, suggested that 8,000 households be selected for potential participation in this study. In August 1994, the Tri-Care Flight ordered a computer print-out listing all of the 20,900 households in CHCS. A specialized computer retrieval program was employed to ensure that only one member from each household was retrieved from CHCS and listed on the printout. A further data restriction was that the households be comprised of the pool of beneficiaries containing retirees, their spouses, and eligible children, along with spouses and eligible children of active-duty military members. This listing was printed out in alphabetical order by ZIP code.

Systematic random sampling with a specified starting point was used to generate a sample to which the postcard invitations were mailed. Systematic sampling is a procedure where a positive integer  $a$  is selected and is called the sampling interval. Then, as Sarndal, Swensson, and Wretman explain, "the rest of the sample is determined by systematically taking every  $a$ th element thereafter" (1992:74). To determine the sampling interval, a random number was generated using Excel's random number generator function. The number generated was three--this is the sampling interval, every third name on the list.

However, a systematic sampling procedure usually requires a random starting point; that is, a place from which to start counting every 3rd name. The listing of eligible households was printed in alphabetical order by ZIP code. Interpreting Cochran, the listing can be assumed to already be in random order. He explains that

Systematic sampling is sometimes used, for its convenience, in populations in which the numbering of the units is effectively random. This is so in sampling from a file arranged alphabetically by surnames, if the item that is being measured has no

relation to the surname of the individual. There will then be no trend or stratification and no correlation between neighboring values. (1977:212-213)

For purposes of this thesis, the assumption will be made that the last name and the ZIP code of the beneficiary bears no relation to the item being measured (number of household visits). Personnel in the Tri-Care Flight then gathered the WPMC household printout and marked every third name in the list until 8,000 names had been marked. Precautions taken during the computer retrieval of the printout ensured that no households would be marked twice because only one family member was drawn from each eligible household.

Active-duty military members are required under the Uniform Code of Military Justice to seek medical attention when ill to avoid being absent without leave (Manual for Courts Martial, 1994). Article 86 of this Code states that "the status of absence without leave is not changed by inability to return (to duty) through sickness..." (IV-14, 1994). Because of this reason, the WPMC Clinical Investigations Board and Tri-Care Flight recommended that active-duty military personnel be excluded from the study, for a self-care book is expected to have minimal impact. However, the eligible family members of the active-duty member were not excluded.

It was by coincidence that none of the persons involved in the administration of this study were selected. The names selected from the printout were marked using a special field code in CHCS. In October 1994, a mailing list was generated by CHCS. The 8,000 labels were divided in half, and a postcard invitation was mailed to the first 4,000 households on 26 October 1994.

The postcard stated that the beneficiary is invited to participate in a health program that could lower their costs of health care. It instructed recipients to pick up a self-care book free of charge and, at the same time, attend one of seven 30-45 minute educational sessions listed for instructions on use of the book. A map describing directions to the book pickup location was printed on the postcard. On 28 October 1994, the other 4,000 postcards were mailed. Evenly splitting the original 8,000 households for mailing

purposes was done at the suggestion of the Tri-Care Flight chief to preclude any potential capacity problems at the education sessions. An example of the postcard is shown in Appendix A.

Training the Trainers. In August 1994, the WPMC Commander sent a message to all hospital personnel soliciting volunteers to act as facilitators to brief those attending the education sessions. Participation was also urged at weekly staff meetings. By the end of August, approximately 35 people had expressed an interest in being a facilitator. On 18 October 1994, a representative from the Center for Corporate Health, Inc., conducted two four-hour sessions to "train-the trainers." Training sessions included a personal presentation by the representative, watching a video, and a discussion of potential questions and possible answers that the trainers were likely to face. A copy of the Guide for Program Leader was given to each trainer, and the representative covered each section of it during her sessions. Also given to the trainers were one copy each of the three books to be used in the study: Take Care of Yourself, Taking Care of Your Child, and Taking Care of Today and Tomorrow.

Training the Responders. Using materials from the "train the trainers" sessions, the Tri-Care Flight developed a set briefing script for the trainers to follow and overhead slides to be displayed during the educational sessions. This ensured that the same health education information and instructions were presented equally to all individuals. The educational sessions were held in the Air Force Institute of Technology auditorium located on Wright-Patterson AFB. Although entry to the base is controlled, all active-duty and retiree households have a vehicle registration decal on their vehicles to allow entry, day or night. Furthermore, ample parking space is available on three sides of the auditorium. The facility does provide for handicapped access. The educational sessions were phased over a two-week period, during the evening hours on the weekdays, and during the day hours and evening hours on weekends. The postcards for the first 4,000 households listed

different session times than those on the second 4,000. This was done to prevent an overflow situation at the auditorium. The auditorium has a stated capacity of 750 individuals. For none of the education sessions did attendance reach the auditorium capacity.

Upon arrival at the auditorium, responders were asked to give their social security number to the receptionist. The receptionist verified that the responder was a member of one of the households to which a postcard was mailed. The receptionist then placed a mark next the individual's name in a computer printout to identify attendance. The responder was then given a choice of one of the three self-care books. The receptionist explained the target audience for each of the books (child, adult, and senior), and noted the particular book selected next to the person's name in the printout. The responder proceeded into the auditorium for the education session. No individuals were observed picking up a book but not attending the session.

Colonel (deceased) Chris Bell, WPMC Medical Operation Squadron Commander, gave an introduction for each of the 14 educational sessions. Then, the session was turned over to one of the trained facilitators. A copy of the set briefing script and overhead slides is shown in Appendix B. Session duration was approximately 45 minutes, including the question and answer session. Upon counsel from the WPMC Legal Officer, an acknowledgment letter was signed by each book recipient. This letter stressed that the book does not replace medical care and acceptance of the book in no way alters the participant's eligibility for medical treatment at WPMC. The last educational session was held on 16 November 1994. Therefore, the study period was deemed started as of 17 November 1994.

Marking the Data. Based on the attendance listing compiled from the education sessions, each family member was marked in CHCS using a special field code that identified which of the three self-care books had been selected. Every member in the

recipient's household was marked because contamination of the book was assumed throughout the family unit. If the household was active-duty, all members except the military member were marked.

### **Self-Care Books**

As previously mentioned, three self-care books were distributed to education session attendees. The format of these books is designed around detailed presentation of health information and decision charts that show the reader how to deal with common medical problems. The instructions provided by the book state the following:

The general information describes possible causes of the problems, methods for treating them at home, and what to expect at the doctor's office if you need to go. The decision charts summarize this information, helping you decide whether to use home treatment or consult a physician. (Take Care of Yourself, 1994:140)

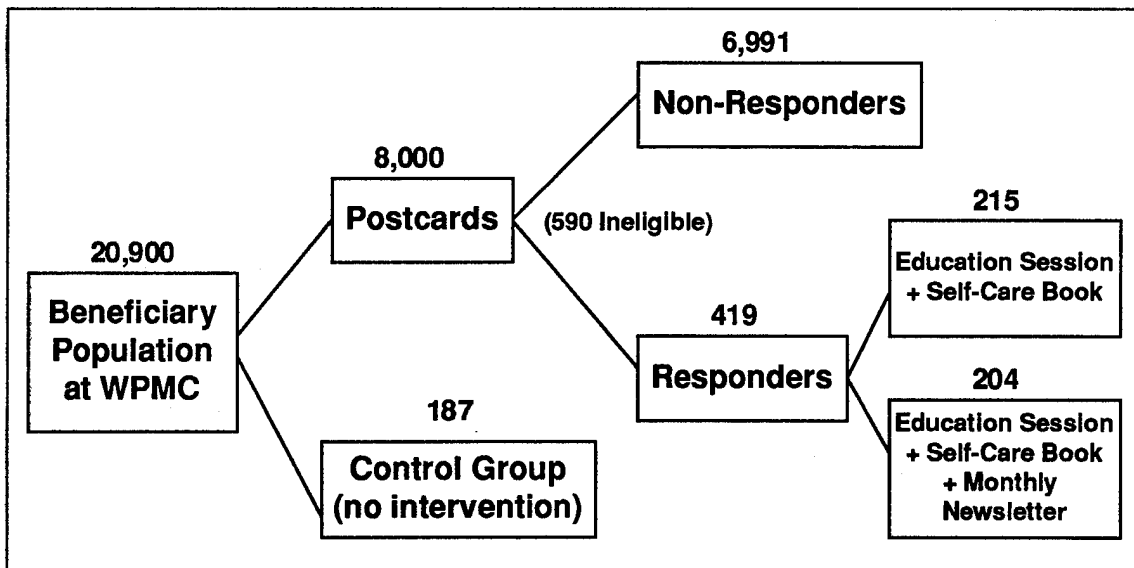
Nine-thousand-five-hundred self-care books were purchased by the WPMC Wellness Center prior to initiation of this study. The quantity of each type of book was 2,500 for children, 5,000 for adults, and 2,000 for seniors. The books not distributed during the education sessions were placed in storage at the WPMC and no other beneficiaries had access to them during the study period.

### **Sample Groups**

The population of beneficiaries who attended the education session and selected a self-care book are the experimental group. Those who were mailed postcards but chose not to respond are called the non-responder group. Another group was selected at random out of CHCS, composing the control group. To aid in selecting the control group, CHCS operators produced a listing of WPMC beneficiaries who (a) had their medical records in CHCS prior to 1 April 1994, and (b) were not already marked as belonging to any other group (postcard recipients). The precaution was also taken that only one member per household was listed. The listing was organized by smallest to

largest social security number (SSN). The assumption was made for this thesis that, as explained by Cochran, the SSN bears no relation to the item being measured (visits) (1977:212-213).

Time and computer database limitations dictated that sequential sampling techniques be used to select eligible control households. Within available time limitations, as many eligible households as possible were marked in CHCS in sequential order of SSN. The number of active-duty households in the control group exceeds the quantity in the experimental group. However, because of the limitations of time and manpower needed to mark all eligible retired households, the number of retired households in the control group is less than that in the experimental group. According to Reynolds, the total control group size of 187 households is sufficient in size to invoke the central limit theorem for normality and comparison purposes against the experimental group (1995). A diagram of the sample delineation's is shown in Figure 3-1.



**FIGURE 3-1.** Graphical Portrayal of Sample Groups and Sizes  
(Note: Numbers represent households)

The non-responders received no intervention other than the postcard invitation. The experimental group received the education session and self-care book, and half of them received a monthly self-care magazine. The members of the control group were monitored without their knowledge. However, only the experimental group and the control group were monitored for outpatient visitation rates at four primary clinics in the WPMC: primary care, pediatrics, emergency room, and flight medicine. The visitation rates of the non-responders were not monitored for two reasons. First, time and manpower were limitations in marking the non-responder households in CHCS; and second, findings of previous self-care studies (Stergachis and others, 1990; Lorig and others, 1985) show that the non-responder group is not statistically different from the experimental responder group regarding visitation frequency.

Marking nearly 7,000 households in CHCS would have required an inordinate amount of time and effort. For each person in each household, the patient file in CHCS would have to be opened and a special field designated on that person's file. Time and manpower restrictions precluded doing this. Furthermore, a review of the self-care literature reveals two previous self-care studies that examined the non-responder group, and both found statistical equality in visitation rates between responder and non-responder groups. Stergachis and others comment that, "There were no significant differences between respondents and nonrespondents" (1990:24). Lorig and others confirm this finding, stating that, "Responders and non-responders had essentially identical baseline utilization rates. There were no significant differences between the groups in baseline utilization rates for adult males, for adult females, or for children" (1985:1052). Making the assumption for this thesis that military medical beneficiaries are similar to civilian beneficiaries, these findings provide a relative degree of assurance that no statistical differences in visitation rates exist between those military medical beneficiaries responding to the postcard invitation and those declining to accept.



Subset Delineations. For the experimental group, the households were split approximately in half. A listing of the households by social security number was generated and every other name on the list was chosen. The odd households received the educational session plus the self-care book of their choice for intervention. The even households received the same plus a monthly lifestyle newsletter that supplements the book. The division of the experimental group was not exactly even because a small number of experimental households was not retrieved by CHCS. The data retrieval problem was later identified and corrected for visitation monitoring purposes.

The newsletter is titled *Taking Care*, published by The Center for Corporate Health, Inc. In The Guide for the Program Leader, the company describes it:

*Taking Care* is a monthly publication focusing on medical self-care decision-making and lifestyle management. Each issue of the twelve-page, four-color newsletter addresses LifeSkills that contribute to the prevention or management of costly, chronic ailments and covers medical self-care information on common medical problems...Each issue features medical self-care information authored by a physician to educate and motivate beneficiaries to be prudent medical decision-makers. (1994)

The Tri-Care Flight at WPMC recommended that this newsletter could be used in the future as a supplement to the self-care books, but the effectiveness of the newsletter was not known for a military medical beneficiary population. The WPMC Commander concurred that the thesis study should, for future implementation decision-making purposes, incorporate the newsletter to determine any effect on visitation rates. However, funding for the newsletters did not become available until February 1995. The first batch of newsletters was mailed in March 1995 and every month thereafter through the end of the study period. An example of the newsletter is presented in Appendix C.

Clinic Information. The four clinics were selected by the WPMC senior staff as being the primary "gateways" for admission into the facility and represent, in their opinion, the clinics having the largest increase in outpatient visitation. According to the Medical

Resource Metrics and Monthly Workload Statistics, there were over 483,000 outpatient visits to the WPMC in fiscal year 1994 (Erickson, 1995). Of this amount, the total outpatient visits for fiscal year 1994 in each of the four gateway clinics was as follows:

Primary Care	73,421
Pediatric Clinic	58,346
Emergency Room	40,231
Flight Medicine	<u>13,402</u>
Total	185,400

As a percentage of total outpatient visits, the total of the four clinics represents 38%. The remainder of the visits is accounted for by the other twenty-seven clinics in the WPMC.

An outpatient visit is defined as medical treatment that does not require an overnight stay. Those visits requiring an overnight stay are classified as inpatient visits. Each time a beneficiary receives treatment in the hospital, a manual annotation is made in the patient's records and simultaneously entered into CHCS, coded as outpatient or inpatient, and the particular clinic visited is identified.

Visitation Data Collection. By manipulation of the computer programs for CHCS, visitation data can be retrieved by clinic. All beneficiaries in the WPMC are identified by their sponsor's social security number. The sponsor is the active-duty or retired military member. Programming CHCS to retrieve visitation data by particular clinic by social security number produces all visits by that particular household during a specified time period. A data retrieval by SSN for each group identifies all visits by the households within a certain time period. Dividing the total visits per household by the number of study-eligible household members will give an average number of visits per person. Pre-test and post-test visitation data were compared for the groups by household and average per person, and further analyzed by household type (retired or active-duty).

## Data Analysis

The WPMC switched to the current CHCS in mid-March 1994. Patient records prior to March 1994 are not retrievable via CHCS. The pre-test baseline comparison period is from 1 April 1994 through 16 November 1994. Visitation data was pulled from that period in total for the four clinics and by each clinic for both individual and household classifications. The period of study was determined to be eight months from the start date, ending 17 July 1995. The end date was dictated by the WPMC senior staff because, if the self-care program proved beneficial, funds needed to be budgeted for it in time for the start of fiscal year 1996 on 1 October 1995. A graphical portrayal of the thesis timeline is shown in Figure 3-2.

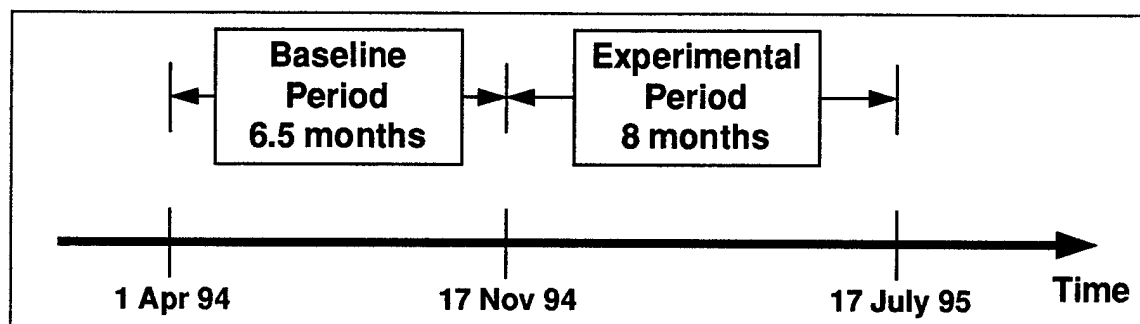


FIGURE 3-2. Timeline for Study Periods

Visits. On 17 July 1995, eight months after the study start date, outpatient visitation data for the groups was retrieved from CHCS. The visits were analyzed in comparison to the pre-test baseline period, 1 April 1994 to 16 November 1994. Furthermore, the subsets of the experimental group, those with book intervention only and those with the book plus monthly newsletter, were similarly compared.

The comparison of pre-test/post-test was done as follows. Visitation data was obtained from CHCS for the groups, gain scores were calculated, and groups compared

using the Statgraphics software package. Each group was arranged in the Microsoft software program Excel, using a spreadsheet organized by SSN, one SSN per row. For each SSN, information was arranged by column regarding the number of people per household, number of visits per household (pre-test and post-test), type of household (retired or active-duty), and type of book (if any) selected (child, adult, or senior). The data was then analyzed using the Statgraphics software program to test the null hypothesis that the means of the E and C groups were equal. Comparisons were primarily made between the E1, E2 and C groups to test the null hypothesis that the mean visitation rates were equal. Comparisons were performed using both gain score by household visits per month and by visits per person per month.

Costs. The WPMC Tri-Care Flight provided computations of outpatient visit costs for each of the four clinics. These estimates include the personnel, supply, and overhead costs required to operate each clinic. The cost per outpatient visit for each of the four clinics was summed and divided by four to obtain an average cost per outpatient visit. The WPMC clinic outpatient cost information for fiscal year 1995 is presented in the table below.

**TABLE 3-1. FY95 WPMC COSTS PER OUTPATIENT VISIT AT SELECTED CLINICS**

<u>Clinic</u>	<u>Outpatient Cost per Visit (FY95)</u>
Emergency Room	\$151
Pediatrics	\$86
Primary Care	\$96
Flight Medicine	\$132
Total--4 Clinics	\$465
Average Cost Per Outpatient Visit	<b>\$116.25</b>

The costs to conduct the self-care study are listed in the table on the next page. Man-hour costs are not shown due to the difficulty in arriving at an accurate amount.

**TABLE 3-2. ITEMIZATION OF SELF-CARE STUDY COSTS**

<b>item</b>	<b>description</b>	<b>cost</b>
self-care books	purchase 9,500 books plus shipping and handling costs	\$52,000.00
postcards	purchase--8,000 cards at \$0.05 each	\$400.00
	mailing--8,000 cards at \$0.19 each	\$1,520.00
train the trainers	two sessions done in one day	\$750.00
monthly newsletters	purchase--204 newsletters at \$0.52 each	\$106.08
	mailing--204 newsletters per month for 5 months at \$0.32 each	\$326.40
<b>TOTAL STUDY COST</b>		<b>\$55,102.48</b>

At the end of the study period, the total difference in visits per household between the control and experimental groups is calculated. The difference is then multiplied by 3/2 to convert the visits to a per year, per household basis. This figure can be interpreted as the yearly number of outpatient visits avoided per household because of the self-care intervention. This figure is multiplied by the number of households serviced by the WPMC (20,900), and then by the average cost per outpatient visit to obtain a rough estimate of the total potential yearly savings that could be attributed to complete implementation of the self-care program at the WPMC. Subtracting the total study cost from the total savings results in the net estimated savings due to self-care intervention. An estimated benefit to cost ratio can also be calculated for the self-care program by dividing the total potential yearly savings by the implementation costs.

## **Summary**

This chapter has outlined the methodology underlying the self-care study. A brief overview of the WPMC was presented, along with an overall description of the self-care program and discussion of the thesis experimental design. The training processes were covered and the book distribution described. The sample groups and subsets were specified, and the clinics under study identified. Methods of data collection and analysis techniques employed were discussed, and mention was made of the types of visits and cost comparisons that are to be done. The next chapter will focus specifically on the analysis of data for the self-care program.

## **IV. Results & Analysis**

### **Chapter Overview**

Presented in this chapter are the results of the experiment for the groups under study. Additionally, these results are analyzed and discussed. First, the data for each of the three groups are shown in summary form. Then, the results of the analysis of variance testing are presented. Next, a discussion is offered concerning incompatibility among the three groups. Finally, an explanation and results summary of the non-parametric test is given in both tabular and narrative form.

### **Preparing the Visitation Data for Analysis**

From July 18-21, 1995, the post-test visitation data was retrieved from the Wright-Patterson Medical Center Composite Health Care System database. As was done for the pre-test, information was coded as to the particular group (E1--self-care book only, E2--book plus monthly magazine, or C--control group). Furthermore, fields were inserted to reflect the type of household (retired or active-duty), size of household, and type of book received (child, adult, or senior). Finally, visits during the post-test period were tabulated. The entire file was then merged with the pre-test database. Visits were computed by household per month and by person per month. Accommodations were made for changes in the size of households, as this affects the number of visits per person per month. Gain scores were then computed by subtracting pre-test visits from post-test visits, as previously discussed in Chapter 3, Methodology. The file was then imported into the Statgraphics software package for data analysis.

## Descriptive Statistics

The sample size, mean, and standard deviation were computed for each group overall, and also for each particular subset (such as, retired households in group E1 given the adult self-care book). Visits per household per month and visits per person per month were the variables under study. Visitation data for the pre-test, post-test, and gain score are presented for overall groups in the table below: Mean and standard deviation data for the other group subsets, along with a comprehensive listing of all descriptive statistics, is included in Appendix D.

**TABLE 4-1. MEAN AND STANDARD DEVIATION DATA FOR GROUPS**

Group* (sample size)	Pre-Test per Month		Post-Test per Month		Gain Score	
	mean	std dev	mean	std dev	mean	std dev
E1-hh (215)	0.28	0.40	0.13	0.27	-0.15	0.30
E2-hh (204)	1.02	1.37	0.52	0.73	-0.49	1.04
C-hh (187)	0.21	0.38	0.09	0.28	-0.12	0.24
E1-pp (215)	0.15	0.27	0.07	0.17	-0.08	0.23
E2-pp (204)	0.46	0.76	0.23	0.34	-0.22	0.65
C-pp (187)	0.09	0.16	0.04	0.12	-0.05	0.11

\*Note: E1=experimental group received book only; E2=received book plus monthly magazine; C=control group; hh=visit rate per household; pp=visit rate per person.

Readily apparent from the above table is the notably high standard deviation for the group E2, whether compared by visits per household or per person. Because the standard deviation is the square root of the variance, E2 also has the highest variance of the three groups compared.

Mean Plots. A graphic portrayal of the mean plots for the three groups can aid in understanding the visitation data. These figures are useful for visually examining relative



differences between group. The “I-beams” in the figures below show the ninety-five percent least significant difference confidence interval for each group; that is, the range where 95% of the data fall. The “tic” mark at the center of each I-beam reflects the point where the mean lies. The two figures portray gain score comparisons both by household and by person, and appear as follows:

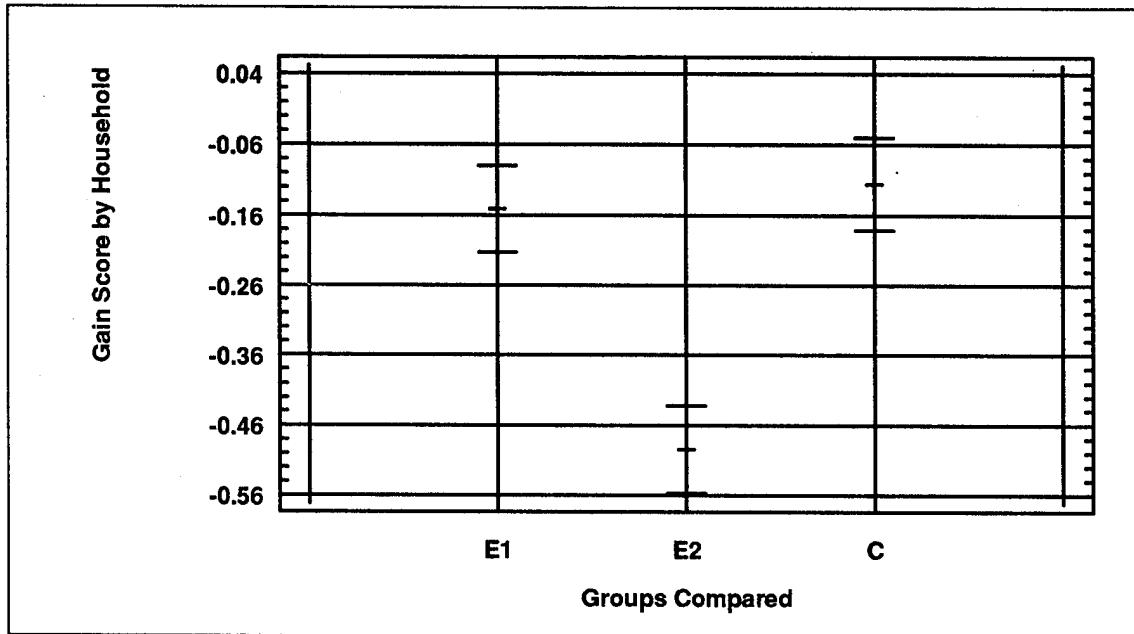
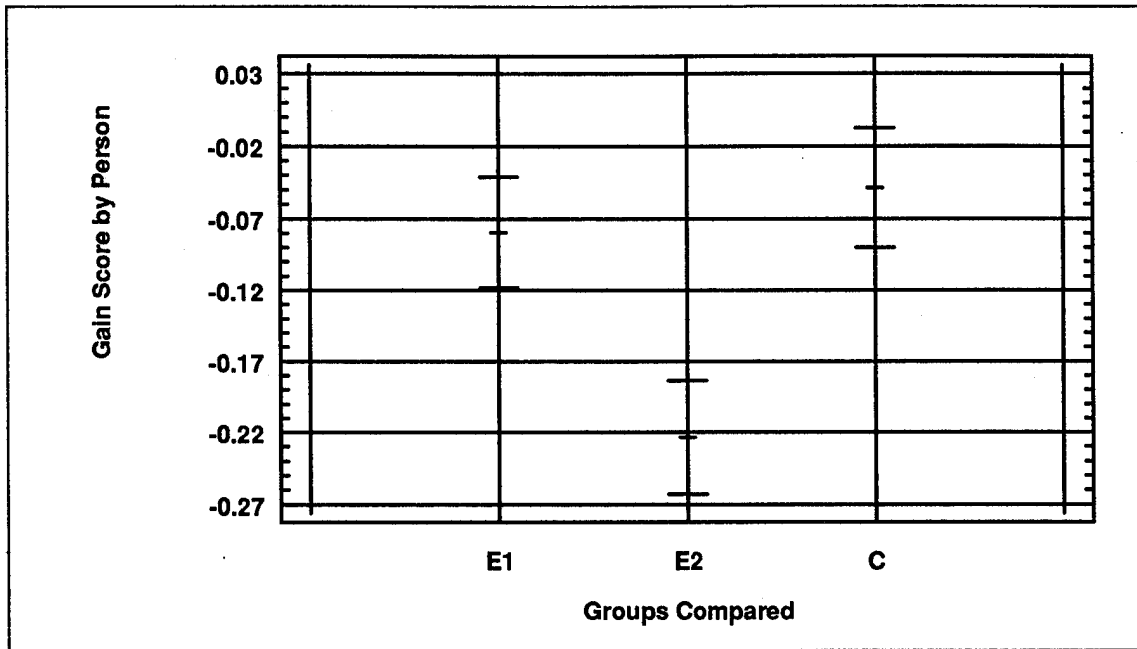


FIGURE 4-1. Mean Plots for Groups Compared by Household Gain Scores



**FIGURE 4-2.** Mean Plots for Groups Compared by Person Gain Scores

Regardless of whether the groups are compared by the dependent variable measured by household or by person, group E2 stands out as having a dissimilar distribution versus E1 and C. From these visuals, E2 clearly had the greatest reduction in visits during the post-test period.

Box and Whisker Plots. Another useful tool for viewing the data is a box and whisker plot. Box and whisker plots show the concentration density, or tightness or fit, of the data around the mean. Possible outliers are indicated by the dots outside of the “box” and “whiskers”. Major subset box and whisker plots are included in Appendix E. The figures appear as follows, first using the gain score by household as the measurement variable, then the gain score by person.

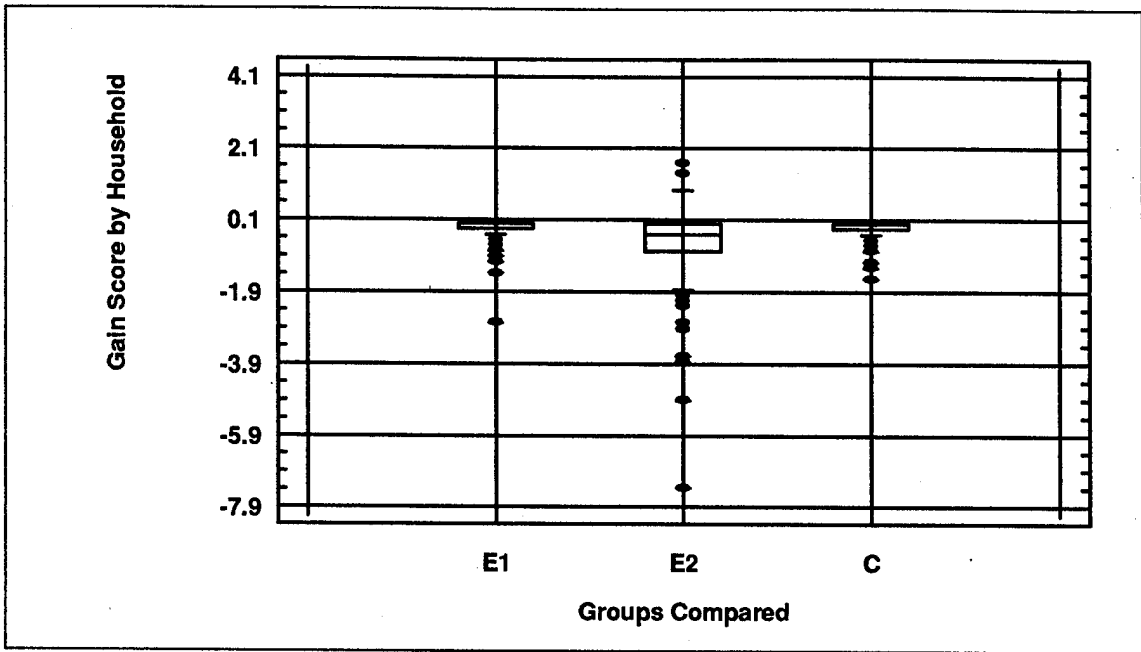


FIGURE 4-3. Box and Whisker Plots of Groups Compared by Household Gain Scores

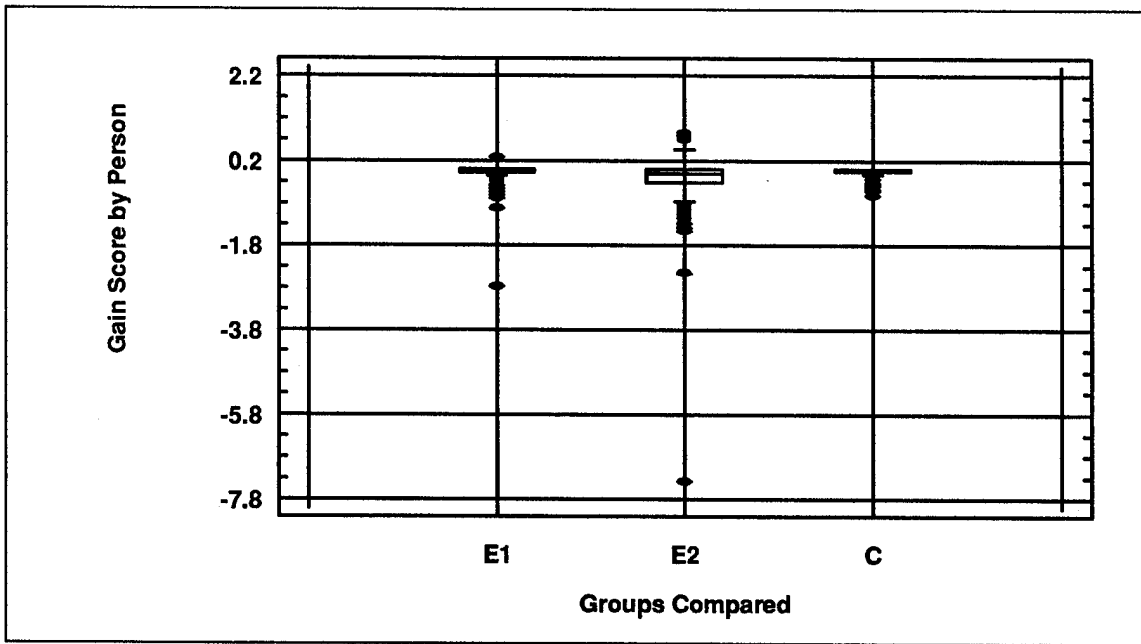


FIGURE 4-4. Box and Whisker Plots of Groups Compared by Person Gain Scores

The plots can be interpreted as follows: the more “dots” around the box and whiskers for each group, the greater the variability the data is exhibiting. In both figures, E1 and C appear to have similar means and variance dispersions, using either the visit rate per household per month or the visit rate per person per month gain scores. However, E2 seems to have a noticeably greater variability than E1 and C. Experimental group E2 exhibits a very large variance in favor of a greater reduction in visitation frequency, post-test versus pre-test, using either per-household or per-person gain scores. There is also a noted presence of significant outliers in E2. Outliers are those data observations that fall beyond the plus or minus range expected from the mean.. This warrants further analysis.

### **Examination of Variance**

For the three groups E1, E2, and C, the minimum and maximum gain scores can be identified. These data points readily appear on the box and whisker plots previously mentioned. Because these points are so far removed from the rest of the concentration of data points, they are termed outliers. The group C does not appear to have any extreme outliers. In the case of E1, perhaps only one relatively mild outlier exists. However, if attention is turned to the group E2, the picture clearly reveals several data points distanced from the “box”. These outliers, according to Dr. Dan Reynolds, are causing the large variance associated with E2 (1995). Upon closer examination of the households responsible for the extreme reductions in visitation frequency, it was found that the most extreme data point in group E2 was indeed due to an administrative keying error. Re-examination of the data revealed virtually no change in the descriptive statistics for E2. Investigation of the other outliers verified the visitation rates as being correct, thus the dispersion of visits for groups E1, E2, and C2 are accurately reflected in the box and whisker plots.

Turning back to Table 4.1, one can see that E2 clearly has the largest standard deviation of the three groups, whether the visitation rate is measured by household or by person. Since the standard deviation is the square root of the variance, the large values found for the standard deviation of group E2 become even more pronounced when squared to equal the variance. Therein lies a data problem warranting further research.

Variance and Normality Checks. The variance issue associated with E2 is troubling when one considers testing the sample against the other samples using a series of two sample analysis of variance tests. Two basic requirements exist before a two sample ANOVA can be run. First, according to Winer, "one of the basic assumptions underlying (the) model...is that the variance due to experimental error within each of the treatment populations be homogeneous" (1971:205). This means that, for the groups to be comparable using typical analysis of variance testing, the variances of each group must be relatively equal. Secondly, the samples must be normally distributed. Because the groups were systematically and sequentially randomly chosen, expectations were that the groups would exhibit normality. The box and whisker plots indicate otherwise.

Statistical procedures do exist to check for both homogeneity of variance and normal distributions among samples. Two methods were chosen to test for the homogeneity of variance--Cochran's test and Bartlett's test. Winer comments that "...the Cochran test uses more of the information in the sample data (and) it is generally more sensitive" (1971:208). Winer further states that "Barlett's test for homogeneity of variance is perhaps the most widely used test" (1971:208). Both tests establish the null hypothesis as the groups have equal variance. The sample combinations E1 versus E2 versus C were analyzed for the gain scores by household and by person using both tests, and the results are presented in the following table, along with the accompanying F-ratios.

**TABLE 4-2. RESULTS OF COCHRAN'S AND BARTLETT'S TESTS**

Groups	Cochran's Test		Bartlett's Test		F-Statistic	
	Statistic	p*	Statistic	p*	Value	p*
E1 v E2 v C by household	.879	0.000	2.27	0.000	21.2	0.000
E1 v E2 v C by person	.867	0.000	2.47	0.000	10.5	0.000

\*Note: The letter "p" represents the significance level; alpha was set at the .05 level.

Results of the tests indicate that there is sufficient statistical evidence to reject the hypothesis that the variances of the groups are homogeneous.

According to Pfaffenberger and Patterson,

the chi-square distribution may be used to test the hypothesis that a random variable has a specified theoretical statistical distribution. Perhaps the more important application of the chi-square distribution in this context is testing whether or not a random variable is normally distributed. (1977:447)

The test examines the differences between the data in the sample as compared against the dispersion frequencies expected if the sample were normally distributed (Pfaffenberger & Patterson, 1977:447). Tests were run for each group and all subsets. While complete tabular data is included at Appendix F, a summary of the highest-level groups is presented in the following table.

**TABLE 4-3. SELECTED RESULTS OF THE CHI-SQUARED TEST ON GROUPS**

<u>Group</u>	<u>Chi-Square Statistic</u>	<u>Significance Level</u>
E1 by household	405	0
E2 by household	105	0
C by household	660	0
E1 by person	368	0
E2 by person	145	0
C by person	641	0

When examined using the visitation measurements by household or by person, none of the groups tests significant. As a general rule, Shao states that "the larger the value of chi-square, the greater is the difference between observed and expected or theoretical

frequencies" (1976:423). The null hypothesis is rejected, and the conclusion is drawn that the groups are not normally distributed.

Implications of Extreme Variance in One Group. Because it has been statistically shown that (a) the groups are not normally distributed, and (b) there is evidence of heteroskedasticity of variance, formal analysis of variance testing is ruled out. This precludes the use of the F-statistic as a basis for judging the sample differences. Dr. Reynolds confirmed this, concluding that formal analysis of variance testing cannot be employed (1995).

### **Exploration Using Other Measurements**

Additionally, Reynolds explained that the heteroskedasticity of the data in group E2 may also affect the ability to engage non-parametric measures, but he agreed that the option should be explored, and that the data outliers should not be trimmed to force conformance (1995). Heteroskedasticity refers to the property that the variance of the visits in E2 are not equally distributed around the mean of the sample E2. In an attempt to compensate for the variance inequality among the groups, tests were conducted using non-parametric measures. Shao provides a concise explanation of non-parametric measures.

The methods of testing hypotheses employed in the area of non-parametric statistics are not concerned with population parameters. This provides a distinct advantage since we do not have to know the shape of the population (either distributed normally or not normally), or make assumptions about the population for the purpose of estimating population parameters. (1976:418)

Upon the advice of Dr. Reynolds, a non-parametric measurement was applied--the Kruskal-Wallis test--and a logarithmic data transformation was performed (1995).

Kruskal-Wallis Test. The Kruskal-Wallis test was the first non-parametric measure employed to examine the data. Shao states that, "This test can be used to determine whether  $k$  independent samples are drawn from identical populations or from  $k$  populations with the same mean" (1976:441). According to the Statgraphics Reference

Manual, “The Kruskal-Wallis test procedure analyzes the effect of a classification factor on a variable for a balanced or unbalanced one-way design. Because non-parametric tests look at median values rather than means, which outliers affect, use this procedure if you have outliers” (1993:K-19). The null hypothesis in the Kruskal-Wallis test is that each of the samples is drawn from the same population; in other words, it tests to see if their means are equal. As a general rule, a large Kruskal-Wallis test statistic leads to acceptance of the null hypothesis. Selected results of the Kruskal-Wallis test are presented in the following table.

**TABLE 4-4. SELECTED RESULTS OF THE KRUSKAL-WALLIS TEST ON GROUPS AND SUBSETS**

<u>Groups Compared</u>	<u>K-W Test Statistic</u>	<u>Significance Level</u>
E1/E2/C by household	-77.3	1.000
E1/E2/C by person	-13.5	1.000
E2/C by household	22.6	0.000
E2/C by person	24.7	0.000
E2/C by retired households	14.6	0.000
E2/C by retired persons	24.1	0.000

At the highest group level, the Kruskal-Wallis results indicate that there is no significant difference, and the null hypothesis must be accepted. It appears that the Kruskal-Wallis test corrects for the heteroskedasticity of the data, and the results seem to indicate that there is no statistical basis for stating that one group has a different visitation rate than the others.

Interesting results were obtained at the subset level when two groups were compared. Evidence exists to suggest that groups E2 and C exhibit different visitation patterns, both at the aggregate level and according to the classification type (retired), evaluating the gain scores both by household and by person. However, while the appropriateness of the Kruskal-Wallis test for comparing three groups has been



established, some ambiguity remains as to its validity and reliability when comparing two groups. According to Conover, the Kruskal-Wallis test reverts to the Mann-Whitney test when only two samples are compared. As a result, some of the non-parametric statistical power of the Kruskal-Wallis test is sacrificed when comparing two samples versus three samples (Conover, 1971:261). Therefore, the results for the E2 and C subset comparisons must be interpreted with caution.

Data Transformation. Because results of the Kruskal-Wallis test suggests that the samples are not comparable at the aggregate level, a last measurement was run to examine the effect of transforming the data. Upon the advice given by Dr. Reynolds, the logarithm of the visitation gain scores was taken, both by household and by person (1995). A value of positive eight was added to each data response, the result being that no negative values then existed in the data set because one cannot take the log of a negative number. Acknowledging that the distributions for the three groups had been consciously shifted, box and whisker plots revealed the same variance skewedness as reported for the untransformed data. Similarly, variance testing showed that the variance associated with the group E2 was significantly different when compared to the other groups, E1 and C.

## **Summary**

This chapter has presented the results and accompanying analysis of the visitation data for the three groups in the study. A discussion was given concerning the descriptive statistics, using mean plots and box and whisker plots to illustrate the data. Variance and normality tendencies were then explored using both Cochran's and Bartlett's tests. Finally, non-parametric measures were used to further explore the data. The conclusions based on these findings are presented in the following chapter.

## V. Conclusions

### **Chapter Overview**

Earlier chapters outlined the philosophy surrounding a self-care education program. The previous chapter presented the results of the study at the Wright-Patterson Medical Center. This chapter will discuss the conclusions drawn based upon the detailed statistical analysis. First, the results for the self-care program at Wright-Patterson Air Force Base will be interpreted and discussed. The investigative questions are answered based on the findings of the experiment. Next, limitations and constraints that possibly impact the study results will be presented. Reasons will then be covered that may aid in interpreting the findings, and the findings will subsequently be related to the larger Department of Defense military population. Finally, recommendations are made for future research into specific areas of self-care education.

### **Investigative Questions Answered**

In Chapter One, Introduction, the research investigative questions were posed. They included (1) does a self-care education program reduce visitation rates for a military beneficiary population?, (2) for what beneficiary group (retired or active-duty) does the program have the most impact?, and (3) what are the corresponding estimated cost savings associated with any reduction visitation demand? This thesis outlined the following hypothesis, a rejection of which would lead to the conclusion that visitation rate differences exist between the three groups:

Null hypotheses	$H_0:$	$\mu_{E1} = \mu_{E2} = \mu_C$
Alternate hypothesis	$H_A:$	Visitation means are different

As presented in the preceding chapter, the variance and non-normality of the groups is so extreme as to preclude use of ordinary parametric measurements to determine

differences between the sample groups. Non-parametric measures were subsequently employed, and the results strongly suggest that the null hypothesis cannot be rejected. There is no statistical basis for stating that the groups are different when the pre-test visitation rates are compared to the post-test rates. Thus, it must be concluded that the self-care education program, with the accompanying book and monthly magazine, have no statistical impact on the outpatient visitation rates of the Emergency Room, Primary Care, Pediatrics, and Flight Medicine clinics, as measured by gain scores per household or per person.

However, deserving of comment is that the trend in the visitation patterns for both E1 and E2 groups is in a favorable direction. This trend in decreased outpatient visits is most noticeable for group E2. Recall that the group E1 received the self-care book, and E2 received the same plus a monthly newsletter. The descriptive statistics reveal that E2 had the largest drop in visits per month after being given the treatment (-0.49 when measured by household, -0.22 when measured per person). The fact that E2 received the most intensive intervention treatment--combining the self-care book with the monthly *Taking Care* newsletter--may be deemed somewhat responsible for the positive direction of decreased visits.

Unfortunately, because the groups are not comparable using normal analysis of variance testing, the second investigative question cannot be answered. Differences between subset delineation's of the sample groups by household type (retired versus active-duty household) and by book type (child, adult, and senior) cannot be determined. Furthermore, investigative question number three, related to any cost savings associated with the self-care program has to be answered negatively. Since findings indicate no significant differences between groups, and any cost savings would be based on these differences, it must be concluded that no savings were found.

## **Impact of Study Constraints**

It is appropriate for some issues to be discussed concerning the experiment. Constraints do exist, such as the short observational period, the possible seasonality influence on the visitation rates, the potential for self-selection bias, and visitation rates of the non-responders, that can be interpreted to be directly related to the study.

Length of Post-Test Period. Previous studies exploring the impact of a self-care education program have based their findings on observational periods of one year or longer after application of the intervention treatment (Kemper, 1982; Vickery and others, 1983; Lorig and others, 1985; Vickery and others, 1988). A notable limitation of this study is that the observational period was from 17 November 1994 to 17 July 1995, a period of 8 months. While the results indicate no statistically significant decrease in visitation frequency among the groups, the trend is noticeably toward less visits. A longer study period, perhaps of a year or more after the books were distributed, could prove to be a decisive factor in making a statistical conclusion about decreased visitation rates.

Additionally, a constraint imposed by funding difficulties precluded the monthly *Taking Care* newsletters from being mailed to experimental households until late March 1995. There was a four-month lapse between distribution of the self-care books and mailing of the newsletters. Previous studies have lauded the benefit of the monthly magazines, stating that they provide systematic behavior reinforcement and reminders for the recipients to apply the algorithms set forth in the self-care book (Vickery and others, 1983 and 1988). Group E2, which received the monthly newsletters, does exhibit the largest trend in decreased visitation rates. However, it is difficult to ascertain the extent of the impact that the lapse in behavior reinforcement had on the group. Likewise, the lack of study results available presents a disappointing barrier to analyzing the extent to which the magazine can be determined responsible for the decreased visitation trends.

Seasonal Influence on Visitation Rates. Closely related to the duration of the study period is the potential affect of seasonality upon the observed visitation rates. The baseline period for this study, from 1 April 1994 to 16 November 1994, covered mainly the summer months. However, the study period covered mostly the winter and spring months, only partially recording summer month visitations. Establishing the baseline and experimental periods was beyond the control of the researcher, as information demands levied by the WPMC dictated the study period length and limitations within the WPMC CHCS database restricted the baseline period. The use of a control group in the study is believed to be a reinforcing factor to somewhat mitigate the effects of seasonality. However, the lack of overlap between the baseline and study periods may lead to some seasonal variation in utilization patterns for the groups. A more attractive arrangement would have established baseline and study periods that completely overlapped, in order to correct for any effects of seasonality.

Potential for Self-Selection Bias. While the households to which the postcard invitations were sent were selected randomly, those choosing to respond to the invitation cannot be considered random. It can be argued that those households made a conscious decision to participate, and thus are predisposed to wanting to improve their health. Furthermore, those respondents may reflect households who are inherently interested in health education programs and are most likely to actively participate. In the self-care study conducted by Vickery and others, they addressed the issue of a potential self-selection bias. They comment that, "Certainly the population was self-selected, but we doubt that participants selected themselves on the basis of a willingness to use fewer medical services" (1983:2956). On the contrary, based on the design of their study, Vickery and others concluded that "it is likely that participants selected themselves on the basis of their interest in using more services rather than less" (1983:2956). Based on these

observations, similar visitation behavior patterns were expected for the respondents in this study, and any self-selection bias was believed to be nominal.

Visitation Rates for the Non-Responders. The large majority of retired respondents (383 out of 419 participants were retired households) is likely to be a reflection of the population served by the WPMC. Over half of the beneficiary population serviced by the WPMC is comprised of military retirees and their dependents (Bradley, 1994). However, it is interesting to note the low response rate in total--419 respondents from nearly 7,000 households solicited. It would have provided some reassurance had the visitation rates of the non-responders been available. Then, any differences between those households responding and those choosing not to respond could have been addressed and analyzed. Due to data limitations, the visitation rates of the non-responders was unobtainable.

In a previous study of a self-care health education program, Lorig and others addressed the issue of non-responders. A concern arose that "data from the non-responders might change the study conclusions. However, the data we do have on non-responders do not suggest this" (1985:1052). In another self-care related study, Stergachis and others similarly found that the non-responder group is not statistically different from the experimental responder group (1990:24). The conclusions of these two previous studies lends assurance that, despite restrictions on access to non-responder visitation data, important considerations were not overlooked when comparing the experimental and control groups.

### **Possible Explanations for the Data Findings**

Analysis of the data retrieved as a result of this study point to no difference in visitation rates based on a self-care intervention program, but the trend toward decreased outpatient services utilization is encouraging. Studies on other than military beneficiary

populations, using the same materials as this study employed, reported statistically reliable differences between groups using a self-care education program (Morrell and others, 1980; Vickery and others, 1983 and 1988; Lorig and others, 1985). The question must then be asked, why wasn't a significant difference found in a military medical population?

Air Force Goal: Healthier People. The Air Force surgeon general, Lieutenant General (Dr.) Edgar R. Anderson, Jr., has remarked that, "Our goal is to keep our people healthier" (Lowe, 1995:22). From the start of recruitment into the military, members are constantly reminded of the emphasis given towards excellent health through proper exercise and nutrition. Because of the past emphasis on military readiness, including the requirement to be in a constant state of excellent physical health, some have also forwarded the conclusion that, "Military beneficiaries may actually be healthier than civilians because of their unimpeded access to (health) care" (Reischauer, 1994:72). This statement may provide some explanation for the results presented in this thesis. The hypothesis could be formulated that, since military members are encouraged to maintain high standards of physical fitness, this behavior remains intact even after retirement from the services. Furthermore, the fitness behavior patterns may "spill over" into the family of the military member. And when the military person or family members do fall ill, ready access to health facilities provides quick reaction and crucial treatment, lessening the chance for escalating ailment severity. Thus, the statement of Reischauer may have some interesting connotations when viewed in this regard.

Current Health Promotion Efforts. The outlook for the future continues the emphasis of the past on fitness and health. The Air Force surgeon general explains that "future efforts will teach people how to take better care of themselves" (1995:22). Additionally, recent decisions within the managed care system of the military services "will restructure incentives for delivering DoD health care by encouraging beneficiary wellness and cost-effective approaches such as use of preventive services" (Aspin, 1994:119). At

the WPMC, the Business Plan outlines greater outreach and prevention efforts to reduce overall demand for medical services. Indeed, one entire department within the WPMC is devoted to health promotion and education--the Wellness Center (Dodd, April 1995). Other military medical centers also have health promotions and awareness offices. It is not known whether the efforts of the health promotions offices have been so effective for military medical beneficiaries as to produce minimal additional benefit from implementing a self-care education program.

Incentives to Avoid Treatment. Moore and others, in their study of self-care using the same books as this thesis, offered participants \$50 if their visits to the doctor at the end of six months had decreased notably. However, findings led to the conclusion that "even with aggressive book distribution with a \$50 incentive, we found no significant change in the number of visits to physicians" (1980:2319). Turning attention to possible incentives for a military beneficiary population to avoid formal physician treatment through self-care methods, little is offered to dissuade users of a military health care facility such as the WPMC. Active-duty military and their families enjoy outpatient medical treatment (and most inpatient treatment) free of charge at most DoD military medical centers. Likewise, retired persons and their eligible family members also enjoy virtually cost-free outpatient medical care, on a space available basis. The only incentive to consider is that of time-savings enjoyed by those who employ self-care to avoid treatment. The lack of a substantial incentive not to visit the military medical center may offer a plausible explanation for not finding significant visitation decreases associated with the self-care program.

### **Suggestions for Future Research on Self-Care**

Future attempts to determine the effectiveness of a self-care education program should ensure that completely overlapping baseline and study periods are built-in to the



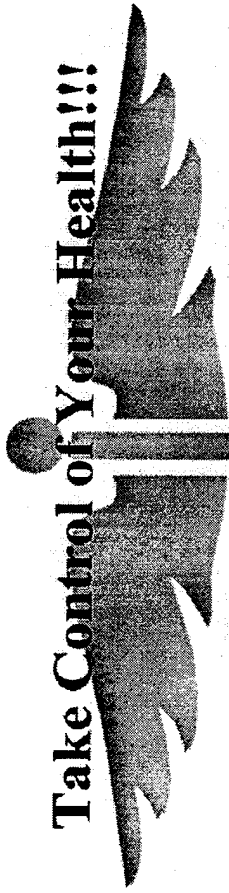
experimental design. Furthermore, funding for the complete study should be secured up-front for all treatments to be applied through the study.

An interesting area for future self-care efforts is that of the relationship between the continued military emphasis on physical fitness and subsequent self-care behaviors induced as a result of that emphasis. Perhaps military members and their families have a heightened level of self-care awareness, compared against civilian counterparts, because of the health promotion and education programs already in place in DoD and the Air Force. Another issue requiring future attention when considering self-care programs is in the area of incentives. It would be interesting to see the effect of a self-care program aimed at a military beneficiary population when coupled with various incentives not to seek physician intervention.

### **Summary**

Presented in this chapter were the conclusions, based on the findings of the self-care education program experiment conducted at the Wright-Patterson Medical Center. The investigative questions were answered in light of these findings, and possible constraints and limitations pertaining to the study were discussed. Several explanations were then offered for the results. Finally, suggestions for future research in self-care were given, addressing not only caveats but also indicating areas needing attention.

**Appendix A: Example of Postcard Invitation**



# Take Control of Your Health!!

As part of our continuing effort to improve benefits, we are offering a new service called the Taking Care Program. Taking Care is a patient health education program which supports you and your family (if applicable) in the decisions you face regarding health and medical care.

If you are interested in taking part in this program and receiving your FREE guide to medical care, please come to Bldg 640, AFIT School of Engineering, Bane Hall, Room 120, on one of the dates listed to the right.

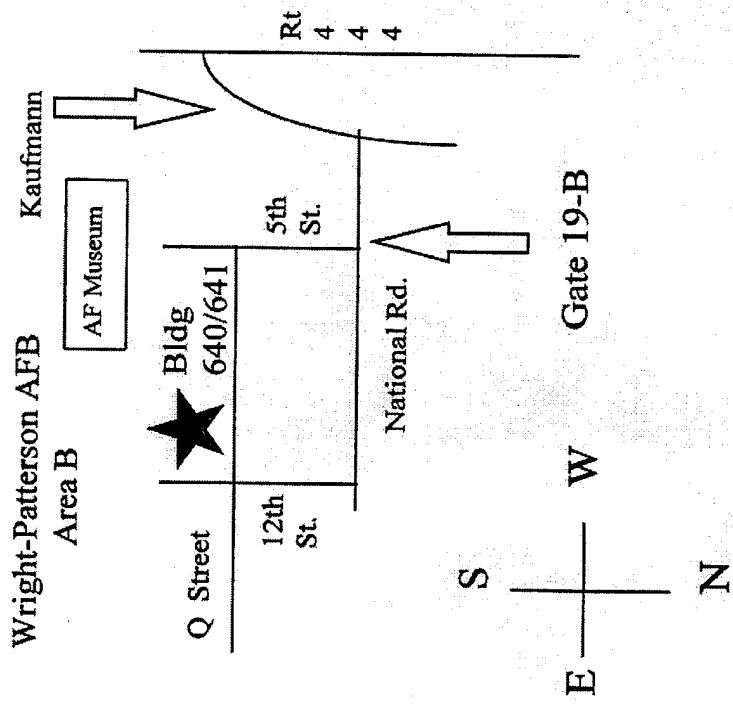
Along with your self-care book, you will receive a 30-45 minute class of instruction to show you the three pertinent books available and teach you how to use the book best designed for you.

Book pickup and training will be in the AFIT School of Engineering, Bldg 640, Area B (Look for the "Self-Care" signs). This location was selected for your convenience due to parking problems at the medical center. Please choose a day that best fits your schedule. No pre-registration is required.

(FRONT)

31 Oct (Mon)/1900-2000	When?
1 Nov (Tue)/1900-2000	
2 Nov (Wed)/1900-2000	
3 Nov (Thur)/0900-1000	
4 Nov (Fri)/1400-1500	
5 Nov (Sat)/1000-1100 or 1500-1600	

(BACK)



**Appendix B: Self-Care Briefing Script and Overhead Slides**

## Self-Care Book Presentation

### **Welcome/Introductions (2-3 min)**

- Welcome the group on behalf of Col Dodd, Commander Wright-Patterson Medical Center.
- Introduce yourself and your training partner
- Have participants read and sign Receipt and Acknowledgment paper (go over it with them)
  - Collect
- Ask a few of the participants why they came to the session

### **Attention (2 min)**

Question: Has anyone here ever gone to the Medical Center's emergency room, especially in the winter, and found it full of people waiting to be seen? Did you think all those people needed to be there receiving emergency treatment? (Try to elicit some response)

*TP-1 - National studies have shown that from 11-38% of emergency room visits are for non-emergencies*

Question: Has anyone here ever had difficulty making an appointment at the Medical Center's primary care or pediatric clinics? Why are they always so crowded? (Try to elicit some response)

*TP-2 - As many as 70% of visits to doctors for new problems have been termed unnecessary  
- 5% of doctor visits are for the common cold for which no medical intervention is necessary*

If unnecessary visits were reduced, there would be more appointments available for necessary medical treatment

### **Program Introduction (5 min)**

What we want to do today (tonight), is to give you a tool to help you make better, informed decisions of when you think medical intervention is necessary and when you should treat the medical problem at home. In 1981, the Surgeon General of the United States released a carefully worded report, Health Promotion and Disease Prevention, with this statement:

*TP-3 "You, the individual, can do more for your own health and well being than any doctor, any hospital, any drug, any exotic medical devices."*

To decide if medical problems can be treated at home, you need information. When you signed in today you were asked to select one of three books developed by the Center for Corporate Health, Inc.: Taking Care of Your Child, Take Care of Your Self, and Taking Care of Today and Tomorrow.

(Show the three books)

These books are designed to help you:

- TP-4 - Improve your health*
- Raise your self-care skills*
- Use medical services more wisely*
- Save money*

(Show each book individually as you talk about it)

**Taking Care of Your Child** gives parents detailed instructions for all aspects of home care for children, as well as what to expect if you do need to go to the doctor. The book includes information and decision charts for over 100 common medical problems of children.

**Take Care of Yourself** gives some detailed instructions of home care for children, but concentrates mostly on the adult population. The book contains information and decision charts that show you how to deal with 120 common medical problems.

**Taking Care of Today and Tomorrow** is different from the other two books in that it doesn't give detailed instructions on home care, instead it gives readers of all ages a guide on how to maintain health, age successfully, and identify resources to help care for an elderly parent or loved one.

We realize that you were not given much time to choose which book you wanted to receive. So at the end of today's short session, if you would like to exchange the book you selected for another book, we would be happy to do that for you.

(Transition)

In a few minutes we'll take a closer look at each of the books and show you how to locate and step through the decision charts. But first, we'd like to show a short videotape developed by the Center for Corporate Health which describes, from the patient's perspective, the need for this self-care program.

### **Show Videotape (10 min)**

As the videotape showed, these self-care books are a guideline to help you decide if you need to seek medical intervention. **They are not a replacement for medical care.** If you delay a visit to the doctor when you really need it, you may suffer unnecessary discomfort, or have an illness go untreated. On the other hand, if you go to the doctor when you don't need to, you waste time, often lose money, and can cause longer waiting times for those patients needing treatment.

Let's now take a look at the books you've selected.

### **Navigating Through the Books (10)**

A good method for learning how to use your new book is to first examine the Table of Contents

(Have everyone find their table of contents - Child, Yourself page VIII, Today page IX)

#### **TP-5**

All three books are divided into four or five major parts or sections. Note that each book is different and concentrates on different stages in our lives.

The **Taking Care of Your Child** book begins with Birth of a Family, followed by The Growing Child, The Healthy Child, The Child and the Common Complaint, and Family Records.

#### **TP-6**

The **Take Care of Yourself** book begins with The Habit of Health, followed by Working With Your Doctors, Managing Your Medicines, The Patient and the Common Complaint, and Family Records.

**TP-7**

The **Taking Care of Today and Tomorrow** book begins with *Are You Aging Successfully*, followed by *Developing Your LifeSkills*, *Common Chronic Ailments of Older People*, and *Preparing for Long-Term Care*.

Take a minute to look at the various chapters contained in the major parts or sections of your book.

(Use the **Take Care of Yourself** book as a visual aid)  
(Name a few of the chapters listed in the **Take Care of Yourself** book)

While all the chapters are important, we will concentrate today (tonight) on the chapters involving **Common Complaints**.

This is Part IV of both the **Taking Care of Your Child** and the **Take Care of Yourself** books. There is no corresponding chapter in the **Taking Care of Today and Tomorrow** book.

Part IV, which discusses common complaints, begins by explaining how to use this section of the book.

(Have the participants turn to that section of their books - Child page 243, Adult page 40)

Both books guide you through the same procedures:

- TP-8**
1. *Determine if emergency action is necessary*
  2. *Find the section that covers your medical problem*
  3. *Turn to the section for your worst problem first*
  4. *Read all the general information in the section*
  5. *Go through the decision chart*
  6. *Follow the treatment indicated*

The charts will usually recommend one of these actions:

- TP-9**
1. *Apply home treatment*
  2. *See Doctor now*
  3. *See Doctor today*
  4. *Make appointment with Doctor*
  5. *Call Doctor today/now*

Following these brief explanations you will see a decision chart which, if followed, will lead you to the books recommended course of action.

(Step through the basic decision chart - Child page 246, Adult page 143)

### **Decision Charts (15-20)**

Let's take a medical situation to see if we can determine the most appropriate treatment method recommended in your books.

Situation: Tomorrow night a freezing rain falls and as you're walking out to your car, you slip and fall on the icy sidewalk, hurting your wrist. You look at your wrist and see no obvious deformity. You can still use bend your wrist and use it for minor things, but it hurts if you try to lift anything. What is the most appropriate treatment method?



1. Use your main decision chart to locate this injury.

(Step through the Arm Injury decision chart - It is located under common injuries in both books)

2. Turn to the common injuries section of your books (Child page 260, Adult page 155)

3. Locate Arm Injuries (Child page 282, Adult page 174)

4. Step through the decision chart

Is there obvious deformity - No  
Does pain prevent any use - No

5. Apply home treatment which consists mainly of Rest, Ice and Protection.

**Another method for finding which decision chart to use is by looking up the problem in the index located in the back of the book.**

(Have the participants look up Wrist injuries in the index.)

Let's take a look at another situation to determine if medical intervention is necessary or if you can apply home treatment to resolve the problem.

Situation: You've just poured yourself a cup of coffee at home. You sit down in a chair and are getting ready to drink your coffee, when your dog bumps into your arm. You spill the scalding hot coffee on your leg creating a red, blistered area approximately the size of a silver dollar. What is the recommended method of treatment for this medical problem?

Use your book to determine what you should do. (Have participants do this exercise)

(Look up Burns in the index, it discusses burns on - Child page 288, Adult page 179)

(Briefly discuss the recommended home treatment)

We'll examine one more medical problem.

Situation: A week ago, you took your kids bike riding on the Yellow Spings-Xenia bike trail. Riding along, enjoying the scenery, you didn't see the rock in the middle of the trail. Your front tire hit the rock, sending you and your bike tumbling onto the paved trail. In the process, you badly scraped your right leg and arm. You hobble home and clean your wounds as best as you can. But you can't remove all the dirt and foreign material that's embedded in your leg. What is the recommended method of treatment for this medical problem?

Use your book to determine what it recommends as the best treatment alternative.

(Scrapes and Abrasions - Child page 269, Adult page 163)

In this case the recommended alternative is to see the doctor now.

### **Conclusion (2-3)**

As you can see, these books are designed to be an easy to use guide to your own medical self-care. In addition to chapters on preventing illness, what things to keep in your home pharmacy, staying healthy, and aging successfully, the **Taking Care of Your Child** book discusses and has decision charts for 100 common childhood complaints. And the **Take Care of Yourself** book discusses and has decision charts for 120 common complaints.

Use these books as a guide to better health for you and your family. They can help you save time, save money, improve your health, raise your self-care skills, and help you use medical services more wisely.

As we said at the beginning of this session,

**TP-10** *"You, the individual, can do more for your own health and well being than any doctor, any hospital, any drug, any exotic medical devices."*

Ask the participants if they have any questions.

Thank everyone for coming and remind them that they can exchange the book they initially selected for a different book.


### **Answers to possible questions**

Q. Why was I selected to receive a book?

A. The Medical Center only received a limited amount of self-care books, and we wanted to get them to people who might be interested in using them. We didn't want to give them out to people who don't really want the books. So we randomly selected individuals to receive invitations with the understanding that those individuals, such as yourself, who would make a special effort to pick them up, would be more likely to use the books.

Q. How is using this book going to save me money since I don't pay for my medical care now?

A. If you use CHAMPUS accepting providers for your medical care, you will save money by avoiding unnecessary co-payments. If you use WPMC for your medical care, you could save money by not having to take time off from work to take yourself or child to the hospital. You won't have to pack up the family, drive to the medical center, wait in line, and see a doctor only to be told you really didn't need to come in. You will help free up appointments for medically necessary visits, which means that delays and waiting lines may be shorter for you the next time, when you really do need medical intervention.



**Welcome to  
Wright-Patterson Medical  
Center's  
Self Care Program**

# Self-Care Program

- 11-38% of emergency room visits are for non-emergencies



# Self-Care Program

- 70% of visits to doctors for new problems have been termed unnecessary
- 5% of doctor visits are for the common cold



# Surgeon General

- "You, the individual, can do more for your own health and well being than any doctor, any hospital, any drug, any exotic medical devices."



# Taking Care of Your Child

- Birth of a Family
- The Growing Child
- The Healthy Child
- The Child and the Common Complaint
- Family Records

# Self-Care Book Design

- Improve your health
- Raise your self-care skills
- Use medical services more wisely
- Save money



# Taking Care of Today and Tomorrow

- Are You Aging Successfully
- Developing Your Lifeskills
- Common Chronic Ailments of Older People
- Preparing for Long-Term Care

# Take Care of Yourself

- The Habit of Health
- Working With Your Doctors
- Managing Your Medicines
- The Patient and the Common Complaint
- Family Records

# Common Complaints

- Is emergency action necessary
- Find the section that covers your medical problem
- Turn to section of worst problem first
- Read the general information in the section
- Go through the decision chart
- Follow the treatment indicated



# Recommended Actions

- Apply home treatment
- See Doctor now
- See Doctor today
- Make appointment with Doctor
- Call Doctor today/new

# Surgeon General

● "You, the individual, can do more for your own health and well being than any doctor, any hospital, any drug, any exotic medical device."

**Appendix C: Example of Monthly *Taking Care* Newsletter**



# Taking Care®

TAKING CARE PROGRAM, WINNER OF THE C. EVERETT KOOP NATIONAL HEALTH AWARD

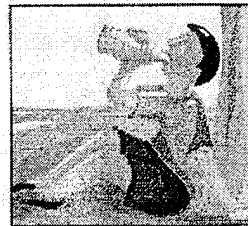


**Fun in the Sun**  
How to avoid common  
summer pitfalls, page 6

## IN THIS ISSUE

### Toll-Free Checkup

Is your doctor board  
certified?, page 4



### Beat the Heat

Protect yourself against  
heat exhaustion, page 5

### AIDS Update

Separate fact from fiction,  
page 9

### Money & Marriage

How to achieve financial  
harmony, page 10



# Taking Care

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# FOR THE HEALTH OF IT

## Chicken pox Vaccine

Varivax, a vaccine for chicken pox, is expected to be 70 to 90 percent effective in preventing the disease, says the Food and Drug Administration (FDA). The FDA recommends a single dose of the vaccine for children ages 12 months to 12 years, and two doses of the vaccine—administered four to eight weeks apart—for adolescents and adults ages 13 and older who have never had chicken pox.

Research shows the vaccine may be most effective when given between 12 and 18 months of age, at the same time as the child's first measles, mumps and rubella immunization. Chicken pox is one of the most contagious childhood diseases and accounts for 50 to 100 deaths annually.

*The Food and Drug Administration*

## Wash Cutting Boards

One in four people fail to wash cutting boards with soap and water before preparing another raw food, according to the Center for Food Safety and Applied Nutrition. Failure to clean cutting boards can allow the transfer of harmful bacteria from uncooked turkey or chicken, for example, to raw fruit or vegetables.

The Food and Drug Administration recommends washing all cutting boards with hot soapy water after each use, and using one board for cutting meat and another for vegetables and bread.

*Tufts University Diet & Nutrition Letter*

## Screen Cleaning

Cleaning your computer screen weekly is good for your eyes, says the American Optometric Association. Dirt and dust—drawn to your computer by static electricity—accumulate quickly and make your eyes work harder.

*American Optometric Association*

## Tetanus Protection

More than seven in 10 Americans age 70 and older lack protection against tetanus, a potentially fatal infectious disease—also known as lockjaw—that attacks the nervous system, according to researchers. Peter Gergen, M.P.H., of the National Institutes of Health, and colleagues also found that 12 percent of

children ages 6 to 11 and 20 percent of children 10 to 16 lack protection.

The tetanus vaccine is very effective; only 36 cases were reported last year in the United States. The vaccine, though, loses its effect over time. For that reason, the Advisory Committee on Immunization Practices and the American Academy of Pediatrics recommend adults get a tetanus/diphtheria booster shot every 10 years and that children have five tetanus immunizations by age 6.

*The New England Journal of Medicine*



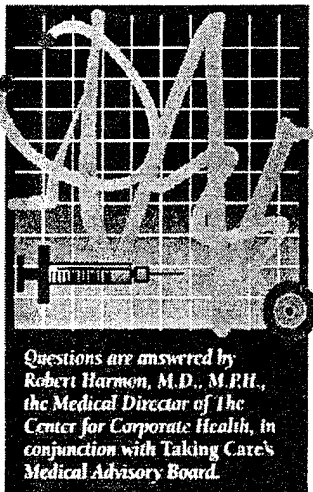
## Keep Fireworks Safe

Fireworks are a part of many July 4 celebrations, but if not used safely they can cause serious injury. The U.S. Consumer Product Safety Commission (CPSC) estimates that 12,800 people received emergency room treatment for fireworks-related injuries in 1993. To help people use fireworks more safely, the CPSC offers these recommendations:

- Do not allow young children to play with fireworks.
- Older children should use fireworks under close adult supervision only.
- Before using fireworks, read all warning instructions printed on the label.
- Light fireworks outdoors in a clear area away from houses, dry leaves, grass or flammable materials.
- Keep a bucket of water nearby for emergencies and for pouring on fireworks that don't go off.
- Make sure other people are out of range before lighting fireworks.
- Never ignite fireworks in a container.
- Store fireworks in a cool, dry place.

*U.S. Consumer Product Safety Commission*





Questions are answered by Robert Harmon, M.D., M.P.H., the Medical Director of The Center for Corporate Health, in conjunction with Taking Care's Medical Advisory Board.

**Bad Breath**

**Q.** I have had halitosis for years and cannot figure out why. I eat a good diet, drink a lot of water and exercise regularly. Can you shed some light on what causes halitosis, and on possible cures?

—A reader from Virginia

**A.** Offensive mouth odors can be caused by poor dental hygiene, tooth decay, inflamed gums, smoking, certain foods like garlic and coffee (especially decaf) and impaired saliva flow. Diseases such as diabetes, liver and kidney failure, infections of the lungs or sinus cavities and digestive problems are other potential causes.

Assuming you are a nonsmoker and do not have one of the underlying diseases listed above, you may want to consider a dental checkup, complete with a thorough teeth cleaning, and training on flossing and dental self-care. It is important to brush the tongue as well as the teeth and gums. Mouthwashes can provide temporary help, but eliminating the real cause is the best approach.

Have a question? Send it to "The Doctor is In," The Center for Corporate Health, 10467 White Granite Dr., Suite 300, Oakton, VA 22124, or fax it to (703) 218-8467. "The Doctor is In" supplements the advice of your personal physician, whom you should consult for personal problems and questions. We're unable to respond to all questions personally.

**Breast Implants**

**Q.** Ten years ago I had silicone breast implants placed. Are there serious health risks to babies breast-fed by mothers who have these implants? Also, is it possible to have a mammogram immediately after delivery or to have the milk tested to detect the presence of silicone?

—M.M., Granite Bay, Calif.

**A.** A small study in the *Journal of the American Medical Association* found a relationship between breast-feeding by mothers with silicone implants and esophageal or immune disorders in their children. However, larger research studies are needed to verify these findings.

Douglas Marchant, M.D., director of the Breast Health Center, Women and Infants Hospital in Providence, R.I., said the key is to know where the implant was placed. "Normally the implant is put in behind the chest muscle. If that's the case, women don't need to worry about [health risks related to breast-feeding]," Dr. Marchant said. "If the implant was placed on top of the muscle, women may want to consult with their doctor before breast-feeding because there may be a problem with the breast itself and [the possibility of] disturbing the implant."

Dr. Marchant added that breast milk can be checked for silicone particles.

However, he said if the implant remains intact it is very unlikely there will be any leakage that would affect the baby.

**Attention Deficit Disorder**

**Q.** My grandson was recently diagnosed with attention deficit disorder. Can you discuss this condition, including treatment options and possible warning signs to look for?

—D.E., El Paso, Texas

**A.** This condition, known as ADD, is very similar to attention deficit/hyperactivity disorder (ADHD), which is ADD with hyperactivity. Both are behavioral disorders that begin in childhood whose causes are unknown. ADHD is characterized by varying degrees of inattention and impulsiveness, which often interfere with school performance and social interaction. ADHD affects about 3 to 9 percent of school-age children, and boys are four times more likely to have it than girls.

Treatment options include counseling and medication. More than 70 percent of children with ADHD respond well to stimulant medications such as dextroamphetamine (Dexedrine) and methylphenidate (Ritalin). The most common side effects of these medications are poor appetite, weight loss, insomnia, nightmares, irritability, headache and upset stomach.

**Dietary Fat**

**Q.** What is the difference between total fat and saturated fat, how many grams of fat do people need each day and how much fat is too much?

—K.W., Wichita, Kan.

**A.** Total fat is a term commonly found on food labels and refers to the sum (in grams per serving) of several different types of fat compounds. Saturated fat is one of the more harmful types and comes mostly from animal sources (like meat) and coconut and other

palm oils. It is associated with raising LDL (bad) cholesterol and total blood cholesterol levels.

Fats have nine calories per gram, more than twice as many as carbohydrates or proteins, which have four calories per gram. It is recommended that no more than 30 percent of your dietary calories come from fat. It is very difficult for anyone over age 2 to eat too little fat.

For a person eating 2,000 calories a day, fat should be limited to 630 calories or 66.7 grams. Saturated fat should be no more than a third of this, or 22.2 grams. Low-fat foods include fruits, vegetables, fish, skinless white meat (poultry), lean meat and those labeled fat-free or nonfat.

Nutrition Facts	
Serving Size 1 cup (225g) Servings Per Container 2	
Amount Per Serving	
Calories 250	Calories from Fat 110
% Daily Value*	
Total Fat 12g	18%
Saturated Fat 5g	10%
Cholesterol 30g	60%
Sodium 20g	40%

	Calories	% Daily Value*
Total Fat	12g	24%
Saturated Fat	5g	10%
Trans Fat	0g	0%
Cholesterol	30mg	60%
Total Carbohydrate	30g	60%
Dietary Fiber	2g	4%

\*Percent Daily Values are based on a diet of other people's secrets. Your daily values may be higher or lower depending on your calorie needs.

## How to Verify Your Doctor's Credentials

**R**are is the doctor's office that doesn't have medical certificates hanging on the walls. But what do these certificates mean to you—or, more importantly, what certificates or training should you look for in your doctor?

Board certification is a good place to start. The Evanston, Ill.-based American Board of Medical Specialties (ABMS), the leading authority on board certification, has 24 member boards (see box) that govern certification in 38 general specialties and 74 subspecialties.

### What Certification Means

To become board certified, doctors complete three to seven years of training after medical school and pass written or oral exams. All states require doctors to have a medical license, but board certification is voluntary.

The ABMS estimates that 25 percent of the 600,000 doctors in the United States are not board certified.

J. Lee Dockery, M.D., executive vice president of ABMS, said while board certification is no assurance of quality, it is an important piece of information for people to know.

"Board certification means doctors have completed approved training, that their performance has been evaluated and they have passed an examination to determine their knowledge, skills and ability to practice that respective specialty," says Dr. Dockery.

Beware: There are as many as 127 self-designated specialty boards not recognized by the ABMS. Some of these boards require extensive training, while others supply a certificate in exchange for a fee.

### Call for Answers

How can you tell the difference? The ABMS has established a toll-free number you can call to verify your doctor's certification status. By calling (800) 776-2378 Monday through Friday between 9 a.m.

and 6 p.m. Eastern time, you can find out:

- If your doctor is board certified.
- What specialty certification(s) your doctor has.
- When the certification expires.
- The school your doctor graduated from.
- The office address and phone number.

Doctors certified less than four months prior to your call will not show up on the database. Also, some member boards require a practice period (maximum of two years) after completion of training before an examination can be taken.

Dr. Dockery said it's a good idea to have the correct spelling and address of your doctor, as there could be several doctors with the same name.

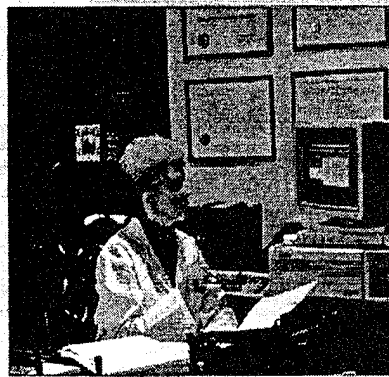
### Facts to Consider

You may be very happy with a non-board certified doctor. But if you are selecting a new doctor, here are several facts to consider:

- Many hospitals will not allow admitting or surgical privileges to doctors who aren't board certified.
- Of 69 doctors disciplined in California from 1991 to 1994 for the most serious offenses, 68 involved doctors not certified by the ABMS.
- A 1989 study published in the *Annals of Internal Medicine* found that board-certified doctors scored significantly higher on written tests and received higher ratings on clinical skills from their peers than non-certified doctors.

Just because a doctor is board certified does not mean he or she is better than a non-certified doctor.

"But you do know that the board-certified doctor has been evaluated and the other has not," says Dr. Dockery. "And the ABMS toll-free number is one of the ways people can determine whether a doctor has achieved board certification." ☐



Plus get what your doctor's certificates mean.

### ABMS Member Specialty Boards

Here is a list of the 24 specialty boards recognized by the ABMS. The official title of each is the American Board of \_\_\_\_\_.

- Allergy & Immunology
- Anesthesiology
- Colon & Rectal Surgery
- Dermatology
- Emergency Medicine
- Family Practice
- Internal Medicine
- Medical Genetics
- Neurological Surgery
- Nuclear Medicine
- Obstetrics & Gynecology
- Ophthalmology
- Orthopedic Surgery
- Otolaryngology
- Pathology
- Pediatrics
- Physical Medicine & Rehabilitation
- Plastic Surgery
- Preventive Medicine
- Psychiatry & Neurology
- Radiology
- Surgery
- Thoracic Surgery
- Urology

## How to Beat the Heat (Exhaustion)

Your best protection against a raging heat wave: Stay out of the sun and move slowly. Your next best: Get sweaty. Sweat is your body's way of cooling you. As it evaporates, it draws heat away from the body.

Unfortunately, this form of natural air conditioning doesn't work well when it's very humid—the sweat simply doesn't evaporate efficiently. That's why a muggy 90 degrees feels as bad as a dry 100.

But don't depend on the TV weatherperson to tell you when to take special precautions against the heat. Each person varies in his or her ability to handle heat.

People at high risk for heat-related medical problems include: newborns; the elderly; people with cardiovascular disease, diabetes or skin ailments; and those who are taking certain medications, such as antidepressants, diuretic pills and any others your doctor says could cause problems.

### Warning Signs

If you are succumbing to heat exhaustion, the earliest sign will be extreme thirst. Other signs may be loss of appetite, headache, fatigue, dizziness and nausea. You will sweat profusely and have cold, clammy skin. You may have trouble concentrating. For athletes, heat cramps are an early warning sign.

To recover from heat exhaustion, get yourself to a cool spot, lay down if possible and sip water. Or rinse yourself in cool or lukewarm water.

A more serious condition is heat stroke or sunstroke, which is life threatening. Sweating will cease and the body temperature will shoot up, generally to over 105 degrees. The pulse will be racing and the breathing fast. The person may become incoherent or display bizarre behavior.

If you see such signs, seek emergency medical help. The temperature must be brought down quickly to avoid shock, convulsions, coma and death. While awaiting help, try to cool the per-

**Heat Exhaustion (Adults)**

Thirst, fatigue, dizziness or sweating associated with high outdoor temperature and humidity.

YES → Apply home treatment, which includes drinking fluids containing no alcohol or caffeine, and cooling off.

NO → Are you also experiencing:

- shortness of breath
- confusion
- high body temperature (104°)

YES → SEE DOCTOR IMMEDIATELY

*Note: This chart does not apply to infants and children, who may require medical attention far sooner than adults.*

son by, if possible, wetting the body or at least fanning it. But don't ice it down, because getting the body too cold could backfire by causing shivering (which creates heat).

### What You Can Do

To prevent heat exhaustion:

- Drink lots of water before you get into the heat. Continue drinking even if you don't feel thirsty. "Don't wait until you're totally thirsty," says Jose Salazar, a health and safety expert for the American Red Cross. "Thirst means you should have been drinking a long time ago."
- If you don't like plain water, reach for a sports drink with electrolytes (like Gatorade) or drink diluted juice. But avoid beer, other alcohol or anything

with caffeine, because these cause you to urinate away your fluids.

- Get in good physical condition, because you need good circulation to sweat well.
- Consume lots of fruits, but eat lightly to keep your metabolic rate down.
- Wear loose-fitting, light-colored clothing made of natural, breathable materials. But don't go shirtless. When you sweat, a damp, loose shirt will help you stay cooler than bare skin.
- Stay in an air-conditioned environment as much as possible. ☺

**Sources:** *Take Care of Yourself*; *The Doctors Book of Home Remedies II*; *Health*, a weekly supplement to *The Washington Post*; *The Complete Medical Guide*, by Benjamin F. Miller, M.D.; the American Red Cross.

## Fun in the Sun: How to Avoid Common Summer Pitfalls

**T**o many people, summer means vacations, outdoor sports and activities like hiking and camping. Summer also means blistered feet, sunburn, parched throats and insect bites.

Like the saying goes, one has to take a little of the bad with the good, but with a little preparation and planning you can keep the "bad" parts of summer to a minimum.

Nancy Arbas, R.N., the supervisor of nursing services at Canyon Ranch Health and Fitness Resort in Tucson, Ariz., is skilled at helping people enjoy outdoor activities while avoiding the common pitfalls.

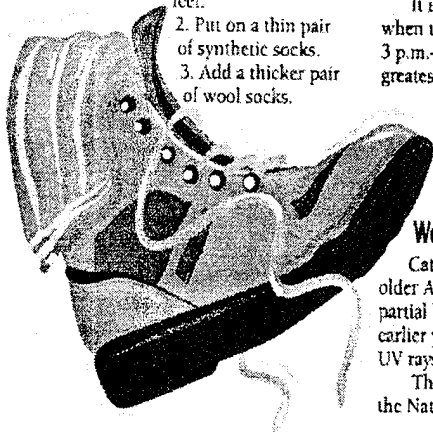
Sound good? Arbas and other experts offer tips on a variety of summer subjects that can help you do just that.

### Happy Feet

Blisters are the bane of novice exercisers, says Arbas. Whether you are hiking or just doing a lot of walking, it is important to have shoes with comfort, grip and support.

Hiking footwear should be a half-size larger than the regular shoe size. There are several other steps you can take to reduce friction:

1. Smear petroleum jelly on your feet.
2. Put on a thin pair of synthetic socks.
3. Add a thicker pair of wool socks.



6 *Taking Care* • July 1995

"It is especially important for people with diabetes to take care of their feet," says Arbas. "If there is any soreness or hot spots, the activity should be stopped and the feet checked for areas of irritation."

### Keep the Sunshine Out

Arizona is the land of the sun, but much of the United States experiences a good deal of sunshine in the summer months. Sunshine comes at a price, however, as regular exposure to harmful ultraviolet rays can lead to sunburn—a risk factor for skin cancer.

Arbas recommends people who spend a lot of time in the sun wear loose, "breathable" clothing that covers much of the body and hats with broad rims. And sunblock is considered as essential as good shoes.

"You can get a sunburn right through flimsy cotton and thin nylon," says Arbas. "I've gotten wonderful burns through bathing suits."

"We tell people to smear sunscreen with an SPF of 15 to 30 [with protection against both] UV-A and UV-B [light] over their whole bodies at least half an hour before an outdoor activity." The time lag allows the lotion to be absorbed into the skin.

It is best to stay inside if possible when the sun is at its peak—10 a.m. to 3 p.m.—because the risk of burning is greatest during that time. Arbas said swimmers are not protected from the sun's rays while in the water and should use waterproof sunblock and reapply it frequently.

### Wear Shades

Cataracts—which plague many older Americans, causing complete or partial blindness—may be rooted in earlier years when people let the sun's UV rays burn into their eyes.

The best prevention, according to the National Society to Prevent

Blindness: good-quality sunglasses worn consistently when outdoors or staring at sunlight, as happens while driving.

Read the label on the sunglasses carefully and make sure they absorb 99-100 percent of both UV-A and UV-B light. Seek a quality lens to ensure that there is no distortion in your field of vision.

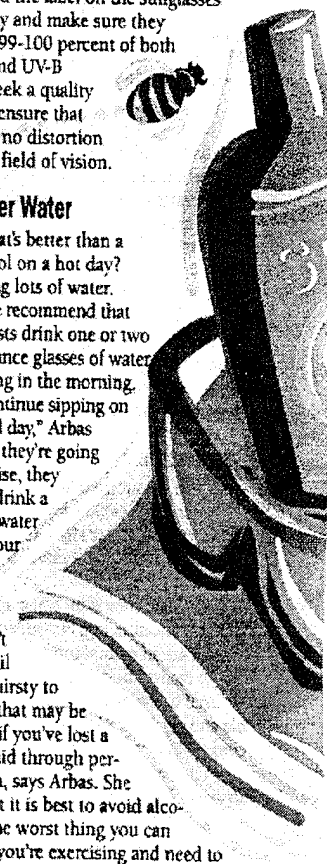
### Discover Water

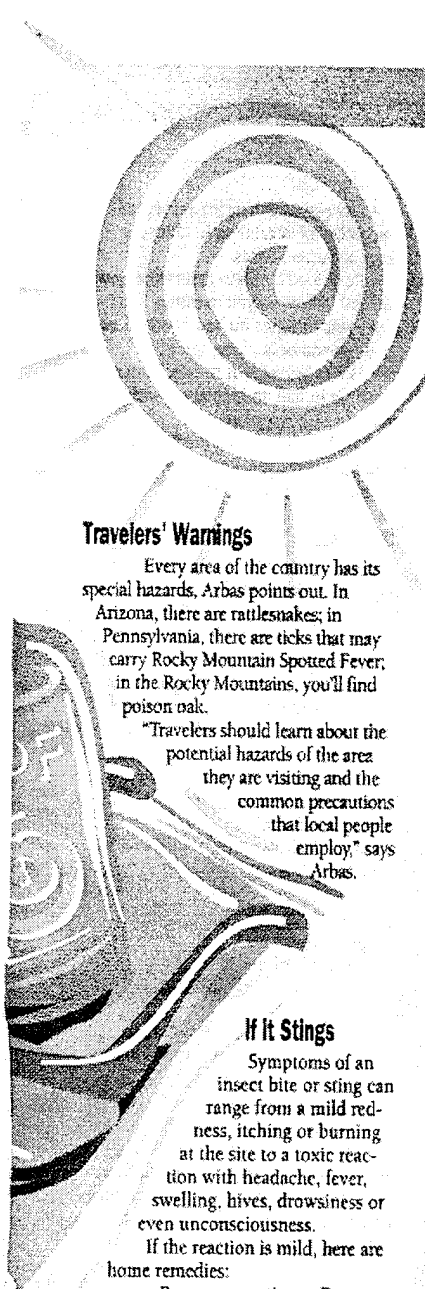
What's better than a cool pool on a hot day? Drinking lots of water.

"We recommend that our guests drink one or two eight-ounce glasses of water first thing in the morning, then continue sipping on water all day," Arbas says. "If they're going to exercise, they should drink a glass of water a half-hour before-hand."

Don't wait until you're thirsty to drink—that may be too late if you've lost a lot of fluid through perspiration, says Arbas. She adds that it is best to avoid alcohol—"the worst thing you can drink if you're exercising and need to replenish your body fluid"—as well as drinks with caffeine such as coffee, tea and many soft drinks, which promote dehydration.

"Sports drinks like Gatorade are OK, but we believe water is best," says Arbas. "If people want it to have more taste, we suggest they squeeze a lemon into it."





### Travelers' Warnings

Every area of the country has its special hazards, Arbas points out. In Arizona, there are rattlesnakes; in Pennsylvania, there are ticks that may carry Rocky Mountain Spotted Fever; in the Rocky Mountains, you'll find poison oak.

"Travelers should learn about the potential hazards of the area they are visiting and the common precautions that local people employ," says Arbas.

### If It Stings

Symptoms of an insect bite or sting can range from a mild redness, itching or burning at the site to a toxic reaction with headache, fever, swelling, hives, drowsiness or even unconsciousness.

If the reaction is mild, here are home remedies:

- Remove any stinger. Do not squeeze it. Scrape it out with a fingernail or credit card. If a tick, apply nail polish and remove once head is visible.
- Wash the area with soap and water.
- Apply an ice pack or cold compresses. Don't put ice directly on the skin, as you can burn it.

If the reaction is severe, seek emergency medical help. Some reactions are slow to develop, so watch for symptoms for 24 to 48 hours. ©

## Flame-Broiled Fun: Summer Grilling Safety Tips

There's nothing more American than outdoor grilling, especially during the summer months. Summer, though, is also the peak season for foodborne illnesses, so it's important to handle and cook food properly.

The U.S. Department of Agriculture (USDA) has established the Meat and Poultry Hotline to promote the safe handling and preparation of meat and poultry products. Just call (800) 535-4355 weekdays between 10 a.m. and 4 p.m. Eastern time to speak with a hotline expert.

Here is a sampling of safe grilling tips from hotline experts:

- Marinate foods in the refrigerator only. Reserve a portion of the marinade, before raw meat is placed in it, for use later in basting or as a dip for cooked food.
- To avoid flame flare-ups and charred food, remove visible fat from meat.
- Don't partially cook in advance unless food will go immediately onto the grill.
- If cooking ahead, cook completely, then cool down fast for reheating later.
- Cook meat and fish thoroughly to 160°. For taste, cook poultry to 180°. Flesh shouldn't be pink and juices should run clear.
- Serve food from the grill on a clean platter, not one that has raw, possibly contaminated juices on it.

### Grilling and Cancer

A National Cancer Institute study linked cancer in lab animals to meats cooked at grill-like temperatures. The USDA says present research findings indicate that eating moderate amounts of grilled foods at safe temperatures does not pose a health problem.

Still, the American Institute for Cancer Research says you can lower your cancer risks by following these guidelines:

- If you grill more than several

times a week, consider precooking (microwaving or parboiling) the meat so it is not on the grill very long.

- Raise the level of the grill so food is farther from the heat.
- Cook meat until it's done and avoid consuming charred meat.
- Clean the grill after each use.



Outdoor safety is a family affair.

### Meatless Treats

More and more people are switching from grilling hamburgers and hot dogs to grilling vegetables instead. Grilled vegetables pose fewer safety risks, contain little if any of the fat found in meat and have a unique taste.

Kelly McCune, author of *Vegetables on the Grill* (HarperCollins, 1992, \$17), says that almost any vegetable normally found in the American kitchen can be grilled.

"Vegetables have a delightful texture and lose none of their flavor on the grill," McCune says. "Because of their slight sugar content, the outside browns and seals quickly, locking in flavor and moisture."

McCune recommends against using a liquid starter, because such starters can be dangerous, contribute to air pollution and lead a chemical taste to the food. Instead, she advocates taking the time to use mechanical starting methods, such as an electric coil or kindling.

She also recommends untreated, hardwood charcoal or hardwood briquets because they burn "hot and clean."



## Vegetarians: Make Your Meatless Meals Healthy

**M**ona Sutnick tells the story of a vegetarian whose diet consists largely of rice, beans and vegetables—and fat. Sutnick, R.D., of Philadelphia and a spokesperson for the American Dietetic Association (ADA), said the vegetarian cooked in a sea of oil, and thus her fat intake was much higher than desired.

Vegetarian diets have a healthy reputation, and studies, including one by British researchers, indicate vegetarians have lower rates of heart disease and some forms of cancer than nonvegetarians. Sutnick, however, said avoiding meat, fish and poultry does not necessarily make your diet a healthy one.

"In general, vegetarians consume less fat and saturated fat since meat is a major source of it," Sutnick said. "But vegetarians who eat lots of high-fat foods such as eggs, cheese, ice cream and vegetable oils can compensate for that. Vegetarians and nonvegetarians alike should limit their fat intake and eat a variety of good foods."

### Cut the Fat

Here are tips Sutnick said can help vegetarians keep fat consumption to a minimum:

- Drink skim or 1% milk instead of 2% or whole.

- Buy plain fresh or frozen vegetables instead of vegetables in cheese, cream or butter sauces.
- Read food labels to determine how much fat is in what you're eating.
- Sauté in water instead of oil, or use non-stick pan or cooking spray.
- When baking, cut the oil, butter or margarine in half and replace it with a fruit puree (like applesauce).
- Use low-fat cooking methods like broiling, steaming, baking, boiling or poaching instead of frying.

### Plan Ahead

Sutnick said it is easy for vegetarians to get the nutrients they need with a little planning—even those found primarily in meat.

"There are some nutrients in meat, like iron and protein, that vegetarians need to pay attention to get enough of," Sutnick says. "Foods like dark green vegetables, whole grains and legumes (peas and beans) are good for everybody, but they are more important if you are not eating meat."

The ADA has created a daily food guide for vegetarians to help them get the nutrients they need. Sutnick said a vegetarian diet can be healthful for people of all ages, including people with special nutritional needs like pregnant women, infants and children.

"A vegetarian diet will support a healthy pregnancy, but women should consult with their doctor or registered dietitian to make sure they're getting the nutrients they need," Sutnick said. "With children, it's important to make sure they are getting the extra calories they need because vegetarian diets in general have fewer calories than other types of food." ◀

### RECIPE FOR HEALTH

Healthy meals don't need to take a lot of preparation and cooking time. The American Heart Association Quick and Easy Cookbook: Over 200 Recipes You Can Prepare in Minutes is loaded with good-tasting examples, most of which can be prepared from start to finish in less than an hour. For cooks on the go, meals like curried lentils and vegetables are a welcome sight.



### Curried Lentils and Vegetables

1 cup dry green lentils, rinsed and drained	1/4 teaspoon salt
2 cups water	1/4 teaspoon black pepper
1 medium onion, chopped	8-ounce package frozen, no-salt added, cut green beans
1/4 cup currants or raisins	4 carrots, peeled and sliced 1/2 inch thick
1 teaspoon minced garlic	
1/2 teaspoon curry powder	

In a large saucepan or Dutch oven, combine lentils, water, onion, currants, garlic, curry powder, salt and pepper. Bring to a boil over high heat. Reduce heat, cover and simmer 20 minutes. Add green beans and carrots. Cover and simmer 15 to 20 minutes more or until lentils and vegetables are tender, stirring occasionally. Serves 4. Preparation time: 10 minutes. Cooking time: 35 to 40 minutes.

**PER SERVING:** Calories—243; total fat—1 gm; saturated fat—0 gm; protein—15 gm; carbohydrates—48 gm; cholesterol—0 mg; sodium—190 mg; percent of calories from fat—4%.

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### For More Information

**The Vegetarian Resource Group, P.O.** Box 1463, Baltimore, MD 21203. Send a stamped, self-addressed envelope for the free brochure *Heart Healthy Eating Tips the Vegetarian Way*.

**The American Dietetic Association.** For a free brochure titled *Eating Well—The Vegetarian Way*, send a stamped, self-addressed business-sized envelope to Eating Well—The Vegetarian Way, NCND, 216 W. Jackson Blvd., Chicago, IL 60606-6995.

## Separating Fact from Fiction

**T**here have been more than 400,000 reported cases of AIDS in the United States, and of those, more than 240,000 (60 percent) have died, according to the Centers for Disease Control and Prevention (CDC). AIDS—a disease in which the body's immune system breaks down—is also the No. 1 killer of Americans between the ages of 25 and 44.

Recent statistics show that more women, heterosexuals and young people are becoming infected with HIV—which causes AIDS—than ever before. In short, no one is immune.

Gordon Trenholme, M.D., director, Section of Infectious Disease at Rush-Presbyterian-St. Luke's Medical Center in Chicago, shares his thoughts on this important subject in the following interview.

**Q.** There are many myths associated with how HIV is spread. What are the specific ways the virus can be transmitted?

**A.** Basically, in the United States, AIDS is usually transmitted through sexual contact. There were people who got it from blood transfusions, but the U.S. blood supply is almost completely free of HIV now.

The virus can also be transmitted from a pregnant woman with HIV to her fetus, and from intravenous (IV) drug use, as people infect themselves by using contaminated needles.

But further concern is that since IV drug users are associated with risky sexual behavior, their sexual partners are at risk for HIV infection. That is one reason why the number of infected women is growing.

There are many misconceptions about how HIV is spread. For example, you can't get the virus from shaking hands or kissing someone who is HIV positive.



The chances of getting HIV by coming in contact with someone else's blood, as can happen in contact sports, is almost zero.

positive person got into somebody else's open wound.

Take another example: If you were drawing blood from an AIDS patient and you stuck yourself deep with a needle and drew blood, the highest reported incidence of acquiring HIV in such a case is 1 in 200. A transfusion of HIV-positive blood, however, is a much higher risk.

It is important for travelers to be aware that although the blood supply in the United States and most of Europe is almost 100 percent safe, in many developing areas it isn't.

**Q.** Under what conditions should a person be tested for HIV/AIDS?

**A.** People should be tested if they have high-risk behavior (unprotected sex, sharing drug needles with an infected person), or have had a sexual partner who is known to be HIV positive.

**Q.** AIDS is almost 100 percent preventable, but still the number of new cases increases each year. What can people do to reduce their risk of acquiring HIV/AIDS?

**A.** We tell them two things: practice abstinence or safer sex (sex with only one partner who is not infected and only has sex with you, and condom use every time you have sex).

What can people do? People can make sure that adolescents, in particular, receive adequate education on and have an understanding of the dangers of HIV infection. More young people are testing positive for HIV than any other age group, so they need to know the facts.

**Q.** Much has been made of HIV transmission through blood. What is the risk of getting HIV by coming in contact with someone else's blood?

**A.** The risk of getting HIV when you happen to touch someone else's blood, as might happen in a sporting event, is almost zero. About the only way this could happen is if blood from an HIV-

**Q.** Recent statistics from the CDC say HIV infection among heterosexuals is increasing. Is anyone or group of people immune?

**A.** No one is immune to the disease. For HIV to be transmitted through heterosexual contact, one of the people must already be HIV positive. Here again, the spread of AIDS is linked to risky sexual behavior.



**Dr. Gordon Trenholme** is a member of *Taking Care's* Medical Advisory Board. Dr. Trenholme is

the director of the Section on Infectious Disease at the Rush-Presbyterian-St. Luke's Medical Center, where he is also a professor in the Department of Medicine.

### For More Information

The CDC National AIDS Hotline. Call (800) 342-AIDS or (800) 342-2437 24 hours a day, seven days a week for more information. ☺

## Money & Marriage: How to Achieve Financial Harmony

**T**he husband wants to invest in high-risk stocks; the wife wants to put their savings into a federally insured bank account. She wants their children in an expensive private school; he says public school is fine.

Disagreement over saving or spending money is the single biggest source of marital discord, according to a recent study by Roper Starch Worldwide for *Worth* magazine.

Roper identified "seven key money personalities" in its survey group. One type is "the hunters," who are an avid group of investors; they control their money well, using it to make more money. Another type is "the splurgers," who "lavish luxuries on themselves, whether or not they can afford it."

What happens when a "hunter" marries a "splurger"? Marital fireworks. Which perhaps explains why survey participants ranked "having similar views about spending and saving money" high on their list of ingredients for a successful marriage.

Malcolm H. Gissen, a San Francisco financial adviser, says he insists on seeing both spouses when his financial advice is sought by a married person. Not only must both spouses concur on all decisions regarding investments or spending patterns, but both should understand their financial affairs, in case of death or divorce.

"I would say that 85 percent of the time, women are more cautious in their financial dealings," says Gissen. "More men throw caution to the wind and want to strike it rich."

Gissen tries to find a balance between the two approaches—too much caution can work against efforts to build your net worth, Gissen warns, causing money to lose its value against the cost of income taxes and the rate of inflation. But reckless use of money can lead to tragedy.

Gissen suggests couples take three steps to reach financial harmony:



It's important to discuss your financial goals.

1. Discuss their goals in life. Do they want to establish a goal to retire at a certain age? Do they intend to pay for their children's college educations?

The couple must at least be clear on what their differences are so they can (if possible) find ways to satisfy their disparate goals, instead of pulling against each other.

2. Analyze exactly where their dollars are going and make a budget.

Here is where a financial adviser or planner can help. "We do budgets for every one of my clients," says Gissen, whether the person is a teacher earning \$25,000 a year or a professional athlete earning \$60,000 a month.

"We help our clients make lifestyle decisions—perhaps to spend less money on vacations or on cars in order to have some money for investments, so that their future is secure."

3. Decide what type of investments or savings are best suited to the couple's goals.

Don't rush into investments. Establish financial goals and then decide which investments will help you reach them. Gissen says once he outlines the pros and cons of various financial decisions, married couples usually arrive at agreement before they leave his office. ☐

### Maintain That Stretch

Stretching is something most experts advise be part of your pre-exercise routine, but you need to hold your stretch for at least 30 seconds to get any benefit, according to researchers at the University of Central Arkansas. Researchers say it takes that long for you to loosen ligaments and muscle fiber, which makes it easier to exercise efficiently. A good stretch consists of holding a steady position with no bouncing.

Health magazine

### Dentists on (Toll-Free) Call

Do you have any dental questions you've never asked your dentist? Here's your chance to get the answer. The Academy of General Dentistry (AGD) has set up a national toll-free hotline staffed by AGD dentists, who will answer your questions. Just call (800) SMILE-33 or (800) 764-5333 on July 17 or 18 between 7 a.m. and 7 p.m. Eastern time.

Academy of General Dentistry



Half of U.S. cooks start from scratch.

### Cook From Scratch With Speed

Cooking's popularity is on the rise in this country, and one of the reasons is the increased number of food products designed to save cooking and preparation time, according to a recent survey. Roper Starch Worldwide found that 42 percent of American adults who do some cooking really enjoy it, up from 38 percent in 1987. While about 50 percent of American cooks frequently make main meals from scratch, 33 percent make meals mostly from store-bought items—such as gravies, sauces and pasta products. This process, called "speed scratch cooking," is especially popular with cooks between the ages of 18 and 29.

American Demographics



### Cataracts: From Diagnosis to Recovery

It is likely that someone you know has a cataract or has undergone cataract surgery. There are several million such surgeries in the United States each year, with a success rate of higher than 95 percent. Still, the decision to undergo cataract surgery—or any other eye surgery—is a tough one to make, a decision the book *Cataracts* can help you feel good about making.



Author Julius Shulman, M.D., an assistant clinical professor of ophthalmology at Mount Sinai Medical Center, understands the anxiety associated with cataract surgery first-hand. His book clearly explains—and informative illustrations show—in layman's terms everything you need to know, from how a cataract forms to how to find a good ophthalmologist.

*Cataracts*, by Julius Shulman, M.D. Published by St. Martin's Press, \$9.95 paperback plus \$3 shipping. To order, call (800) 288-2131.

### Hiking and Backpacking

When gathering supplies for a hiking trip, make sure to include a copy of *Hiking and Backpacking*. This colorful and informative book covers all the basics—what to wear, equipment and food recommendations, how to find your way and much more.

Those new to the sport will appreciate the emphasis on safety—an entire chapter as well as practical safety tips scattered throughout. The detailed photographs and illustrations help reinforce the easy-to-understand text written by veteran trail blazers. There's even a glossary in the back to help you with the lingo.

*Hiking and Backpacking*, by Eric Seaborg and Ellen Dudley. Published by Human Kinetics Publishers, \$12.95 plus \$3.85 shipping. To order, call (800) 747-4457. *Taking Care* readers: mention code 2818 when ordering for a \$2 discount.



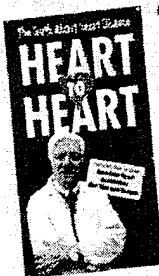
### The Truth About Heart Disease

When it comes to heart disease, separating fact from fiction isn't always easy. One fact, though, is crystal clear: Heart disease is the leading killer of both men and women in the United States.

Now you can find out the truth about heart disease in the comfort of your living room from one of America's best-known doctors. In the video *Heart to Heart: The Truth About Heart Disease*, William Castelli, M.D., the director of the world-famous Framingham Heart Study, is joined by heart patients and doctors as they discuss how to prevent, recognize, treat and cope with heart problems.

Taking care of your heart is hard work, but Dr. Castelli offers the latest research on exercise, diet and stress that can help you lower your heart disease risk and feel better in the process.

*Heart to Heart: The Truth About Heart Disease*, produced by WGBH TV in Boston, \$14.95 plus \$3.95 shipping. To order, call (800) 255-9424. Mention *Taking Care* when ordering for a \$2 discount.



Check this spot each issue for a listing of free books, brochures and information lines. When writing for a free item, it's a good idea to include a self-addressed, stamped envelope (SASE).

- Are you looking for information on diseases like carpal tunnel syndrome, epilepsy or Hodgkin's disease? If so, the National Organization for Rare Diseases (NORD) can help. NORD is dedicated to helping people who have the thousands of rare diseases that affect fewer than 200,000 people in the United States. Call NORD at (800) 999-NORD or (800) 999-6673 for information on a specific rare disease.

- A healthy diet that doesn't mean giving up your favorite foods and drinks? *The Food Guide Pyramid: Your Guide to Healthful Eating* shows that it's possible by making good food choices. Send a business-sized SASE to: The Food Guide Pyramid Brochure, P.O. Box 1144, Rockville, MD 20850.

### THIS MONTH

## Taking Care Health-Line

Seniors' Health  
(800) 933-4636

The Taking Care Health-Line is available 24 hours a day, seven days a week—and now offers fax-on-demand. It's free! Call (800) 933-4636 and enter the access code (2273 or CARE) when prompted. Then select one of the specially recorded seniors' health messages listed below. You will have the option of listening to the message (press 1) or having it faxed to you (press 2).

Messages	Access Code
Alzheimer's & Senility	2531
Medicaid or Medicare?	2532
Which One?	
Medication & Older Adults	2633
Memory Loss in Aging	2534
Osteoporosis	2535

The Taking Care Health-Line is designed to help you become more informed about specific health issues. It is not intended to replace necessary medical consultations to meet your individual needs.

## Strategies For Vacation Fun

**1** Involve kids in vacation planning. One sure way for a vacation to backfire is to ignore the interests of your children. On the other hand, if your children are excited about what they are going to do on an upcoming vacation, your trip will be off to a great start.

**2** Be flexible. You may want to vacation in the mountains and your kids may want to go to the beach. Instead of forcing your kids to the hills, reaching a compromise like spending a few days at both places can save your vacation.

**3** Be realistic. There is a good chance that no matter where you go, your family won't be able to do everything it would like. Decide as a group in advance what places you add to the list if you have time.

**4** Plan car activities for kids. Many family vacations include long car trips, and this time can make or break a trip. Make sure your kids have plenty of things like books, games and music to keep them happily occupied for the length of the trip.



Go places the whole family will enjoy.

**5** Allow some freedom. There is no need for families to be together 24 hours a day when on vacation. Both children and parents may want to go places on their own, and that time apart can make the time spent together more enjoyable.

**6** Vacation with friends. If your family gets along well with another family, think about inviting them along. It is fun to share vacation experiences with friends, and this also gives your kids playmates.

**7** Take plenty of pictures. Vacations are fun while they are happening, but the memories are what last. Photos can help the entire family relive a vacation, and can be used to build excitement for an upcoming trip as well. ☺

COMING SOON

Water Exercises  
Hysterectomies

Select the Right Toothpaste



10467 White Granite Drive  
Oakton, Virginia 22124

Printed on Recycled Paper

# FLEX

YOUR MENTAL MUSCLES

1 hos pital	2 hos pital	SPIEKY	
3 UR	4 ALL	WORLD	
5 warranty no longer			

Puzzle creators: 1. Kasey Lippert; 2. Shannon Johnson; 3. Richard Thomas; 4. Cecelia Klugobring; 5. Jack Bauer.

Boost your brain power by solving these puzzles, created by *Taking Care* readers. See if you can uncover the meaning in these words, letters, symbols and their positions. Each puzzle represents a common word, phrase, expression, person, place or event.

The example below is "hit below the belt."

BELT

HIT

**CONTEST RULES:** All *Taking Care* readers are eligible to enter. List your answers (1-5), your name and address on a postcard and mail to: *Contests*, The Center for Corporate Health, 10967 White Granite Drive, Suite 300, Oakton, VA 22124. All entries must be postmarked by July 24, 1995. Ten winners will be drawn at random from all correct entries. All winners will receive a *Taking Care* desk clock.

June 1995 Contest Answers: 1. Marathon overcoat; 2. 7-11 shop; 3. Soccer time next year; 4. Mirror image; 5. Apple turnover.

1057

MC1884

**Appendix D: Descriptive Statistics for Group Subsets**

**Key to Abbreviations Used in Descriptive Statistics Tables:**

- E1=Experimental group given self-care book
- E2=Experimental group given self-care book plus monthly magazine
- C=Control group (no intervention)
- hh=Visitation gain scores reported by household per month
- pp=Visitation gain scores reported by person per month
- ret=Retired household classification
- ad=Active duty household classification

<b><u>Descriptive Statistic</u></b>	<b><u>E1hh</u></b>	<b><u>E2hh</u></b>	<b><u>Chh</u></b>
Sample size	215	204	187
Average	-0.150984	-0.494721	-0.115179
Median	0	-0.307692	0
Mode	0	0	0
Variance	0.0906847	1.08905	0.0594499
Standard deviation	0.301139	1.04358	0.243824
Standard error	0.0205375	0.0730649	0.0178301
Minimum	-2.76923	-7.38462	-1.53846
Maximum	0	1.69231	0
Range	2.76923	9.07692	1.53846
Lower quartile	-0.153846	-0.769231	-0.153846
Upper quartile	0	0	0
Interquartile range	0.153846	0.769231	0.153846
Skewness	-4.12062	-2.69146	-3.05013
Standardized skewness	-24.6664	-15.6938	-17.028
Kurtosis	27.5202	11.991	11.1168
Standardized kurtosis	82.3694	34.9594	31.031
Coeff. of variation	-199.451	-210.942	-211.691
Sum	-32.4615	-100.923	-21.5385

<u>Descriptive Statistic</u>	<u>E1pp</u>	<u>E2pp</u>	<u>Cpp</u>
Sample size	215	204	187
Average	-0.0797496	-0.223394	-0.0486631
Median	0	-0.102564	0
Mode	0	0	0
Variance	0.0524641	0.425797	0.0119066
Standard deviation	0.22905	0.652531	0.109118
Standard error	0.0156211	0.0456863	7.97946E-3
Minimum	-2.76923	-7.38462	-0.615385
Maximum	0.282051	0.846154	0
Range	3.05128	8.23077	0.615385
Lower quartile	-0.0769231	-0.307692	-0.0512821
Upper quartile	0	0	0
Interquartile range	0.0769231	0.307692	0.0512821
Skewness	-8.16608	-7.03247	-3.10145
Standardized skewness	-48.883	-41.006	-17.3145
Kurtosis	89.9099	72.3833	10.5048
Standardized kurtosis	269.105	211.032	29.3226
Coeff. of variation	-287.212	-292.099	-224.231
Sum	-17.1462	-45.5723	-9.1

<u>Descriptive Statistic</u>	<u>E1hhret</u>	<u>E2hhret</u>	<u>Chhret</u>
Sample size	203	180	148
Average	-0.143236	-0.409402	-0.101871
Median	0	-0.153846	0
Mode	0	0	0
Variance	0.0894059	0.990688	0.0459056
Standard deviation	0.299008	0.995333	0.214256
Standard error	0.0209863	0.0741878	0.0176117
Minimum	-2.76923	-7.38462	-1.23077
Maximum	0	1.69231	0
Range	2.76923	9.07692	1.23077
Lower quartile	-0.153846	-0.615385	-0.153846
Upper quartile	0	0	0
Interquartile range	0.153846	0.615385	0.153846
Skewness	-4.4007	-3.1992	-2.92235
Standardized skewness	-25.5973	-17.5227	-14.514
Kurtosis	30.4486	16.9411	10.3571
Standardized kurtosis	88.5542	46.3951	25.7195
Coeff. of variation	-208.752	-243.119	-210.321
Sum	-29.0769	-73.6923	-15.0769

<u>Descriptive Statistic</u>	<u>E1hhad</u>	<u>E2hhad</u>	<u>Chhad</u>
Sample size	12	24	39
Average	-0.282051	-1.13462	-0.16568
Median	-0.230769	-0.923077	0
Mode	0	-0.923077	0
Variance	0.102564	1.41767	0.110102
Standard deviation	0.320256	1.19066	0.331817
Standard error	0.09245	0.243043	0.0531332
Minimum	-0.923077	-3.84615	-1.53846
Maximum	0	0.615385	0
Range	0.923077	4.46154	1.53846
Lower quartile	-0.461538	-1.61538	-0.153846
Upper quartile	0	-0.230769	0
Interquartile range	0.461538	1.38462	0.153846
Skewness	-0.917769	-0.929455	-2.73203
Standardized skewness	-1.29792	-1.85891	-6.96533
Kurtosis	-0.151049	0.279515	8.0602
Standardized kurtosis	-0.106808	0.279515	10.2748
Coeff. of variation	-113.545	-104.94	-200.275
Sum	-3.38462	-27.2308	-6.46154

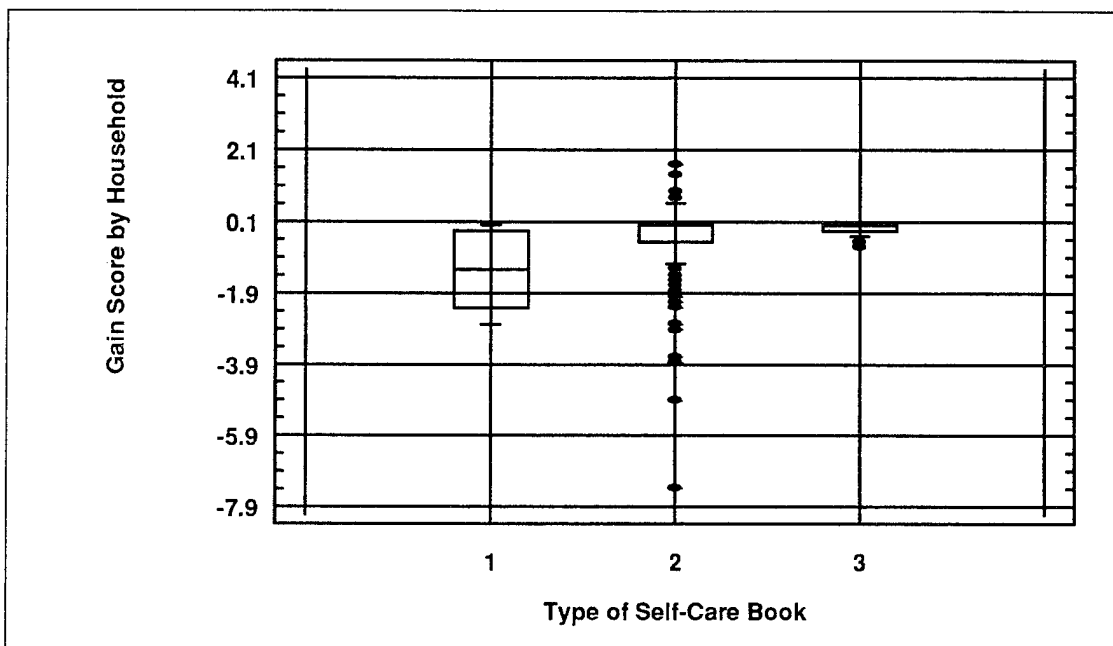
<u>Descriptive Statistic</u>	<u>E1ppret</u>	<u>E2ppret</u>	<u>Cppret</u>
Sample size	203	204	148
Average	-0.0747379	-0.223394	-0.0435551
Median	0	-0.102564	0
Mode	0	0	0
Variance	0.0509838	0.425797	0.0102476
Standard deviation	0.225796	0.652531	0.10123
Standard error	0.0158478	0.0456863	8.32107E-3
Minimum	-2.76923	-7.38462	-0.615385
Maximum	0.282051	0.846154	0
Range	3.05128	8.23077	0.615385
Lower quartile	-0.0769231	-0.307692	-0.0384615
Upper quartile	0	0	0
Interquartile range	0.0769231	0.307692	0.0384615
Skewness	-8.81701	-7.03247	-3.47685
Standardized skewness	-51.2854	-41.006	-17.268
Kurtosis	101.163	72.3833	14.3495
Standardized kurtosis	294.215	211.032	35.6339
Coeff. of variation	-302.117	-292.099	-232.419
Sum	-15.1718	-45.5723	-6.44615

<u>Descriptive Statistic</u>	<u>E1ppad</u>	<u>E2ppad</u>	<u>Cppad</u>
Sample size	12	24	39
Average	-0.16453	-0.332021	-0.0680473
Median	-0.0576923	-0.307692	0
Mode	0	-0.307692	0
Variance	0.0761112	0.107578	0.0181507
Standard deviation	0.275883	0.327991	0.134725
Standard error	0.0796404	0.0669509	0.0215732
Minimum	-0.923077	-1.28205	-0.512821
Maximum	0	0.205128	0
Range	0.923077	1.48718	0.512821
Lower quartile	-0.185897	-0.487179	-0.0769231
Upper quartile	0	-0.0897436	0
Interquartile range	0.185897	0.397436	0.0769231
Skewness	-2.27628	-1.05748	-2.28168
Standardized skewness	-3.21915	-2.11497	-5.81716
Kurtosis	5.29477	1.97618	4.3548
Standardized kurtosis	3.74397	1.97618	5.5513
Coeff. of variation	-167.679	-98.7863	-197.987
Sum	-1.97436	-7.9685	-2.65385

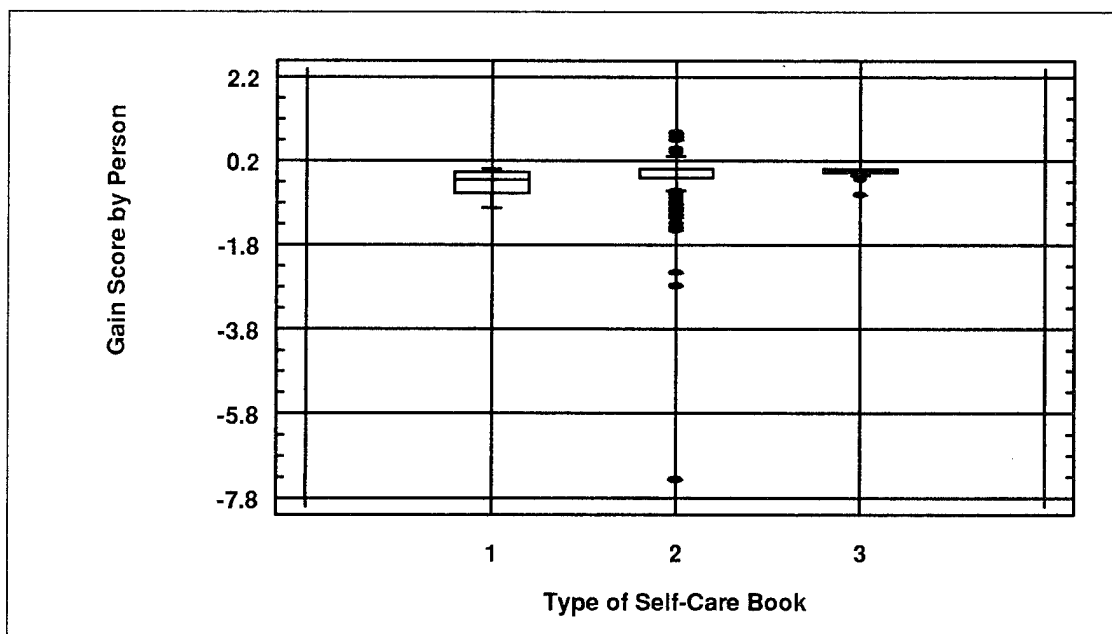
<u>Descriptive Statistic</u>	<u>Ehbb1</u>	<u>Ehbb2</u>	<u>Ehbb3</u>
Sample size	7	373	39
Average	-1.25275	-0.325015	-0.086785
Median	-1.23077	0	0
Mode	-1.53846	0	0
Variance	1.08425	0.637734	0.0234131
Standard deviation	1.04127	0.798583	0.153013
Standard error	0.393564	0.041349	0.0245018
Minimum	-2.76923	-7.38462	-0.615385
Maximum	0	1.69231	0
Range	2.76923	9.07692	0.615385
Lower quartile	-2.30769	-0.461538	-0.153846
Upper quartile	-0.153846	0	0
Interquartile range	2.15385	0.461538	0.153846
Skewness	-0.264288	-3.80473	-1.84347
Standardized skewness	-0.285464	-29.9987	-4.69993
Kurtosis	-1.22801	23.545	3.00754
Standardized kurtosis	-0.6632	92.8212	3.83388
Coeff. of variation	-83.1191	-245.706	-176.313
Sum	-8.76923	-121.231	-3.38462

<b><u>Descriptive Statistic</u></b>	<b><u>Eppb1</u></b>	<b><u>Eppb2</u></b>	<b><u>Eppb3</u></b>
Sample size	7	373	39
Average	-0.364469	-0.156322	-0.047666
Median	-0.25641	0	0
Mode	-0.512821	0	0
Variance	0.105296	0.263404	0.0121194
Standard deviation	0.324493	0.513229	0.110088
Standard error	0.122647	0.026574	0.0176282
Minimum	-0.923077	-7.38462	-0.615385
Maximum	0	0.846154	0
Range	0.923077	8.23077	0.615385
Lower quartile	-0.576923	-0.205128	-0.0769231
Upper quartile	-0.0769231	0	0
Interquartile range	0.5	0.205128	0.0769231
Skewness	-0.74892	-8.55235	-3.95461
Standardized skewness	-0.808926	-67.4317	-10.0823
Kurtosis	-0.132117	109.184	18.895
Standardized kurtosis	-0.0713514	430.435	24.0865
Coeff. of variation	-89.0317	-328.315	-230.957
Sum	-2.55128	-58.3082	-1.85897

**Appendix E: Additional Box and Whisker Plots**



Box and Whisker Plot Comparing the Three Types of Self-Care Books, Using Gain Scores by Household



Box and Whisker Plot Comparing the Three Types of Self-Care Books, Using Gain Scores by Person



**Appendix F: Chi-Square Distribution Statistics for Group Subsets**

SUBSET	CHI-SQUARE TEST	
	Statistic	Significance Level
E by household	487	0
E1 by household	405	0
E2 by household	105	0
C by household	660	0
E by retired household	233	0
E1 by retired household	395	0
E2 by retired household	50	0
C by retired household	633	0
E by active duty household	4.4	0.11
E1 by active duty household	Insufficient degrees	of freedom
E2 by active duty household	4.4	0.04
C by active duty household	22	0
E by household for book 1	Insufficient degrees	of freedom
E by household for book 2	229	0
E by household for book 3	58	0
E by person	236	0
E1 by person	368	0
E2 by person	145	0
C by person	641	0
E by retired persons	236	0
E1 by retired persons	349	0
E2 by retired persons	145	0
C by retired persons	456	0
E by active duty persons	10.4	0.005
E1 by active duty persons	Insufficient degrees	of freedom
E2 by active duty persons	Insufficient degrees	of freedom
C by active duty persons	66	0
E by person for book 1	Insufficient degrees	of freedom
E by person for book 2	264	0
E by person for book 3	82	0

Note: Book 1 refers to child self-care book, book 2 refers to adult book, and book 3 refers to senior book.

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## Vita

Captain Christopher S. Svehlak was born on 10 April 1967 in Fairfax VA. Growing up in south Mississippi, he graduated third in his class from Pearl River Central High School in 1984, and entered undergraduate studies at the University of Mississippi (Ole Miss) in Oxford MS on a full ROTC academic scholarship. He received his diploma in 1988 with a Bachelor of Arts degree in Foreign Languages and was commissioned in the Air Force. After technical training school at Sheppard AFB TX, he was assigned as Deputy Chief, Cost Analysis Branch, 7 Air Force and 51 Tactical Fighter Wing, Osan AB, Republic of Korea, in 1989. In 1990, he was assigned to the 31 Tactical Fighter Wing at Homestead AFB FL, as Chief of the Cost Analysis Branch. In 1991, he was transferred to the 366 Composite Wing at Mountain Home AFB ID, as Chief, Cost Analysis. Later, he assumed duties as Chief of the Wing Budget Office. In 1993, he was temporarily assigned to the 4409 Operations Wing, Kingdom of Saudi Arabia, as the first budget officer after Operation Desert Storm. Upon return, he attended Squadron Officer School in residence at Maxwell AFB AL. In May 1994, he entered the School of Logistics and Acquisition Management, Air Force Institute of Technology, Wright-Patterson AFB OH, to pursue a Master's of Science in Cost Analysis. Upon completion, he will report to Headquarters, Space Command, Financial Management Division, at Peterson AFB CO. His decorations include the Air Force Achievement Medal, the Air Force Commendation Medal, and the Air Force Meritorious Service Medal. He is married to the former Miss Jacqueline Ybarra of San Antonio TX.

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