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A STUDY TO IDENTIFY THOSE VARIABLES WHICH CONTRIBUTE TO THE UTILIZATION OF WELLNESS CLINIC SERVICES BY ACTIVE DUTY ARMY FAMILY MEMBERS

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This study was conducted to determine the factors that influence Army spouses to attend a wellness clinic. Army spouses were surveyed to assess their knowledge and attitudes about the wellness clinic. Five factors effecting clinic use were identified. (Perceived health status, Income, Worry about health, Education, Attitude towards military medical care). The lack of awareness of the wellness clinic, combined with a high level of interest on the part of the population, indicated that minimal marketing efforts may bring significant increases in useage. The author included some specific recommendations for marketing the Wellness Clinic.

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A STUDY TO IDENTIFY

THOSE VARIABLES WHICH CONTRIBUTE TO THE UTILIZATION OF WELLNESS CLINIC SERVICES BY ACTIVE DUTY ARMY FAMILY MEMBERS

A Graduate Research Project

Submitted to the Faculty of

Baylor University

In Partial Fulfillment of the

Requirements for the Degree

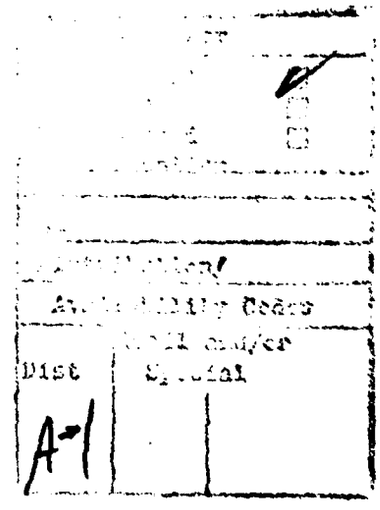
of

Master of Health Administration

by

Captain Eric J. Rubel, MSC

July 1985



EXECUTIVE SUMMARY

Wellness services, although well thought of by many health professionals, are of no benefit unless consumers use these services. Despite the Fort Knox Wellness Clinic's successful service to active duty soldiers, very few spouses have participated. The purpose of this study was to determine the factors that influenced Army spouses to attend the Wellness Clinic. Given this information, specific recommendations to improve utilization could be made.

Eighty-seven spouses were interviewed by phone. Multiple linear regression analysis showed that five factors (in the following rank order) played a key role in levels of interest in wellness services:

1. (-) Perceived health status
2. (-) Income
3. (+) Worry about their health
4. (+) Education
5. (+) Attitude towards military medical care

This five factor model indicates that the two major approaches to analyzing preventive health care consumer decisionmaking, marketing and health education, are partially applicable to military spouses. Five recommendations for improving clinic utilization were derived:

1. Increase name recognition and awareness of the wellness services product.
2. Foster awareness concerning potential health problems.
3. Rename and relocate the wellness program.
4. Remold the wellness service product.
5. Define target populations using both need and demand.

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The cooperation of COL Speedy, Deputy Commander of the 194th Armored Brigade and MAJ Makara, Adjutant General Officer, was instrumental in allowing the close to 100 phone interviews to be conducted efficiently. COL Kenneth Yamanouchi, my preceptor, supported my efforts throughout the research process, reviewed the several drafts of this project and provided many useful insights.

The contributions of Cathy Oskin. a volunteer research assistant, enabled the capture of a larger sample than would have otherwise been possible. CPT Kim Havas, Chief of the Wellness Clinic was also quite helpful in providing information concerning the wellness clinic.

Lastly, the patience and understanding of my wife, Diana, enabled me to devote my full efforts to this project over an extended period of time.

LIST OF TABLES

CHAPTER I

INTRODUCTION

Justification for the Research Effort

Wellness programs have helped many Americans to improve their health status and life-expectancy through positive changes in life-style.[1] The wellness clinic at Ireland Community Hospital has provided such assistance to the Fort Knox, Kentucky military community since 1981. The four-hour long wellness program includes the following: health hazard appraisal, health risk counseling, nutritional counseling, stress management, physical fitness and exercise tips. Despite extensive efforts to encourage both active duty personnel and their spouses to take advantage of the clinic, clinic utilization by spouses has not reached desired levels. Appendix B lists clinic utilization over the past year by beneficiary type.

The purpose of this study is to determine the reasons behind an Army spouse's decision whether or not to use the wellness clinic. Once these reasons are identified, a marketing program to increase clinic utilization by spouses can be designed and implemented.

Research Question

What are the factors that may influence an Army spouse's decision to attend a wellness clinic.

Objectives

1. To determine the key factors which contribute significantly to an Army spouse's decision to attend the Fort Knox wellness clinic.

2. To construct a mathematical model which estimates the relative impact of each of the key factors.

Criteria

A linear probability of use model, consisting of a set of explanatory variables (x1, x2, ... xN) with coefficients of contribution(b0, b1, b2,.. bN), which meets the following conditions:

1. The chi-square goodness of fit statistic is significant at the .05 level.

2. The null hypothesis that b(i) = 0 is rejected for each variable in the set when tested at the .10 level of significance.

3. No more than five independent variables are used in the model.

Assumption

Consumer demand behavior(the probability that a member of the community uses the wellness clinic) is determined by the consumer's characteristics and his/her consideration (conscious or unconscious) of certain product variables. Comparison of user and non-user populations' responses to questions concerning their personal characteristics and perceptions of the wellness clinic is a valid way to analyze the determinants of demand.

Limitations

1. This study was limited to a sample of Fort Knox community spouses.

2. Dependents of retirees were not included in this study.

3. The Fort Knox Wellness Clinic does not provide the same services as other wellness programs.

4. The accuracy of variable measurement depended on the honesty and recall ability of those who responded to the research instrument. Certain sensitive questions, such as those concerning alcohol consumption, may have been hard for some respondents to answer truthfully. Other questions had well-publicized "right answers" which the respondents may have used (consciously or unconsciously) instead of the true answer. Direct observation of health habits and attitudes, the only way to avoid this limitation, was not practical.

5. The representativeness of the sample was limited by the fact that both consent and a moderate level of English-speaking ability were required before the phone interview could be conducted.

6. Unit administrative and mission constraints limited random selection. Although unit leaders were cooperative, the project was a low priority for them. Due to several high priority missions, the unit was not able to provide the sample size requested, thus reducing the potential statistical significance of the findings.

7. The representativeness of the sample was limited by use of a methodology (phone interviews) which excluded spouses without personal telephones.

8. The primary statistical tool utilized, logit analysis with weighted least squares(WLS)[2] required that the observed logit values be independent of each other and that they follow a normal distribution. It also required that each subpopulation of the model tested have at least 25 members. This was not attainable for each subpopulation considered.

9. The lack of utilization of the wellness clinic by spouses sampled (either before or within three months after contact) made the direct comparison of users and non-users impossible. This required a substitute dependent variable. The lack of direct data limited the research to assessing the relative impacts of possible decision factors as opposed to being able to predict a probability of use.

10. Response to questions may have varied over time (e.g. subjective questions such as "in general, how happy are you?").

Other Key Factors

Environmental

Some active duty personnel, due to insecurity or jealousy, do not want their wives to take advantage of outside opportunities such as the wellness clinic. In some cases these personnel may have withheld permission for the researcher to interview their spouse or discouraged honest answers.

Interviewing over the telephone insured a sense of anonymity and privacy but may also have raised doubts as to the legitimacy of the researcher.

Fort Knox is in a rural area with no public transportation into the post from outlying housing areas. Post support has

been excellent for incorporating the wellness clinic into Armor School curricula, but has been minimal for encouraging and providing support to enable Army spouses to attend. Policy precludes Army funding of the necessary public transportation and daycare services.

The wellness clinic is conducted primarily in the hospital. The only occasion when an outside location is used is for large Armor School classes such as the Officer Advanced Course. Many potential clients do not want to come to the hospital unless they are sick. The designation "clinic" may imply that only sick people need attend. The term "wellness" is unclear to many potential clients.

Historical

Historical factors played a significant role in this research project. The Fort Knox wellness clinic was started in 1981, largely through the individual initiative of an administrative resident, MAJ George Gisin. It is a unique model which has not been duplicated in Health Services Command. When the initiators of the clinic left, the nurse practitioners in the Internal Medicine Clinic continued the clinic, but without the same proprietary interest.

Marketing efforts were practically non-existent due to the many patient care responsibilities of the nurse practitioners, of which the wellness clinic was a minor one. This largely accounts for the contrast between the consistently high clinic utilization among the captive Armor School population and the lack of clinic utilization among Army spouses.

Hospital Mission

The Ireland Army Community Hospital mission is also a key consideration in this research project. Wellness and other prevention-oriented services are part of the health care services which the hospital provides to the community. Wellness has been designated as one of the MEDDAC's six key goals.

There exists a potential conflict between two alternative views of the hospital's mission, one process-oriented (maximize the volume of quality health services provided given existing resources) and the other outcome-oriented (keep the population healthy). The present workload reporting and management information system is predominantly process-oriented.

The amount of future hospitalization and other health care services avoided through wellness services, although admittedly hard to quantify, can not be captured as cost avoidance under the present workload reporting system. Pragmatic healthcare managers may question the need to expend scarce resources in encouraging the service population to use a service in which it shows little interest, and which may reduce hospital workload. Such a reduction in workload might well result in reduced resource allocation from Health Services Command.

Literature Review

A search of the literature on wellness, health education and marketing of preventive medicine and health behaviors reveals that the specific subject of this research, factors in consumer choice of a wellness program, has had little or no prior research. The majority of wellness-oriented articles and books

are anecdotal and promotional in nature, describing successes of particular wellness programs and offering lessons learned from initial failures. Many articles address the marketing of wellness programs to corporations, other third party payers or broad population segments, but there is little information on how individuals decide whether to use wellness services.

Although there is an extensive body of health education theory concerning how individuals choose selected health behaviors, engaging in a wellness program is not a specific behavior which has been studied extensively using these models.

Given the lack of specific research on the topic studied, this literature review will summarize the two major types of theoretical models traditionally used by researchers: the health education model and the marketing model. The health education model is oriented towards needs as defined by experts and the marketing model is driven by consumer demand. Although their perspectives are diametrically opposed, the models agree on many key determinants of consumer decisionmaking.

Health Education Models

Researchers have postulated a wide variety of health education models: health belief,[3] PRECEDE(which uses predisposing, enabling and reinforcing factors),[4] values clarification,[5] epidemiological/systems,[6] behavioralist,[7] field theory,[8] and decision-making.[9]

Each model emphasizes different aspects of the health education process. Their common denominator is the assertion that the provision of health care information is only a small part of

the overall objective of encouraging health-maximizing behavior. Wellness services must extend far beyond the traditional lecture approach. Read states:[10]

> "A growing number of individuals are recognizing that the factual approach and the scare tactic approach to health are at the best ineffective and at the worst counter-productive."

These health education models can be synthesized into a generic five-step model. Each successive step is a prerequisite for the next. Together, they are a necessary condition for preventive health services, such as wellness programs, to be effective in improving health. Specific findings concerning hypertension are used to illustrate this model due to the variety of detailed research on treatment of this preventable disease and the similarity of its treatment regimen to the wellness lifestyle prescription.

Step 1. Cognitive and affective foundation

Consumers require a cognitive base of knowledge, and an affective base of attitudes and values before they can internalize health information. The extent of this foundation depends upon such factors as sociocultural environment, educational level, mass-market advertising, past experiences with health care providers, family environment, work environment and group environment(e.g. religious, civic, fraternal,social).

Values clarification techniques attempt to strengthen the consumer's affective base by promoting consistency of values, commitment to the support of those values, and self-esteem. Seeman and Seeman[11] found that a low sense of control was significantly associated with less self-initiated preventive services.

Some health educators feel that most preventive services are oriented to middle-class, well-educated decisionmakers who don't need them.[12,13] They maintain that better packages need to be designed for minority groups whose values differ significantly from the norm.

Field theory emphasizes the multitude of environmental impacts on the affective and cognitive foundation.

The PRECEDE model would consider this foundation to be formed of predisposing factors (knowledge, beliefs, values, attitudes and selected demographic variables).

Step 2. Internalization of Information

Each consumer will demand a certain amount of health care information given its price, which includes not only monetary cost but also time, distance and convenience costs. High information search costs limit most consumers to passive information search (i.e. obtaining their health information from the mass media or casual social contacts). Active information search will not be engaged in unless the topic is especially important to the consumer. The PRECEDE model similarly breaks the internalization of information stage into awareness and interest stages.

The cognitive and affective foundation determines how health care information will be processed once received. Internalization of the information does not occur until the individual understands the message(cognitive base) and accepts it as valid (affective base). Lenz [14] postulates the following information search process: stimulus, goal setting, a decision whether to seek information actively, search behavior, information acquisi-

tion and clarification, and decision regarding accuracy of information acquired. Predictors of variation in search behavior include three variable groups: Background(sociodemograhic factors and previous health experiences), personality (tolerance for ambiguity, self-esteem, need for cognitive clarity, rigidity, trait anxiety, and cognitive style), and context (time limits, importance/risk of decision and interpersonal environment).

Step 3. Decisionmaking/Readiness to Act

Once the information is internalized, the individual must decide what action to take. The health belief model[15] asserts that this decision will depend on the individual's perceived susceptibility to a given health risk, the perceived severity of the risk(both combine to form the readiness to act factor) and the perceived benefits and costs(or implicit barriers) of various alternative courses of action. Barriers may include monetary cost, long waiting times, inconvenient service hours, impersonal attitude of providers, extent to which existing behavior must be modified, complexity of the alternative, psychological cost of admitting that one has a chronic disease and side effects (both physical and mental). The final decision requires an additional precipitating force or "cue to action".

The rational actor decisionmaking model implies that each of us will use the same standard decision process in determining our health behavior as we would use for other daily decisions. Other authors stress the importance of persuasion to motivate people to take healthy action.[16]

Step 4. Initial Implementation/Action

If the patient decides to participate in wellness services, the initial implementation of a new regimen plays a key role in determining whether or not the consumer will follow through on this decision. Successful initial implementation of the consumer's decision to change his behavior is the hardest step in the entire process. Research shows that half of all non-symptomatic hypertensives regularly miss treatment appointments.[17]

The desire to change one's behavior is futile unless one has the necessary self-control skills, motivation and resources to do so. A consumer's motivation to follow through with cognitive decisions(e.g. stop smoking, exercise, diet) stems from values and emotions aroused by stimuli perceived through the consumer's health beliefs. Some authors emphasize the value of training to increase skills such as self-control.

The PRECEDE model emphasizes the variety of enabling factors required for successful initial implementation. These factors include availability of health resources, accessibility of health resources, community/government priority and commitment to health, and health related skills. The PRECEDE model terms this initial implementation the adoption stage.

Step 5. Continuing Reinforcement

Since many healthy behavior changes are difficult to maintain and most require continuous adherence to maximize their benefits, reinforcement is crucial to the long-term success of wellness services. Physicians report that long-term full compliance with hypertension regimens averages one-third, while

one-third comply most of the time and one-third never comply.[17] The consequences of one's behavior may provide some positive reinforcement, but frequent feedback from and support of family, health care professionals, friends, and others exposed to the same risk factor are the major sources of reinforcement. Behavioralist theory techniques are widely used in this stage of the decisionmaking process. They have been successfully applied to problems such as alcoholism, retardation, anorexia nervosa, overeating and depression.[19]

The PRECEDE model emphasizes the importance of reinforcing factors(family, peers, teachers, employer) during this stage. Positive reinforcement of desired patient behavior can include the provider's sincere interest in patient progress, awards, verbal strokes and public recognition. Lack of continuity of care is a negative reinforcer which often affects the poor. The Stanford Heart Disease Control Project showed that complex behavioral changes required extensive face-to-face reinforcement and support which mass media could not provide.[20]

The community system model [21,22] emphasizes a comprehensive approach, as opposed to piecemeal solutions. A joyful, pleasurable orientation, as opposed to grim scare tactics, is sought. This model stresses the key role of self-help groups and other specialized support groups in sustainment of change over the long run.

Marketing Models

Marketing has been described as: [23]

"...the analysis, planning, implementation and control of carefully formulated programs designed to bring about voluntary exchanges of values with target markets for the purpose of achieving organizational objectives. It relies heavily on designing the organization's offering in terms of the target markets' needs and desires and on using effective pricing, communication and distribution to inform, motivate and service the markets".

Marketing seeks to identify and develop customer demand for services which the organization can offer. Capacity is linked with demand to insure maximum utilization of organizational assets. The marketing mix model consisting of the four key variables of price, promotion, product, and place, is commonly used.[24,25]

In the next four sections, each of these key determinants of successful marketing is further analyzed by citing common issues which determine marketing success and wellness-related examples of those issues.

Marketing Variable 1. Product

What exactly is the product? What are the expected benefits which the seller expects the customer to gain? Are these the same as the benefits which the customer is seeking? Will there be a exchange of goods mutually beneficial to each party? Is the product designed with the target market in mind?

Examples of Product Issues

1. The wellness product has been alternately described as short-term (health, sexiness, feeling good, looking good) or long-term(increasing life expectancy).

2. MacStravic[26] states that service design entails examination of what services to offer to which markets (and which services to target for utilization increases). He urges the consideration of current demand vs. potential need.

3. Some authors have claimed an overemphasis by wellness programs on the medical model. They claim that medically determined needs often differ from consumer perceptions.[27]

4. Wellness centers have attempted to emphasize their comprehensive approach, in contrast with the normal health club.

5. Other authors[28] have maintained that wellness products are actions(preventive behaviors) that: require giving up things people like, are often unpleasant and are life-time commitments. Given these factors, it is very hard to fit the product to the consumer.

6. In contrast to other types of marketing, after sale service[29] of wellness programs is crucial. There must be motivation to stick with the product, not just buy it. Persistance becomes the most crucial issue.

7. Are we marketing a particular organization's health promotion service or permanent changes in health behavior?[30]

8. Many people with a low tolerance for uncertainty may balk at purchasing a product (such as wellness services) with a high degree of uncertainty of utility.[31] Wellness is a lifestyle which requires sequential actions over time to be effective, not just one action/purchase.

Marketing Variable 2. Promotion

What is the target population? Who else is providing the product to the target population? How is the product and the organization which provides it perceived by the target population? Do customers recognize the name? What message does the name and logo send? Is the advertising effort promoting the desired image of the program? Is personal salesmanship being emphasized as well as advertising? Are there plans to attract interested but wavering clients?

What attracts the target population? What are their values? What media do they prefer? What has credibility for them? What is their prior experience with wellness programs or concepts? Examples of Promotion Issues.

1. Qualities which the wellness program should seek to have associated with it by the target market include: professional, competent, expert, quality, health. Amateurish ads, for example, may damage the professional image being sought. The use of the word "clinic" may send the wrong message because this brings to mind sick people.

2. Promotion must be based on solid consumer research.[32]

3. Promotion can have an impact on consumer attitude, which has been found to be more of an indicator of wellness-related behavior than readiness to act or level of concern.[33]

4. Studies suggest that market is segmented in terms of attitude (given cultural, economical background).[34] Only certain segments are disposed to behave in a preventive fashion. Attempts to promote wellness services in other markets may be a waste of resources.

5. Bloch[35] classifies "wellness-seekers" as a subgroup of the broader "health-seekers" group. Others are assumed not to be interested in wellness services and are not targeted. His review of the literature revealed that the population segment which demonstrated interest in the wellness concept consisted predominantly of the following types of people:

a. people already involved in other health promoting activities.

b. singles who fear the implications of disease or wish to maintain a good physical appearance.

c. others who felt vulnerable to disease

d. "hobbyists" who enjoyed wellness as recreation and an opportunity to socialize.

e. those dissatisfied with the medical care system or impatient with its results.

6. Non-rational, situational forces may be more important than rationality in determining health related behaviors.[36]

7. Even if consumers feel the need for preventive services and have the appropriate attitude, they must be motivated to make the exchange.[37]

Marketing Variable 3. Price.

What is the direct monetary cost? What is the non-monetary cost(e.g. psychic cost of ridicule, time , effort, opportunity costs)? How competitive are these costs with similar products offered by competitors? What image does the price of the service provide?

Examples of Price Issues

1. Free services are often assumed to be shabby and less than professional. Participants in free services have a minimal investment and therefore frequently drop-out.

2. One wellness center[38] uses flexible pricing, consisting of a sliding scale based on intensity of use. These scales are built based on careful research concerning what clients can afford and are willing to pay.

Marketing Variable 4. Place.

Is the service location convenient to the target population? What message does the location and the building send to potential customers?

Example of Place Issues

The most frequent example is placement of a wellness service in a bright new/renovated facility outside the hospital setting (e.g. in a shopping mall). This has distinct advantages in attracting business from many consumers who would not otherwise use hospital-based wellness services. One wellness center[39] bought a former racquetball tennis club located two miles from the main hospital.

Synthesis of Literature Reviewed

The two generic models discussed provide differing perspectives on wellness. Combining the demand-driven variables of the marketing model with the need-driven variables of the health education model would result in a useful synthesis model. This model would enable analysis of wellness as both a personal growth process and a consumer product.

Methodology

Research Design

Key determinants (from both generic models) which could be captured by interview formed the basis for the variables to be included in the questionnaire design. In accordance with the approach widely used in the literature on health education, variables were classified into three categories: demographic (or control), objective (measured with a minimum of recall bias), and subjective (based on respondent perceptions). They are listed at Table 1. The variable code sheet (Appendix C) explains how each variable was reduced to a set of intervals.

The research instrument through which the above variables was measured was an in-depth phone survey(see Appendix D) consisting primarily of items from the 1979 National Center for Health Care Statistics Health Practices and Consequences Survey.[40] Decision variables which the NCHCS questionnaire did not capture were measured by items from other validated questionnaires. A data capture form(Appendix E) was completed for each phone survey to insure accurate conversion of the written interview record into the decision variable values to be keyed into the computer.

TABLE 1

VARIABLE LISTING

Demographic(control) variables(10)

-Age
-Sex
-Educational level
-Rank of Sponsor
-Marital Status
-Is spouse employed outside the home?
-Number of children aged 6 or under.
-Race
-Amount of time at Ft. Knox
-Family income

Objective variables(5)

-Risk factors (use existing risk questionnaire-score)

-Health Status (objective) (using existing health interview questionnaire items).

-Access (time required to get from house/workplace to wellness clinic)

-Spouse attendance at clinic

-Previous participation in wellness programs(at other locations).

Subjective variables(8)

-Perceived health status

-Worry [Perceived severity of / concern over health problems].

-Locus of control/responsibility

-Awareness of IACH wellness clinic services (name recognition of clinic, degree of awareness of services offered).

-Perceived wellness service needs (measured interest in a series of hypothetical programs).

-Major sources of information about IACH wellness clinic (e.g. word of mouth, newspaper, radio, TV).

-Impression of IACH wellness clinic (positive, negative, neutral/uninterested).

-Attitude towards organized medicine (e.g. physicians and hospitals).

The first draft of the questionnaire was staffed through subject matter experts at Fort Sam Houston. Revisions were made based on their input. The revised questionnaire was administered by phone in November to a sample of ten spouses of Fort Knox MEDDAC soldiers in order to ascertain its face validity. After taking the survey, each spouse was interviewed in detail concerning the clarity of the questionnaire. Based on these test results, the survey forms were revised.

In order to minimize the effects of recall bias and provide maximal predictive power, a prospective design would have been optimal. Due to the short period of time available to the researcher and the low clinic utilization rates by the overall Fort Knox spouse population, no users were identified during the three-month timespan of the study. The lack of use of the clinic by the study population required the adoption of the backup design: a cross-sectional study.

Reason for Use of Logit Technique as Primary Means of Analysis.

The original dependent variable in this study was categorical: use or non-use of wellness clinic. The statistical tool best suited to construct a model to predict this yes-no type of dependent variable was the logit method with weighted least squares. This multiple linear regression technique could be used to predict the probability that any given individual would use the clinic. It computes the probability by assigning coefficients to each independent variable in the decision model so as to minimize the variance between estimated and actual logarithmic transformations of the probabilities.

Data-gathering

The sample size goal was set at 200, in order to yield an average of 25 people per each of 8 final subpopulations (required for statistical validity in logit analysis). This would allow a statistically valid three variable model, if each variable had only two possible outcomes (because two raised to the third power is eight). This concept is illustrated in a generic data analysis table (Table 2).

TABLE 2

GENERIC DATA ANALYSIS

Subpopulation	DECISION FACTORS (Y=YES) (N=NO) 1	2	3	USERS	NONUSERS	LOGIT TRANSFORMATION
1.	N	N	N	a	b	ln [a/b]
2.	N	N	Y	c	d	ln [c/d]
3.	N	Y	N	e	f	ln [e/f]
4.	N	Y	Y	g	h	ln [g/h]
5.	Y	Y	Y	i	j	ln [i/j]
6.	Y	Y	N	k	l	ln [k/l]
7.	Y	N	Y	m	n	ln [m/n]
8.	Y	N	N	o	p	ln [o/p]
TOTAL				total users	total nonusers	logit average or "constant"

STATISTICS COMPUTED

-CHI-SQUARE GOODNESS OF FIT FOR FINAL MODEL
-BETA COEFFICIENTS: B0 B1 B2 B3
-CHISQUARE FOR B0 B1 B2 B3

The largest field unit on post, the 194th Armored Brigade, was selected as a representative sample of the Army population. In order to reduce administrative coordination required, the minimum number of battalions(three) was selected and all possible spouses of soldiers in these battalions were interviewed.

Coordination was made with unit leaders to explain the importance of the survey and set quotas for three rank categories: officers, NCO's(E-6 and above) and enlisted (E-1 to E-5). Soldiers with spouses were requested to furnish their home phone number and explain to their spouses the purpose of the survey and advise them that the researcher would be calling them to administer the questionnaire over the phone. The researcher maintained a roster of the names selected.

All questionnaires were kept confidential. The only identifying information captured on the questionnaire was the code number from the master name list provided by the units. This was necessary to ascertain whether the spouse used the wellness clinic during the study period.

The unit provided the researcher with 141 of the 200 names requested. Eighty-seven non active-duty Army spouses were administered the full questionnaire, yielding a gross response rate of sixty-two percent. This response rate was primarily attributable to the high number of phones which had been disconnected or incorrectly listed. Eighty-seven percent of all spouses with correct working phone numbers were interviewed. A response rate analysis is included at Table 3.

TABLE 3

RESPONSE RATE ANALYSIS

Sample size goal requested of unit:	200	
Sample size provided by unit:	141	
- Phone disconnected		23
- Wrong number		14
- Not available		10
- Refused to complete survey		2
- Not able to speak English		2
- Active duty spouse		3
Total interviews completed, coded and analyzed	87	

Response rate of total unit provided sample: 62 %

Response rate of non-active duty spouses with phones: 87 %

The researcher elected not to attempt to interview the fifty-four non-responding spouses in person because of the following reasons: the length of time per interview (twenty to thirty minutes), the travel time that would have been required and the consistency of the findings among the eighty-seven spouses fully interviewed. The actual sample size of eighty-seven was accepted with the understanding that subsequent analysis would provide useful **indications** of consumer decision behavior and rank ordering of the importance of the decision variables. There were enough cases to enable derivation of a model which would meet the general project criteria, although strict adherance to the two statistical significance conditions would be sacrificed.

Data Analysis Plan

The primary means of data analysis chosen was the logit method, because it lent itself well to the user versus non-user dependent variable. A secondary means of data analysis, normal multiple regression, was chosen in case the dependent variable had to be changed to likelihood of use of the clinic (as measured by the wellness interest level score). This would occur if an insufficient number of users were identified in the sample population.

Primary Data Analysis - Logit Method

Logit Step 1.

The first task in the data analysis was to eliminate independent variables that contributed little to predicting the dependent variable. A BASIC computer program named DATAGATH (see Appendix F for listing and sample output) was written to facilitate this elimination. The program first considers the individual impact of each variable on the dependent variable. This allows rapid elimination of variables which have little predictive value (e.g. sex if all but a few spouses interviewed are female). In order for the logit analysis subgroup requirements to be met, only variables which had a reasonable spread of positive and negative values (defined as no less than ten and no more than seventy-seven of either) would be chosen. Independent variables which had a proportion of users and non-users which was close to the sample population average would be excluded due to lack of predictive power.

Logit Step 2.

The second task was to select the independent variable combinations(choose three) which had high predictive value and enough spread among the eight subpopulations to warrant logit analysis. The second portion of the DATAGATH program was written to assist in this task. This subprogram processes each possible combination of the decision variables remaining after the first step. The program outputs (for each combination of three variables): the number of users and non-users in each of the eight resulting subpopulations, and the proportion of users in each subpopulation. The researcher could then search the printout to weed out combinations with excessively uneven subgroup distributions and select those combinations with subgroup proportions which signaled possible explanatory power (e.g. one subgroup might have three times the proportion of users as the sample population and another might have only half).

Logit Step 3.

The third task was to choose from among the most promising combinations the one with the highest predictive power. This was accomplished by comparing all the most promising combinations using the BASIC computer program LOGIT (See Appendix G for listing). This program determines the best predictive model and then calculates the chi-square goodness of fit and each variable's chi-square significance test statistic. The researcher can thus select the model with the best fit with respect to the project criteria (see page 2). The final result would be a set

of three or less variables which were the most significant in explaining why consumers were interested in wellness services.

Secondary Data Analysis-Normal Multiple Regression

This method of analysis only works if the dependent variable is modified from a variable with only two outcomes (use or non-use of the clinic) into a continuous one (e.g. interest level score). This would require recoding the dependent variable.

The thirty-three independent variables would have to be reduced to a manageable number (in order to meet microcomputer requirements) by means of selecting the most promising variables and consolidating categorical into continuous variables (e.g. the low perceived health status and the medium perceived health status variables could be combined into the perceived health status score for the respondent).

An off-the-shelf computer statistics package was obtained. This package could derive a predictive model by means of step-wise multiple linear regression. In order to expand the policy significance of the findings, a broader "indicator" model would be developed in which the stringency of the F test criteria was reduced.

Consolidation of Primary and Secondary Analyses

Upon completion of the logit and multiple regressions analyses, the results could be compared for inclusion into a combined model. Agreement on key variables for inclusion in the combined model would reinforce the accuracy of the model.

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CHAPTER II

DISCUSSION

Description of the Sample Population

The sample population of eighty-seven spouses was composed entirely of women. Their active-duty spouses were predominantly enlisted personnel(fifty-two percent) and NCO's(thirty-three percent). Close to half of the sample population had some college education. Most identified their racial group as white(seventy-nine percent). Half had been at Fort Knox for over a year. All but ten percent lived within fifteen minutes of Fort Knox.

None of the sample population used the wellness clinic prior to or during the study period. An overwhelming majority had never heard of the Fort Knox wellness clinic (81/87). Only one of the respondents knew something about the services provided by the clinic. Close to half of the sample population(forty-four percent) categorized the quality of military medical care they had received as either fair or poor. Eighteen percent of the respondents indicated a high level of interest in wellness services. Appendix H describes the sample population in more detail.

Modifications in Data Analysis

The lack of identified users required a modification of the data analysis plan. The dependent variable was redefined from use or non-use of the clinic to likely use or likely non-use of the clinic. The variables NEEDLO and NEEDMED, which measured the level of interest in wellness services, were used. Those respondents with values of +1 for either variable were grouped as likely non-users, because they did not have a high level of expressed interest in wellness services. The remaining respondents (i.e. those having -1 scores on both NEEDLO and NEEDMED) were considered to be likely users.

The logit analysis technique described earlier was used on the redefined dependent variable. To supplement and validate this primary technique, the secondary technique, normal multiple regression, was used as well. This required further modifications in the variable coding which are addressed in detail in the Multiple Regression Data Analysis Section.

Primary Data Analysis - Logit Method

Logit Step 1

The direct relationship of each of the thirty-three independent variables to the dependent variable was assessed and the proportion of likely users among those scored as positive for that variable was calculated (see Appendix I for the results). Appendix J shows the remaining variables after those with insufficient spread (less than ten or more than seventy-seven positive respondents) were eliminated.

The remaining variables were then classified based on the proportion of likely users in the entire sample (.18). Variables with proportions of .21 or more were classified as positive variables. Variables with proportions of .15 or less were classified as negative variables. Variables with proportions between .16 and .20 were classified as neutral.

A ranked list of all positive, negative and neutral variables considered is at Table 4. The proportions of likely users in each group is listed to the right of the variable number and name. An asterisk denotes a 2x2 adjusted chi-square value of over 3.0, indicating significant association. Neutral variables were excluded from logit analysis.

TABLE 4

LOGIT VARIABLES RANKED BY EFFECT

Positive		Neutral		Negative	
(31) BLACK	.29	(30) CHILD	.20	(1) LOWRISK	.14
*(7) WORRY	.27	(2) MEDRISK	.18	(8) LOCUS	.14
(5) LPHS	.25	(21) MEDATT	.18	(33) KTIME	.13
(22) AGE	.24	(23) HS	.18	(29) FTIME	.08
(31) PTIME	.21	(25) NCO	.17	*(35) INCOME	.05
(4) MHSOBJ	.21	(24) COLL	.16	(26) OFFICER	.00

Initial indications from these results were that the following groups were more likely to use wellness services:

1. respondents who were worried about their health.
2. respondents who perceived their health status as low.
3. older respondents
4. black respondents
5. part-time employed spouses.
6. respondents with medium objective health status.

Similarly, the following groups initially were classified as less likely to use wellness services:

1. officers' spouses
2. families with high income levels
3. full-time employed spouses
4. spouses who have been at Fort Knox over one year.
5. respondents with a self-centered locus of control.
6. respondents with a low level of health risk factors.

Logit Step 2

All possible combinations of three of the remaining variables were analyzed by computer, using the eight subgroup scheme shown earlier at Table 1. Appendix K is a sample listing of all combinations and the resulting subgroup proportions.

Ideally, only combinations with twenty-five respondents per subgroup should have been considered for logit analysis. Due to the reduced sample size, this criteria was relaxed to: no less than four respondents in each of the eight subgroups and no more than three subgroups with zero likely users. Variable combinations which did not meet these criteria were eliminated from further logit analysis.

These criteria necessitated the exclusion of the officer variable from logit analysis, but the fact that none of the 13 officer spouse respondents were likely users was nonetheless significant.

Logit Step 3

After this process of elimination, each of the thirty-seven resulting combinations was analyzed. Appendix L summarizes the beta coefficients, chi-square goodness of fit and chi-square individual variable coefficients for each combination.

None of the variable groupings met both of the first two criteria of the research project (significance of the goodness of fit and individual coefficient chi-squares at the .05 level). In the interests of providing policy guidance, however, the logit model 1.72 + .70*INCOME - .37*LPHS - .42*WORRY, which by far surpassed the other models, was chosen as the logit indicator model. The goodness of fit chi-square statistic was 2.77 (with df=4) (high but not statistically significant) and all individual coefficient chi-square values were well over 1 (with df=1) (high but not significant at the .25 level). No other model met these criteria.

These coefficients mean that high income has a negative association with likely use, and low perceived health status or high worry have a positive association with likely use. Due to the log transformation process, negative logit coefficients show positive association and positive ones imply negative association.

Secondary Data Analysis- Normal Multiple Regression

This secondary data analysis required restarting from the raw data provided by the original thirty-three independent variables. Variables were recoded into continuous form whenever possible (i.e. risk score, perceived health status score, objective health score). Variables with very few positive responses

(e.g. sex) were eliminated. The seventeen key variables which resulted from this process are listed at Table 5.

Upon recoding, the dependent variable NEED was found to be mound-shaped and approximately normal in distribution. A frequency table is listed below at Table 6. The sample mean was 2.77, with a sample standard deviation of 1.67. This distribution is well suited for multiple regression analysis. Means, standard deviations and ranges of the independent variables are listed at Appendix M.

TABLE 5

MULTIPLE REGRESSION VARIABLES SELECTED

RISK = actual numerical score on risk questions
HSOBJ= actual numerical score on objective health status
PHS = actual numerical score on perceived health status
WORRY= same coding as original
LOCUS= same coding as original
AWARE= rescored on scale from -1(never heard of clinic) to +2 (familiar with services of clinic)
NEED = actual numerical score on interest in wellness services
MEDAT= same coding as original
AGE = same coding as original
EDUCN= rescored on scale for -1(non-highschool grad) to +1(some college)
RANK = rescored on scale from -1 (EM) to +1(officer)
WORK= rescored on scale from -1 (not working) to +1 (full-time worker)
CHILD= same coding as original
RACE = recoded into white versus non-white
TIME = same coding as original
ACCESS = same coding as original
INCOME = same coding as original

TABLE 6

FREQUENCY TABLE OF DEPENDENT VARIABLE

Interval	Number observed	Percentage
0-1	11	12.6
1-2	17	19.5
2-3	14	16.1
3-4	21	24.1
4-5	14	16.1
5-6	6	6.9
6-7	3	3.5
7-8	1	1.1
Total	87	100

Analysis of the correlation matrix of all seventeen variables resulted in seven policy-significant correlations, listed at Table 7 below. None of these involved the dependent variable, likelihood of use. Perceived health status has strong correlations with four other independent variables, underlining its predictive power.

TABLE 7

POLICY SIGNIFICANT CORRELATIONS

PHS-RISK	.507
PHS-HSOBJ	.478
EDUCN-RISK	.435
LOCUS-WORRY	-.337
LOCUS-PHS	.332
RANK-AWARE	.308
EDUCN-PHS	.304

A step-wise multiple regression analysis revealed that with a F to enter of 3, only one variable, PHS (perceived health status), entered into the model. The regression formula was 2.698 - 0.1457 * PHS, which would indicate that the lower one's perceived health status, the higher one's likely interest in wellness services. Explanatory power was limited, however, because despite the highly significant ($p<.025$) F-statistic value of 5.56, the R-squared value for this variable was .06.

With the F-to-enter criteria reduced to 1, four other variables entered, in the following order: INCOME, EDUCN, MEDAT and TIME (see Appendix N for the stepwise regression results). As expected, INCOME had a negative coefficient, EDUCATION a positive coefficient and MEDAT a positive coefficient. An unexpected finding was that TIME (at Fort Knox) had a negative coefficient.

The multiple r-squared value increased to .12 with the addition of the first four independent variables and did not increase appreciably with the further addition of the variable TIME. The F-test for the model formed by the first four independent variables was significant at the .05 level ($F(4,83)=2.68$).

Consolidated Indicator Model

The findings from the logit analysis and the normal multiple regression analysis were in overall agreement, although the order of importance of the independent variables varied. Based on the original research project criterion of no more than five variables, the following consolidated indicator model was constructed (indicator variables are listed, in approximate order, from strongest to weakest):

PHS (perceived health status)
INCOME
WORRY
EDUCATION
MEDAT (attitude towards military medical care)

Both analyses found that perceived health status was among the strongest indicator variables. This reinforces the health belief model's emphasis on perceived severity of disease in determining consumer health behaviors. The direction of the effect was, as predicted, negative.

Both analyses revealed that INCOME was also a strong indicator variable. Higher income people were found less likely to be interested in wellness, contradicting some of the literature reviewed earlier. This result may have been due to the fact that none of the thirteen officer spouses indicated a high level of interest in the wellness clinic. A plausible explanation, reinforced by several unrecorded comments made during the phone interviews, may be that officer spouses felt they already had mastered the skills taught in the clinic. Perhaps a curvilinear effect exists whereby the likely use of wellness services increases to a maximum at a given socioeconomic level and then tails off due to previous saturation of perceived needs or lack of time available.

Logit analysis resulted in the selection of WORRY as the third indicator variable. The positive association again confirmed the health belief model. The variable WORRY approximated the "perceived vulnerability to disease" factor postulated by that model. Multiple regression analysis did not indicate a statistically significant result, however. This may have been due to the categorical scoring of this variable.

Multiple regression analysis resulted in the identification of EDUCN as another indicator variable, with a positive association, as one would predict from the health education literature. This finding contrasts with the INCOME variable findings. Such a combination of findings may indicate that moderate income respondents with higher levels of education were most likely to be interested in wellness services. Such an explanation would be consistent with the curvilinear effect of income postulated

earlier. Logit analysis subgroup requirements account for the fact that the EDUCN variable was not considered for inclusion in the logit-based predictive model.

The last indicator model variable selected was MEDAT (attitude toward military medical care), which entered on the fourth step of the multiple regression analysis. Although it was rejected as a predictor by logit analysis, it provides indications that the better one's evaluation of military medical care, the more interested one is in wellness services. This finding reinforces the conjecture that the image of the wellness clinic is associated with the hospital due to its name, location and lack of separate publicity.

Implications of Variables not Selected

The absence of certain variables (in either the logit or the multiple regression models) which one would have anticipated to be significant was equally interesting.

The RISK variable's lack of association indicates that those who live by wellness precepts were not necessarily more interested in wellness program services, contradicting Bloch's thesis of wellness-seekers.

The HSOBJ(objective health status) variable's lack of association indicates that perceptions about health status may be more important than actual health status in decisions to consume wellness services.

The lack of significance of the variable RANK in the multiple regression analysis, despite the disproportionate lack of use by officer spouses, indicates that, when controlled for

other factors, the difference in rank between NCO and enlisted spouses did not significantly impact on likely use of wellness services. Curvilinearity may also have reduced its significance as an indicator variable.

The lack of association of the LOCUS variable seems to contradict the health education and marketing literature which predicts that the greater the sense of self-control one has, the more likely one is to be interested in wellness services. Perhaps the relationship is, like that of income or rank, curvilinear. Those consumers with high or low levels of perceived self-control may have lower levels of interest in wellness services than those with medium levels of perceived self-control.

AGE, an initial positive demographic variable was not designated as significant in either the logit or the multiple regression final analysis. This implied that the indicator variables listed above (e.g. INCOME, EDUCN), since they better account for observed variance, were largely responsible for the high proportions of potential users observed in these populations. Once these other variables were controlled, age and work status lost their predictive value.

The variable TIME (at Fort Knox) entered on the fifth step of the multiple regression analysis but was excluded from the indicator model due to the simplicity criterion and its limited contribution to the multiple r-squared value. This variable's effect was negative, which indicated that, all other things being equal, the longer one is stationed at Fort Knox, the less interested one becomes in wellness services. Although unexpected, this result is consistent with a lack of advertising and

publicity about the availability of wellness services. Newer arrivals may have greater interest because they are less committed to other competing activities.

The lack of significance in the multiple regression analysis of the CHILD variable confirmed the finding of neutrality in the logit analysis. The presence of small children at home did not seem to be a barrier to likely use of wellness services.

Although twenty-eight percent of the fourteen blacks surveyed indicated a high level of interest in wellness services, neither logit analysis or multiple regression verified an independent effect of race on likely use of wellness services. The small size of the black subpopulation, combined with other intervening demographic factors, may have been responsible for this.

The variable ACCESS, as measured by commuting time, was expected to play a role in interest in wellness services. The lack of such a finding may have been due to inadequate measurement of the access variable. A longer questionnaire could have included questions such as "How many cars does your family own?" and "How often do you come on Post?" If the commuting time approximation was accurate, access is not a consideration in likely use of wellness services.

The WORK variable's lack of selection for the model was based on weak multiple regression and logit analysis results. The initial positive effect of the PTIME (part-time worker) and stronger negative effect of the FTIME (full-time worker) variable may be explained by fact that part-time employees and non-working spouses have free time not available to full-time workers. The

impact of this variable was reduced once other demographic factors in the consolidated indicator model were taken into account.

Medical Need for Wellness Services - An Added Dimension

The consolidated indicator model shows that medical need is not closely associated with interest in wellness services. This mismatch between need and demand raised the question of whether targeting or groups should be based on either interest in wellness services or medically-defined need? The market-driven private sector does not have the luxury of asking this question, but federal health-care facilities have more flexibility.

The traditional public health model favors the provision of preventive services to people in high risk groups. The literature reviewed earlier indicated that high risk was associated with unhealthy lifestyles, which in turn was associated with low socioeconomic status.

Supplementary data analysis was conducted to verify the impacts of socioeconomic factors on health and health-related behavior. The health-related variables of RISK, HSOBJ and PHS were chosen as dependent variables. RANK, INCOME, AGE and EDUCN were selected as key demographic independent variables. Both sets of variables were selected in accordance with the literature cited earlier, which predicted that as socioeconomic status (particularly income and education) increased, so did adherance to wellness precepts and overall health (see Appendix O).

The variable RISK, which measures the extent to which respondents are at risk for premature death due to health-related behaviors, had a strong association with education. Multiple

regression analysis assigned EDUCN a coefficient of -1.3, with a constant of -.99 and an F value of close to 20 ($p<.001$). R-squared was .19. No other independent variable had a F-test score of over 1.2. This confirmed that higher educated people are at less risk for premature death and are an important part of the "wellness seekers" designated by Bloch.

The variable OBJHS (objective health status) was found to have no direct relationship to education or other demographic variables. In this sample, demographic factors do not have the same impact on objective health status as they do in the population at large. One plausible explanation is the financial security and free health care provided through government employment.

The variable PHS(perceived health status) had a positive, though weak interrelationship with EDUCN. The coefficient was 1.26. R-squared was .09 but the F-test was highly significant at 8.65 ($p<.005$). Incorporation of the next significant variable, INCOME, added .03 to the r-squared value. INCOME was found to have a negative coefficient(-.57) and the coefficient for EDUCN increased to 1.53. The effect of EDUCN supports the literature and the effect of INCOME contradicts it.

Socioeconomic factors have an important association with lifestyle risk and thus medical need for wellness services. Those with lower socioeconomic status also have lower interest levels in these services. This paradox poses the ethical issue of what incentives (ranging from persuasion to coercion) should be used to encourage use of wellness services by the service population segment characterized by low socioeconomic status and high-risk lifestyle.

CHAPTER III

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The following five rank-ordered variables have a significant impact on Army spouses' decisions to use the wellness clinic (positive and negative associations are denoted with (+) and (-) respectively):

1. (-) Perceived health status
2. (-) Income
3. (+) Worry about their health
4. (+) Education
5. (+) Attitude towards military medical care

Together, these variables form a model which, despite its lack of statistical precision, indicates that both the need-driven health education approach and the demand-driven marketing approach have explanatory power in consumers' decisions to use wellness services. The five variable model is a practical synthesis of the two seemingly contradictory approaches.

Two subjective variables are key indicators of likely use of wellness services. Perceived health status has a negative association with likely use. The higher one's health status, the lower the likelihood of use of wellness services. Worry over

one's health has a positive association with likely use of wellness services. These results bolster the health education model's depiction of the preventive health habits decisionmaking process. They also define a target population for the wellness services offered at Fort Knox. This population includes those who feel that their health is fair to poor and are worried about it.

The key demographic variables are income and education. The negative impact of income contradicts both the health education model and the marketing model. The positive impact of education reinforces the health education model and the marketing model.

The MEDAT variable's positive impact on likely use of wellness services, albeit weak, reinforces the marketing and health education models. Past positive experiences with the medical care system influence perceptions of a wellness services provided in a hospital.

The lack of association of many key variables which the marketing models and health education models predicted would be significant in explaining likely use of wellness services implies that these models have limited applicability to the active duty military spouse population at Fort Knox.

The lack of a stronger, statistically significant indicator model implies that the concept of the target population of "wellness seekers" postulated by Bloch has limited validity in the military spouse population. Interest in wellness services among the military spouse population seems more broadly distributed than Bloch found in his study.

The lack of awareness of the wellness clinic, combined with a high level of interest on the part of the population, indicates that minimal marketing efforts may bring significant increases in utilization.

Recommendations for Improving Clinic Utilization

1. Increase name recognition and awareness of the wellness services product. The lack of publicity concerning the wellness clinic has resulted in very low name recognition of the clinic. Increasing this name recognition must be the primary goal of an effective publicity campaign. Awareness of services offered will be the next publicity goal.

2. Foster awareness among the broad service population concerning potential health problems. This would increase demand by decreasing perceived health status and increasing the worry factor.

3. Rename and relocate the wellness program to reduce its association with the hospital.

4. Remold the wellness service product to increase its attractiveness to a variety of demographic groups. This would include steps such as:

   a. designing versions which ~~have~~ replace didactic instruction with shorter informal discussions.

   b. targeting versions to different age groups and geographic locations.

   c. designing exportable packages for target populations who have limited transportation assets.

d. emphasizing social cohesion, such as self-help groups, throughout the program.

e. allowing consumers a choice of wellness packages meeting their perceived needs.

5. Define target populations based on both need and potential demand. Promote the repackaged product through intensive advertising and gimmicks that appeal to these target populations.

A concept paper (Appendix P) based on these recommendations was presented to and approved by the hospital's Community Health Education Program Committee in March 1985. The product development phase of the "Invest In Yourself Program" is now underway. A group of forty hospital civilian employees recently participated in a pilot study which included a four week, twelve session program of aerobics combined with health education. Thirty of them graduated. Their comments about the program were very favorable.

APPENDIX A

DEFINITIONS

DATAGATH. A BASIC computer program written by the researcher to compute entry data for the logit analysis program LOGIT.

Likely User. A consumer who has a high level of expressed interest in wellness services.

LOGIT. A BASIC computer program co-written by the researcher and LTC Badgett. This program takes the number of likely users and non-users in each subpopulation and computes the logit coefficients which best predict likely use of wellness services for the entire sample population.

Logit Analysis. A technique of statistical analysis which permits multiple regression techniques to be used when the dependent variable and independent variables are categorical (non-continuous). The logit method enables a probability of use(dependent variable) to be estimated given certain consumer characteristics(dependent variables). The logit method computes the probability by assigning predictive weights to each independent variable in the model.

Subpopulation. One of the eight groups formed by all possible combinations of three variables, each of which has two possible outcomes.

Wellness Services. Those services provided by the Fort Knox Wellness Clinic. They include: stress management, health risk assessment and counseling, nutrition counseling and exercise counseling.

APPENDIX B

FY 84 WELLNESS CLINIC UTILIZATION BY BENEFICIARY TYPE

MONTH	AD	D/AD	RET	D/RET	DAC
January	230				
February	130	6	3	7	1
March	65				
April	230				
May	410				
June	140				
July	240				
August	150				
September	160				
October	275				
November	60	2			
December	300	1			
Total Past Year	2400	9	3	7	1

Source: Wellness Clinic log-in sheets for feeder reports

APPENDIX C

VARIABLE CODE SHEET

The following sets of variables will be measured through the research instrument. Questions used to construct each variable are listed. Proposed logit (categorical) intervals are also listed for each variable. Note that some of the original variables have been coded into two logit variables.

Demographic(control) variables(15)

-Age (under 30, 30 or over) Birth year: qxn. 55

AGE	+1	30 years or over
	-1	under 30

-Educational level(high school, some college, college graduate) qxn. 58

HS	+1	High School graduate
	-1	Non-high school graduate
COLL	+1	Some college
	-1	No college

-Rank of Sponsor(E-1 to E-5, E-6 to E-9, officer) qxn. 59

SNCO	+1	E6 and above
	-1	E1-5
OFF	+1	commissioned officer
	-1	non officer

-Sex qxn. 60

SEX	+1	Male
	-1	Female

-Does spouse work?(no, part-time only, full-time) qxn. 61-62

PTIME	+1	Part-time
	-1	Not working part-time
FTIME	+1	Full-time
	-1	Not working full-time

-Number of children 6 or under (none, some) qxn. 63

CHILD	+1	Some children under 6 yrs. old
	-1	No children under 6 yrs. old

-Race(black, white, hispanic, other) qxn. 64

BRACE	+1	Black
	-1	Not Black
HRACE	+1	Hispanic
	-1	Not Hispanic

-Amount of time at Ft. Knox(< 1 yr , >= 1 yr) qxn. 65

KTIME	+1	More than 6 months at Fort Knox.
	-1	6 months or less at Fort Knox.

-Family Income. qxn 67

INCOME	+1	$20,000 or more per year
	-1	less than $20,000 per year

Objective variables(7)

-Risk factors(use existing risk questionnaire-score)
(low, medium, high)

LOWRISK	+1	Risk score <=	-2
	-1	Risk score >	-2
MEDRISK	+1	Risk score <=	+1
	-1	Risk score >	+1

*** Where risk score is derived from 7 components
(each of which is a -1 for low risk, 0 for medium, +1 for high):

---

general practices = sum of scores from qxns. 1-8

social support network = sum of scores from qxns.9-11

preventive health practices = sum of scores from qxns. 12-15.

physical fitness practices = sum of scores from qxns. 16-18

nutrition = sum of scores from qxns. 19-21

family history = sum of qxns 22-24

stressors = sum of qxns 26-27

---

health status(objective) sum of scores from qxns. 28-32
+ overweight score (using Army table on qxns. 56-57)

LHSOBJ	+1	Yes	<= -4	(low)
	-1	No	> -4	
MHSOBJ	+1	Yes	<= 0	(medium)

-1 No >0

-access(time requiredto get from house/workplace to wellness clinic) [< 20 min., >= 20 min.] qxn. 66

ACCESS +1 < 20 min.
-1 >= 20 min.

-spouse attendance at clinic(yes,no) qxn. 45

SPOATT +1 YES
-1 NO

-previous participation in wellness programs(at other locations) qxn. 46

PREVATT +1 YES
-1 NO

Subjective variables(16)

-perceived health status (using standard health belief questions) (high, medium, low): qxns. 33-41.

LPHS (low) +1 score <= -2
-1 score > -2

MPHS (medium) +1 score > -2
score <= +1

-concern/ worry over health: sum of qxns. 42-43

WORRY +1 marked concern, perceived severity
-1 no marked concern

-locus of control/responsibility qxn 44

LOCUS +1 internal
-1 external, neutral

-awareness of IACH wellness clinic services(name recognition of clinic, awareness of services offered). qxn. 47-48.

AWARELO +1 never heard of clinic
-1 has heard of clinic

AWAREMED +1 knows location of clinic and some services
-1 extensive knowledge

-perceived wellness service needs(measure interest in a series of hypothetical programs). Each program will be scored 0 for little or no interest and 1 for marked interest. qxns. 51-52.

NEEDLO	+1	no interest (sum = 0)
	-1	some interest
NEEDMED	+1	some interest (sum = 1 - 3)
	-1	high interest (sum = 4+)

-major sources of information about IACH wellness clinic(word of mouth, newspaper, radio, TV,etc.). qxn. 49

TVRAD	+1	TV or radio
	-1	no
NEWSMAG	+1	Newspaper or magazine
	-1	no
FRIEND	+1	Friend or acquaintance
	-1	no
SPOUSE	+1	Chain of command
	-1	no
DOC	+1	Physician or nurse
	-1	no

-impression of IACH wellness clinic (positive, negative, neutral/uninterested). qxn. 50

IMPRESS	+1	positive
	-1	negative, uninterested

-attitude towards physicians, hospitals, organized medicine. qxn. 53-54.

MEDATT	+1	positive, neutral
	-1	negative

APPENDIX D

RESEARCH QUESTIONNAIRE:PHONE

Date Coded: _____

Date:_____ Phone #:_____ Time:_____ Qxnaire #_____

Hello, I'm _____. This phone survey is part of a research project which I am doing for Ireland Army Community Hospital. Your spouse has given us permission to call you. It should take about 15 minutes. I will be asking you questions about your health and your opinions about wellness services. Your cooperation will help improve health care at Fort Knox. Is this a good time for you or should I call back some other time? (call back on _____ at _____)

THE FIRST SECTION ASKS ABOUT SOME FACTORS WHICH MAY AFFECT YOUR FUTURE HEALTH.

1. On the average, how many hours of sleep do you get each day (that is, during a 24 hour period)? __hours.
+1 if < 6, else 0

---

2. How often do you use seat belts when you ride in a car?

-1	0	+1	+1
(always/nearly always)	(sometimes)	(seldom)	(never)

---

3. On the average, how often do you drink any alcoholic beverages such as beer, wine or liquor? (check the closest answer)

+1__Every day
+1__4-6 days a week
0__2-4 days a week
0__1 day a week(4 days/mo)
-1__2-4 days a month
-1__Less than 2 days/mo.
-1__never (IF SO, skip to #5)

---

4. When you do drink, how many drinks do you have per day, on the average? # of drinks per day = ____
+1 if 3 or more, else 0

---

5. Do you smoke cigarettes now? +1__ YES (IF YES, THEN SKIP TO #8)
0__ NO

---

6. Didyou ever smoke cigarettes regularly? (at least one cigarette per week on a regular basis)

0__YES
-1__NO (IF NO, go to next page)

---

7. During the period when you were smoking most, abouthow manycigarettes aday did you usually smoke? (1 pack = 20 cigarettes) # cigarettes = ___
+1 if >=10
else 0

---

8. On the average, how many cigarettes a day do you smoke? (1 pack = 20 cigarettes)
cigarettes = ____
0 if < 10
+1 if betw 10-30
+2 if > 30

9. About how often, if ever, do you go to religious services?

-1	0	+1	+1
Once a week or more		Less that once a month	
	1 to 3 times a month		Never

---

10. How many close friends or relatives do you have? These are friends or relatives that you feel at ease with, can talk to about private matters and can call on for help.

0	1-2	3-4	5-6	7-8	9-10	More than 10
(+1)	(0)	(-1)				

---

11. How many of these do you see at least once a month?

0	1-2	3-4	5-6	7-8	9-10	More than 10
(0)	(0)	(-1)				

---

12. How long has it been since you last went to a dentist?

-1 less than one year
0 1 to 2 years
+1 more than 2 years

---

13. How often, if ever, do you use dental floss or a waterpick?

-1 every day
0 3-6 times a week
+1 1-2 times a week
+2 less than once a week, never

---

14. How long has it been since you last had your blood pressure checked?

-1 less than 1 year ago
0 1-2 years ago
+1 more than 2 years ago
+1 never

---

15. WOMEN ONLY. When was the last time you had a Pap smear test for cancer?

-1 less than 1 year ago
0 1-2 years ago
+1 more than 2 years ago
+2 never

---

16. How would you compare your level of physical activity with other people your age? Would you say you are ...

-2 Much more physically active
-1 Somewhat more active
+1 Somewhat less active
+2 Much less active

---

17. Here is a list of things that people do in their free time. How often do you do each activity?

Would you say?	Often	Sometimes	Rarely	Never
	*-1 -----	*-.5-----	0------	0--
Go swimming in the summer				
Take long walks				
Work on a physically active hobby such as dancing or gardening				
Go jogging or running				
Ride a bicycle				
Participate in any other active sports(such as basketball,tennis)				
Do calisthenics or other exercises				

18. **IF YOU ANSWERED "OFTEN" OR "SOMETIMES" TO JOGGING OR RUNNING,**

On the average, how many miles a week do you usually run or jog?

+1 doesn't jog
0 Less than 5 miles
-1 5 to 15 miles
-2 More than 15 miles

---

19. How often do you eat breakfast? Would you say...

-1 almost every day
0 sometimes
+1 rarely or never

---

20. On an average day, how many of each do you drink?

*+ cups of coffee
*+ cups of tea (iced or hot)
*- glasses of water
*+ cans or bottles of soft drinks
*- glasses of fruit/vegetable juice

TOTAL=___/3 = ___adjusted score

---

21. Do you make any conscious effort to limit the amount of red meat in your diet for health reasons?

-1 YES
+1 NO

---

22. Is your father living? YES NO

IF YES, How old is he? _____(about)
-1 if father lived 65+, 0 =accid,<65, else +1

IF NO, How old was he when he died? ____(about)
Did he die as a result of an accident? YES NO

---

23. Is your mother living? YES NO

IF YES, How old is she? _____(about)
-1 if mother lived 70+, 0 =accid,<70, else +1

IF NO, How old was she when she died? ____(about)
Did she die as a result of an accident? YES NO

---

24. How many of your grandparents, if any, are living?

NONE (+1) 1 (0) 2 (-1) 3 4

IF SO, are any of them over 80 years old? YES -1 NO 0

IF NONE, did any live to be over 80 years old YES -1 NO 0

---

25. IF YOU WORK, how would you describe the degree of emotional stress associated with your job? Would you say you are under a great deal of stress, some stress, or hardly any stress?

A great deal +1 Some 0 Hardly any -1

---

26. How much enjoyment do you get out of the free time that you have?

-1__A great deal
0__Some
+1__A little

---

27. I'm going to read you a list of things that can happen to people. Please tell me which of these events, if any, happened in your life during the past five years.

Event	Add 1 for each "YES"	Yes	No	Don't Know	Not Appl.
Death of one of your children					
Serious financial difficulties or problems					
Your own serious illness, injury or operation					
Serious illness, injury or operation of your children					
Serious problems related to your marriage	TOTAL SCORE:___				

---

28. Have you had high blood pressure or were you treated for it during the last twelve months?

-1__YES
+1__NO
0__Don't Know

---

29. About how many colds, if any, did you have in the past 12 months?

0	1	2	3	4	5 or more	Don't Know
(+1)	(0)	(-1)	(-1)			

---

30. About how often, if ever, do you get headaches?

+1__ Less than once a month
0__ 1 to 3 times a month
-1__ Once a week
-2__ More than once a week
0__ Don't Know

---

31. During the past 12 months (since NOV. 1983), about how many days did illness/injury keep you in bed all or most of the day?

+1	0	-1	-2
None	1-7 days	8-30 days	more than 30 days

---

32. Are you limited, because of your health or a disability, from doing the activities (work, housekeeping, other) you would like to do?

-1	+1
YES	NO

***** THE NEXT GROUP OF QUESTIONS ASKS FOR YOUR OPINIONS ABOUT HEALTH -RELATED MATTERS *******

33. Would you say your health is: +1 excellent 0 good -1 fair -2 poor

---

34. Do you consider yourself to be:
-1__ overweight
0__ underweight
+1__ average weight

---

35. How good a job do you feel you are doing in taking care of your health? Would you say ...

+1 Excellent 0 Good -1 Fair -2 Poor

---

36. All in all, how happy are you these days? Would you say . .

+1 Very happy 0 Pretty happy -1 Not too happy

---

37. Do you feel that you get as much exercise as you need, or less than you need?
+1__ As much as you need
-1__ Less than you need
0__ Don't Know

---

38. In general, are you satisfied with your overall physical condition? Would you say ...

(+1)very satisfied
(0)somewhat satisfied (or satisfied)
(-1)not too satisfied
(-2)not at all satisfied

---

39. Over the past year, has your health caused you:

+1 A great deal of worry +1 Some worry -1 hardly any worry -1 No worry at all

---

40. IF YOU SMOKE, during the past two years, did you make a serious attempt to stop smoking cigarettes?

(+1)YES (-1)NO N/A(0)

---

41. How much control do you think you have over your future health? Would you say . . .

+1 A great deal +1 Some -1 Very little -1 None at all

THIS NEXT SECTION ASKS YOU ABOUT THE WELLNESS CLINIC

43. Have you ever attended any wellness classes? YES NO
+1 -1

IF YES, which did you attend? _____
and about how long ago? _____

---

45. Have you ever heard of the Fort Knox wellness clinic? __ YES
__ NO (IF NO, go to #51)

---

42. Has your spouse attended the Fort Knox wellness clinic?
+1__YES
-1__NO
-1__DON'T KNOW

---

45. How much do you know about the wellness clinic? (check the answers that apply)
+1,-1__I can barely recognize the name.
-1,+1__I know something about the services provided at the clinic
-1,-1__I know a lot about the services available at the clinic.

---

46. How did you hear about the wellness clinic?
[Circle all the sources which were important to you]
(+1 if circled)
SPOUSE newspaper radio TV from a friend

Poster/Announcement Doctor/Nurse other: _____

---

47. What is your impression of the wellness clinic?
[check the answer closest to the way you feel]

+1__POSITIVE (I've heard good things about it or I think it's a good idea)
-1__NEUTRAL (I don't know enough about it to be sure)

-1__NEGATIVE (I don't think it's worth my time and effort togo)

---

48. How interested are you in the following wellness clinic services? (check columns as appropriate)

Service	*1 **Very Interested**	*.5 **Medium Interest**	**NO**
stress management			
time management			
weight loss counseling			
nutrition counseling			
stop smoking clinic			
physical fitness counseling			
health risk/health hazard screening test			
TOTAL EQUIVALENT INTEREST POINTS:	_____	_____	

49. What other health classes or programs (if any) are you interested in? _____ _____ _____

#listed *.5 = ___

---

50. How would you rate the quality of the medical care you have received from military hospitals and clinics?

Excellent	Good	Fair	Poor	Can't say
+1	+1	-1	-1	0

THIS LAST SECTION ASKS FOR BASIC INFORMATION ABOUT YOU.

This information will be used to compare results from different groups of people who participate in the survey and will not be used to identify you in any way.

51. How old are you? ____yrs. +1 if 30 or over, else -1

---

52. About how tall are you without shoes?
use h-w tables ___feet ___inches

---

53. How much do you weigh?
use h-w tables _____pounds

---

54. What was the last year of school you completed?

+1,-1

Up to 9th grade 9-11 years High school Grad

Some College +1,+1 College Grad +1,+1

---

55. What is the rank of your spouse:__-__Off=+1,+1; NCO=+1,-1
E5&below= -1,-1

---

56. What is your sex: (+1)MALE (-1)FEMALE

---

57. Do you now have a job? +1 YES -1 NO

---

58. If you now have a job, do you work full-time (40 or more hours a week)? YES +1 NO -1

---

59. How many children do you have aged 6 or under? _____
+1 if any listed, else -1

---

60. Which one of the following racial groups best describes your background?

White	Black	Hispanic	Asian	Other
-1,-1	+1,-1	-1,+1	-1,-1	-1,-1

---

61. How long have you been at Fort Knox? ___years ___months
+1 = 12mos+, else -1

---

62. On the average, how many minutes does it take for you to get from your home to the Fort Knox hospital, using your normal means of transportation? # of minutes = _____
+1 = 15 min or less, else -1

---

63. Which of the following groups did your family's annual income fall in 1984, before taxes.

-1___ 0 - $15,000
-1___ $15,000 - $20,000
+1___ $20,000 - $25,000
+1___ $25,000 or more

THIS COMPLETES THE SURVEY. THANK YOU VERY MUCH FOR YOUR HELP.

APPENDIX E

CAPTURE SHEET

Questionnaire #_____

		RAW	ADJUSTED -1 TO +1 = 0
gen. pract	___(1)+___(2)+___(3)+___(4)+___(5)+___(6)+___(7)+___(8) =	___	= ___
social support net	___(9)+___(10)+___(11) =	___	= ___
preventive health practices	___(12)+___(13)+___(14)+___(15) =	___	= ___
physical fitness practices	___(16)+___(17)+___(18) =	___	= ___
nutrition	___(19)+___(20)+___(21) =	___	= ___
family history	___(22)+___(23)+___(24) =	___	= ___
stressors	___(25)+___(26)+___(27) =	___	= ___
	TOTALS=	____	_____

1. **LOWRISK** +1 -1 | Low <= -2

2. **MEDRISK** +1 -1 | Med <= 1

---

3. **LHSOBJ** +1 -1 | <= -3 ___(28)+___(29)+___(30)+___(31)+___(32)+_____(overw 56&57) = ___

4. **MHSOBJ** +1 -1 | <= 1

---

5. **LPHS** +1 -1 | <= -2 ___(33)+___(34)+___(35)+___(36)+___(40)+___(41) = ___

6. **MPHS** +1 -1 | <= +1

---

7. **WORRY** +1 -1 | ___(42) & ___(43) = +1 if some worry or did try stop

---

8. **LOCUS** +1 -1 | (44) some or more = +1

9.SPOATT	+1	-1	(45)YES = +1
10.PREVATT	+1	-1	(46)YES = +1
11.AWARELO	+1	-1	barely or less = +1, else -1 (47-48)
12.AWAREMED	+1	-1	some = +1, else -1
13.TVRAD	+1	-1	
14.NEWSMAG	+1	-1	
15.FRIEND	+1	-1	[all from qxn 49]
16.SPOUSE	+1	-1	
17.DOC	+1	-1	
18.IMPRESS	+1	-1	(50) Positive = +1, else = -1
19.NEEDLO	+1	-1	(51-52) lo: one equiv. entry or less
20.NEEDMED	+1	-1	med: 2-4 equivalent entries
21.MEDATT	+1	-1	(53) Good or Excell = +1, else = -1
22.AGE	+1	-1	(55) 30+ = +1, else -1
23.HS	+1	-1	(58) high school grad = +1
24.COLL	+1	-1	some college = +1
25.NCO	+1	-1	(59) E-6 and above = +1
26.OFF	+1	-1	" officer = +1
27.SEX	+1	-1	(60) Male = +1
28.PTIME	+1	-1	(61-2) working at least partime = +1
29.FTIME	+1	-1	working fulltime (avg>35hrs/wk)
30.CHILD	+1	-1	(63) Yes = +1
31.BRACE	+1	-1	(64) Black = +1, else -1
32.HRACE	+1	-1	" Hispanic = +1, else -1
33.KTIME	+1	-1	(65) 12+ mos = +1
34.ACCESS	+1	-1	(66) 20 min or less = +1
35.INCOME	+1	-1	(67) 20,000+ = +1

APPENDIX F

DATAGATH LISTING

```
5  DEFINT R
10 DIM USERP(35)          ' USERS WITH POSITIVE FOR GIVEN VARIABLE
15 DIM ID$(8)
20 DIM USERM(35)         ' USERS WITH NEGATIVE FOR GIVEN VARIABLE
30 DIM NONUSERP(35)      ' NONUSERS WITH POSITIVE FOR GIVEN VARIABLE
40 DIM NONUSERM(35)      ' NONUSERS WITH NEGATIVE FOR GIVEN VARIABLE
50 DIM RESULTS(35,100)
60 DIM USE(100)    '0 IF LOW OR MEDIUM INTEREST, 1  IF POTENTIAL USER(HI INTERST
70  FOR J = 1 TO 200    'COLUMN COUNTER
80       FOR I = 1 TO 35
90                READ RESULTS(I,J)    'USING DATA STMTS 1000-2999,ONE LINE/PERS
100                IF RESULTS(I,J) <0 THEN GOTO 140
110       NEXT I
120        PRINT J
130  NEXT J
140  N = J-1: PRINT N,"OBSERVATIONS READ TOTAL"
160 FOR J = 1 TO N        'COLUMN COUNTER
162      USE(J)=1         'IF THIS STAYS 1, THEN JTH PERSON HAS HIGH INTEREST
164      IF RESULTS(19,J)=1 THEN USE(J)=0    'LOW  INTEREST PERSON
166      IF RESULTS(20,J)=1 THEN USE(J)=0    'MEDIUM INTEREST PERSON
170      IF USE (J) =1 THEN USERS = USERS +1   'CUMUL COUNT OF USERS
180      FOR I = 1 TO 35
190               IF RESULTS(I,J) = 0 THEN GOTO 230
200               IF USE(J) = 0  THEN GOTO 220
210               USERP(I) = USERP(I) + 1: GOTO 230
220               NONUSERP(I) = NONUSERP(I) + 1
230      NEXT I
250 NEXT J
255 INPUT "DO YOU WANT PRINTOUT?";Y
256 IF Y <> 1 THEN GOTO 320
260 FOR I = 1 TO 35
270      PRINT I;
280      FOR J = 1 TO N
290               PRINT RESULTS(I,J);
300      NEXT J: PRINT
310 NEXT I
320 NONUSERS= N - USERS
323  INPUT"DO YOU WANT LOGIT TABLE PRINTOUT (1 = YES)",A
325  IF A <> 1 THEN GOTO 382       'SKIPS LOGIT TABLE PRINTOUT
330 LPRINT"# OF USERS =";USERS;"# OF NONUSERS=";N-USERS;"FOR TOTAL =";N
331 LPRINT "PROPORTION OF USERS IN TOTAL POPULATION IS";USERS/N
338 LPRINT
340 LPRINT : LPRINT "USERS AND NONUSERS BY VARIABLE"
342 LPRINT
350 LPRINT: LPRINT "VARIABLE","USERS+", "NONUSER+", "USERS+/ALL +","POPLN PROPN"
360 FOR I = 1 TO 35
370      LPRINT I, USERP(I), NONUSERP(I), USERP(I)/(USERP(I)+NONUSERP(I)+.005),
371      LPRINT (USERP(I)+NONUSERP(I))/N
380 NEXT I
382  DIM IN(15)
383 LPRINT
385  INPUT "HOW MANY VARIABLES TO BE LOOKED AT THREE AT A TIME";NUM
386  FOR I = 1 TO NUM
387       INPUT"NEXT CODE # ";IN(I)
388  NEXT I
390  DIM SUB(8)          'COUNTS TOTAL NUMBER IN SUBGROUP
391  FOR I1 = 1 TO NUM-2
392      FOR J1 = I1+1 TO NUM-1
393               FOR K1 = J1 +1 TO NUM
394                        V1=IN(I1):V2=IN(J1):V3=IN(K1)
                         GOSUB 420
```

```
395
396              NEXT K1
397      NEXT J1
398    NEXT I1
400  DIM USERSUB(8)      'COUNTS NUMBER OF USERS IN SUBGROUP
405  LPRINT"THE FOLLOWING SECTION OF THE PRINTOUT LOOKS AT THREE VARIABLE SUBGRO
UPS"
406  LPRINT"SUBGROUPS ARE NUMBERED FROM ONE TO EIGHT, AS FOLLOWS:"
407  LPRINT"SUBGROUP 1:    +1     +1       +1": ID$(1)="+ + +"
408  LPRINT"SUBGROUP 2:    +1     +1     -1": ID$(2)= "+ + -"
409  LPRINT "SUBGROUP 3:     +1    -1       +1": ID$(3)= "+ - +"
410  LPRINT"SUBGROUP 4:     +1     -1       -1" :ID$(4)= "+ - -"
411  LPRINT"SUBGROUP 5:     -1     +1       +1": ID$(5)="- + +"
412  LPRINT"SUBGROUP 6:     -1     +1       -1": ID$(6)="- + -"
413  LPRINT"SUBGROUP 7:     -1     -1       +1" : ID$(7) = "- - +"
414  LPRINT"SUBGROUP 8:     -1     -1       -1": ID$(8) = "- - -"
418 INPUT "WHICH THREE VARIABLES TO SUBGROUP";V1,V2,V3
420 FOR I = 1 TO 8 :  USERSUB(I) =0 :SUB(I) = 0: NEXT I
430 LPRINT "TESTING VARIABLE #'S", V1;V2;V3 : LPRINT
440 FOR J = 1 TO N    'ROW COUNTER - GOES THROUGH EACH VARIABLE ONE AT TIME
450      R1 = RESULTS(V1,J) : R2 = RESULTS(V2,J) :   R3 = RESULTS(V3,J)
460      IF R1 = 0 THEN GOTO 510
470      IF R2 = 1 AND R3 =1 THEN GROUP = 1 :ID$(1)="+ + +" : GOTO 550
480      IF R2 = 1 AND R3 =0 THEN GROUP = 2: ID$(2)="+ + -" :GOTO 550
490      IF R2 = 0 AND R3 =1 THEN GROUP = 3 : ID$(3)="+ - +" :GOTO 550
500      IF R2 = 0 AND R3 =0 THEN GROUP = 4 :  ID$(4) = "+ - -" :GOTO 550
510      IF R2 =1 AND R3 = 1 THEN GROUP = 5 : ID$(5) = "- + +" :GOTO 550
520      IF R2 =1 AND R3 = 0 THEN  GROUP = 6 : ID$(6) = "- + -": GOTO 550
530      IF R2 =0 AND R3 = 1 THEN GROUP = 7 : ID$(7)= "- - +" : GOTO 550
540      IF R2 =0 AND R3 = 0 THEN GROUP = 8  : ID$(8)= "- - -":GOTO 550
550      SUB(GROUP) = SUB(GROUP) + 1
560      IF USE(J) = 1 THEN USERSUB(GROUP) = USERSUB(GROUP) + 1
570 NEXT J
580 LPRINT TAB(20) "NONUSERS","USERS","USE/TOTAL","TOTAL" ,"SUB/N"
590 FOR I = 1 TO 8
600      LPRINT "SUBGRP#";I;ID$(I);"       ";SUB(I)-USERSUB(I);"      ";USERSUB(I);
602      LPRINT "          ";USERSUB(I)/SUB(I),SUB(I);"      ";SUB(I)/N
610  NEXT I
620  LPRINT
625  RETURN
630  INPUT "DO YOU WANT TO TRY MORE VARIABLES 1=YES";TRY
640  IF TRY = 1 THEN GOTO 418
2001 DATA 0,1,0,0,0,1,1,1,0,1,0,1,0,0,0,0,0,0,1,0,0,1,1,1,1,1,0,0,0,0,0,0,1,1,1
2002 DATA 0,0,0,1,1,0,0,0,0,0,0,1,0,0,0,0,0,0,0,0,0,1,1,1,1,1,1,1,0,0,0,0,0,0,1,1
2003 DATA 1,0,0,1,1,0,0,1,0,0,1,0,0,0,1,0,0,0,0,0,1,0,1,1,1,1,1,1,0,0,0,1,0,0,1,1,1
2004 DATA 1,0,0,1,0,1,1,1,0,0,0,1,0,1,0,0,0,1,0,1,1,1,1,1,1,1,0,0,0,1,0,0,1,1,1
2005 DATA 1,0,0,1,0,0,0,1,0,0,1,0,0,1,0,0,0,1,0,1,1,0,1,1,1,1,0,1,1,0,0,0,1,1,1
2006 DATA 0,1,0,1,1,0,1,1,1,1,1,0,0,0,0,0,0,0,0,0,1,1,0,1,1,1,1,0,0,0,1,0,0,1,1,1
2008 DATA 1,0,0,1,0,0,0,0,0,0,0,1,0,0,0,0,0,0,0,0,1,0,1,0,1,1,1,1,0,1,1,1,0,0,1,1,1
2009 DATA 1,0,0,1,1,0,1,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,1,1,1,1,1,0,1,0,0,0,0,0,1,1
2012 DATA 1,0,0,1,1,0,0,0,1,0,1,0,0,1,0,1,0,0,0,1,0,0,1,1,1,1,1,0,0,0,1,0,0,1,1,1
2013 DATA 0,1,0,1,1,0,1,1,0,0,1,0,0,0,0,0,0,0,0,0,1,1,1,1,1,0,1,0,0,0,0,1,0,0,1,1,1
2014 DATA 0,1,0,0,0,0,0,1,0,0,1,0,0,0,0,0,0,0,0,0,1,1,0,1,1,1,0,0,0,0,1,1,0,0,1,1
2015 DATA 1,0,1,0,1,0,0,0,1,0,0,1,0,1,1,0,0,1,0,1,1,1,1,1,0,1,0,0,0,0,1,0,0,1,1,0
2016 DATA 1,0,0,1,0,1,0,1,1,1,1,0,1,0,1,0,0,0,1,0,0,1,1,1,1,1,1,0,0,0,0,1,0,0,1,1,0
2017 DATA 0,1,0,1,0,1,1,0,0,0,1,0,0,0,0,0,0,0,0,1,0,1,1,0,0,1,0,0,0,0,0,0,0,0,1,0
2018 DATA 0,1,1,0,1,0,1,0,0,0,1,0,0,0,0,0,0,0,0,0,0,1,1,1,1,1,0,0,0,0,1,0,0,0,1,0
2019 DATA 1,0,0,0,0,0,0,1,0,0,1,0,0,0,0,0,0,0,0,1,1,1,1,1,1,1,0,0,0,0,1,0,0,0,1,0
2020 DATA 1,0,1,0,0,1,1,0,0,0,1,0,0,0,0,0,0,0,1,0,1,1,1,1,1,1,0,0,0,0,1,0,1,0,1,0
2021 DATA 0,0,0,1,1,0,1,0,0,0,1,0,0,0,0,0,0,0,0,1,0,1,1,0,1,0,0,0,0,0,0,0,1,1,1
2022 DATA 1,0,1,0,0,0,1,1,0,0,1,0,0,0,0,0,0,0,1,0,1,0,1,1,1,1,0,0,1,1,1,1,0,0,0,1,0
2023 DATA 1,0,0,1,0,0,0,1,0,0,1,0,0,0,0,0,0,0,0,1,1,0,1,1,0,0,0,1,0,0,0,0,0,0,1,0
2025 DATA 0,1,0,0,0,0,0,1,0,0,1,0,0,0,0,0,0,0,1,0,1,0,1,0,0,0,0,0,0,0,0,0,1,1,1
2026 DATA 0,1,0,0,0,1,1,0,0,0,1,0,0,0,0,0,0,0,1,0,0,0,1,1,0,0,0,0,0,0,0,0,0,1,0
2027 DATA 0,0,0,1,1,0,1,0,0,0,1,0,0,0,0,0,0,0,0,0,1,1,1,0,0,0,0,1,1,0,0,0,1,1,0
2029 DATA 1,0,0,0,0,1,0,1,0,0,1,0,0,0,0,0,0,0,0,1,1,0,1,1,0,0,0,0,0,1,0,0,0,1,0
```

(F-2)

```
2030 DATA 0,1,0,1,1,0,1,0,0,0,1,0,0,0,0,0,0,0,1,0,0,0,0,0,0,0,1,0,1,0,0,1,1,0
2032 DATA 1,0,0,1,0,1,1,0,0,0,1,0,0,0,0,0,0,0,1,0,0,0,1,1,0,0,0,1,1,0,0,0,0,1,0
2035 DATA 1,0,0,1,0,1,0,1,0,0,1,0,0,0,0,0,0,0,0,1,0,0,1,1,1,1,0,1,1,0,0,0,1,1,1
2036 DATA 1,0,0,1,0,1,1,1,1,0,0,1,0,0,0,0,0,0,0,0,1,0,0,1,0,1,1,0,1,0,1,0,0,1,1,1
2037 DATA 0,1,0,0,0,0,0,1,0,0,1,0,0,0,1,0,0,0,1,0,1,1,1,1,1,1,0,0,0,0,0,0,0,1,1
2041 DATA 1,0,0,1,0,1,0,1,0,0,1,0,0,0,0,0,0,0,1,0,0,1,1,0,1,1,0,0,0,0,0,0,1,1,1
2043 DATA 0,1,0,1,0,1,1,1,0,0,1,0,0,0,0,0,0,0,1,0,0,1,1,0,1,0,0,0,0,1,0,0,0,1,0
2044 DATA 0,1,0,1,0,1,0,0,0,0,1,0,0,0,0,0,0,0,1,0,0,1,1,0,0,0,1,1,0,0,0,1,1,1
2045 DATA 1,0,0,1,1,0,0,1,0,0,1,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0,1,1,0,0,1,0
2046 DATA 1,0,0,1,0,0,1,1,0,0,1,0,0,0,0,0,0,0,0,0,1,1,0,1,0,0,0,0,0,0,0,0,1,0
2047 DATA 1,0,0,1,0,1,1,0,0,0,1,0,0,0,0,0,0,0,1,1,1,1,1,1,0,0,0,0,0,0,0,1,1,1
2048 DATA 0,0,0,1,1,0,1,0,0,0,1,0,0,0,0,0,0,0,0,1,1,1,0,0,0,0,0,0,1,0,0,0,1,0
2049 DATA 1,0,0,1,1,0,0,0,0,0,1,0,0,0,0,0,0,0,1,1,1,0,0,1,0,0,0,0,0,0,0,1,1,0
2050 DATA 0,1,0,0,1,0,0,0,0,0,1,0,0,0,0,0,0,0,1,0,0,1,0,1,0,0,0,0,1,1,0,1,0,0
2051 DATA 0,0,0,1,0,1,0,1,0,0,1,0,0,0,0,0,0,0,1,0,0,1,0,0,0,0,0,0,1,0,0,1,1,0
2052 DATA 0,0,1,0,1,0,1,0,0,0,1,0,0,0,0,0,0,0,1,1,0,0,0,1,0,0,0,0,1,0,0,0,1,0
2054 DATA 1,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0,0,1,1,1,1,1,1,0,0,1,1,0,0,0,1,0,1
2055 DATA 1,0,0,0,0,1,0,1,0,0,1,0,0,0,0,0,0,0,1,1,0,1,0,0,0,0,0,0,1,0,0,1,1,0
2056 DATA 1,0,0,1,1,0,0,1,0,0,1,0,0,0,0,0,0,0,1,0,0,1,1,0,1,0,0,1,0,0,0,0,1,1,1
2057 DATA 1,0,0,0,0,1,0,1,0,0,1,0,0,0,0,0,0,0,1,1,1,1,1,1,0,0,1,0,0,0,0,0,0,1
2059 DATA 0,1,0,1,1,0,1,0,0,0,1,0,0,0,0,0,0,0,1,1,0,1,0,0,0,0,1,1,1,1,0,1,1,0
2060 DATA 0,1,0,0,0,1,1,0,0,0,1,0,0,0,0,0,0,0,1,0,1,1,1,0,0,0,0,0,0,1,0,0,0,1,0
2062 DATA 0,1,0,1,0,1,1,0,0,0,1,0,0,0,0,0,0,0,0,1,0,1,0,0,0,0,0,0,1,1,0,0,1,0
2064 DATA 1,0,0,1,0,0,0,1,0,0,1,0,0,0,0,0,0,0,0,1,1,1,1,1,0,0,0,0,0,0,1,0,0,1,0
2068 DATA 0,1,0,1,0,1,0,0,0,0,1,0,0,0,0,0,0,1,0,1,1,0,1,0,0,0,0,0,0,0,0,0,0,1,0
2069 DATA 0,1,0,1,0,1,1,0,0,0,1,0,0,0,0,0,0,0,1,0,1,0,1,0,0,0,0,1,1,0,0,0,0,1,0
2071 DATA 0,1,0,1,1,0,1,0,0,0,1,0,0,0,0,0,0,0,0,1,1,1,1,1,0,0,0,0,0,1,0,0,0,1,0
2072 DATA 0,1,0,1,0,1,0,0,0,0,0,1,0,0,1,0,0,0,0,0,1,0,0,1,0,0,0,0,0,0,1,0,0,0,1,0
2073 DATA 1,0,0,1,1,0,0,0,0,0,0,1,0,0,0,0,0,0,0,1,0,0,0,0,0,0,0,0,0,0,1,1,0,1,1,0
2077 DATA 1,0,0,1,0,0,0,1,0,0,1,0,0,0,0,0,0,0,1,0,0,0,1,1,0,0,0,1,1,0,1,0,1,0,1
2086 DATA 1,0,0,0,1,0,0,0,0,0,1,0,0,0,0,0,0,0,1,0,0,0,1,0,0,0,0,1,0,1,1,0,1,1,0
2088 DATA 0,1,0,1,1,0,0,1,0,0,1,0,0,0,0,0,0,0,0,1,0,0,1,1,0,0,0,0,0,1,0,0,0,0,0
2090 DATA 1,0,0,1,0,1,1,1,0,0,1,0,0,0,0,0,0,0,0,1,0,0,1,0,0,0,0,0,0,1,0,0,0,1,0
2091 DATA 0,0,0,1,0,1,0,1,0,0,1,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0,0,0,0,1,0,0,1,1,0
2092 DATA 1,0,0,0,0,1,0,1,0,0,1,0,0,0,0,0,0,0,1,0,0,0,1,0,0,0,0,0,0,1,1,0,0,1,0
2093 DATA 0,1,0,1,0,0,0,0,0,1,1,0,0,0,0,0,0,0,0,1,1,0,1,1,0,0,0,0,0,1,0,0,1,1,0
2094 DATA 1,0,0,0,0,0,0,1,0,0,1,0,0,0,0,0,0,0,1,0,0,0,1,0,1,0,0,0,0,1,0,0,1,1,0
2096 DATA 0,1,1,0,0,1,1,0,0,0,1,0,0,0,0,0,0,0,0,1,1,1,0,1,0,0,0,0,1,1,0,1,1,0
2097 DATA 0,1,0,0,0,0,1,0,0,0,1,0,0,0,0,0,0,0,0,1,0,0,1,0,1,0,0,1,1,1,0,0,1,0,0
2099 DATA 1,0,0,1,1,0,0,1,0,0,1,0,0,0,0,0,0,0,0,1,0,0,1,1,0,0,0,0,0,1,1,0,1,1,0
2100 DATA 1,0,0,0,0,0,0,1,0,0,1,0,0,0,0,0,0,0,1,0,1,0,1,1,1,0,0,0,0,1,1,0,1,1,0
2101 DATA 0,1,0,1,0,1,1,0,0,0,1,0,0,0,1,0,0,1,1,0,1,1,1,0,1,0,0,0,0,0,0,0,1,0
2102 DATA 0,0,1,0,1,0,1,0,0,0,1,0,0,0,0,0,0,0,0,0,0,1,1,1,0,0,0,0,1,0,0,0,1,1
2103 DATA 0,1,0,0,0,1,1,1,0,0,1,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,1,0,1,0,0,1,1,0
2104 DATA 1,0,0,1,0,1,0,1,0,0,1,0,0,1,0,0,0,0,0,1,0,0,1,0,1,0,0,0,0,1,0,0,1,1,0
2106 DATA 0,0,0,1,1,0,1,0,0,0,1,0,0,0,0,0,0,0,0,0,0,1,0,1,0,0,1,0,0,0,0,1,1,0
2107 DATA 1,0,0,1,0,1,0,0,0,0,1,0,0,0,0,0,0,0,0,1,0,1,1,0,0,0,1,0,1,0,0,0,1,0
2108 DATA 1,0,0,1,0,0,0,1,0,0,1,0,0,0,0,1,0,0,0,0,1,0,1,1,0,0,0,1,0,1,0,0,0,1,0
2112 DATA 0,1,0,1,1,0,1,0,0,0,1,0,0,0,0,0,0,0,1,1,0,0,0,0,0,0,1,1,1,0,0,0,1,1
2113 DATA 0,0,0,1,1,0,0,1,0,0,1,0,0,0,0,0,0,0,1,0,0,0,1,0,0,0,0,0,0,1,0,0,0,1,0
2115 DATA 1,0,0,1,0,1,1,0,0,0,1,0,0,0,0,0,0,0,1,0,1,0,1,0,1,0,0,0,0,1,0,0,0,1,0
2117 DATA 0,1,0,0,0,1,1,1,0,0,1,0,0,0,0,0,0,0,1,0,1,0,0,0,0,0,0,0,0,1,0,0,1,0,0
2121 DATA 0,1,0,1,1,0,0,1,0,0,1,0,0,0,0,0,0,0,1,1,0,0,0,0,0,0,0,0,1,0,0,1,0,0
2122 DATA 1,0,0,1,0,0,0,0,0,0,1,0,0,0,0,0,0,0,1,1,0,1,0,0,0,0,0,0,1,0,0,1,1,0
2124 DATA 0,1,0,1,0,1,0,1,0,0,1,0,0,0,0,0,0,0,1,1,0,1,1,0,0,0,0,0,1,0,0,0,1,0
2125 DATA 0,0,0,1,0,1,1,0,0,0,1,0,0,0,0,0,0,0,0,1,0,0,1,0,0,0,0,0,0,1,0,0,1,1,0
2128 DATA 1,0,0,0,0,1,0,0,0,0,1,0,0,0,0,0,0,0,0,1,1,0,1,1,0,0,0,0,0,1,1,0,1,1,0
2129 DATA 0,1,0,1,1,0,1,0,0,0,1,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0,0,0,1,0,0,1,1,0
2131 DATA 1,0,0,0,0,0,0,1,0,0,1,0,0,0,0,0,0,0,1,0,1,0,1,0,0,0,0,0,0,1,0,0,1,1,0
2132 DATA 1,0,0,1,1,0,1,0,0,0,1,0,0,0,0,0,0,0,1,0,0,1,0,0,0,0,0,0,1,0,0,0,0,1,0
2133 DATA 0,1,0,1,1,0,0,0,0,0,1,0,0,0,0,0,0,0,1,1,0,1,0,0,0,0,0,0,0,0,0,0,1,0
2138 DATA 0,1,0,1,1,0,1,0,0,0,1,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0,1,0,0,0,0,0
2140 DATA 1,0,0,0,0,0,1,1,0,0,1,0,0,0,0,0,0,0,1,0,1,0,1,0,0,0,0,0,0,1,0,0,0,1,0
2999 DATA -1
```

OF USERS = 16 # OF NONUSERS= 71 FOR TOTAL = 87
PROPORTION OF USERS IN TOTAL POPULATION IS .183908

USERS AND NONUSERS BY VARIABLE

VARIABLE	USERS+	NONUSER+	USERS+/ALL +	POPLN PROPN
1	6	37	.139519	.494253
2	6	27	.181791	.37931
3	3	4	.428266	.0804598
4	12	46	.206879	.666667
5	8	24	.249961	.367816
6	5	30	.142837	.402299
7	11	29	.274966	.45977
8	6	36	.14284	.482759
9	1	3	.249688	.045977
10	1	3	.249688	.045977
11	15	67	.182916	.942529
12	1	3	.249688	.045977
13	0	0	0	0
14	1	6	.142755	.0804598
15	0	4	0	.045977
16	1	1	.498753	.0229885
17	0	0	0	0
18	1	5	.166528	.0689655
19	0	28	0	.321839
20	0	43	0	.494253
21	9	40	.183655	.563219
22	7	22	.241338	.333333
23	14	62	.184198	.873563
24	6	31	.16214	.425287
25	7	35	.166647	.482759
26	0	13	0	.149425
27	0	0	0	0
28	5	19	.20829	.275862
29	1	12	.0768935	.149425
30	12	47	.203373	.678161
31	4	10	.285612	.16092
32	0	1	0	.0114943
33	6	40	.130421	.528736
34	15	63	.192295	.896552
35	1	24	.039992	.287356

APPENDIX G

LOGIT PROGRAM LISTING

```
3   ZEROCOMP = .001
5   PRINT"IF YOU WANT TO RESET ZEROCOMP OF";ZEROCOMP;"GO TO LINE 3"
10  INPUT"DO YOU WANT FULL(TYPE 1) OR REDUCED(TYPE 0) PRINTOUT";Z
15 R1=8:R2=8:C1=4:C2=2
20  INPUT"WHICH THREE VARIABLE #'S ARE BEING STUDIED";VAR(1),VAR(2),VAR(3)
30  INPUT"ROUTINE X, Y MATRIX SIZE";A
31  IF A =1 THEN GOTO 70
40 REM INPUT DESIGN MATRIX X
50 PRINT"DIMENSION OF X MATRIX(R,C)"
60 INPUT R1,C1
70 DIM X(R1,C1)
80 REM INPUT Y MATRIX
85 IF A = 1 THEN GOTO 100
90 INPUT"DIMENSION OF Y MATRIX(R,C)";R2,C2
100 DIM Y(R2,C2), PY(R2,C2)     'PY IS ROW PROBABILITY MATRIX
110 PRINT"X MATRIX"
120 FOR J = 1 TO R1
140     FOR I = 1 TO C1
160             READ X(J,I)
170     NEXT I
180 NEXT J
190 IF Z = 1 THEN LPRINT
200 IF Z=1 THEN LPRINT TAB(10) "X MATRIX"
210 FOR I = 1 TO R1
220     FOR J = 1 TO C1
230             IF Z=1 THEN LPRINT X(I,J);"    ";
240     NEXT J
250 IF Z=1 THEN LPRINT
260 NEXT I
270 PRINT
280 PRINT"Y MATRIX"
290 FOR J = 1 TO R2
300     PRINT"ROW";J
310     FOR I = 1 TO C2
320             PRINT "VALUE COLUMN";I;
330             INPUT Y(J,I)
332             IF Y(J,I) = 0 THEN Y(J,I) = ZEROCOMP
340     NEXT I
342     PRINT
350 NEXT J
360 IF Z=1 THEN LPRINT: LPRINT TAB(10) "Y MATRIX":LPRINT
390 FOR I = 1 TO R2
400     FOR J = 1 TO C2
410             PY(I,J) = Y(I,J)/(Y(I,1)+Y(I,2))
420               LPRINT Y(I,J);PY(I,J);"  ";
430     NEXT J
440     IF Z = 1 THEN LPRINT
450 NEXT I
460 IF Z = 1 THEN LPRINT:PRINT
470  DIM A(R2, R2*2)    'THIS IS THE A MATRIX AS IN PAGE 106
480 DIM DINV(R2*2, R2*2)    'THIS IS D INVERSE AS ON PAGE 26
490    J = 0
500    FOR I = 1 TO R2
510             FOR K = 1 TO R2*2
520                     A(I,K) = 0  :  DINV(I,K) = 0  : DINV(I+R2,K) = 0 'ZERO
530             NEXT K
540    NEXT I
550    FOR I = 1 TO R2
560             A(I, I+J) = 1     'NUMERATOR PROBABILITY
570             A(I,I+J+1) = -1       'DENOMINATOR PROBABILITY
580             J = J + 1     'INCREASE POINTER
```


(G-1)

```
590    NEXT I
600   DIM AT(2*R2, R2)
610   FOR I = 1 TO 2*R2
620     FOR J = 1 TO R2
630               AT(I,J) = A(J,I)
640               IF Z = 1 THEN LPRINT AT(I,J);
650                 NEXT J : IF Z = 1 THEN LPRINT
660   NEXT I : IF Z = 1 THEN LPRINT
670 POINTER = 1        'NOW CALCULATE D INVERSE
680 FOR I = 1 TO R2
690     FOR J = 1 TO 2
700     DINV(POINTER, POINTER) = (Y(I,1)+Y(I,2))/Y(I,J)    'INVERSE = REC
710     POINTER = POINTER + 1: NEXT J
720 NEXT I : IF Z<>1 THEN GOTO 760
730 FOR I = 1 TO R2*2 : FOR J = 1 TO R2*2
740               LPRINT DINV(I,J); :NEXT J: LPRINT
750 NEXT I : LPRINT
755 LPRINT TAB(10) "ADI = A * D INVERSE"
760 DIM ADI(R2, 2*R2)
770  FOR I = 1 TO R2
780        FOR J = 1 TO 2*R2
790             FOR K = 1 TO 2*R2
800                      ADI(I,J)=ADI(I,J) + A(I,K)*DINV(K,J)
810             NEXT K
820             IF Z = 1 THEN LPRINT ADI(I,J);
830       NEXT J :  NEXT I : IF Z = 1 THEN LPRINT
840  DIM DIAT(2*R2,R2) : IF Z = 1 THEN LPRINT TAB(10) "DIAT = DI * AT"
850     FOR I = 1 TO 2*R2
860               FOR J = 1 TO R2 : DIAT(I,J) = 0
870                       FOR K = 1 TO 2*R2
880                              DIAT(I,J) = DIAT(I,J)+DINV(I,K)*AT(K,J)
890                        NEXT K : IF Z = 1 THEN LPRINT DIAT(I,J);
900                NEXT J : IF Z = 1 THEN LPRINT
910     NEXT I:   IF Z =1 THEN LPRINT
920 IF Z = 1 THEN LPRINT TAB(10) "X TRANSPOSE = XT": LPRINT
930 DIM XT(C1,R1)
940 FOR I = 1 TO C1
950     FOR J = 1 TO R1
960               XT(I,J)= X(J,I)
970               IF Z = 1 THEN LPRINT XT(I,J);"    ";
980     NEXT J
990       IF Z = 1 THEN LPRINT
1000 NEXT I: IF Z = 1 THEN  LPRINT
1010 DIM VP(R2*2,R2*2)
1020 FOR I = 1 TO R2*2:FOR J = 1 TO R2*2
1030     VP(I,J)=0
1040 NEXT J: NEXT I
1050 POINTER = 1
1060 FOR I = 1 TO 2*R2 -1 STEP 2 :  INDEX = (I+1)/2
1070              K = PY(INDEX,1)*PY(INDEX,2)/(Y(INDEX,1)+Y(INDEX,2))
1080               VP(I,I) = K
1090               VP(I+1,I+1) = K
1100              VP(I, I+1) = -K
1110               VP(I+1,I) = -K
1115 NEXT I
1120 IF Z <> 1 THEN GOTO 1155 :   LPRINT TAB(15) "VP MATRIX"  : LPRINT
1130  FOR I = 1 TO R2*2 : FOR J = 1 TO R2*2
1140 LPRINT VP(I,J); : NEXT J : LPRINT : NEXT I : LPRINT
1150  LPRINT TAB(10) "VPDIAT = VP * DIAT"
1155 DIM VPDIAT(2*R2,R2)
1160  FOR I = 1 TO 2*R2
1170     FOR J = 1 TO R2 : VPDIAT(I,J) = 0
1180             FOR K = 1 TO 2 * R2
1190                   VPDIAT(I,J) = VPDIAT(I,J) + VP(I,K) * DIAT(K,J)
1200              NEXT K : IF Z = 1 THEN LPRINT VPDIAT(I,J);
1210     NEXT J : IF Z =1 THEN LPRINT
```

```
1220   NEXT I : IF Z = 1 THEN LPRINT
1230  DIM VF(R2,R2) : IF Z = 1 THEN LPRINT TAB(10) "VF = ADI*VPDIAT"
1240   FOR I = 1 TO R2
1250        FOR J = 1 TO R2
1260             FOR K = 1 TO 2*R2
1270                  VF(I,J) =VF(I,J) + ADI(I,K) * VPDIAT(K,J)
1280             NEXT K: IF Z = 1 THEN LPRINT VF(I,J);
1290        NEXT J : IF Z = 1 THEN LPRINT
1300   NEXT I: IF Z = 1 THEN LPRINT
1310  DIM  VFI(R2,R2), START(R2,R2)
1320  INVDIM = R2
1330  FOR I = 1 TO R2
1340      FOR J = 1 TO R2 :  START(I,J)=VF(I,J)
1350      NEXT J :  : NEXT I
1360  GOSUB 1680  'GO TO INVERSE PRODUCING SUBROUTINE
1370  FOR I = 1 TO R2: FOR J = 1 TO R2  'THIS LOOP ASSIGNS RESULT TO VFI
1380        VFI(I,J) = B(I,J)
1390     NEXT J : NEXT I
1400  ERASE B, START
1410 IF Z = 1 THEN LPRINT TAB(10) "XTVFI" :  DIM XTVFI(C1,R2)
1415   DIM XTVFI(C1,R2)
1420 FOR I = 1 TO C1
1430    FOR J = 1 TO R2
1440        XTVFI(I,J) = 0
1450        FOR K=1 TO R1
1460             XTVFI(I,J) = XTVFI(I,J)+XT(I,K)*VFI(K,J)
1470        NEXT K
1480        IF Z = 1 THEN LPRINT XTVFI(I,J);"  ";
1490    NEXT J
1500     IF Z = 1 THEN LPRINT
1510 NEXT I
1520  DIM XTVFIX(C1,C1): IF Z = 1 THEN LPRINT TAB(10) "XTVFIX = XTVFI * X"
1530  FOR I = 1 TO C1
1540      FOR J = 1 TO C1 : XTVFIX(I,J) = 0
1550          FOR K = 1 TO R2
1560               XTVFIX(I,J) = XTVFIX(I,J) + XTVFI(I,K)*X(K,J)
1570          NEXT K : IF Z =1 THEN LPRINT XTVFIX(I,J);"  ";
1580      NEXT J: IF Z = 1 THEN LPRINT
1590  NEXT I: IF Z = 1 THEN LPRINT
1600  INVDIM = C1
1610  DIM XTXI(C1, C1), START(C1,C1)
1620  FOR I = 1 TO C1 : FOR J = 1 TO C1
1630        START(I,J) = XTVFIX(I,J)
1640  NEXT J : NEXT I
1650  GOSUB 1680   ' CALL INVERSE SUBROUTINE TO GET XTXI = INVERSE OF XTVFIX
1660  FOR I = 1 TO C1: FOR J = 1 TO C1
1670        XTXI(I,J) = B(I,J) : NEXT J : NEXT I
1675   ERASE B, START
1678   GOTO 2110
1680 DIM B(INVDIM,INVDIM)
1690 FOR I = 1 TO INVDIM
1700    FOR J = 1 TO INVDIM
1710        B(I,I)=1
1720    NEXT J
1730 NEXT I
1740 FOR J = 1 TO INVDIM
1750    FOR I = J TO INVDIM
1760        IF START(I,J)<>0 THEN 1800
1770    NEXT I
1780    PRINT "SINGULAR MATRIX"
1790    END
1800    FOR K= 1 TO INVDIM
1810        S=START(J,K)
1820        START(J,K)=START(I,K)
1830        START(I,K) = S
1840        S=B(J,K)
```

```
1850              B(J,K)=B(I,K)
1860              B(I,K)=S
1870     NEXT K
1880     T=1/START(J,J)
1890     FOR K = 1 TO INVDIM
1900              START(J,K)=T*START(J,K)
1910              B(J,K)=T*B(J,K)
1920     NEXT K
1930     FOR L = 1 TO INVDIM
1940              IF L=J THEN 2000
1950              T=-START(L,J)
1960              FOR K=1 TO INVDIM
1970                       START(L,K)=START(L,K)+T*START(J,K)
1980                       B(L,K)=B(L,K)+T*B(J,K)
1990              NEXT K
2000     NEXT L
2010 NEXT J
2020 IF Z =1 THEN LPRINT 'PRINT RESULTING MATRIX
2030 IF Z = 1 THEN LPRINT TAB(10) " INVERSE = ": LPRINT
2040 FOR I = 1 TO INVDIM 'ROUND OFF AND PRINT
2050     FOR J = 1 TO INVDIM
2060              IF Z = 1 THEN LPRINT INT(B(I,J)*1000+.5)/1000 ; "   ";
2070     NEXT J: IF Z = 1 THEN LPRINT
2080 NEXT I: IF Z = 1 THEN LPRINT
2100 RETURN
2110 REM     *** FORM LOGIT MATRIX = LY
2120 DIM LY(R2,1)
2130 IF Z = 1 THEN LPRINT TAB(10) "LOGIT MATRIX = LY":LPRINT
2150 FOR I = 1 TO R2
2160     FOR J = 1 TO (C2-1)
2170              LY(I,J)= LOG(Y(I,J)/Y(I,(J+1)))
2180     NEXT J
2190  NEXT I
2210 IF Z = 1 THEN LPRINT TAB(10) "XTVFI*LY":LPRINT
2230 DIM XTVFILY(C1,(C2-1))
2240 FOR I = 1 TO C1
2250     FOR J = 1 TO (C2-1)
2260              XTVFILY(I,J) = 0
2270              FOR K=1 TO R1
2280                       XTVFILY(I,J)=XTVFILY(I,J)+XTVFI(I,K)*LY(K,J)
2290              NEXT K
2310     NEXT J
2320 NEXT I
2330  LPRINT:LPRINT TAB(10) "BETA MATRIX": LPRINT
2340  DIM BETA(C1,(C2-1))
2350 FOR I = 1 TO C1
2360     FOR J = 1 TO (C2-1)
2370              BETA(I,J)=0
2380              FOR K= 1 TO C1
2390                       BETA(I,J)=BETA(I,J)+XTXI(I,K)*XTVFILY(K,J)
2400               NEXT K
2410              LPRINT BETA(I,J), : IF I >1 THEN LPRINT "VARIABLE";VAR(I-1)
2415              IF I = 1 THEN LPRINT "CONSTANT"
2420     NEXT J
2430 NEXT I
2432  DIM XBETA(R1,1) : IF Z = 1 THEN LPRINT "XBETA = X*BETA"
2434  FOR I = 1 TO R1 : XBETA(I,1) = 0
2436        FOR J = 1 TO C1
2438              XBETA(I,1) = XBETA(I,1) + X(I,J)*BETA(J,1)
2440        NEXT J : IF Z =1 THEN LPRINT XBETA(I,1);
2441 NEXT I
2442  DIM  FMINXB(R1,1) : IF Z = 1 THEN LPRINT "FMINXB = LY - XBETA"
2444  FOR I = 1 TO R1
2445        FMINXB(I,1) = LY(I,1) - XBETA(I,1) : IF Z = 1 THEN LPRINT FMINXB(I,1)
2446  NEXT I: DIM CHI1(1,R2)
2447   FOR I = 1 TO R2  : CHI1(1,I) = 0 :  FOR J = 1 TO R2
```

```
2448          CHI1(1,I) = CHI1(1,I) + FMINXB(J,1) * VFI(J,I)
2450           NEXT J : NEXT I
2452  CHI2 = 0     ' THIS IS THE FINAL GOODNESS OF FIT TEST STATISTIC
2454  FOR I = 1 TO R2
2456        CHI2=CHI2 + CHI1(1,I)*FMINXB(I,1)
2458  NEXT I
2459  LPRINT "CHI SQUARE GOODNESS OF FIT =";CHI2;"WITH DF =";R2-C1
2460 DATA 1,1,1,1
2461 DATA 1,1,1,-1
2462 DATA 1,1,-1,1
2463 DATA 1,1,-1,-1
2464 DATA 1,-1,1,1
2465 DATA 1,-1,1,-1
2466 DATA 1,-1,-1,1
2467 DATA 1,-1,-1,-1
2490   INPUT"ENTER NUMBER OF VARIABLES TO BE TESTED";N
2500 DIM C(N,C1), CT(C1,N), BTCT(1,N)
2510 DIM CTXTI(N,C1), CXTXICT(N,N), NUMER1(N,N), NUMER2(1,N),CB(N,1)
2520 DIM BTXT(1,R1)
2530 FOR I = 1 TO N
2540    FOR J = 1 TO C1: C(I,J) = 0:NEXT J
2550    INPUT "WHICH BETA COEFFICIENT"; COEFF
2555    LPRINT "BETA COEFFICIENT";COEFF;"WAS CHOSEN"
2560    C(I,COEFF+1) = 1
2570 NEXT I
2580 FOR I = 1 TO C1
2590    FOR J = 1 TO N
2600          CT(I,J)=C(J,I)
2610    NEXT J
2620 NEXT I
2630 REM CONSTRUCT BETA TRANSPOSE * CT = BTCT
2640 IF Z = 1 THEN LPRINT TAB(10) "BTCT = BETA TRANSPOSE * C TRANSPOSE" : LPRINT
2650 FOR I = 1 TO N
2660    BTCT(1,I)=0
2670    FOR K = 1 TO C1
2680          BTCT(1,I)=BTCT(1,I)+BETA(K,1)*CT(K,I)
2690    NEXT K
2700    IF Z = 1 THEN LPRINT BTCT(1,I);"     ";
2710 NEXT I
2730  IF Z = 1 THEN LPRINT: LPRINT TAB(10) "CXTXI = C * XTXI":LPRINT
2740 FOR I = 1 TO N
2750    FOR J = 1 TO C1
2760          CXTXI(I,J)=0
2770          FOR K = 1 TO C1
2780                CXTXI(I,J)=CXTXI(I,J)+C(I,K)*XTXI(K,J)
2790          NEXT K
2800          IF Z = 1 THEN LPRINT CXTXI(I,J);"     ";
2810      NEXT J: IF Z = 1 THEN LPRINT
2820 NEXT I: IF Z = 1 THEN LPRINT
2830 IF Z = 1 THEN LPRINT: LPRINT TAB(10) "CXTXICT = CXTXI * CT":LPRINT
2840 FOR I = 1 TO N
2850    FOR J = 1 TO N
2860          CXTXICT(I,J)=0
2870          FOR K = 1 TO C1
2880                CXTXICT(I,J)=CXTXICT(I,J)+CXTXI(I,K)*CT(K,J)
2890          NEXT K
2900          IF Z = 1 THEN LPRINT CXTXICT(I,J);"    ",
2910    NEXT J
2920 NEXT I
2930 REM WE NOW NEED TO TAKE THE INVERSE OF CXTXICT = NUMERAT1
2940 INVDIM = N  : DIM START(N,N)
2950 IF Z = 1 THEN LPRINT TAB(10) "NUMERAT1";
2960 FOR I = 1 TO N : FOR J = 1 TO N
2970     START(I,J)=CXTXICT(I,J)
2980  NEXT J : NEXT I
2990 GOSUB 1680
```

```
3000 FOR I = 1 TO N : FOR J = 1 TO N
3010     NUMER1(I,J) = B(I,J): IF Z = 1 THEN LPRINT NUMER1(I,J)
3020  NEXT J : NEXT I
3030 ERASE START, B
3050 REM NOW WE MULTIPLY BTCT BY NUMERAT1 TO GET NUMERAT2
3060 IF Z = 1 THEN LPRINT TAB(10) "NUMERAT2 = BTCT * NUMERAT 1"
3070 FOR I = 1 TO N
3080 NUMER2(1,I)=0
3090    FOR K = 1 TO N
3100            NUMER2(1,I)=NUMER2(1,I)+BTCT(1,K)*NUMER1(K,I)
3110            IF Z = 1 THEN LPRINT NUMER2(1,K);"    ";
3120    NEXT K
3130 NEXT I
3140 IF Z = 1 THEN LPRINT:LPRINT TAB(10) "CB = C * B":LPRINT
3150 FOR I = 1 TO N
3160    CB(I,1)=0
3170    FOR K = 1 TO C1
3180            CB(I,1)=CB(I,1)+C(I,K)*BETA(K,1)
3190    NEXT K
3200    IF Z = 1 THEN LPRINT CB(I,1);"    ";
3210 NEXT I: IF Z = 1 THEN LPRINT
3220  REM OUR FINAL NUMERATOR MATRIX MULTIPLICATION IS NUMERAT2 * CB
3230  NUMER3 = 0
3240  FOR K = 1 TO N
3250     NUMER3=NUMER3+NUMER2(1,K)*CB(K,1)
3260  NEXT K
3280 LPRINT  "CHI SQUARE STATISTIC FOR INDIVIDUAL COEFFICIENT(S) IS";NUMER3
3640 INPUT"DO YOU WANT TO TEST ANOTHER BETA (0=NO 1=YES)";Q
3650  LPRINT "                          **************************":LPRINT
3660 IF Q > 0 THEN GOTO 2530  ELSE END
```

APPENDIX H

SAMPLE POPULATION DESCRIPTIVE DATA

Variable	Category/Interval	Percent
RISK	high risk	13
	medium risk	49
	low risk	49
HSOBJ	high objective health status	25
	medium obj. health status	67
	low objective health status	8
PHS	high perceived health status	23
	medium perceived health status	40
	low perceived health status	37
WORRY	some or more	46
LOCUS	feel great deal of control over their health	48
SPOUSEATT	spouse attended clinic	5
PREVATT	attended wellness program previously	5
AWARE	never heard of clinic	94
	barely recognized name	5
	knew about services offerd	1
INCOME	(over $20,000 per year)	29
ACCESS	(within 15 minutes)	90
KTIME	(at Knox for > 1 year)	53
RACE	Black	15
	Asian	6
	White	79
CHILD	(have child age 6 or under)	68
PTIME	work at least part-time	24
FTIME	work full-time	13
SEX	female	100

RANK	officer spouse	15
	NCO spouse	33
	enlisted spouse	52
EDUCN	some college	43
	high-school graduate	87
NEED (wellness)	high level of interest	19
	medium level of interest	49
	low level of interest	32
IMPRESSN	positive impression of wellness clinic	6
SPOUSE	spouse mentioned clinic	2
DOC	doctor mentioned clinic	0
FRIEND	friend mentioned clinic	4
NEWSMAG	saw clinic mentionned in newspaper or magazine	8
TVRADIO	heard clinic mentionned on radio or TV	0
MEDATT	quality of military medical care is fair or poor	44

APPENDIX I

LOGIT ANALYSIS STEP 1.

- ALL VARIABLES CONSIDERED.

- POSITIVE/TOTAL PROOPORTIONS CALCULATED.

- 2X2 CHI-SQUARE FOR VARIABLES WITH USERS+ / ALL+ RATIOS FAR FROM POPULATION AVERAGE (16/87 = .18)

VARIABLE	# USERS POSITIVE	# NON-USERS POSITIVE	USERS+ /ALL +	ALL + /TOTAL	CHISQ RAW	CHISQ ADJ *
1. LOWRISK	6	37	.14	.49	1.15	.61
2. MEDRISK	6	27	.18	.38		
3. LHSOBJ	3	4	.43	.08	3.03	1.52
4. MHSOBJ	12	46	.21	.67		
5. LPHS	8	24	.25	.37	1.47	.86
6. MPHS	5	30	.14	.40		
7. WORRY	11	29	.27	.46	4.09	3.05
8. LOCUS	6	36	.14	.48		
9. SPOATT	1	3	.25	.05		
10.PREVATT	1	3	.25	.05		
11.AWARELO	15	67	.18	.94		
12.AWAREMED	1	3	.25	.05		
13.TVRAD	0	0	N/A	0		
14.NEWSMAG	1	6	.14	.08		
15.FRIEND	0	4	.00	.05		
16.SPOUSE	1	1	.50	.02		
17.DOC	0	0	N/A	.00		
18.IMPRESSN	1	5	.17	.07		
19.NEEDLO	0	28	.00	.32		
20.NEEDMED	0	43	.00	.49		
21.MEDATT	9	40	.18	.56		
22.AGE	7	22	.24	.33	.98	.47
23.HS	14	62	.18	.87		
24.COLL	6	31	.16	.43		
25.NCO	7	35	.17	.48		
26.OFF	0	13	0	.15	2.74	1.59
27.SEX	0	0	0	.00		
28.PTIME	5	19	.21	.28		
29.FTIME	1	12	.08	.15	1.16	1.47
30.CHILD	12	47	.20	.68		
31.BRACE	4	10	.29	.16	1.10	.45
32.HRACE	0	1	0	.01		
33.KTIME	6	40	.13	.53	1.86	1.18
34.ACCESS	15	63	.19	.90		
35.INCOME	1	24	.04	.29	4.84	3.59

Note: * = Yates correction for chi-square with discrete values.

APPENDIX J

LOGIT ANALYSIS. STEP 2.

VARIABLES WITH ADEQUATE SPREAD.

1. LOWRISK
2. MEDRISK
4. MHSOBJ
5. LPHS
6. MPHS
7. WORRY
8. LOCUS
21. MEDATT
22. AGE
23. HS
24. COLL
25. NCO
28. PTIME
29. FTIME
30. CHILD
31. BRACE
33. :TIME
35. INCOME

APPENDIX K

SAMPLE LISTING OF VARIABLES CONSIDERED

FIRST TWO PAGES OF DATAGATH
(part II) OUTPUT

TESTING VARIABLE #'S 1 26 8

	NONUSERS	USERS	USE/TOTAL	TOTAL	SUB/N
SUBGRP# 1 + + +	6	0	0	6	.0689655
SUBGRP# 2 + + -	3	0	0	3	.0344828
SUBGRP# 3 + - +	16	5	.238095	21	.241379
SUBGRP# 4 + - -	12	1	.0769231	13	.149425
SUBGRP# 5 - + +	3	0	0	3	.0344828
SUBGRP# 6 - + -	1	0	0	1	.0114943
SUBGRP# 7 - - +	11	1	.0833333	12	.137931
SUBGRP# 8 - - -	19	9	.321429	28	.321839

TESTING VARIABLE #'S 1 26 29

	NONUSERS	USERS	USE/TOTAL	TOTAL	SUB/N
SUBGRP# 1 + + +	3	0	0	3	.0344828
SUBGRP# 2 + + -	6	0	0	6	.0689655
SUBGRP# 3 + - +	4	0	0	4	.045977
SUBGRP# 4 + - -	24	6	.2	30	.344828
SUBGRP# 5 - + +	0	0	-1.70141E+38	0	0
SUBGRP# 6 - + -	4	0	0	4	.045977
SUBGRP# 7 - - +	5	1	.166667	6	.0689655
SUBGRP# 8 - - -	25	9	.264706	34	.390805

TESTING VARIABLE #'S 1 26 33

	NONUSERS	USERS	USE/TOTAL	TOTAL	SUB/N
SUBGRP# 1 + + +	8	0	0	8	.091954
SUBGRP# 2 + + -	1	0	0	1	.0114943
SUBGRP# 3 + - +	16	1	.0588235	17	.195402
SUBGRP# 4 + - -	12	5	.294118	17	.195402
SUBGRP# 5 - + +	2	0	0	2	.0229885
SUBGRP# 6 - + -	2	0	0	2	.0229885
SUBGRP# 7 - - +	14	5	.263158	19	.218391
SUBGRP# 8 - - -	16	5	.238095	21	.241379

TESTING VARIABLE #'S 1 8 29

	NONUSERS	USERS	USE/TOTAL	TOTAL	SUB/N
SUBGRP# 1 + + +	4	0	0	4	.045977
SUBGRP# 2 + + -	18	5	.217391	23	.264368
SUBGRP# 3 + - +	3	0	0	3	.0344828
SUBGRP# 4 + - -	12	1	.0769231	13	.149425
SUBGRP# 5 - + +	0	0	-1.70141E+38	0	0
SUBGRP# 6 - + -	14	1	.0666667	15	.172414
SUBGRP# 7 - - +	5	1	.166667	6	.0689655
SUBGRP# 8 - - -	15	8	.347826	23	.264368

TESTING VARIABLE #'S 1 8 33

	NONUSERS	USERS	USE/TOTAL	TOTAL	SUB/N
SUBGRP# 1 + + +	14	1	.0666667	15	.172414
SUBGRP# 2 + + -	8	4	.333333	12	.137931
SUBGRP# 3 + - +	10	0	0	10	.114943
SUBGRP# 4 + - -	5	1	.166667	6	.0689655
SUBGRP# 5 - + +	8	1	.111111	9	.103448
SUBGRP# 6 - + -	6	0	0	6	.0689655
SUBGRP# 7 - - +	8	4	.333333	12	.137931
SUBGRP# 8 - - -	12	5	.294118	17	.195402

TESTING VARIABLE #'S 1 29 33

	NONUSERS	USERS	USE/TOTAL	TOTAL	SUB/N
SUBGRP# 1 + + +	5	0	0	5	.0574713

SUBGRP# 2 + + -	2	0	0	2	.0229885
SUBGRP# 3 + - +	19	1	.05	20	.229885
SUBGRP# 4 + - -	11	5	.3125	16	.183908
SUBGRP# 5 - + +	3	1	.25	4	.045977
SUBGRP# 6 - + -	2	0	0	2	.0229885
SUBGRP# 7 - - +	13	4	.235294	17	.195402
SUBGRP# 8 - - -	16	5	.238095	21	.241379

TESTING VARIABLE #'S 26 8 29

	NONUSERS	USERS	USE/TOTAL	TOTAL	SUB/N
SUBGRP# 1 + + +	2	0	0	2	.0229885
SUBGRP# 2 + + -	7	0	0	7	.0804598
SUBGRP# 3 + - +	1	0	0	1	.0114943
SUBGRP# 4 + - -	3	0	0	3	.0344828
SUBGRP# 5 - + +	2	0	0	2	.0229885
SUBGRP# 6 - + -	25	6	.193548	31	.356322
SUBGRP# 7 - - +	7	1	.125	8	.091954
SUBGRP# 8 - - -	24	9	.272727	33	.37931

TESTING VARIABLE #'S 26 8 33

	NONUSERS	USERS	USE/TOTAL	TOTAL	SUB/N
SUBGRP# 1 + + +	8	0	0	8	.091954
SUBGRP# 2 + + -	1	0	0	1	.0114943
SUBGRP# 3 + - +	2	0	0	2	.0229885
SUBGRP# 4 + - -	2	0	0	2	.0229885
SUBGRP# 5 - + +	14	2	.125	16	.183908
SUBGRP# 6 - + -	13	4	.235294	17	.195402
SUBGRP# 7 - - +	16	4	.2	20	.229885
SUBGRP# 8 - - -	15	6	.285714	21	.241379

TESTING VARIABLE #'S 26 29 33

	NONUSERS	USERS	USE/TOTAL	TOTAL	SUB/N
SUBGRP# 1 + + +	3	0	0	3	.0344828
SUBGRP# 2 + + -	0	0	-1.70141E+38	0	0
SUBGRP# 3 + - +	7	0	0	7	.0804598
SUBGRP# 4 + - -	3	0	0	3	.0344828
SUBGRP# 5 - + +	5	1	.166667	6	.0689655
SUBGRP# 6 - + -	4	0	0	4	.045977
SUBGRP# 7 - - +	25	5	.166667	30	.344828
SUBGRP# 8 - - -	24	10	.294118	34	.390805

TESTING VARIABLE #'S 8 29 33

	NONUSERS	USERS	USE/TOTAL	TOTAL	SUB/N
SUBGRP# 1 + + +	3	0	0	3	.0344828
SUBGRP# 2 + + -	1	0	0	1	.0114943
SUBGRP# 3 + - +	19	2	.0952381	21	.241379
SUBGRP# 4 + - -	13	4	.235294	17	.195402
SUBGRP# 5 - + +	5	1	.166667	6	.0689655
SUBGRP# 6 - + -	3	0	0	3	.0344828
SUBGRP# 7 - - +	13	3	.1875	16	.183908
SUBGRP# 8 - - -	14	6	.3	20	.229885

APPENDIX L

RESULTS OF LOGIT RUNS

VAR 1	8	1	1	35	5	35	33
VAR 2	33	8	35	5	7	7	5
VAR 3	22	7	7	7	22	28	28
BETA 0	1.44	1.09	1.40	1.72	1.20	1.42	1.21
BETA 1	.24	.42	.78	.70	-.43	.45	.50
BETA 2	.35	.13	.63	-.37	-.31	-.42	-.51
BETA 3	-.26	-.04	.38	-.42	-.35	-.36	-.33
GOOD FIT	1.41	1.60	.23	2.77	2.01	2.29	1.32
CHI 0	23.11	11.50	5.39	8.07	13.88	4.80	14.30
CHI 1	.66	.37	1.85	1.32	1.84	.61	2.70
CHI 2	1.48	.10	1.16	1.18	.88	1.66	2.94
CHI 3	.82	.00	.42	1.59	1.34	1.10	1.02
# users=0	0	3	3	3	1	3	1
low subgp	6	6	4	4	7	3	2
CRITERIA MET	NO	NO	NO	YES	NO	NO	NO

VAR 1	5	33	35	33	1	1	8
VAR 2	7	5	5	35	8	8	7
VAR 3	28	7	28	7	35	22	28
BETA 0	1.31	1.20	1.27	1.02	1.32	1.13	1.35
BETA 1	-.36	.17	.42	-.06	.15	.16	.34
BETA 2	-.45	-.46	-.31	.01	.03	.22	-.24
BETA 3	-.16	-.25	-.44	-.36	.27	-.56	.06
GOOD FIT	2.46	2.35	.41	4.56	2.93	1.23	1.38
CHI 0	15.70	12.78	4.16	2.05	4.70	13.56	17.80
CHI 1	1.28	.30	.50	.03	.14	.16	.86
CHI 2	1.94	2.06	1.02	.00	.00	.29	.39
CHI 3	.25	.56	1.71	1.20	.20	3.38	.04
# users=0	1	1	3	3	3	2	1
low subgp	6	5	3	3	5	4	3
CRITERIA MET	NO	NO	NO	NO	NO	NO	NO

VAR 1	1	8	8	1	8	33	35
VAR 2	8	33	35	35	35	5	7
VAR 3	5	7	5	5	7	22	22
BETA 0	1.08	1.28	1.50	1.54	1.49	1.33	.96
BETA 1	.01	.32	-.01	.09	-.11	.34	-.01
BETA 2	.07	.08	.45	.50	.34	-.33	-.38
BETA 3	-.64	-.17	-.33	-.32	-.52	-.26	-.56
GOOD FIT	.95	2.31	.76	1.62	.87	2.21	.56
CHI 0	12.14	15.54	6.33	6.67	5.83	20.01	2.07
CHI 1	.00	.77	.00	.07	.08	1.32	.00
CHI 2	.03	.06	.56	.69	.32	1.26	1.40
CHI 3	3.48	.20	.93	.88	1.94	.80	3.04
# users=0	2	3	3	3	3	0	3
low subgp	4	5	4	4	5	5	4
CRITERIA MET	NO	NO	NO	NO	NO	NO	NO

VAR 1	8	8	8	8	8	8	33
VAR 2	33	35	5	5	33	7	35
VAR 3	28	22	28	22	5	22	5
BETA 0	1.44	.84	.97	1.24	1.31	1.37	1.37
BETA 1	.22	.01	.05	.03	-.04	.20	.19
BETA 2	.37	-.06	.05	-.39	.29	-.35	.29
BETA 3	-.15	-.64	-.44	-.36	-.49	-.29	-.34
GOOD FIT	.95	1.37	.73	1.94	.12	1.57	.35
CHI 0	21.44	1.66	2.16	16.63	18.21	19.76	4.65
CHI 1	.58	.00	.02	.01	.02	.30	.39
CHI 2	1.54	.01	.01	1.42	.98	.95	.20
CHI 3	.24	3.88	1.66	1.51	2.18	.90	1.27
# users=0	0	3	3	1	1	1	3
low subgp	4	5	4	3	3	4	3
CRITERIA							
MET	NO	NO	NO	NO	NO	NO	NO

VAR 1	33	33	33	1	1	1	1
VAR 2	35	35	7	8	33	33	5
VAR 3	22	28	28	33	5	22	22
BETA 0	.52	.88	.96	1.21	1.17	1.21	1.09
BETA 1	.04	.18	.51	.15	-.05	.04	-.04
BETA 2	-.38	-.04	-.56	.13	.22	.11	-.44
BETA 3	-.63	-.47	-.76	.28	-.47	-.14	-.40
GOOD FIT	1.58	.82	.42	3.12	2.45	1.77	.91
CHI 0	.56	1.79	6.86	14.57	13.13	14.58	13.03
CHI 1	.02	.33	2.39	.11	.02	.01	.01
CHI 2	.34	.00	2.94	.09	.46	.13	1.80
CHI 3	3.77	1.85	4.25	.71	1.91	.21	1.83
# users=0	3	3	2	2	1	1	1
low subgp	3	3	4	6	3	5	5
CRITERIA							
MET	NO	NO	NO	NO	NO	NO	NO

VAR 1	1	35
VAR 2	5	5
VAR 3	28	22
BETA 0	1.24	.82
BETA 1	.15	-.02
BETA 2	-.39	-.32
BETA 3	-.25	-.65
GOOD FIT	1.11	.28
CHI 0	14.53	1.63
CHI 1	.20	.00
CHI 2	1.43	1.05
CHI 3	.64	4.14
# users=0	1	3
low subgp	3	4
CRITERIA		
MET	NO	NO

APPENDIX M

REVISED SAMPLE POPULATION DESCRIPTION.

Variable.	Range Max.	Range Min.	Sample Mean	Sample Stnd. Dev.	Sample Variance
1. RISK	3	-6	-1.40	2.1	4.4
2. HSOBJ	4	-7	.22	2.00	3.99
3. PHS	5	-7	-.49	2.84	8.09
4. WORRY	1	-1	.08		
5. LOCUS	1	-1	-.03		
6. AWARE	1	-1	-.74		
7. NEED	7	0	2.77	1.67	2.79
8. MEDATT	1	-1	1.26		
9. AGE	1	-1	-.33		
10. EDUCN	1	-1	.30		
11. RANK	1	-1	-.37		
12. WORK	1	-1	-.58		
13. CHILD	1	-1	.36		
14. RACE	1	-1	.26		
15. TIME	1	-1	.06		
16. ACCESS	1	-1	.78		
17. INCOME	1	-1	-.43		

RISK

VALUE	Frequency	Percentage
-6	2	2.3
-5	4	4.6
-4	10	11.5
-3	8	9.2
-2	20	23.0
-1	14	16.1
0	10	11.5
1	10	11.5
2	8	9.2
3	1	1.2
Total	87	100.0

HEALTH STATUS - OBJECTIVE

VALUE	FREQ	PERCENTAGE
-4 or less	3	3.5
-3	4	4.6
-2	13	14.9
-1	9	10.3
0	9	10.3
1	27	31.0
2	14	16.1
3.	6	6.9
4.	2	2.3

PERCEIVED HEALTH STATUS

VALUE	FREQ	PERCENT
-7	1	1.2
-6	2	2.3
-5	4	4.6
-4	8	9.2
-3	7	8.1
-2	10	11.5
-1	10	11.5
0	13	14.9
1	12	13.8
2	4	4.6
3	8	9.2
4	5	5.8
5	3	3.5
	87	100

APPENDIX N

STEPWISE MULTIPLE REGRESSION

DEPENDENT VARIABLE: NEED (variable number 7)

INDEPENDENT VARIABLES: All others (total of 16)

STEP 1. PHS variable entered

	Coeff.	Stnd Error	F(1,85)	
PHS	-.146	.062	5.57	p <.025
CONSTANT	2.698			

s/e estimate = 1.62
r-squared = .06

STEP 2. INCOME variable entered

	Coeff.	Stnd Error	F(1,84)	Partial r^2
PHS	-.150	.062	5.89	.07
INCOME	-.241	.193	1.569	.02
CONSTANT	2.594			

F(2,84) = 3.58
s/error estimate = 1.62
multiple r-squared = .08

STEP 3. EDUCN variable entered

	Coeff.	Stnd Error	F(1,83)	Partial r^2
PHS	-.183	.065	7.85	.086
EDUCN	.426	.290	2.16	.025
INCOM	-.360	.208	3.01	.035
CONSTANT	2.399			

F(3,83) = 3.14
stnd error estimate = 1.61
multiple r-squared = .10

STEP 4. MEDAT variable entered

	Coeff.	Stnd Error	F(1,82)	Partial r^2
PHS	-.198	.067	8.86	.098
EDUCN	.416	.290	2.06	.025
INCOM	-.348	.208	2.81	.033
MEDAT	.201	.179	1.27	.015
CONSTANT	2.399			

F(4,82) = 2.68
stnd error estimate = 1.61
multiple r-squared = .12

STEP 5. TIME variable entered

	Coeff.	Stnd Error	F(1,81)	Partial r^2
PHS	-.208	.067	9.71	.107
MEDAT	.229	.180	1.62	.020
EDUCN	.524	.301	3.03	.036
TIME	.233	.187	1.56	.019
INCOM	-.439	.220	4.01	.047
CONSTANT	2.281			

F(5,81) = 2.47
stnd error estimate = 1.60
multiple r-squared = .13

APPENDIX O

IMPACT OF SOCIOECONOMIC FACTORS ON HEALTH

INDEPENDENT VARIABLES: Rank, Education, Income, Age

DEPENDENT VARIABLE: RISK

Step 1. Variable EDUCN entered

	Coeff.	F(1,85)
EDUCN	-1.34	19.8
CONST.	-.99	

standard error = 1.91
r-squared = .19

Step 2. Variable RANK entered

RANK	- .30	.2926	1.224	.01
EDUCN	-1.24	.3136	15.56	.15
CONST	-1.14			

standard error = 1.90
r-squared = .20

DEPENDENT VARIABLE: HSOBJ

NO VARIABLES MET CRITERIA

DEPENDENT VARIABLE = PHS

Step 1. Variable EDUCN entered.

	Coeff	stnd error	F(1,85)
EDUCN	1.26	.4297	8.65
CONST.	-.87		

r-squared = .09

Step 2. Variable INCOME entered.

	Coeff	stnd error	F(1,84)	partial r^2	F(3,84)
EDUCN	1.53	.4551	11.35	.12	5.80
INCOME	- .57	.342	2.76	.03	
CONST.	-1.19				

stnd error= 2.70
r-squared = .12

APPENDIX P

CHEP CONCEPT PAPER

Mission: To help Fort Knox community beneficiaries adopt and/or maintain healthier lifestyles.

Broad courses of action possible:(*=recommended)

a. advertising existing program vs. (*)building new product

b. Customers: broad spectrum vs. (*)target populations

c. Physician involvement: (*)yes vs. no

d. Comprehensive vs (*)incremental initiatives towards goal.

e. Place: hospital-based vs. community vs. (*)combined

f. One-time class vs. (*)ongoing progression, followup program.

Objectives:

a. Reduce percentage of dependent population grossly overweight (as determined by random sample, using standard height/weight tables) by five percent within one year.

b. Increase percentage of dependent population exercising regularly (as determined by random sample measuring levels of activity) by five percent within one year.

c. Increase awareness of heart disease and cancer risk factors among all beneficiaries (as determined by random sample measuring level of knowledge) by 10 percent within one year.

d. Increase seat belt and infant car seat usage among the young dependent population (as deterimined by random sample) by five percent.

e. Decrease percentage of population smoking (as determined by random sample) by 5 percent within one year.

Strategies:

a. Remodel our product to make it more interactive (outreach model). Use community assets in partnership with hospital staff expertise. Have hospital provide visiting experts to existing community groups.

b. Build a progression(flowchart) of community health education which will first inform beneficiaries of what is available and then help them choose the appropriate level of instruction based on their interests and perceived needs.

c. Divide CHEP committee into series of small working groups, each responsible for implementing part of the strategic plan, under the supervision of the chairperson.

d. Target marketing to junior enlisted spouses and retirees.

e. Build and maintain simple CHEP database to allow evaluation of program.

PROPOSED CHEP SYSTEM FLOWCHART:

a. Awareness and Interest Phase
- Health Tips Ads
- Physician, screeners referral
- Display booths at briefings, community center,etc
- Hospital week (volksmarch)

b. Intake Session. Includes:

-short, exportable,
-stimulating, attention-grabbing
-abbreviated lifestyle assessment
-no electricity required
-emphasizes benefits which can be expected from what we are offering.
-if successful, results in a referral to the lifestyles program (see para c.) or --
a specific hospital-based program (see para d).
-initiate database, count as clinic visit

c. INVEST IN YOURSELF Program.

-community based
-begins with contract between leader and participants.
-emphasizes social cohesiveness, esprit de corps.
-four week program, each week devoted to major area of wellness. Each week has one designated subject matter expert responsible for instruction.
-stresses that health is fun, helps develop personal wellness plan in each of the four areas of wellness.
-integrates teaching with ongoing physical activity.
-ends with graduation, certificate, dinner.
-referrals as needed to in-depth hospital based programs.

d. Specific, in-depth Hospital-based Programs.

- one hour blocks of didactic instruction for those interested in in-depth knowledge.
- each one hour block has proponent, a schedule coordinated with CHEP, and is promoted as a separate product.
- standard reporting into CHEP database.

e. Followup program. Periodic checks of participants, invitation to return(through intake program) for reassessment, evaluate how useful CHEP intervention was. Use database initiated at intake to conduct followup.

PROPOSED CHEP ORGANIZATION: 2 temporary task forces(eventually consolidated into one Operation committee) and 3 permanent subcommittees.

Intake Program Task Force. Develop program. operate program through test phase.

Invest in Yourself (Lifestyles) Program Task Force. Develop program. operate program through test phase.

Publicity (promotion) committee. Develop and implement ad campaign. Select media to be utilized.

Assessment committee. Design database, gather baseline and periodic information, assess success of program. Recommend changes in direction.

Program and Budget committee. Coordinates budget with CHEP objectives by working with each of the other four committees.

TASKS TO BE ACCOMPLISHED

Determine pilot groups
Identify experts
Design lifestyles program
Design intake program
Linkage/agreements with existing groups
Certificates
Graduation dinner at dining facility
Establish health information file: collection of camera ready ads

Decide on theme for new program
Design mailings, plan for how they will be accomplished.
Design ads: radio, TV, print, handbills, posters
Decide where and when to run intake program.
Media plan: which channels do we use, how do we use them, yearlong schedule of advertising, using prepared ads.
Implement mailing plan
Implement media plan
Marketing presentation to nurses, physicians, screeners, command group

INVEST IN YOURSELF PROGRAM

Objective: Improve participants' health by:
a. encouraging them to voluntarily adjust their lifestyles
b. showing them the easiest way to do so and
c. providing the social support to help them make that commitment.

Concept: -Four week program
-Meets three times a week, 45 minutes per session.
-Mixture of aerobics exercise and health information. Avoids lectures in favor of short interactive discussions while warming up and warming down from exercise session.
-Stresses group cohesiveness and mutual assistance in meeting health goals.
-Offers practical techniques to maintain healthier lifestyles.
-Each participant commits to program by entering into contract(with individual goals mutually set by participant and group leaders).

Schedule:

Week 1: Day 1: Wellness overview, baseline assessment, develop goals, sign contract.

Day 2: (First aerobics session) Proper Exercise Techniques. How to get the most out of your exercise time.

Day 3: Proper Exercise Techniques - how to exercise sensibly and have fun while you do it.

Week 2: Day 1: Trimming Calories, not Flavor

Day 2:High Energy Food: High Fiber, LowSugar Diets

Day 3: Behavior Modification - how you can use it to help you control your eating habits.

Week 3: Day 1: How to recognize and deal with stress at home and at work.
Day 2: Personal strategies for better managing your stress.
Day 3: How to cope with stress - specific techniques you can use.

Week 4: Day 1: Health Risks: How to improve your chances against Cancer, Heart Disease and Stroke.

Day 2: Other Risks to your Health and how to recogize and deal with them.

Day 3: Program review, self-assessment, feedback Referrals to in-depth programs.

Week 5 Day 1: Graduation luncheon

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