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## *THE USE OF TOTAL QUALITY LEADERSHIP IN HEALTH PROMOTION ACTIVITIES IN U.S. NAVY COMMANDS*

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**The Use of Total Quality Leadership in Health Promotion Activities  
in U.S. Navy Commands**

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## Summary

### Problem and Objective

Total quality leadership (TQL) is a participative, systematic approach to planning and implementing a continuous organizational improvement process. The U.S. Navy has adopted the principles of TQL as the new paradigm for quality. Health promotion represents an important area in which the TQL approach appears particularly well-suited because changing lifestyle behaviors, and, more importantly, maintaining behavior change requires an environment or organization that is actively supportive of change.

The objective of this study was to determine the effectiveness of TQL on health promotion activities in the Navy and to develop methods of TQL and health promotion data capture.

### Approach

To determine the extent to which Navy commands were implementing TQL principles and practices and those that were being specifically applied to health promotion, a brief survey was mailed to 277 selected commands to obtain command-level data. To supplement the mailed survey, a telephone interview was conducted on a subsample of these commands to provide in-depth information on TQL implementation. Customer-based information was obtained from two separate sources: (1) a 1994-1995 Navywide health and fitness survey, which included several items on TQL implementation, related perceptions, and health status; and (2) the Aviation Medical Data Retrieval System database, which provides physical examination data that were merged with the command survey data to compare health indicators of individuals at commands that used TQL for health promotion and commands that did not.

### Results

The command survey indicated that 32% of commands had used TQL specifically for improving health- and fitness-related processes and outcomes between 1991 and 1995. The most commonly used TQL activities applied to health promotion were process action teams, brainstorming, and flow diagrams. The most common health promotion areas in which TQL techniques were applied were exercise and fitness and tobacco cessation and control. Among non-TQL-using commands, the factors or barriers considered most important in impeding its use were inadequate training in TQL, insufficient time, and lack of support from the highest ranks in the command. The Navywide Individual Survey indicated that individuals at commands using TQL for health promotion programs consistently reported more positive perceptions of their command's support for health and fitness issues than individuals at commands not using TQL for such purposes. The only TQL health promotion program that was related to a specific medical outcome was a TQL cholesterol reduction program. The cholesterol program, along with sex and age, significantly predicted lower body fat.

### Conclusions

Much evidence suggests that the Navy has been successful in its effort to introduce and employ TQL concepts and tools in many of its administrative, operational, mission-related, and health promotion processes

and functions. However, extensive use of TQL to meet the Navy's health and fitness goals has not been realized. The study found that successful implementation of TQL rests upon support for it from the highest ranks of the command, a well-trained work force in TQL principles and techniques, and having adequate time during the day for TQL activities. Based upon the study's findings, a summary of recommendations is provided for successful development and implementation of TQL.

## The Use of Total Quality Leadership in Health Promotion Activities in U.S. Navy Commands

Total Quality Leadership (TQL) is a participative, systematic approach to planning and implementing a continuous organizational improvement process. Its approach focuses on satisfying customers' expectations, identifying problems, building commitment, and promoting open decision-making among workers.<sup>1,2</sup> Within the U.S. Navy, in general, and the Bureau of Medicine and Surgery (BUMED), in specific, the principles of TQL have been adopted as the new paradigm for quality. This approach consists, at a minimum, of three essential elements: (1) efforts to know the customer more deeply and to link that knowledge more closely to the day-to-day activities of the organization; (2) efforts to mold the culture of the organization, largely through the deeds of leaders, to foster pride, joy, collaboration, and scientific thinking; and (3) efforts to continuously increase knowledge of and control over variation in the processes of work through the widespread use of the scientific methods of collection, analysis, and action upon data.<sup>3</sup> Although many of the concepts of TQL resemble philosophical beliefs long held by the military medical community, it does offer many opportunities to refine old concepts and further those goals of quality care to which health care providers have always aspired.<sup>4</sup>

Within the area of health promotion, OPNAV INSTRUCTION 6100.2, "HEALTH PROMOTION PROGRAM," identifies the broad objectives for the Navy program. While these objectives are based upon the national health promotion goals for the Year 2000,<sup>5</sup> additional efforts are required to identify customer needs and benchmark relevant processes. As McEachern<sup>6</sup> and his colleagues pointed out:

"In health care we lack not only our many customers' input but also a systematic way to incorporate input into improving the system...However, before health care providers can begin to meet the needs of their customers, they need to marshal an understanding of the two other essential elements of the new quality: a process focus and statistical thinking (p. 366)."

Health promotion represents an area of health care in which an innovative approach such as TQL appears particularly well-suited. While the number of individuals at risk due to smoking, a sedentary lifestyle, high cholesterol, and high blood pressure have generally decreased due to changes in behavior, millions of individuals still are at high risk.<sup>7,8</sup> One of the reasons that health behavior change success has been mixed is that, even for those risk factors for which strong links to morbidity and mortality have been established and where methods of change have been developed, maintenance of change over the long term has not been easy to affect.<sup>9-13</sup> Zimmerman and Connor,<sup>14</sup> for example, contended that "long-term change requires more than education, persuasion, behavior modification, or occasional follow-up; it requires an environment that is supportive of change, in fact that is 'actively' supportive of change (p. 58)."

While the workplace has been considered the most appropriate site for a health promotion program,<sup>15,16</sup> the family, as the primary unit of health care and health promotion, also represents a potentially powerful influence on health behavior.<sup>14,17,18</sup> In any intervention, whether concerning a clearly individual behavior (such as smoking) or one that may directly relate to others' behavior (such as fat consumption or team sports), participating individuals should learn about structuring their environment with respect to people and situations that will promote behavior change and reduce the likelihood of returning to old habits. In those instances in which the behaviors involve others, those individuals should be involved in the intervention wherever possible, learning how to facilitate behavior change and to reduce the likelihood of relapse.<sup>14</sup>

Considering the "grass roots" origin of much health promotion,<sup>19</sup> Anderson<sup>20</sup> argued that health behavior should be considered in lay-defined terms, covering not only what individuals do to or for themselves and for their families, but also their involvement in group or community activities, including those designed to promote a social or physical environment more conducive to health. Recent research on active-duty Navy personnel demonstrated that health behaviors form two broad categories or dimensions--preventive behavior and risk-taking behavior.<sup>21</sup> Preventive behavior included wellness-maintenance behaviors and accident-control behaviors. Risk-taking behavior, on the other hand, included subsets comprising traffic-related risk-taking and risk-taking through exposure to hazardous substances. To provide information for continuous process improvement in the area of health promotion, it is first necessary to explore the concept from the consumer's perspective and to develop tools to assess process improvement through the reduction of "assignable"<sup>3</sup> causes of variation.

The objective of this study was to determine the effectiveness of TQL on health promotion activities in the Navy and to develop methods of TQL and health promotion data capture.

## METHODS

Data for this study were collected from several sources to provide both command-level and individual (or customer-based) information. To determine the extent to which Navy commands were implementing TQL principles and practices and those which were being specifically applied to health promotion, a brief survey was mailed to selected commands to provide command-level data. To supplement the mailed survey, a telephone interview was conducted on a subsample of these commands to provide in-depth information on TQL implementation. Customer-based information was obtained from two separate sources: (1) a 1994-1995 Navywide health and fitness survey, which included several items on TQL implementation, related perceptions, and health status; and (2) the Aviation Medical Data Retrieval System (AMDRS) database, which provides physical examination data that were merged with the command survey data to compare health indicators of individuals at commands that used TQL for health promotion and commands that did not.

### **Command Survey**

Commands were selected by identifying the Unit Identification Codes (UICs) in which at least 25 Navy aviation personnel from AMDRS relational database were attached between 1991 and 1994. This database was utilized because a related objective of this study was to compare TQL- and non-TQL-using commands on various health indicators, which are indexed in this database. This process resulted in 327 UICs targeted to receive the survey. These UICs then were matched with a current UIC address file, maintained by Bureau of Naval Personnel, which yielded 277 matches. The UICs that did not match and hence did not have a current mailing address represented decommissioned and deactivated commands. The survey was mailed to 277 UICs in March 1995, followed by a second mailing to nonresponders in April 1995. Fourteen additional commands were excluded from the study because their surveys were undeliverable. Data collection was completed in June 1995.

The "U. S. Navy Quality Health Promotion Survey" was a single-page, return-postage-paid, 7-item survey designed to briefly query TQL coordinators about the use of TQL in health promotion activities within their commands. The survey assessed the extent to which TQL practices had been implemented, proportion of personnel who attended TQL training, types of health promotion activities to which various TQL principles were applied, and level of success in improving overall command health (see Appendix A). Descriptive statistics were used to identify and characterize TQL activities within individual commands.

### **Command Telephone Interviews**

The response to the command survey established the pool from which UICs were sampled for participation in an in-depth follow-up telephone interview. Of the 204 commands that participated in the command survey, 7 had been decommissioned by the time of the follow-up, thereby reducing the eligible pool of UICs to 197. To provide adequate statistical power for this phase of the study design, an effect size of .30, power of .85, and an alpha level of .05 corresponding to a two-tailed test were chosen. The requisite number of subjects was 97, thus, approximately 50 respondent commands were required for both the study and the control groups. Anticipating an approximate 20% nonresponse rate, all commands reporting on the command survey that they had used TQL for improving health and fitness anytime between 1991 and 1995 (n=64) were targeted for the follow-up telephone interviews. In addition, a 68% random sample of the 133 commands from the command survey reported they had never used TQL in their health promotion programs comprised the control group (n=90).

The follow-up command interviews were conducted using a 20-item survey, which lasted between 10 and 40 minutes (see Appendix B). Two trained interviewers inquired about the facilitating or inhibiting factors pertaining to general- and health-promotion-related implementation of TQL and command characteristics. At the conclusion of the structured questioning, the interviewers gave respondents the opportunity to provide

contextual details that related to their TQL programming efforts and to forecast the future of TQL for health promotion.

### **Statistical Analysis**

Chi-square and independent t-test statistics provided descriptive univariate and bivariate analyses. The major organizational variables of command size, unit type, and mission were dichotomized into the following respective categories: small/large, shore/nonshore, white collar/blue collar. Following the same principle, dependent variables were dichotomized to reflect use/nonuse of TQL for various purposes and low/high importance of the factors that impeded or facilitated efforts to implement TQL.

### **Navywide Individual Survey**

A 9-page survey titled, "U.S. Navy Follow-Up for Fitness," assessed health and physical readiness and lifestyle behavior information from a Navywide sample of active-duty personnel who participated in a similar evaluation approximately 10 years earlier. The survey was mailed to 5,000 individuals in the fall of 1994 followed by two follow-up mailings to nonresponders. The survey included items on awareness, participation, and implementation of TQL practices and command support of the Navy's Health and Physical Readiness Program, as well as a variety of health-related items in such areas as current physical activity, diet, and general health behaviors and attitudes. These items are shown in Tables 8 and 9 and have been described in detail elsewhere.<sup>22</sup> Univariate and bivariate statistical analyses compared TQL and non-TQL commands and examined the hypothesis that personnel in TQL commands will have more positive health promotion attitudes, perceptions, and behaviors.

### **AMDRS**

The AMDRS database, maintained by the Naval Aerospace and Operational Medical Institute, Pensacola, FL, was accessed to examine medical indicators of Navy aviators who were assigned to the 204 commands selected for the previously noted command TQL survey. Medical exam data from 1993 were utilized such that the medical indicators of Navy personnel who were assigned to commands that used TQL for health promotion in 1992 or 1993 as determined from the command survey, could be compared with personnel assigned to commands not using TQL for health promotion. It was hypothesized that individuals who were at commands which had implemented TQL health promotion programs would have better health indicators. The database contained medical indicators from the most recent physical examination including blood pressure, cholesterol level, and percent body fat as measured by standard protocol outlined by the Department of the Navy (DON), BUMED.

## **Statistical Analysis**

Multiple regression analyses were used to assess the association between the medical indicators and TQL health promotion programs. In these analyses, cholesterol, body fat, and blood pressure were regressed on demographic variables and the use of overall and specific TQL health promotion programs (i.e., cholesterol reduction, hypertension management, and physical fitness programs). To predict cholesterol, body fat, and blood pressure, the independent variables examined were sex, age, race, overall TQL health promotion program use, and specific TQL health promotion program use. Sex, age, and race variables were included in the regression equation first to remove any effects that could be due to these demographic factors. Then the other independent variables were inserted if they accounted for significant additional variance in the medical indicator.

## **RESULTS**

### **Command Survey**

A total of 204 commands out of 263 targeted commands responded to the U.S. Navy Quality Health Promotion Survey (77% response rate). The respondents were primarily command TQL coordinators (77%), followed by Administrative Officers (10%), Executive Officers (6%), and unspecified others (7%) (Table 1). Overall, 94% of commands had implemented TQL principles and practices to "some" extent, although nearly half (49%) of commands had implemented TQL only "to a small extent" or "not at all." A total of 20% of commands surveyed indicated that 76-100% of their personnel have attended an introductory TQL lecture, 21% of commands reported 51-75%, 23% of commands reported 26-50%, and 35% reported that only 25% or less of their personnel have attended an introductory TQL lecture. Thirty-two percent of commands indicated that 51% or more of their officers have attended a TQL course. A total of 32% (n=66) of commands had used TQL specifically for improving health-and fitness-related processes and outcomes between 1991 and 1995.

The most commonly used TQL activities applied to health promotion were process action teams, brainstorming, flow diagrams, and cause and effect diagrams (Table 2). The most common health promotion areas in which TQL techniques were applied were exercise and fitness and tobacco cessation and control. Overall, commands reported that TQL has been "somewhat" to "fairly" successful in improving the overall health and fitness of the command.

Table 1. General TQL Implementation, U.S. Navy Quality Health Promotion Survey, 1995

Item	%
1. Respondent	
1. TQL Coordinator	77.0
2. Administrative Officer	9.8
3. Executive Officer	5.9
4. Other	7.4
2. Extent to which command has implemented TQL	
1. Not at all yet	6.4
2. To a small extent	42.4
3. To some extent	43.8
4. To a large extent	7.4
3. Proportion of all command personnel who have attended at least one introductory TQL lecture	
1. None	.5
2. 1-25%	35.3
3. 26-50%	23.0
4. 51-75%	21.1
5. 76-100%	20.1
4. Proportion of command officers who have completed at DON TQL training course	
1. None	1.5
2. 1-25%	42.9
3. 26-50%	23.6
4. 51-75%	15.8
5. 76-100%	16.3
5. Year(s) TQL has been used in the command to improve health and fitness <sup>a</sup>	
1. Before 1990	0
2. 1990	0
3. 1991	.5
4. 1992	2.9
5. 1993	6.9
6. 1994	23.0
7. 1995	18.6
8. Never been used	66.7

Note. n=204.

<sup>a</sup> Percentages do not total 100 because respondents could mark all that apply.

Table 2. TQL Implementation for Health Promotion Activities, U.S. Navy Quality Health Promotion Survey, 1995

Item	%
1. Types of TQL tools that have been used for improving command health promotion activities <sup>a</sup>	
1. Brainstorming	83.3
2. Process action team	75.8
3. Flow diagram	33.3
4. Cause and effect diagram	27.3
5. Histogram	13.6
6. Control chart	10.6
7. Pareto chart	10.6
8. Run chart	9.1
9. Scatter diagram	3.0
10. Other	16.7
2. Health promotion activities to which TQL tools have been applied <sup>a</sup>	
1. Exercise	78.8
2. Smoking cessation	39.4
3. Substance abuse	25.8
4. Stress reduction	21.2
5. Cholesterol reduction	16.7
6. Hypertension	10.6
7. Other	30.3
3. Level of success of TQL in improving overall command health and fitness	
1. Not at all successful	8.8
2. Somewhat successful	54.4
3. Fairly successful	33.8
4. Very successful	2.9

Note. n ranged from 66 to 68.

<sup>a</sup> Percentages do not total 100 because respondents could mark all that apply.

## Command Telephone Interviews

### Response Rate

Of the 64 commands using TQL for health promotion activities when the command survey was administered, 39 (61% response rate) participated in the follow-up telephone interviews one year later (Table 3). Commands unable to participate most often were out to sea (11%), unavailable to answer NHRC's calls after repeated tries (8%), or no good telephone number was available at which to reach them (8%), which may suggest that these UICs had been decommissioned sometime after participating in the command survey in the Spring of 1995. For the participants of the command survey who had not used TQL for health promotion by early 1995, 90 out of 133 were randomly sampled (68%), and 58 of the 90 completed the telephone interview (64% response rate). The reasons for which the follow-up interviews could not be completed with non-TQL-using commands generally mirrored those of TQL-using commands: the telephone number was no longer correct (10%), or there was no response after repeated tries (6%) or after numerous messages had been left (7%).

### Command Characteristics and General TQL Implementation

Commands participating in the follow-up telephone survey consisted of very small commands (20% with < 150 military personnel), midsized commands (52% between 150 and 300 personnel), and large commands with more than 500 active-duty personnel (28%) (Table 4). Among participating commands, officers averaged 22% in relation to all active-duty personnel assigned to the command. Although the majority of commands that participated in the telephone interviews were shore-based operations (61%), 21% and 19% primarily conducted nonshore operations at sea or in the air, respectively. Nearly 85% of all commands interviewed identified their main mission as either fleet operations (47%) or education and training (36%). The balance of commands participating in the telephone follow-up interviews were involved with research, administration, medicine, or construction, or performed multiple functions such as research and development and operations. The top five health issues reported by the commands participating in the survey, in order of importance, were exercise (51%), operational safety (34%), smoking (33%), stress (32%), and substance abuse (either alcohol or drugs, 22%). Myriad other health issues were deemed important, including cholesterol reduction, suicide, hypertension, and nutrition (Table 4). Given that half of all commands identified exercise as their number one health issue, it was not surprising to see the range of scores related to the overall level of physical fitness of their active-duty personnel. Nearly half were rated 7 or below on a scale of 1 to 10, from poor to excellent, and the balance were rated 8 or better, excluding the 4% that could not provide an overall physical fitness rating.

Similar to the command survey, the individual most often responding to the follow-up telephone interviews was the TQL coordinator (77%) (Table 5). The remaining interviews were conducted with the Executive Officer (8%), the Administrative Officer (3%), and others (12%, usually contract personnel). Few of the individuals contacted had any training or formal education in the health field (13%). Overall, 82% of

Table 3. Response Rates for TQL-Using and Non-TQL-Using for Health Promotion Commands, Command Telephone Interview,<sup>a</sup> 1996

Reason	TQL-Using for Health Promotion		Non-TQL-Using for Health Promotion	
	n	%	n	%
Interview completed	39	60.9	58	64.4
UIC out to sea	7	10.9	4	4.4
No answer after repeated tries	5	7.8	5	5.6
No good telephone number	5	7.8	9	10.0
Disestablished	3	4.7	3	3.3
No response after 6 messages left	3	4.7	6	6.7
Interview refused	0	0.0	2	2.2
Other	2	3.1	3	3.3
Total	64	99.9	90 <sup>b</sup>	99.9

<sup>a</sup> 154 contacts were attempted out of a total of 197 UICs that participated in the command survey.

<sup>b</sup> 43 UICs were not sampled to participate in the follow-up telephone survey.

Table 4. Characteristics of Commands, Command Telephone Interview, 1996

Characteristic	% or mean (SD)
1. Size of command	
<150	19.6
150-300	34.0
301-500	18.6
501+	27.8
2. Proportion of officers	
	22 (.22)
3. Primary base of operation <sup>a</sup>	
Shore	60.8
Sea	20.6
Air	18.6
4. Command's main mission	
Operational	47.4
Education & training	36.1
Medical	5.2
Administration	3.1
Research	3.1
Construction & maintenance	2.1
Other	3.1
5. Most important health issue <sup>b</sup>	
Exercise	50.5
Operational safety	34.0
Smoking	33.0
Stress	32.0
Substance abuse	21.6
Vehicle accidents	14.4
Cholesterol reduction	8.2
Suicide	8.2
Back pain	7.2
Hypertension	6.2
Nutrition	6.2
Pregnancy awareness	3.1
Overweight/obesity	3.1
Other	12.4 <sup>c</sup>
6. Overall level of physical fitness of command	
Rating of 5-6	20.6
Rating of 7	27.8
Rating of 8	27.8
Rating of 9-10	19.6
Unknown	4.1

Note. n=97.

<sup>a</sup> Although multiple bases of operations were reported, the primary field of operation was coded.

<sup>b</sup> Percentages do not total 100 because respondents were not limited to a single most important issue.

<sup>c</sup> Other health issues of importance included dental health, psychological and overall health, hearing loss, recreational injury, and toxins in the workplace.

Table 5. General TQL Implementation - One Year Later, Command Telephone Interview, 1996

<u>Item</u>	<u>% or mean (SD)</u>
1. Respondent	
TQL coordinator	76.3
Administrative Officer	3.1
Executive Officer	8.2
Other	12.4
2. Respondent's background in health	
No background	86.6
Some background	13.4
3. Extent to which command has implemented TQL	
Not at all yet	17.5
To a small extent	29.9
To some extent	33.0
To a large extent	19.6
4. Command processes to which TQL has been applied <sup>a,b</sup>	
Administration	73.7
Mission-related	82.5
Operations (personnel, equipment, physical plant)	68.7
Ancillary	21.2
5. Importance of barriers to TQL implementation <sup>c</sup>	
Inadequate training in TQL	2.5 (.73)
Not enough time	2.4 (.89)
Command not supportive	2.1 (.93)
Insufficient interest among internal customers	1.8 (.83)
Inability to identify motivated individual	1.4 (.72)
Insufficient financial resources	1.4 (.74)
No need to improve health & fitness	1.4 (.50)
Prefer another management style	1.2 (.41)

Note. n=97.

<sup>a</sup> 80 commands had implemented TQL.

<sup>b</sup> Percentages do not total 100 because commands used TQL for various purposes.

<sup>c</sup> 3-point Likert scale of low, moderate, great importance.

commands currently were using TQL principles and practices, 12% fewer than one year ago. However, about half of the commands participating in the 1995 and 1996 surveys were using TQL extensively, either "to some extent" or "to a large extent." This reduction in TQL use was attributed to pervasive downsizing throughout the Navy or to base closures under the 1988 congressionally mandated Base Realignment and Closing (BRAC). Where TQL was used it had been applied extensively to mission-related processes (83%), administrative activities (74%), and various facets of operations (69%). Only 28% of commands participating in the follow-up interviews reported that TQL tools had been applied to health- and fitness-related activities (not shown in Table 5). There was a strong relationship between TQL use for core or mission-related functions and TQL use for health promotion ( $X^2=12.5$ ,  $p=.002$ ). For those commands using TQL to promote health and fitness, nearly 90% reported moderate to extensive use of TQL in carrying out their administrative functions or in conducting essential operations. This compares with 56% of commands using TQL for core functions only. Among non-TQL-using commands, the factors or barriers considered most important in impeding its use were inadequate training in TQL (mean rating of 2.5 on a 3-point Likert scale, from low to great importance), insufficient time (2.4), and lack of support from the highest ranks in the command (2.1).

#### **TQL Implementation for Health and Fitness**

Considering only those commands using TQL for health- and fitness-related objectives ( $n=27$ ), the critical value that the Navy places on exercise is again underscored: fully 4 of 5 of these commands were applying TQL techniques to their exercise programs (Table 6). More than 40% of commands using TQL for health promotion applied these principles to smoking cessation, whereas one third utilized TQL tools to address substance abuse issues. An array of TQL techniques were applied to these and other areas, with the most notable being brainstorming (89%), process action teams (70%), and flow diagrams (59%). Commands utilizing TQL techniques for their health- and fitness-related goals reported that half or more of their active-duty personnel had attended at least one introductory TQL lecture, while that same proportion of officers had completed a DON TQL training course. The decision to introduce TQL in health promotion programming was most influenced by the support of the highest-ranking officers (mean rating of 2.7 on a 3-point Likert scale, from low to great importance). Nearly as important to this objective was the availability of a highly motivated individual to coordinate the effort (2.4), the adequacy of TQL training among command personnel (2.4), and an identifiable health- and fitness-related need requiring improvement throughout the command (2.3).

For those commands not using TQL principles and practices for health promotion, having enough time (2.1) and adequate training (2.0) to incorporate TQL techniques in their fitness training were the greatest deterrents (Table 6). By and large these commands did not foresee the introduction of TQL in their health promotion activities over the next year, particularly in light of the current emphasis on downsizing and restructuring within the Navy.

Table 6. Health Promotion TQL Implementation -- One Year Later, Command Telephone Interview, 1996

Item	% or mean (SD)
1. Implemented TQL for health promotion <sup>a</sup>	
No	72.2
Yes	27.8
2. Health promotion activities for which TQL has been used	
Exercise	81.5
Smoking	44.4
Substance abuse	34.6
Stress	25.9
Hypertension	22.2
Cholesterol reduction	22.2
3. TQL tools used for health promotion	
Brainstorming	88.9
Process action team	70.4
Flow diagram	59.3
Histogram	33.3
Cause & effect diagram	33.3
Control chart	14.8
Run chart	11.1
Pareto chart	11.1
Scatter diagram	3.7
Other <sup>b</sup>	4.1
4. Proportion of all command personnel who have attended at least one introductory lecture	
None	3.8
1-25%	3.8
26-50%	11.5
51-75%	30.8
76-100%	50.0
5. Proportion of command officers who have completed a DON TQL training course	
None	0.0
1-25%	7.7
26-50%	23.1
51-75%	15.4
76-100%	53.8

Note. n=27.

<sup>a</sup> N=97.

<sup>b</sup> Other TQL tools mentioned include affinity diagrams, customer surveys, and logic trees.

Table 6 (Cont.). Health Promotion TQL Implementation -- One Year Later, Command Telephone Interview, 1996

Item	% or mean (SD)
6. Importance of factors contributing to decision to implement TQL for health promotion <sup>c</sup>	
Command was supportive	2.7 (.48) <sup>c</sup>
Adequate training in TQL	2.4 (.69)
Highly motivated individual	2.4 (.75)
Identified need for improving health & fitness	2.3 (.76)
Sufficient time	1.9 (.78)
Was mandated	1.8 (.92)
Widespread interest in TQL among internal customers	1.7 (.66)
Adequate financial resources	1.5 (.64)
7. Importance of factors inhibiting the use of TQL for health promotion <sup>d</sup>	
Not enough time	2.1 (.92)
Inadequate training in TQL	2.0 (.82)
Insufficient interest in TQL among internal customers	1.7 (.76)
No need to improve health & fitness	1.7 (.83)
Insufficient financial resources	1.5 (.76)
Command not supportive	1.4 (.69)
No highly motivated individual	1.3 (.62)
Prefer another management style	1.3 (.70)

Note. n=27.

<sup>c</sup> 3-point Likert scale: low, moderate, great importance.

<sup>d</sup> n=46.

Table 7. Impact of TQL Use in Health Promotion on Command Morale and Health, Command Telephone Interview, 1996

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Outcome	%
1. Improvement in morale	
Not at all yet	11.5
To a small extent	34.6
To some extent	23.1
To a large extent	23.1
Unknown	7.7
2. Adoption of healthier behaviors	
Not at all yet	15.4
To a small extent	34.6
To some extent	23.1
To a large extent	19.2
Unknown	7.7
3. Improved fitness or Physical Readiness Test (PRT) scores	
Not at all yet	11.5
To a small extent	11.5
To some extent	15.4
To a large extent	42.3
Unknown	19.2

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Survey participants were questioned about any noticeable impact of TQL on health behaviors, fitness, and morale. Although respondents expressed difficulty in disentangling the numerous factors that may have precipitated these changes, the consensus was TQL had produced positive results (Table 7). The greatest impact of TQL use in health promotion was believed to be improved fitness or physical readiness test (PRT) scores, with just over 40% of commands reporting change “to a large extent” in this area. Changes of this magnitude in improved morale and adoption of healthier behaviors were more modest, 23% and 19%, respectively.

### **Influence of Organizational Characteristics on TQL Use**

While the first objective of the telephone follow-up interview was to determine what obstacles Navy commands faced in their attempts to incorporate TQL practices in the conduct of their daily business, the second objective was to examine the role of organizational characteristics in facilitating or inhibiting the use of TQL principles and practices. We specifically questioned whether small, nonshore commands that support the fleet could avail themselves of the opportunities afforded by TQL. Without sizable staffing and a stable base of operations, we anticipated that commands would have difficulty utilizing the principles of TQL.

Contrary to expectations, small and large commands alike, shore- and non-shore operations, and commands with varying missions utilized TQL for many of their administrative and operational procedures and for their health and fitness activities. Among the small percentage of commands not utilizing TQL in any capacity, the lack of support from the highest ranks in the command was more important in inhibiting the application of TQL among commands with a low proportion of officers than among those that had a heavy concentration of officers ( $t_{10}=-2.67$ ,  $p=.02$ ). For those commands not using TQL in their health and fitness activities, nonshore commands believed that inadequate knowledge and training ( $X^2_1=4.2$ ,  $p=.04$ ) and sufficient time ( $X^2_1=6.8$ ,  $p=.01$ ) more seriously impacted their ability to incorporate TQL in health promotion than did shore-based commands.

### **Navywide Individual Survey**

A total of completed 3,872 surveys were returned for an overall participation rate of 77%. More than half of the respondents (57%) reported that TQL principles had been applied, ranging from a small to a large extent, toward health and fitness goals at their command, although 43% reported that TQL principles had not been applied at all (Table 8). Approximately 30% of the participants were aware of quality improvement feedback processes to improve health and fitness at their command. About 26% of participants reported that they were aware of Process Action Teams (PAT) and brainstorming activities at their command to improve health and fitness. Nearly 30% of respondents had participated in an introductory TQL lecture, 23% in a TQL training course, 13% in a brainstorming session, 8% in a quality management board, and 8% in a PAT to improve command health and fitness.

Table 8. TQL Perceptions, Navy Follow-up for Fitness Survey, 1994-1995

Item	%
1. Awareness of TQL activities for improving health and fitness at command <sup>a</sup>	
1. Quality improvement feedback	29.7
2. PAT	26.5
3. Brainstorming	25.9
4. Other <sup>b</sup>	11.1
2. Participation in TQL activities to improve health and fitness at command <sup>a</sup>	
1. Introductory TQL lecture	27.8
2. TQL training course	23.3
3. Brainstorming session	12.5
4. Quality management board	8.2
5. PAT	8.5
6. Other <sup>c</sup>	5.7
3. Extent to which TQL principles have been applied toward health and fitness goals at command	
1. Not at all	42.7
2. To a small extent	25.8
3. To some extent	25.7
4. To a large extent	5.8

*Note.* n ranged from 3676 to 3757, except where otherwise noted.

<sup>a</sup> Percentages do not total 100 because respondents could mark all that apply.

<sup>b</sup> n=1332.

<sup>c</sup> n=1339.

### **Attitudes, Health Behaviors, and TQL**

Independent t-tests were performed to assess differences in attitudes and health behaviors between individuals who reported TQL had been used to any extent for health and fitness goals at their command and individuals who reported TQL had not been used at all for this purpose at their command. Because chi-square tests determined that there were slightly more men (90%) in the TQL-reporting group than in the non-TQL-reporting group (87%), (but no significant differences in age, education, or in the percentage of enlisted personnel and officers), the main analyses were conducted by gender as well as on the overall sample. It was anticipated that the implementation of a mandatory exercise program for all personnel would be related to command implementation of TQL; therefore, analyses were also conducted separately for participants who had reported their command had implemented a mandatory exercise program and for those who did not.

Overall, many significant differences between TQL- and non-TQL-reporting participants, with the TQL-reporting participants having more positive perceptions of their command's support for health and fitness (e.g., top levels of command support physical fitness and set good examples), more positive attitudes (e.g., importance of regular exercise and ideal weight), and health behaviors (e.g., regular doctor checkups, frequency of exercise) (Table 9). Most of these differences were also observed among men and participants who reported that their command had a mandatory exercise program (Appendices C and D). Although not many differences in health behaviors occurred between TQL- and non-TQL-reporting women and participants who reported that their command did not have a mandatory exercise program, significant differences were present in their perceptions of command support for health and fitness issues (Appendices E and F). Participants in all of the TQL-reporting subgroups consistently had more positive perceptions of their command's support for health and fitness than did non-TQL-reporting participants.

### **AMDRS**

The 6,439 individuals in the 1993 data set were predominately male (94%), white (95%), and had a mean age of 30.8 years (SD=7.77). Six percent of the aviators were assigned to commands that had used TQL for health promotion programs in 1992 or 1993, which represented 16 of the 204 commands in the study.

The analysis to predict cholesterol level indicated that age (being older) and race (being nonwhite) significantly predicted higher cholesterol, accounting for 13% of the variance (Appendix G). The use of TQL health promotion programs was not associated with cholesterol level. A similar analysis to predict blood pressure indicated that sex, race, and age were significant predictors of blood pressure. Being male, nonwhite, and older was associated with having higher blood pressure, although these 3 factors accounted for only 3% of the variance in blood pressure and no TQL health promotion programs significantly predicted blood pressure. Sex (being

Table 9. Independent T-Tests on Attitudes and Health Behaviors by TQL Use for Overall Group, Navy Follow-up for Fitness Survey, 1994-1995

Item	TQL			No TQL			t	p
	Mean	SD	n	Mean	SD	n		
<u>Command support regarding fitness</u>								
Command attitudes toward fitness/weight <sup>a</sup>	5.91	1.10	2100	5.18	1.41	1558	-17.09	<.001
Command set good physical fitness examples <sup>b</sup>	5.55	1.30	2099	4.82	1.63	1558	-14.59	<.001
Standards applied equally across ranks <sup>c</sup>	4.38	2.00	2104	3.48	2.10	1557	-13.13	<.001
Enough space and equipment to exercise <sup>d</sup>	5.40	1.77	2095	4.79	2.05	1562	-9.54	<.001
Command mess provide low-calorie foods <sup>d</sup>	4.48	1.75	1921	3.80	1.89	1389	-10.50	<.001
Sufficient time and opportunity to exercise <sup>d</sup>	4.79	1.77	2104	3.94	1.98	1563	-13.48	<.001
<u>Importance of health behaviors<sup>e</sup></u>								
Regular exercise	3.68	1.07	2103	3.54	1.15	1564	-3.78	<.001
Ideal weight	3.76	1.02	2103	3.61	1.12	1564	-3.95	<.001
Physically fit	4.00	.86	2092	3.89	.97	1559	-3.64	<.001
Good health	4.43	.72	2092	4.40	.78	1561	-1.29	.199
Stop smoking/remain a nonsmoker	3.90	1.46	2046	3.94	1.45	1531	.69	.490
<u>Attitudes toward health behaviors</u>								
Desired physical fitness level <sup>f</sup>	3.89	.87	2104	3.92	.86	1564	1.22	.222
Expected physical fitness level <sup>f</sup>	3.56	.89	2099	3.48	.91	1552	-2.71	.007
Effort to increase fitness <sup>g</sup>	3.64	.90	2105	3.59	.83	1563	-1.84	.066
Likely to reach/maintain ideal weight <sup>h</sup>	3.81	.90	2105	3.64	1.00	1562	-5.32	<.001
Likely to stop smoking/remain a nonsmoker <sup>h</sup>	4.02	1.37	2041	4.02	1.40	1524	-.02	.985
Likely to exercise regularly <sup>h</sup>	4.03	.90	2088	3.87	1.00	1554	-4.83	<.001
Certainty reach/maintain ideal weight <sup>i</sup>	3.98	.81	2102	3.84	.88	1563	-4.72	<.001
Certainty stop smoking/remain a nonsmoker <sup>i</sup>	4.14	1.24	2052	4.17	1.24	1529	.55	.584
Certainty exercise regularly <sup>i</sup>	4.11	.79	2081	3.99	.88	1555	-4.15	<.001
Work to improve physical condition <sup>j</sup>	3.59	.94	2101	3.50	.99	1561	-2.86	.004

Response options were as follows:

<sup>a</sup> 1=extremely anti-fitness, 2=moderately anti-fitness, 3=slightly anti-fitness, 4=neither pro- nor anti-fitness, 5=slightly pro-fitness, 6=moderately pro-fitness, 7=extremely pro-fitness.

<sup>b</sup> 1=extremely poor example, 2=quite poor example, 3=somewhat poor example, 4=neither a good nor poor example, 5=somewhat good example, 6=quite good example, 7=extremely good example.

<sup>c</sup> 1=absolutely not, 2=generally not, 3=often not, 4=mixed about 50/50, 5=sometimes are, 6=generally are, 7=always are.

<sup>d</sup> 1=absolutely never enough, 2=generally never enough, 3=often never enough, 4=mixed about 50/50, 5=often enough, 6=generally enough, 7=always enough.

<sup>e</sup> 1=not at all important, 2=somewhat important, 3=moderately important, 4=very important, 5=extremely important.

<sup>f</sup> 1=decline slightly, 2=stay the same, 3=improve slightly, 4=improve moderately, 5=improve a great deal.

<sup>g</sup> 1=none, 2=a little effort, 3=moderate effort, 4=quite a lot, 5=extreme effort.

<sup>h</sup> 1=no chance at all, 2=slight chance, 3=somewhat likely, 4=quite likely, 5=extremely likely.

<sup>i</sup> 1=absolutely certain I will not, 2=pretty certain I will not, 3=maybe I will and maybe I won't, 4=pretty certain I will, 5=absolutely positive I will.

<sup>j</sup> 1=not at all, 2=somewhat hard, 3=moderately hard, 4=quite hard, 5=extremely hard.

Table 9 (Cont.). Independent T-Tests on Attitudes and Health Behaviors by TQL Use for Overall Group, Navy Follow-Up for Fitness Survey, 1994-1995

Item	TQL			No TQL			t	p
	Mean	SD	n	Mean	SD	n		
<u>General health behaviors<sup>k</sup></u>								
How good is usual diet <sup>l</sup>	2.55	.78	2088	2.61	.83	1550	2.39	.017
Eat a balanced diet	3.23	.88	2091	3.18	.95	1554	-1.56	.120
Get enough sleep	3.38	.99	2094	3.31	1.02	1554	-2.29	.022
See a doctor for regular checkups	3.03	1.28	2088	2.89	1.32	1553	-3.20	.001
Watch weight	3.45	1.12	2093	3.34	1.16	1555	-3.08	.002
Chose relaxing activities	3.46	1.03	2084	3.34	1.13	1551	-3.24	.001
Smoke/use smokeless tobacco	2.22	1.67	2084	2.29	1.72	1553	1.12	.261
Limit intake of bad foods	3.04	1.10	2084	2.96	1.14	1545	-2.07	.039
Take vitamins	2.56	1.52	2088	2.53	1.56	1554	-.59	.557
Exercise to stay healthy	3.56	1.14	2093	3.35	1.26	1554	-5.24	<.001
Drink alcohol	2.46	1.22	2094	2.51	1.27	1558	1.42	.156
<u>Frequency of common exercises<sup>m</sup></u>								
Running	1.92	1.52	1953	1.72	1.56	1462	-3.79	<.001
Walking	1.97	2.03	1767	1.56	1.91	1355	-5.83	<.001
Calisthenics	1.46	1.69	1723	1.13	1.60	1335	-5.38	<.001

Response options were as follows:

<sup>k</sup> For all items except the first: 1=not at all like me, 2=mostly not like me, 3=sometimes like me, other times not like me, 4=mostly like me, 5=very much like me.

<sup>l</sup> 1=very healthy, 2=pretty good, 3=okay, 4=not very good, 5=very unhealthy.

<sup>m</sup> 0=never, 1= 1 to 4 times per month, 2=2 times per week, 3=3 times per week, 4=4 times per week, 5=5 times per week, 6=6 times per week, 7=7 times per week or more.

female) and age (being older) significantly predicted a higher percentage of body fat. In addition, the use of a TQL cholesterol reduction program predicted lower body fat. These 3 factors accounted for a total of 24% of the variance in body fat, although the TQL cholesterol reduction program by itself accounted for less than 1% of the variance.

## DISCUSSION

The Navywide Individual Survey indicated individuals at commands that used TQL for health promotion programs consistently reported more positive perceptions of their command's support for health and fitness issues than did individuals at commands that did not use TQL for such purposes. This lends support for the hypothesis that a command's use of TQL may be successful in reducing perceived barriers to health behavior change (such as inadequate time and space for exercise), and it may help facilitate healthy behaviors and positive attitudes toward health behavior change. These effects appeared particularly strong with regard to exercise and weight control. Consistent with social cognition models of health, the Health Belief Model,<sup>23</sup> and self-efficacy,<sup>24</sup> it may be suggested that TQL operates through improving extrinsic factors that produce behavior change and intrinsic factors by making people understand what they are able to change.

On the other hand, the AMDRS data indicated the use of TQL health promotion programs was not found to be associated with 3 health outcomes among aviators. This may be due to the fact that behavior change and the effects of behavior change may require more time to occur than the time frame available in this study. Also, the relatively small number of commands responding positively to using TQL for health promotion on the command survey and the limitation of the AMDRS data set to Navy aviators tended to restrict the variability in health behaviors and the power to detect differences between TQL and non-TQL commands. The follow-up telephone interviews and Navywide individual survey offset these limitations by allowing a more personalized investigation of command activities and attitudes toward TQL and an examination of a wide range of health behaviors and attitudes in a large, representative cohort of naval personnel. Furthermore, both additional data sources had good response rates.

Much evidence suggests the Navy has been successful in its effort to introduce and employ TQL concepts and tools in many of its administrative, operational, mission-related, and health promotion processes and functions. However, extensive use of TQL to meet the Navy's health and fitness goals has not been realized. This study determined that fewer than 30% of commands used TQL in shaping and evaluating their health and fitness programs. This is not to say that the majority of commands did not have access to health promotion programs that may have benefited from TQL. To the contrary, many commands included in these data had access to health and fitness programs offered through Navy hospitals and branch clinics. Navy hospitals, in particular, tended to substantiate an impressive array of accomplishments resulting from creative applications of TQL. At commands with missions other than medical services, however, results suggest that utilization of TQL in health

and fitness activities may be conditional upon full-scale deployment of TQL throughout basic command operations. That is, once TQL is fully utilized for the core activities of the command, potential for expansion of TQL exists in auxiliary areas such as health promotion.

This study found that successful implementation of TQL rests upon support for it from the highest ranks of the command, a well-trained work force in TQL principles and techniques, and having adequate time during the day for TQL activities. In regard to training, this research indicated that diagramming (cause and effect and scatter) and charting (run, control, pareto) are utilized much less frequently than brainstorming and PATs, which may suggest that additional training is particularly needed in these lesser-used TQL techniques. The necessity of having adequate time during the day for TQL was elaborated upon by respondents to include time to promote TQL among internal customers, to educate the work force on its use, and to put TQL into everyday practice. Due to the perceived limitations of time and adequate training in TQL among Navy commands with nonshore operations, it may be prudent to ensure a majority of the work force is trained in TQL and time is set aside during the workday for TQL activities.

In addition to the Navy's success in incorporating TQL tools and techniques in everyday practice, this study showed that the use of TQL as applied to health promotion resulted in gains to command morale, improved fitness or PRT scores, and healthier behaviors and attitudes in general.

A comparison of results from the command survey and the one-year follow-up telephone survey may connote a change in the extent to which TQL is being utilized. Between 1995 and 1996 there was a significant decline in TQL use ( $n=87$ , McNemar test,  $p=.04$ ). Respondents' perceptions mirrored this downward trend, citing the massive downsizing of the Navy as the single most detrimental factor to the TQL movement. Remarkably, downsizing produced some unanticipated opportunities. Several commands reported they anticipated fully employing TQL as a management strategy to close down BRAC-mandated operations.

In the context of the open-ended questioning it was learned that organizational climate and structure, situational factors, and advocates played a major role in determining the extent of TQL implementation. Overshadowing the business of the Navy are BRAC and the current emphasis on downsizing and restructuring. With more limited staff but the same objectives to accomplish, respondents indicated they have had to tailor their TQL-related activities to what was within the realm of possibility; unfortunately, this sometimes meant dropping them altogether. In addition to the constraints imposed by base closings and downsizing, some respondents believed a sharp rift existed between DON policy on TQL use and TQL practice. More specifically, several respondents commented that the TQL directive was given without adequate implementation guidance and without the financial backing an initiative of this magnitude required. In their opinion, the directive was designed as a "quick fix", and, therefore, had no potential for long-term improvement. This short-term orientation contrasts sharply with the Deming philosophy of continuous, quality improvement<sup>25</sup> and it is the basis for which many command personnel view TQL in a negative light. To counteract this negative impression, several respondents

referred to the “quiet revolution” in TQL, namely, applying the principles and techniques of TQL to command processes without providing the TQL label.

Staffing, though not addressed directly by the questionnaire, emerged as an important factor in the success of TQL. It appeared that a single individual undertaking TQL as a collateral duty could affect only a bare minimum of changes, which typically consisted of improvements to the flow of paperwork and check-in procedures. Another factor of relevance to the success of TQL is the notion of a “critical mass” well-trained in TQL strategy. This becomes even more important given the mobility of the work force. Several interesting scenarios were presented in which commands extended their staffing through reorganization and cooperation. In the first situation, a Navy hospital expanded staffing in support of TQL by combining the offices of Quality Assurance, Total Quality Leadership, and Information Technologies. This restructuring brought together experts from a variety of technical areas, which allowed for the expansion of TQL tools and techniques to address a wider range of command processes and functions. The second situation involved a tenant command. Here, a single representative from each of the tenant commands joined one of several committees to enhance base operations and quality of life. In this case TQL was the management strategy undergirding all committee activities. Health fairs co-sponsored by Navy commands and community organizations were effective in educating military personnel on health-risk behaviors and prevention.

As in all Navy activities, advocates played a unique role in promoting fitness and wellness. One particularly commendable effort included an officer who organized an annual Quality of Life retreat in Hawaii. The theme of this annual event changed from year to year and addressed every aspect of Navy life. Many participated in the event from diverse commands throughout the chain of Hawaiian islands.

### Recommendations

In the short-term, it may not be possible to buttress or even to sustain the level of TQL activity currently being undertaken by Navy commands worldwide. However, once the majority of downsizing and restructuring is accomplished, attention should again be redirected to the practice of TQL.

The current study identified many important ingredients and organizational arrangements that fostered the development and successful practice of TQL. These characteristics and strategies are highlighted as follows and conclude by recommending their packaging and widespread dissemination through special forums and Internet technologies.

- Strive to educate 100% of all active-duty and civilian personnel in the principles of TQL.
- Broaden the TQL curriculum by including training on the lesser-used diagramming and charting techniques and by providing specific illustrations of their use in military operations.
- Extend TQL training beyond the classroom. For example, invite the trainer to the worksite to identify processes that require re-engineering and to brainstorm possible solutions with worksite employees.
- Marshal support for TQL activities from senior-ranking officers.

- Dedicate at least one full-time position to TQL leadership and coordination.
- Engage departments within a command to devote a percentage of a staffer's time to TQL activities, including especially representatives from automatic data processing, accounting, training, and research.
- Mandate time for TQL. Monthly or bimonthly activities might include sharing success stories, providing in-depth training on a particular TQL technique, or presenting examples from industry that parallel Navy processes.
- Consider combining departments with the functions of quality assurance, TQL, and information technologies.
- The Quality Circle could provide essential basic ingredients toward prevention in the Navy workplace.<sup>26</sup>
- A health promotion tracking system<sup>27,28</sup> could help ensure continuous improvement of the Navy's health promotion and preventive efforts.
- Foster interorganizational cooperation on TQL activities in support of health and fitness from other military units, including especially hospitals and branch clinics, and from health and human service agencies in the community.

This study provided many examples of special forums in which to promote TQL. Conferences, retreats, and workshops had high billing for their effectiveness. Not limited by the traditional bounds of geography, Internet technology holds exceptional promise for communicating TQL strategy, ideas, and personal success stories. For example, Navy news services already distribute TQL success stories via the Internet. Individual commands can begin showcasing their personal successes with TQL on their home pages. These can be simply narrative pieces or they can be developed as vignettes using video technology. Commands split across separate locales or regionally disparate commands that wish to collaborate on a common problem using the principles of TQL can do so over the Internet. As Internet technology advances, the military's use of it will be constrained only by the limitations of human imagination.

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Appendix A. U.S. Navy Quality Health Promotion Survey

Naval Health Research Center  
 P.O. Box 85122  
 San Diego, CA 92186-5122

Dear Commanding Officer,

20 Mar 95

The Naval Health Research Center has been tasked by the Bureau of Medicine and Surgery to conduct a study on the influence of Total Quality Leadership (TQL) on health promotion in the U.S. Navy. We would appreciate your assistance in directing this short survey to your TQL Coordinator or Administrative Officer to complete and return by **7 Apr 95**. All responses will be held completely confidential and used for research purposes only. Please contact me at DSN 553-8460 if you have any questions.

Sincerely,

  
 Dr. Laure L. Hourani  
 Project Director

**U. S. NAVY QUALITY HEALTH PROMOTION SURVEY (OPNAV 6200-6 4/30/95)**

**PRIVACY ACT STATEMENT** 1. Authority. 5 USC 301 2. Purpose. Medical Information will be solicited to enhance basic medical knowledge and aspects of clinical preventive services. 3. Routine Uses. Medical research information will be used for analysis and reports by the Departments of the Navy and Defense, and other U.S. Government agencies. Use of the information may be granted to non-Government agencies or individuals by the Navy Surgeon General following the provisions of the Freedom of Information Act. 4. Voluntary Disclosure. I understand that my participation is voluntary and that all information derived from the study will be retained at the Naval Health Research Center, San Diego, and that my anonymity will be maintained.

1. The person completing this survey is: (circle one)
 

1. TQL coordinator	2. Executive Officer	3. Administrative Officer	4. Other (specify) _____
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2. This command has implemented TQL principles and practices. . . (circle one)
 

1. not at all yet	2. to a small extent	3. to some extent	4. to a large extent
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3. What proportion of all personnel (i.e., enlisted members and officers) in this command have attended at least one introductory TQL lecture or briefing: (circle one)
 

1. None	2. 1 - 25%	3. 26 - 50%	4. 51 - 75%	5. 76 - 100%
---------	------------	-------------	-------------	--------------
4. What proportion of the officers in this command have completed a DON TQL training course? (circle one)
 

1. None	2. 1 - 24%	3. 25 - 50%	4. 51 - 75%	5. 76 - 100%
---------	------------	-------------	-------------	--------------
5. Has TQL been used in this command for improving health and fitness related processes and outcomes? (circle all that apply)
 

1. Yes, before 1990	2. Yes, in 1990	3. Yes, in 1991	4. Yes, in 1992
5. Yes, in 1993	6. Yes, in 1994	7. Yes, in 1995	8. No, never

6. If "yes" to Question 5 above, what type of TQL tools have been used for which health promotion activities at this command? (circle all that apply)

TQL Tool	Reduce Cholest	Exer- cise	Hyper- tension	Smoking	Stress	Sub Abuse	Other
a. Process Action Team	1	2	3	4	5	6	7
b. Flow Diagram	1	2	3	4	5	6	7
c. Brainstorming	1	2	3	4	5	6	7
d. Cause & Effect Diagram	1	2	3	4	5	6	7
e. Run Chart	1	2	3	4	5	6	7
f. Control Chart	1	2	3	4	5	6	7
g. Pareto Chart	1	2	3	4	5	6	7
h. Scatter Diagram	1	2	3	4	5	6	7
i. Histogram	1	2	3	4	5	6	7
j. Other (specify) _____	1	2	3	4	5	6	7

7. If "yes" to Question 5 above, how successful do you think TQL has been in improving the overall health and fitness of the command? (circle one)
 

1. Not at all successful	2. Somewhat successful	3. Fairly successful	4. Very successful
--------------------------	------------------------	----------------------	--------------------

For additional comments, please use reverse side of this page. Thank you! UIC: \_\_\_\_\_

Please fold in thirds and tape (do not staple) and return to address printed on reverse.

Appendix B  
**U.S. Navy Quality Health Promotion Survey**  
**Follow-up Telephone Interview with TQL Coordinators**

UIC: \_\_\_\_\_ 1-5

Int initials: \_\_ 6-7

Last April the Naval Health Research Center mailed you a questionnaire which addressed the application of Total Quality Leadership (or TQL) practices and principles to your health promotion activities. Our call today is to follow-up on your TQL activities since most of you told us that you were just getting started. Would that be OK with you?

1. Are you a:
 

1 TQL coordinator	2 Executive Officer	3 Administrative Officer		
4 Other (specify _____)			)	8
  
2. Do you have any education or experience in the health field?
 

	{0 = No; 1=Yes}	9
--	-----------------	---
  
3. To what extent has your command implemented Total Quality Leadership?  
 (*read response options*)
 

1 Not at all yet		
2 To a small extent ( <b>Go to Q. 5</b> )		
3 To some extent ( <b>Go to Q. 5</b> )		
4 To a large extent ( <b>Go to Q. 5</b> )		10
  
4. In your opinion, on a scale from low, moderate, to great importance, how important are the following factors in inhibiting the introduction of TQL at your command?
 

	1 Low importance   2 Moderate importance   3 Great importance	
a. Prefer another quality management style to TQL		11
b. Inadequate knowledge and training in TQL		12
c. Inability to identify a highly motivated individual		13
d. The highest ranks in the command were not supportive		14
e. Insufficient financial resources		15
f. Not enough time		16
g. Insufficient interest in TQL among internal customers		17
h. No need at command for improving health and fitness		18
i. Any other impediment(s) to implementation of TQL principles [ <i>please specify and rate</i> ]		19

**(Go to Q. 16)**

5. To what type of processes has TQL been applied to try to improve at your command?

*[please specify and interviewer classify]*

{0 = No; 1=Yes}

- |   |    |
|---|----|
| a. Administrative processes                               | 21 |
| b. Mission-related activities                             | 22 |
| c. Resources (personnel, equipment, physical plant, etc.) | 23 |
| d. Ancillary activities                                   | 24 |

6. Last year we were told that TQL (*had/had not*) been used in your command for improving health- and fitness-related processes and outcomes. Is this correct?

- |   |    |
|---|----|
| 1 TQL <u>had not</u> been applied to health activities as of a year ago         |    |
| 2 TQL <u>had</u> been applied to health activities ( <b>Go to Question 10</b> ) | 25 |

7. Since then has TQL been used for or applied to health promotion activities? *[If yes]* Would you say that TQL has been implemented to a small extent, to some extent, or to a large extent?

- |   |    |
|---|----|
| 0 No, not at all yet                                  |    |
| 1 Yes, to a small extent ( <b>Go to Question 10</b> ) |    |
| 2 Yes, to some extent ( <b>Go to Question 10</b> )    |    |
| 3 Yes, to a large extent ( <b>Go to Question 10</b> ) | 26 |

8. In your opinion, on a scale from low, moderate, to great importance, how important are the following factors in inhibiting the introduction of TQL principles and practices for health promotion activities at your command?

1 Low importance    2 Moderate importance    3 Great importance

- |   |    |
|---|----|
| a. Prefer another quality management style to TQL       | 27 |
| b. Inadequate knowledge and training in TQL             | 28 |
| c. Inability to identify a highly motivated individual  | 29 |
| d. The highest ranks in the command were not supportive | 30 |

1 Low importance 2 Moderate importance 3 Great importance

- e. Insufficient financial resources 31
- f. Not enough time 32
- g. Insufficient interest in TQL among internal customers 33
- h. No need at command for improving health and fitness 34
- i. Any other impediment(s) to implementation of TQL principles  
[please specify and rate] 35

35

36

37

9. Do you have plans to incorporate TQL in your health promotion activities?  
{0 = No; 1=Yes} 38

**(Go to Q. 16)**

10. In your estimation, on a scale from low, moderate, to great importance, how important were the following factors to the decision to implement TQL principles and practices in your health promotion activities?

1 Low importance 2 Moderate importance 3 Great importance

- a. Adequate knowledge and training in TQL 39
- b. A highly motivated individual 40
- c. The highest ranks in the command were supportive 41
- d. Adequate financial resources 42
- e. Sufficient time 43
- f. Widespread interest in TQL among internal customers 44
- g. Identified need for improving health and fitness 45
- h. Was mandated 46
- i. Any other factors which were important to the  
decision to implement TQL principles? [please specify and rate] 47

47

48

49

11. What proportion of all personnel (i.e., enlisted members and officers) in this command have attended at least one introductory TQL lecture or briefing?

- 1 None
- 2 1 % - 25%
- 3 26% - 50%
- 4 51% - 75%
- 5 76% - 100% 50

12. What proportion of the officers in this command have completed a DON TQL training course?

- 1 None
- 2 1 % - 24%
- 3 25% - 50%
- 4 51% - 75%
- 5 76% - 100% 51

13. For which health promotion activities have you used TQL tools or have you used TQL for any health activities other than what you mentioned before.....such as [*read list*]?

- {0 = No; 1=Yes}
- a. Reduce cholesterol? 52
  - b. Exercise? 53
  - c. Hypertension? 54
  - d. Smoking? 55
  - e. Stress? 56
  - f. Substance abuse? 57
  - g. Other (please specify )

14. Which TQL tools were used for these activities? For example..... [*read list*].

- {0 = No; 1=Yes}
- a. Process action team? 58
  - b. Flow diagram? 59
  - c. Brainstorming? 60
  - d. Cause & effect diagram? 61
  - e. Run chart? 62
  - f. Control chart? 63
  - g. Pareto chart? 64
  - h. Scatter diagram? 65
  - i. Histogram? 66
  - j. Other (please specify ) 67

15. After applying TQL principles and practices to your health promotion activities, to what extent do you believe you have witnessed the following changes? Your response choices are:

Not at all yet (0), To a small extent (1), To some extent (2), To a large extent (3).

- |                                     |    |
|-------------------------------------|----|
| a. Improvement in morale?           | 68 |
| b. Adoption of healthier behaviors? | 69 |
| c. Improved fitness or PRT scores?  | 70 |

I'd next like to ask you a few questions pertaining to the characteristics of your command.

16. How many officers and enlisted personnel are assigned to your command?

Number of officers?	71-73
Number of enlisted?	74-77

*(If respondent cannot answer, use categories and record a total below)*

- |             |                      |    |
|-------------|----------------------|----|
| 1 <25       |                      |    |
| 2 26 - 50   |                      |    |
| 3 51 - 100  |                      |    |
| 4 101 - 500 |                      |    |
| 5 500+      | <i>Approximately</i> | 78 |

17. Are you a shore, sea, sub, or air unit?

- |         |      |
|---------|------|
| 1 Shore |      |
| 2 Sea   |      |
| 3 Sub   |      |
| 4 Air   | _ 79 |

18. What would you consider to be your command's main mission?

- |                                |    |
|--------------------------------|----|
| 1 Administration               |    |
| 2 Research                     |    |
| 3 Education and training       |    |
| 4 Recruiting                   |    |
| 5 Medical                      |    |
| 6 Construction and maintenance |    |
| 7 Operational                  |    |
| 8 Other (specify )             | 80 |
- End card*

19. What do you consider to be the most important health issue in your command?

[code all that are mentioned]

{0 = No; 1=Yes; 8=Don't know)

1 Reduce cholesterol	<i>New card</i>	1
2 Exercise		2
3 Hypertension		3
4 Smoking		4
5 Stress		5
6 Substance abuse		6
7 Back pain		7
8 Vehicle accidents		8
9 Suicide		9
10 Operational Safety		10
11 Other (specify )		11

20. On a scale of 1 to 10, from poor to excellent, how would you rate the level of physical fitness in your command?

12-13

***End Here - Thank respondent for Time!!!***

Additional Comments

Appendix C

Independent T-Tests on Attitudes and Health Behaviors by TQL Use for Men, Navy Follow-Up for Fitness Survey, 1994-1995

Item	TQL			No TQL			t	p
	Mean	SD	n	Mean	SD	n		
<u>Command support regarding fitness</u>								
Command attitudes toward fitness/weight <sup>a</sup>	5.90	1.10	1859	5.19	1.39	1338	-15.58	<.001
Command set good physical fitness examples <sup>b</sup>	5.55	1.30	1856	4.85	1.60	1337	-13.19	<.001
Standards applied equally across ranks <sup>c</sup>	4.38	2.00	1861	3.50	2.11	1337	-11.79	<.001
Enough space and equipment to exercise <sup>d</sup>	5.41	1.77	1858	4.86	2.03	1339	-7.96	<.001
Command mess provide low-calorie foods <sup>d</sup>	4.52	1.73	1706	3.88	1.87	1201	-9.32	<.001
Sufficient time and opportunity to exercise <sup>d</sup>	4.80	1.77	1861	4.01	1.98	1341	-11.66	<.001
<u>Importance of health behaviors<sup>e</sup></u>								
Regular exercise	3.68	1.07	1861	3.54	1.16	1341	-3.55	<.001
Ideal weight	3.72	1.02	1860	3.57	1.13	1341	-3.93	<.001
Physically fit	3.99	.87	1849	3.88	.97	1338	-3.27	.001
<u>Attitudes toward health behaviors</u>								
Expected physical fitness level <sup>f</sup>	3.54	.89	1858	3.46	.90	1331	-2.45	.015
Likely to reach/maintain ideal weight <sup>g</sup>	3.79	.90	1862	3.63	1.00	1341	-4.58	<.001
Likely to exercise regularly <sup>g</sup>	4.01	.91	1847	3.87	1.00	1333	-4.27	<.001
Certainty reach/maintain ideal weight <sup>h</sup>	3.96	.81	1860	3.84	.88	1343	-4.07	<.001
Certainty exercise regularly <sup>h</sup>	4.10	.79	1842	3.99	.88	1333	-3.64	<.001
Work to improve physical condition <sup>i</sup>	3.59	.94	1859	3.49	.99	1339	-2.63	.009

Note. Only significant results are presented.

Response options were as follows:

<sup>a</sup> 1=extremely anti-fitness, 2=moderately anti-fitness, 3=slightly anti-fitness, 4=neither pro- nor anti-fitness, 5=slightly pro-fitness, 6=moderately pro-fitness, 7=extremely pro-fitness.

<sup>b</sup> 1=extremely poor example, 2=quite poor example, 3=somewhat poor example, 4=neither a good nor poor example, 5=somewhat good example, 6=quite good example, 7=extremely good example.

<sup>c</sup> 1=absolutely not, 2=generally not, 3=often not, 4=mixed about 50/50, 5=sometimes are, 6=generally are, 7=always are.

<sup>d</sup> 1=absolutely never enough, 2=generally never enough, 3=often never enough, 4=mixed about 50/50, 5=often enough, 6=generally enough, 7=always enough.

<sup>e</sup> 1=not at all important, 2=somewhat important, 3=moderately important, 4=very important, 5=extremely important.

<sup>f</sup> 1=decline slightly, 2=stay the same, 3=improve slightly, 4=improve moderately, 5=improve a great deal.

<sup>g</sup> 1=no chance at all, 2=slight chance, 3=somewhat likely, 4=quite likely, 5=extremely likely.

<sup>h</sup> 1=absolutely certain I will not, 2=pretty certain I will not, 3=maybe I will and maybe I won't, 4=pretty certain I will, 5=absolutely positive I will.

<sup>i</sup> 1=not at all, 2=somewhat hard, 3=moderately hard, 4=quite hard, 5=extremely hard.

Appendix C (Cont.)

Independent T-Tests on Attitudes and Health Behaviors by TQL Use for Men, Navy Follow-Up for Fitness Survey, 1994-1995

Item	TQL			No TQL			t	p
	Mean	SD	n	Mean	SD	n		
<u>General health behaviors<sup>j</sup></u>								
How good is usual diet <sup>k</sup>	2.55	.78	1849	2.63	.84	1328	2.63	.009
Get enough sleep	3.37	.98	1853	3.30	1.01	1335	-1.97	.049
See a doctor for regular checkups	2.97	1.28	1849	2.84	1.32	1333	-2.79	.005
Watch weight	3.42	1.12	1852	3.33	1.16	1332	-2.40	.016
Choose relaxing activities	3.46	1.04	1845	3.34	1.12	1329	-3.28	.001
Limit intake of bad foods	3.01	1.10	1843	2.92	1.14	1324	-2.26	.024
Exercise to stay healthy	3.56	1.14	1852	3.33	1.27	1334	-5.04	<.001
<u>Frequency of common exercises<sup>l</sup></u>								
Running	1.93	1.50	1733	1.75	1.56	1258	-3.11	.002
Walking	1.96	2.04	1562	1.49	1.90	1156	-6.22	<.001
Calisthenics	1.49	1.70	1528	1.16	1.59	1150	-5.13	<.001

*Note.* Only significant results are presented.

Response options were as follows:

<sup>j</sup> For all items except the first: 1=not at all like me, 2=mostly not like me, 3=sometimes like me, other times not like me, 4=mostly like me, 5=very much like me.

<sup>k</sup> 1=very healthy, 2=pretty good, 3=okay, 4=not very good, 5=very unhealthy.

<sup>l</sup> 0=never, 1= 1 to 4 times per month, 2=2 times per week, 3=3 times per week, 4=4 times per week, 5=5 times per week, 6=6 times per week, 7=7 times per week or more.

Appendix D

Independent T-Tests on Attitudes and Health Behaviors by TQL Use for Commands With a Mandatory Exercise Program, Navy Follow-Up for Fitness Survey, 1994-1995

Item	TQL			No TQL			t	p
	Mean	SD	n	Mean	SD	n		
<u>Command support regarding fitness</u>								
Command attitudes toward fitness/weight <sup>a</sup>	6.07	1.04	1501	5.56	1.30	781	-9.56	<.001
Command set good physical fitness examples <sup>b</sup>	5.68	1.26	1499	5.10	1.55	779	-8.98	<.001
Standards applied equally across ranks <sup>c</sup>	4.49	1.96	1502	3.67	2.13	781	-8.91	<.001
Enough space and equipment to exercise <sup>d</sup>	5.52	1.71	1498	5.02	2.05	781	-5.86	<.001
Command mess provide low-calorie foods <sup>d</sup>	4.59	1.74	1363	3.88	1.91	699	-8.17	<.001
Sufficient time and opportunity to exercise <sup>d</sup>	5.02	1.67	1503	4.38	1.87	781	-8.02	<.001
<u>Importance of health behaviors<sup>e</sup></u>								
Regular exercise	3.72	1.05	1503	3.56	1.10	782	-3.31	.001
Ideal weight	3.78	1.01	1502	3.61	1.11	782	-3.64	<.001
Physically fit	4.02	.86	1497	3.87	.95	780	-3.77	<.001
<u>Attitudes toward health behaviors</u>								
Effort to increase fitness <sup>f</sup>	3.66	.98	1503	3.59	.84	780	-1.97	.049
Likely to reach/maintain ideal weight <sup>g</sup>	3.84	.88	1503	3.67	.98	780	-4.06	<.001
Likely to exercise regularly <sup>g</sup>	4.09	.97	1492	3.97	.96	774	-2.88	.004
Certainty reach/maintain ideal weight <sup>h</sup>	4.00	.79	1501	3.88	.85	781	-3.10	.002
Certainty exercise regularly <sup>h</sup>	4.16	.76	1486	4.09	.81	775	-2.00	.045
Work to improve physical condition <sup>i</sup>	3.62	.94	1502	3.52	.97	780	-2.37	.018
<u>General health behaviors<sup>j</sup></u>								
How good is usual diet <sup>k</sup>	2.54	.76	1495	2.63	.79	779	2.61	.009
Eat a balanced diet	3.25	.87	1492	3.15	.89	776	-2.47	.014
Watch weight	3.47	1.11	1494	3.31	1.14	780	-3.25	.001
Choose relaxing activities	3.47	1.03	1490	3.37	1.11	776	-2.13	.033
Smoke/use smokeless tobacco	2.22	1.67	1487	2.40	1.75	778	2.33	.020
Exercise to stay healthy	3.61	1.11	1495	3.34	1.20	777	-3.30	.001
Drink alcohol	2.43	1.21	1496	2.55	1.24	780	2.17	.030

Note. Only significant results are presented.

Response options were as follows:

<sup>a</sup> 1=extremely anti-fitness, 2=moderately anti-fitness, 3=slightly anti-fitness, 4=neither pro- nor anti-fitness, 5=slightly pro-fitness, 6=moderately pro-fitness, 7=extremely pro-fitness.

<sup>b</sup> 1=extremely poor example, 2=quite poor example, 3=somewhat poor example, 4=neither a good nor poor example, 5=somewhat good example, 6=quite good example, 7=extremely good example.

<sup>c</sup> 1=absolutely not, 2=generally not, 3=often not, 4=mixed about 50/50, 5=sometimes are, 6=generally are, 7=always are.

<sup>d</sup> 1=absolutely never enough, 2=generally never enough, 3=often never enough, 4=mixed about 50/50, 5=often enough, 6=generally enough, 7=always enough.

<sup>e</sup> 1=not at all important, 2=somewhat important, 3=moderately important, 4=very important, 5=extremely important.

<sup>f</sup> 1=none, 2=a little effort, 3=moderate effort, 4=quite a lot, 5=extreme effort.

<sup>g</sup> 1=no chance at all, 2=slight chance, 3=somewhat likely, 4=quite likely, 5=extremely likely.

<sup>h</sup> 1=absolutely certain I will not, 2=pretty certain I will not, 3=maybe I will and maybe I won't, 4=pretty certain I will, 5=absolutely positive I will.

<sup>i</sup> 1=not at all, 2=somewhat hard, 3=moderately hard, 4=quite hard, 5=extremely hard.

<sup>j</sup> For all items except the first: 1=not at all like me, 2=mostly not like me, 3=sometimes like me, other times not like me, 4=mostly like me, 5=very much like me.

<sup>k</sup> 1=very healthy, 2=pretty good, 3=okay, 4=not very good, 5=very unhealthy.

Appendix D (Cont.)

Independent T-Tests on Attitudes and Health Behaviors by TQL Use for Commands With a Mandatory Exercise Program, Navy Follow-Up for Fitness Survey, 1994-1995

Item	TQL			No TQL			t	p
	Mean	SD	n	Mean	SD	n		
<u>Frequency of common exercises<sup>1</sup></u>								
Running	1.98	1.51	1471	1.81	1.56	738	-2.57	.010
Walking	1.99	2.01	1271	1.65	1.92	685	-3.64	<.001
Calisthenics	1.58	1.72	1242	1.31	1.64	682	-3.26	.001

Note. Only significant results are presented.

Response options were as follows:

<sup>1</sup> 0=never, 1= 1 to 4 times per month, 2=2 times per week, 3=3 times per week, 4=4 times per week, 5=5 times per week, 6=6 times per week, 7=7 times per week or more.

Appendix E

Independent T-Tests on Attitudes and Health Behaviors by TQL Use for Women, Navy Follow-Up for Fitness Survey, 1994-1995

Item	TQL			No TQL			t	p
	Mean	SD	n	Mean	SD	n		
<u>Command support regarding fitness</u>								
Command attitudes toward fitness/weight <sup>a</sup>	5.95	1.13	204	5.14	1.43	194	-6.25	<.001
Command set good physical fitness examples <sup>b</sup>	5.57	1.27	206	4.72	1.74	195	-5.59	<.001
Standards applied equally across ranks <sup>c</sup>	4.35	1.99	206	3.32	1.93	195	-5.26	<.001
Enough space and equipment to exercise <sup>d</sup>	5.26	1.82	200	4.42	2.04	197	-4.35	<.001
Command mess provide low-calorie foods <sup>d</sup>	4.05	1.90	181	3.21	1.91	165	-4.11	<.001
Sufficient time and opportunity to exercise <sup>d</sup>	4.67	1.75	206	3.51	1.92	196	-6.35	<.001
<u>Attitudes toward health behaviors</u>								
Likely to reach/maintain ideal weight <sup>e</sup>	3.97	.86	206	3.67	.99	196	-3.14	.002
Likely to exercise regularly <sup>e</sup>	4.13	.82	206	3.87	.95	197	-2.91	.004
Certainty reach/maintain ideal weight <sup>f</sup>	4.03	.79	206	3.85	.90	195	-2.23	.026
Certainty exercise regularly <sup>f</sup>	4.15	.75	204	3.96	.85	197	-2.34	.020
<u>General health behaviors<sup>g</sup></u>								
See a doctor for regular checkups	3.63	1.17	204	3.29	1.30	195	-2.75	.006
Take vitamins	3.12	1.56	205	2.70	1.59	197	-2.65	.008
<u>Frequency of common exercises<sup>h</sup></u>								
Running	1.78	1.70	189	1.41	1.52	181	-2.16	.031

Note. Only significant results are presented.

Response options were as follows:

<sup>a</sup> 1=extremely anti-fitness, 2=moderately anti-fitness, 3=slightly anti-fitness, 4=neither pro- nor anti-fitness, 5=slightly pro-fitness, 6=moderately pro-fitness, 7=extremely pro-fitness.

<sup>b</sup> 1=extremely poor example, 2=quite poor example, 3=somewhat poor example, 4=neither a good nor poor example, 5=somewhat good example, 6=quite good example, 7=extremely good example.

<sup>c</sup> 1=absolutely not, 2=generally not, 3=often not, 4=mixed about 50/50, 5=sometimes are, 6=generally are, 7=always are.

<sup>d</sup> 1=absolutely never enough, 2=generally never enough, 3=often never enough, 4=mixed about 50/50, 5=often enough, 6=generally enough, 7=always enough.

<sup>e</sup> 1=no chance at all, 2=slight chance, 3=somewhat likely, 4=quite likely, 5=extremely likely.

<sup>f</sup> 1=absolutely certain I will not, 2=pretty certain I will not, 3=maybe I will and maybe I won't, 4=pretty certain I will, 5=absolutely positive I will.

<sup>g</sup> For all items except the first: 1=not at all like me, 2=mostly not like me, 3=sometimes like me, other times not like me, 4=mostly like me, 5=very much like me.

<sup>h</sup> 0=never, 1= 1 to 4 times per month, 2=2 times per week, 3=3 times per week, 4=4 times per week, 5=5 times per week, 6=6 times per week, 7=7 times per week or more.

Appendix F

Independent T-Tests on Attitudes and Health Behaviors by TQL Use for Commands Without a Mandatory Exercise Program, Navy Follow-up for Fitness Survey, 1994-1995

Item	TQL			No TQL			t	p
	Mean	SD	n	Mean	SD	n		
<u>Command support regarding fitness</u>								
Command attitudes toward fitness/weight <sup>a</sup>	5.40	1.17	381	4.72	1.37	587	-8.23	<.001
Command set good physical fitness examples <sup>b</sup>	5.13	1.36	383	4.46	1.64	590	-6.90	<.001
Standards applied equally across ranks <sup>c</sup>	4.06	2.06	384	3.23	2.04	590	-6.15	<.001
Enough space and equipment to exercise <sup>d</sup>	5.03	1.91	381	4.51	2.03	591	-4.03	<.001
Command mess provide low-calorie foods <sup>d</sup>	4.13	1.77	364	3.66	1.92	523	-3.73	<.001
Sufficient time and opportunity to exercise <sup>d</sup>	4.11	1.88	383	3.39	1.98	593	-5.66	<.001
<u>Frequency of common exercises<sup>e</sup></u>								
Walking	1.81	2.03	326	1.47	1.91	515	-2.43	.015

Note. Only significant results are presented.

Response options were as follows:

<sup>a</sup> 1=extremely anti-fitness, 2=moderately anti-fitness, 3=slightly anti-fitness, 4=neither pro- nor anti-fitness, 5=slightly pro-fitness, 6=moderately pro-fitness, 7=extremely pro-fitness.

<sup>b</sup> 1=extremely poor example, 2=quite poor example, 3=somewhat poor example, 4=neither a good nor poor example, 5=somewhat good example, 6=quite good example, 7=extremely good example.

<sup>c</sup> 1=absolutely not, 2=generally not, 3=often not, 4=mixed about 50/50, 5=sometimes are, 6=generally are, 7=always are.

<sup>d</sup> 1=absolutely never enough, 2=generally never enough, 3=often never enough, 4=mixed about 50/50, 5=often enough, 6=generally enough, 7=always enough.

<sup>e</sup> 0=never, 1= 1 to 4 times per month, 2=2 times per week, 3=3 times per week, 4=4 times per week, 5=5 times per week, 6=6 times per week, 7=7 times per week or more.

Appendix G  
 Significant Predictors of Medical Indicators, AMDRS 1993 and U.S. Navy Quality Health Promotion  
 Survey, 1995

Outcome	Predictor	Beta	R	AdjR2	R2Ch	SigCh
Cholesterol	Age	.367	.364	.132	.132	.000
	Race	.040	.366	.134	.002	.001
Blood pressure	Sex	-.175	.175	.031	.031	.000
	Race	.050	.182	.033	.002	.000
	Age	.037	.185	.034	.001	.003
Body fat	Sex	.412	.373	.139	.139	.000
	Age	.329	.494	.243	.105	.000
	TQL-implemented cholesterol reduction program	-.023	.494	.244	.001	.044

Table 4. Command Support Regarding Fitness, Navy Follow-up for Fitness Survey, 1994-1995

<u>Item</u>	<u>Mean(SD) or %</u>
1. Top-level command attitudes toward fitness and weight control <sup>a</sup>	5.61(1.29)
2. Top levels of command set good physical fitness examples <sup>b</sup>	5.26(1.49)
3. Physical fitness and weight standards applied equally across ranks <sup>c</sup>	4.01(2.09)
4. Does command provide time during the work day to exercise? (% yes)	68.1
5. Sufficient time and opportunity to exercise <sup>d</sup>	4.43(1.91)
6. Enough space and equipment to exercise <sup>d</sup>	5.14(1.91)
7. Command mess provide low-calorie foods <sup>d</sup>	4.21(1.84)

*Note.* N ranged from 3431 to 3827

<sup>a</sup> Response options were 1=extremely anti-fitness, 2=moderately anti-fitness, 3=slightly anti-fitness, 4=neither pro- nor anti-fitness, 5=slightly pro-fitness, 6=moderately pro-fitness, 7=extremely pro-fitness.

<sup>b</sup> Response options were 1=extremely poor example, 2=quite poor example, 3=somewhat poor example, 4=neither a good nor poor example, 5=somewhat good example, 6=quite good example, 7=extremely good example.

<sup>c</sup> Response options were 1=absolutely not, 2=generally not, 3=often not, 4=mixed about 50/50, 5=sometimes are, 6=generally are, 7=always are.

<sup>d</sup> Response options were 1=absolutely never enough, 2=generally never enough, 3=often never enough, 4=mixed about 50/50, 5=often enough, 6=generally enough, 7=always enough.

Table 5. Health Promotion Program Participation, Navy Follow-up for Fitness Survey, 1994-1995

<u>Program</u>	<u>% Participate regularly</u>	<u>% Would like to participate</u>	<u>% Don't participate</u>
1. Gym or fitness center	40.4	41.0	18.6
2. Command exercise programs	26.0	42.1	31.9
3. Command-organized sports	24.0	44.5	31.5
4. Blood pressure screening	16.5	51.0	32.5
5. Cholesterol/blood fats testing	15.7	58.6	25.7
6. Stress management counseling	2.7	32.8	64.5
7. Alcohol rehabilitation club or clinic (e.g., AA)	2.4	3.3	94.3
8. Weight reduction club or clinic	2.2	21.7	76.1
9. Smoking clinic/support group	1.6	15.9	82.5
10. Drug rehabilitation clinic/support group	.9	2.9	96.2
11. Other <sup>a</sup>	10.9	12.0	77.1

*Note.* n ranged from 3754 to 3819 except where otherwise noted.

<sup>a</sup> n=590.

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13. ABSTRACT (Maximum 200 words)  The objective of this study was to determine the effectiveness of Total Quality Leadership (TQL) on health promotion activities in the Navy and to develop methods of TQL and health promotion data capture. A survey of commands indicated that 32% of commands had used TQL specifically for improving health- and fitness-related processes and outcomes between 1991 and 1995. The most commonly used TQL activities applied to health promotion were process action teams, brainstorming, and flow diagrams. The most common health promotion areas in which TQL techniques were applied were exercise and tobacco cessation. Among non-TQL-using commands, the factors considered most important in impeding its use were inadequate training in TQL, insufficient time, and lack of support from the highest ranks in the command. A Navywide health survey indicated that individuals at commands using TQL for health promotion consistently reported more positive perceptions of their command's support for health and fitness issues than individuals at commands not using TQL for such purposes. Though much evidence suggests that the Navy has been successful in its effort to introduce and employ TQL concepts, extensive use of TQL to meet the Navy's health and fitness goals has not been realized. Based upon study findings, recommendations are provided for successful development and implementation of TQL.			
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