An analysis of the relationship between aquatic certification levels and incidence of aquatic injuries within selected YMCAs

Jonathan B. Smith
University of Nebraska at Omaha

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AN ANALYSIS OF THE RELATIONSHIP BETWEEN AQUATIC CERTIFICATION LEVELS AND INCIDENCE OF AQUATIC INJURIES WITHIN SELECTED YMCA\textsc{s}

A Thesis

Presented to the
School of Health, Physical Education and Recreation
and the
Faculty of the Graduate College
University of Nebraska

In Partial Fulfillment
of the Requirements for the Degree
Master of Science
University of Nebraska at Omaha

by
Jonathan B. Smith
Spring, 1986
THESIS ACCEPTANCE

Accepted for the faculty of the Graduate College, University of Nebraska, in partial fulfillment of the requirements for the degree Master of Science, University of Nebraska at Omaha.

Committee

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4-2-86
ABSTRACT

The purpose of this study was to analyze selected factors which were hypothesized as having an effect on the incidence of aquatic accidents within selected YMCAs. A written survey instrument was utilized and data was received from 51 YMCAs located in a seven state midwest region. No significant statistical differences could be found when comparing directors with different aquatic certification levels (YMCA or Red Cross) or combined certifications with incidence of aquatic accidents. Additional factors examined which yielded no significance were the length of professional tenure (or position) or total years of professional aquatic experience. When diving was not permitted in a facility there was a significant difference regarding incidence of accidents.
ACKNOWLEDGEMENTS

I owe a debt of gratitude to a number of people who have assisted me in attaining my goals. For his assistance and warm friendship I would like to thank my chairman, Dr. H. Edsel Buchanan. I would also like to thank the other two members of my committee, Dr. Larry Albertson and Dr. Michael Stewart, who, with Dr. Buchanan made it possible for me to complete this master's program.

I would like to thank Doug Krecklow and Paul Cerio for their various contributions, especially in analyzing and helping to construct the survey instrument.

For my typist, Marilyn R. Adams, an extra thank you for her time, energy, and dedicated efforts.

To Bill Crawford and the late George H. Ingram an appreciation for their years of dedicated work in the field of aquatics and their personal friendship which were my inspiration for pursuing a career in aquatics.

Finally, to my parents, a special thanks for their support and encouragement through the years.
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CHAPTER I
INTRODUCTION AND JUSTIFICATION

Across the United States each year, approximately 100 million Americans enjoy some type of aquatic-related activity (Brock, 1981). Within this extensive use of aquatic environments, 6,000-8,000 drownings occur each year (Arnold, 1979; Smith, 1984; Stitt, 1982). This statistic does not include the multitude of near-drownings and life-threatening accidents that require life-saving resuscitation and first aid (Andres, 1981). Also not included are the thousands of less severe accidents and injuries that occur. A major objective and portion of an aquatic professional's occupation is to strive toward minimizing the number of accidents and fatalities that occur in aquatic environments.

As a result of this extensive aquatic programming, one ongoing effort that addresses aquatic mishaps and attempts to help reduce the number of accidents and fatalities is the certification process of various national organizations. Today, the Young Men's Christian Association (YMCA) deals with aquatic activities on an instructional, recreational, and competitive basis (with the potential for accidents always present). The YMCA aquatic program offers a vast number of aquatic activities, which include the following: instructional swimming and springboard diving; competitive swimming and springboard diving; scuba diving; instructional programs for preschoolers, infants, and the handicapped; synchronized swimming; lifesaving
programs; and all types of boating, camping, and outdoor activities. As a result of the YMCAs extensive involvement in aquatic programming, there developed a need for aquatic education. The YMCA was the first national organization to develop and implement a national program in aquatic safety, which began in 1911 (Arnold, 1979; Johnson, 1981). In spite of this lengthy history of aquatic involvement, there is no data available which reports on any form of evaluation of aquatic certification systems as they relate to aquatic safety.

The majority of professional aquatic positions in the YMCA require that the director attain the YMCA "Aquatic Instructor" level of certification, but this is not the highest step in the YMCA aquatic certification pyramid. The YMCA "Aquatic Director" certification is currently the highest level of certification a YMCA professional may attain. The hierarchy of aquatic certifications within the YMCA program is depicted in Figure 1. This structure is not without evaluation and change. In August of 1983, the National YMCA Operating Council on Aquatics (NYOCOA) sponsored the Tenth National Aquatic Conference at the Indiana University of Pennsylvania. The question of reorganization of aquatic certifications within the present program was addressed at the 1983 YMCA conference (Klischer, 1983). A consensus emerged among the professionals at the sessions dealing with this subject; they felt
that a need existed for certification improvements and an evaluation of the current certifications (especially regarding the course content in the Aquatic Director and Aquatic Instructor curricula). As a result of this conference, an ongoing task force was assigned to continue further study. However, since the completion of the conference, the National Aquatic Committee has not yet approved proposals that were made at the 1983 conference (see Appendix C for proposal flowcharts). The next time that certification reorganization will be addressed will likely occur at the next
national conference which will be held in March, 1986, at the 11th National Aquatic Conference in New Orleans, Louisiana.

**Statement of Problem**

There appears to be a significant need for a selective evaluation of the current aquatic certification system within the YMCA aquatic safety program. A standard model currently exists for conducting the Aquatic Director and Aquatic Instructor seminars, but different sections of the country have made adaptations based on specific needs within their own areas (see Appendix D, Freeman, 1984). A thorough review of literature suggests that no studies currently exist in regard to the relationship between aquatic certification and the incidence of accidents in aquatic environments. The question then arises: can safety be better maintained in an aquatic environment with personnel who have achieved higher levels of certification, or does more time/experience in that setting make the difference? Does a higher level of staff certification result in a safer environment for the users of the facility? More specifically, does a relationship exist between the number of pool accidents and the certification level of the director? This study investigated:

1. the number of aquatic accidents in YMCAs to determine if higher aquatic certification on the part of the program director has a direct relationship to the number of accidents that occur in YMCA aquatic facilities.

2. the years of experience as an aquatic professional and professional tenure (in a specific position) to see if these factors have a relationship to the incidence of accidents.
3. the relationships that may exist between level of certification, years of experience (as a professional), and professional tenure to determine if the three factors interact to form a relationship to the frequency of aquatic accidents.

4. the effect aquatic certification outside of YMCA training has on the relationship between certification, experience and tenure.

Statement of Hypotheses

For this study, there were no significant statistical relationships between:

1. the certification levels of aquatic program directors and the incidence of accidents within YMCA aquatic programs.

2. the length of experience as an aquatic professional and the incidence of accidents within YMCA aquatic programs.

3. the tenure (of position) of aquatic program directors and the incidence of accidents within YMCA aquatic programs.

4. multiple aquatic certifications and the incidence of accidents within YMCA aquatic programs.

Delimitations

This study examined 51 YMCA aquatic programs within a seven state region. Programs investigated were determined by preliminary survey responses from a nine state region which indicated a willingness to participate. The YMCAs investigated had an indoor swimming pool with a minimum of 20 feet in width, 40 feet in length, and had been in
operation for a minimum of three years. The YMCA aquatic programs examined were from the western portion of the "Midwest Field" as designated by the YMCA of the U.S.A. The YMCAs participating were from seven states which included: Iowa, Kansas, Missouri, Minnesota, Nebraska, North Dakota, and South Dakota.

Limitations

Aspects associated with this study which could be identified as limitations included the following factors:

1. this study concerned YMCAs in a section of the country where the number of aquatic facilities are fewer than typically found in other sections of the country.

2. there is no national standardized accident reporting (forms or procedures) within the YMCA system; if a standardized national or state format existed in the reporting of accidents, or if a standard accident report form were used for all aquatic facilities, or if YMCAs had a standard accident report form, such would add to the strength of the study.

3. the above factors in conjunction with potential subjectivity in reporting accidents may have affected variability and reliability in the responses received.

4. the lack of previous studies pertinent to this investigation limited the data base for the study.

5. the sample consisted of a homogenous group of facilities lacking in configural complexity.
Assumptions

In performing this examination, the following assumptions were made:

1. in completing the survey instrument, respondents were both truthful and accurate.
2. the YMCAs in the preliminary investigation that defined the width of their pools by number of lanes (rather than by the number in feet) were in fact wider than 20 feet; these facilities (N = 15) that defined the width in this fashion were either 20 yard, 25 yard or 25 meter pools. In that competitive racing lanes are a minimum of five feet in width, this (in conjunction with the length of the pools) made it doubtful that these pools had a width of less than 20 feet.
3. although this study was limited to pools with specific specifications, the results of the study are valid regardless of pool dimension and shape, except in extreme cases of irregular design, dimensions or configuration.

Functional Definitions

The following definitions will assist the reader in understanding the investigation presented in this study:

1. YOUNG MEN'S CHRISTIAN ASSOCIATION/YMCA OF THE USA--a worldwide service organization that specializes in social, cultural, athletic and recreational activities based on Christian principles. The YMCA has over 100 million members in 85 countries.
2. **SWIMMING POOL**—an indoor tank or enclosed body of water that is made for (or suitable for) swimming; any enclosed body of water that meets state and local guidelines for operation as a swimming pool.

3. **AQUATIC DIRECTOR** or **AQUATIC PROGRAM DIRECTOR**—an individual who provides leadership/guidance to a facility or program that specializes in activities of a nature that are related to swimming.

4. **YMCA AQUATIC INSTRUCTOR CERTIFICATION**—the person who holds this certification is an individual who is qualified to teach the YMCA Progressive Swimming Program and Lifesaving Program at all levels. The individual is certified to train swimming instructors, lifesaving instructors, and instructors in any other specialized area in which he holds a current instructor rating. Prerequisites for certification include: minimum age of eighteen years; three hundred hours of certified aquatic leadership in a YMCA aquatic program; current YMCA Swimming and Lifesaving Instructor Certifications; a personal recommendation from a YMCA Director; and completion of an Aquatic Instructor's Institute.

5. **YMCA AQUATIC DIRECTOR CERTIFICATION**—the person who holds this certification is an individual who is qualified to direct aquatic leadership training programs, administer YMCA aquatic programs, develop and research new programs and work diligently at upgrading and updating national YMCA aquatic programs. Prerequisites for certification include: minimum
age of twenty-one years; current Aquatic Instructor certification; completion of three years in YMCA aquatic leadership with one year as an Aquatic Instructor; a personal recommendation from a YMCA Director (this endorsement is to verify candidate's aquatic proficiency, personality, character, and general leadership ability); successful completion of the Aquatic Director's seminar.

6. YMCA MIDWEST FIELD—a geographic classification of YMCAs used by the YMCA of the USA as a method of organizing YMCAs by location; the MIDWEST FIELD consists of YMCAs in the following states: Indiana, Illinois, Iowa, Kansas, some portions of Kentucky, Michigan, Minnesota, Missouri, Nebraska, Ohio, North Dakota, South Dakota, West Virginia and Wisconsin.

7. ACCIDENT—an event occurring by chance or unintentionally where an injury occurs that requires:

- need for first aid and filing of an accident report;
- transportation to a hospital for further care.

8. TENURE—the act, right, manner, or period of holding something (landed property or position) over a period of time (as an aquatic director); for this study, the term refers to the time period as an aquatic professional in one specific professional position.

**Research Design**

This study utilized a written survey instrument which was mailed to 71 selected YMCAs. Data analysis utilized the following
statistics: frequency tabulations (Chi Square, Crosstabs), Multiple Analysis of Variance (MANOVA), and Multiple Regression. The level of confidence for significance was p = .05 level.

Justification

This study investigated selected factors which were hypothesized to have a significant bearing on the number of accidents that occur in aquatic environments. While the focus of this study was to look at the relationship between personologic variables and their relationship with accidents, it was recognized that certain confounding variables (if not controlled for) would cloud or distort findings of significance. Therefore, a portion of the data analysis was directed to the impact that user density, multiple pools per facility, diving board existence and location would have on the differences (if any) among the various sub-groups.

An objective of this study was to help provide greater insight for individuals who are administrators of the YMCA aquatic certification system. It was hoped that this investigation would provide information about the significance of the role that a professional's experience plays in the administration of aquatic environments (in regard to safety). Finally, it was hoped that this study might also serve as an aid in improving the administration of YMCA aquatic facilities, and provide information for those individuals in directorship positions with regard to the present certification system.
CHAPTER II

REVIEW OF RELATED LITERATURE

As previously mentioned in the "Statement of Problem" section of Chapter I, there are no studies that examine the certification levels within the YMCA aquatic curricula in relation to the incidence of aquatic accidents. In telephone interviews with Murphy (1984), National Aquatic Program Director for the YMCA, Wertz (1984), National Director of Water Safety for the American Red Cross, and Priest (1984), Executive Director for the Council for National Cooperation in Aquatics, none of these individuals had knowledge of any related studies conducted by these three national organizations regarding certification levels as related to the incidence of aquatic accidents. This is not to say that ongoing evaluations of the aquatic safety programs do not occur. With the publication of the YMCA LIFEGUARD TRAINING MANUAL by Cornforth (1974) and the Red Cross (1983) LIFEGUARD TRAINING text, and the subsequent introduction of the lifeguard training programs by each organization, major attempts have been made by each organization to revise, improve and update their aquatic safety programs.

Orphan (1972) addressed the Second National Aquatic Conference on Professional Standards in Aquatics and Approaches to Certification by stating that "although I am not condemning the Red Cross or YMCA for
the general misuse of their great programs, I do not consider that their objective is to train professional aquatic personnel; nevertheless, administrators continue to recognize these programs as the 'standard,' and as a result, the aquatic field contains many poorly qualified, untrained persons." Orphan (1972) also stated (at that same conference when discussing the then new YMCA Aquatic Program which was adopted at the Sixth National YMCA Aquatics Conference in January of 1971) that "the aquatic instructor certification and the aquatic director certification have been retained, but their qualification requirements have been greatly reduced; the new YMCA programs seem great until one looks to the various qualifications required for each level; it appears the YMCA program is designed not to upgrade its applicants, but to downgrade its program to meet the level of the applicant."

Analysis of Accident/Drowning Statistics

Harris (1983, 1984), a former employee of the National Safety Council and currently the Director of Water Safety Services in Chicago, compiles annual statistics on drownings that occur across the nation. His statistics examine the number of drownings in 52 different categories (which include type of facility, age and sex of the victim, days of the week, time of day, month of year, state by state and cross-categorizing of these groups). At no time in his studies does he investigate the type of personnel (lifeguard, etc.),
the methods of administration of the facilities or qualifications of administrative staff.

Standard Reporting--National Statistics

Another data base of accident/fatality investigation for the Consumer Product Safety Commission in Washington is the National Electronic Injury Surveillance System (NEISS). The NEISS divides reported accidents into the following categories (as related to aquatics): state, location, source of information, age of victim, date of accident, date entered hospital, days hospitalized, days incapacitated, disposition (physical state of victim) and classification of injury (United States Consumer Product Safety Commission, 1977-84). At no time does this data investigate the personnel responsible for the overall administration of the facility, or qualifications of subordinates/lifeguards. Brock (1981), formerly of the National Safety Council, reported statistics regarding the causation factors of drownings and accidents related to aquatic environments and expressed that the key to minimizing aquatic accidents is "proper supervision." At no time in her statistical reporting of fatalities did she mention any statistics regarding the qualifications of the supervisor.

In a major study titled MEDICAL ANALYSIS OF SWIMMING POOL INJURIES, which was conducted by the United States Consumer Product Safety Commission, the University of Miami and Nova University
(1977), the research team investigated 72 injuries that occurred in swimming pools. The research team attempted to provide insight to the causation factors of these accidents. The only areas investigated related to management were under the categories of "Rescue Procedure Employed" and "Type of Supervision of Pool at Time of Accident." The study revealed that improper rescue procedures were used in 59 of the 72 cases. No persons were designated as being "in charge" in 54 of the 72 incidents (a designated lifeguard was present in only 15 cases). These were the only instances where the study discussed the supervision of facilities. The remainder of the study examined the contributing factors on the part of the victim, the pool and surrounding facility, the characteristics of the victims and an analysis of the injuries that occurred. The authors made very few suggestions in their conclusions on owners/operators about how facilities could be made safer and less hazardous from the standpoint of the administrator.

_Drowning: Psychology, Physiology and Cold Water Aspects_

Pia (1974, 1978, 1984) has done extensive research on the physiological effects of drowning and on the actual behaviors a drowning individual exhibits through the filming of actual drowning incidents. He reports that drownings can be caused by the failure to recognize an actual drowning victim, the intrusion of non-lifeguard duties upon a lifeguard's primary task (prevention of accidents), and the distraction from surveillance duties, or a combination of all three. Within his studies, he has not addressed the qualifications of leadership personnel. Smith (1980, 1982, 1984), retired Commander
in the U.S. Coast Guard, does extensive writing and lecturing in regard to drownings and accident prevention as related to aquatics. His specialties are in the areas of the relationship of alcohol to accidents/fatalities, drowning statistics, typical drowning situations, different characteristics of drowning, near-drowning and distress victims, the relationship of cold water drownings and preventive methods in slowing the onset of hypothermia. His work revealed no data nor makes suggestions concerning qualifications of aquatic directors.

**Supervisory Recommendations**

Andres (1978, 1979, 1980), of the University of Toledo, has done substantial writing, editing of publications, and lecturing for the Aquatic Council of the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD) regarding the subject of lifeguard qualifications and training. His writings refer mainly to the prerequisites for certification, in-service training of lifeguards and statistics related to drownings. His writings have not included data in regard to the qualifications of those who serve as administrators and supervisors of guards, or about higher levels of certification. His writings and lectures focus on the lifeguard who is directly responsible for the lives of individuals who use an aquatic facility.

Gabrielson (1975) has done extensive research and writing in a variety of aquatic areas, and has published numerous articles and texts in regard to the aquatic safety setting. He mentions little about the qualifications an individual should possess as an aquatic
facility administrator. In his Council for National Cooperation in Aquatics (CNCA) publication *SWIMMING POOLS: A GUIDE TO THEIR PLANNING, DESIGN, AND OPERATION* (1975), the only personnel specifications/recommendations that he suggests are that aquatic administrators should be those with a Red Cross Water Safety Instructor Certification, a minimum of three years experience in aquatic leadership, a minimum age of 24 years with a college education, and have good eyesight, hearing, and are in good health. At no time does he further discuss the qualifications of aquatic facility managers. Gabrielson and Johnson (1979) in their article titled "Swimming Pool Safety" state that "while aquatic administrators, leaders and instructors have had a profound impact in curtailing water deaths and accidents, their full potential has yet to be realized; operation and supervision must be dealt with by the aquatic professional." In this article, Gabrielson and Johnson report many administrative concerns but at no time discuss the available certifications for administrators or specific qualifications which an aquatic administrator should possess.

In their publication "28 Reasons Why Your Aquatic Program and/or Facility May Not Be Liability Free" (YMCA Mid Atlantic Region, 1981), Gabrielson and Johnson (1981) delineate the personal qualities of the administrator, development of safety procedures, etc., but at no time deal specifically with certification levels of the aquatic administrator. In another article titled "Basic Defenses Against Aquatic Liability," Johnson (undated) reports that it is the professional responsibility of the aquatic administrator to:
(1) read professional materials, (2) practice skills and maintain certifications and (3) attend clinics, workshops, conferences and aquatic schools. In Johnson's (1984) article titled "What is Your Aquatic Liability I.Q.," he reports that today's aquatic facility manager must be trained in hazard identification and risk management. He advises that courses in facility management, pool maintenance and lifeguard training are available and aquatic administrators should be encouraged to enroll in these types of academic courses. Professional consultants should be used (in his opinion) to help in the reduction of potential aquatic liability. In Johnson's articles, he does not specifically discuss proper certification standards or qualifications of professionals.

**Summary**

Although a variety of aquatic investigations and literature has been reported regarding the safety, management, and organization of facilities and personnel, the relationship of certification and experience to the incidence of accidents has yet to be examined. Harris (1984) believes that the original philosophy within which water safety education was founded developed due to the need for knowledge by individuals who supervise aquatic environments and the reduction of drownings/accidents. He feels that this is a humanistic ideal, and with an increasing incidence of lawsuits, today's philosophy appears to be directed as much toward an organization's survival and the avoidance of a multi-million dollar lawsuit, rather than simply the saving of human lives and accident reduction.
CHAPTER III
PROCEDURES

Preliminary Study

A preliminary survey was designed and mailed to 161 YMCAs in a nine state region (see Appendix A for both survey and cover letter). The nine states of YMCAs examined in the preliminary investigation included: Colorado, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota and Wyoming. All of the states except Colorado and Wyoming are located in the western portion of the Midwest Field (as designated by the YMCA of the U.S.A.). The main objective in conducting a preliminary survey was to determine if 50 YMCAs throughout the seven states (that are members of the Midwest Field) met minimal specifications (based on similarity regarding the type and physical aspects of their aquatic facilities) to conduct a future survey. If 50 similar YMCA aquatic facilities were not found within these seven states that met minimal specifications, the study would then have been expanded to include YMCAs in Colorado and Wyoming. If 50 YMCAs were not designated throughout this nine state area, the study would have been further expanded into other states.

The objectives in conducting the preliminary survey were to:

1. determine YMCAs throughout the nine states that operate aquatic facilities;
2. determine what type of aquatic facilities these YMCAs operate;

3. determine which YMCAs would cooperate in completing a future survey instrument regarding certification and experience of employees, accidents, etc.;

4. determine the population to be surveyed with the final instrument, and attain assurance that those who were asked to participate would, in fact, complete the future survey instrument;

5. delimit the population to be studied (based on type of facility, size of facility, etc.);

6. determine whether "extra" or "back-up" states (Colorado and Wyoming) would be utilized in the future survey;

7. determine the necessity of expansion of the study (if necessary) into other states.

To help insure a higher rate of return, enclosed with the preliminary survey was a self-addressed, stamped envelope. For coding purposes, the YMCA address was typed onto the survey instrument by the author. This helped make the preliminary survey easier for participants to complete. The only tasks to be performed by participants were responding to the questions asked, signing their name, and identifying the professional positions in which they were employed.
Preliminary Study Results

The 161 surveys sent to the YMCAs in the preliminary study were mailed on October 13, 1984, and within two weeks, all but 25 (136 or 84.5%) were completed and returned by professional staff members at the YMCAs (Table 1). Seventy-one of those 136 YMCAs were selected for future study and were surveyed with the final instrument based on the following criteria:

1. these YMCAs had a minimum of one indoor swimming pool;
2. at least one swimming pool at each YMCA had a minimum width of 20 feet and minimum length of 40 feet;

TABLE 1

Preliminary Study Data

<table>
<thead>
<tr>
<th>Individual State</th>
<th># sent</th>
<th># returned</th>
<th>Percent</th>
<th>Total # Sent Second Survey Instrument</th>
</tr>
</thead>
<tbody>
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<td>26</td>
<td>74.2</td>
<td>15</td>
</tr>
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<td>Kansas</td>
<td>15</td>
<td>13</td>
<td>86.6</td>
<td>7</td>
</tr>
<tr>
<td>Minnesota</td>
<td>37</td>
<td>34</td>
<td>91.9</td>
<td>17</td>
</tr>
<tr>
<td>Missouri</td>
<td>31</td>
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</tr>
<tr>
<td>Nebraska</td>
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<td>10</td>
<td>90.9</td>
<td>7</td>
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<td>North Dakota</td>
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<td>South Dakota</td>
<td>6</td>
<td>6</td>
<td>100.0</td>
<td>4</td>
</tr>
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<td>0</td>
</tr>
<tr>
<td>Wyoming</td>
<td>4</td>
<td>4</td>
<td>100.0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>161</td>
<td>136</td>
<td>84.5</td>
<td></td>
</tr>
</tbody>
</table>
3. the YMCAs were from one of the following states: Iowa, Kansas, Missouri, Minnesota, Nebraska, North Dakota, South Dakota (all of which are designated as part of the "Midwest Field" by the YMCA of the U.S.A.);

4. all had swimming pools that had been in operation for a minimum of three years;

5. those who were sent the final instrument completed and returned the preliminary survey within two weeks of its having been sent; justification regarding this factor was that those individuals who returned the preliminary survey at an earlier date (it was assumed) would be more likely to complete and return a longer and more detailed survey instrument in the future.

Survey Instrument

The author, in conjunction with a jury of experts, developed a survey instrument (see Appendix B) that would extract data from the YMCAs to be examined which would test the study hypotheses. The jury of experts evaluated the survey instrument for validity. Additional preliminary instrument evaluations were made by members of the thesis committee. The members of the jury of experts included:

1. the University of Nebraska at Omaha Coordinator of Recreation/Leisure Studies academic department (who also serves as coordinator of graduate studies in the School of Health, Physical Education and Recreation)

2. the Supervisor of Aquatics at the University of Nebraska at Omaha
3. the Director of Aquatics/Head Swimming Coach for Westside High School (located in Omaha, Nebraska).

Pilot Study

A pilot study, conducted through three YMCAs that were part of the Omaha-Council Bluffs (Nebraska/Iowa) Metropolitan Association of YMCAs, further tested the survey instrument. The objective in the pilot study was to receive a preliminary analysis of data plus criticisms of the survey instrument by individuals who are current YMCA aquatic professionals. Suggestions that were made by the participants who completed the pilot study instrument were submitted to the jury of experts and thesis committee members for proper adjustment of the survey instrument.

Analysis of Data/Pilot Study Results

Appropriate data analysis anticipated the following procedures: frequency distributions, Crosstabs, Chi Square, and MANOVA were used with p = .05 level. As a result of the small N size, problems were anticipated in determining significance in the pilot study. Due to the small N size, program analysis yielded findings where statistical analysis could be computed for only (1) years as an aquatic professional and (2) sex and age. Insufficient data resulted in program analysis being unable to apply statistical treatment regarding certification levels and tenure. For all areas where analysis was possible, data yielded a significance no greater than .19. It was evident that the N for the YMCAs in reported data was insufficient for analysis. The jury did, however, concur in
reference to the validity of the instrument. It was concluded that the greatest value of the pilot study was for:

1. validation for the final survey instrument.
2. development of data analysis procedures.
CHAPTER IV
ANALYSIS OF DATA

This study examined various factors that were hypothesized as having effects on the incidence of accidents within aquatic environments (specifically related to YMCA aquatic environments). The study utilized a written survey instrument which was sent to 71 selected YMCAs within a seven state midwest region. Frequency tabulations and Chi Square analysis were appropriate descriptive statistics for the population that was studied and to help determine areas of significance. Imbedded within the basic hypotheses were multiple variables (i.e., a variety of types of aquatic certifications) which required the use of Multiple Analysis of Variance (MANOVA) to test for significance.

Accident Category Classification

The accidents which were examined included the three years of 1982-84, and those mishaps which were studied included the following categories:

1. where first aid was administered to the victim, an accident report form was filed, but no further care was rendered for the victim.
2. where the severity of the injury was such that the victim was transported to a hospital, treated and released on the same day.

3. where the severity of the injury was such that it was necessary for the victim to spend a minimum of one night in the hospital.

**Methodology of Data Analysis**

Frequency distributions were compiled on all variables. Data analysis compared each category of accident over each of the three years in the following fashion:

1. crosstab tables were generated and Chi Square analysis calculated for YMCA certification, Red Cross certification, professional experience, professional tenure, users per week, percentage time spent per week as it relates directly to aquatics, time spent "on deck" directly conducting aquatic programs, whether diving was permitted (in specified areas of the facility) and the prevalence of spring board diving facilities.

2. crosstab tables were generated and Chi Square analysis calculated for accidents by tenure and accidents by years of experience by the different levels of YMCA certification and different levels of Red Cross certification.
3. Crosstab tables were generated and Chi Square analysis calculated for the total of each year's accident frequency (all three categories combined), the three year total for each accident category, and the total of combined accidents of all three categories over the total three year period.

4. MANOVA was utilized for Red Cross and YMCA certifications by frequency of accidents for each category of the three designated years.

Background Data—Survey Instrument Returns

Of the 71 surveys sent, 51 of the surveys (72%) were returned which yielded information where data were able to be extracted for analytical purposes. Of the 51 returned instruments, 48 of the YMCAs were designated as having one indoor swimming pool and three YMCAs had two swimming pools. Of these three respondents who reported having two swimming pools, significance of such a small number of second pools was such that additional data regarding multiple facilities were not reported; however, the raw data is available in Appendix E.

Background Data—Aquatic Professionals

Of the aquatic professionals who completed the instrument, 37 were female and 14 were male, and the majority (N = 41) defined themselves as "Aquatic" or "Program" directors. The median age of
these individuals was within the 25-30 age category. The median tenure (in their current professional position) of these individuals was 2.6 years, and the median for years in a professional aquatic position was 3.5 years. These individuals spent an average of 10 hours per week "on deck" (directly supervising aquatic activities) and an average of 50% of their total working time was devoted directly to the position regarding aquatics and aquatic programming. The individuals who completed the instruments reported that they spent an average of 50 hours per week performing their job.

Regarding the educational background and qualifications of these individuals, 38 professionals possessed a four year college degree, with the most common areas of specialization being Health, Physical Education and Recreation (N = 31). Only five individuals did not possess any YMCA aquatic certification, and of the 51 respondents, 18 held the highest level (Aquatic Director) of YMCA certification, and 18 held the second-highest (Aquatic Instructor) level of certification. All but five of the professionals (N = 46) had current Red Cross Water Safety Instructor-Trainer or Water Safety Instructor certifications.

Background Data--Facility Size and Usage

In terms of usage for the aquatic facilities, the data reported represented an average number of 50,000 users per year of the surveyed facilities. All 51 of the facilities examined had pools which were rectangular in shape, with 48 of the 51 facilities having pools which were 60 feet, 75 feet or 25 meters in length (35 of the pools examined were 75 feet in length). The widths of the facilities
varied widely from 20 to 53 feet with 30 feet being the largest single group (N = 11), and of the 51 facilities, 41 directors responded that the minimum depth was three or three and one half feet. The maximum depths varied from six to thirteen feet, where the most common maximum depth (N = 18) was either nine or nine and one half feet. Thirty facilities had either one or two diving boards at a height of one meter, and four facilities had three meter diving facilities. All but five facilities allowed diving from springboards or some area of the pool deck, but only six allowed diving into the shallow end of the pool.

**Hypothesis Testing Analysis**

Although the return rate of the survey instruments was excellent, the amount of data which was reported (the number of accidents) was less than optimal in reference to potential significance in terms of data analysis. Frequencies reported had an N size which suggested that caution must be taken into account when making inferences between the cited variables and the different accident levels (especially those levels where transportation to hospitals were concerned).

**Hypothesis One.** There are no significant statistical relationships between the certification levels of aquatic program directors and the incidence of accidents within YMCA aquatic programs.

Regarding the various levels of aquatic certification, no significant difference could be found regarding the YMCA, Red Cross or combined certification situation (Tables 2 and 3). Significance was revealed regarding YMCA certification as related to all three
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<tbody>
<tr>
<td></td>
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<td>B</td>
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<td>ABC</td>
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<td>.96</td>
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<td>.97</td>
<td>+</td>
<td>.13</td>
<td>.08</td>
<td>.68</td>
<td>.97</td>
<td>.76</td>
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<tr>
<td><strong>df</strong></td>
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<td>5</td>
<td>105</td>
<td>80</td>
<td>30</td>
<td>+</td>
<td>95</td>
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<td>10</td>
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<tr>
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<td>+</td>
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<td>84.80</td>
<td>18.31</td>
<td>18.31</td>
<td>90.53</td>
<td>129.63</td>
</tr>
</tbody>
</table>

**KEY:**
- Category A---where injury occurred and an accident report was filed
- Category B---where victim was transported to hospital for further treatment but released on the same day
- Category C---where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
- * significance found in this category
- + unable to compute due to small N size
<table>
<thead>
<tr>
<th></th>
<th>1984</th>
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<th>1982</th>
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<tbody>
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<td>25</td>
<td>5</td>
</tr>
<tr>
<td>( \chi^2 )</td>
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<td>Significance Value for ( \chi^2 )</td>
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<td>37.65</td>
<td>11.07</td>
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</table>

**KEY:**
- Category A—where injury occurred and an accident report was filed
- Category B—where victim was transported to hospital for further treatment but released on the same day
- Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
* significance found in this category
+ unable to compute due to small N size
years of accident totals for all three categories (.02) of YMCA certification (Table 2). The data tend to suggest that the individuals who possess the highest levels of certification are more conscious of the need for reporting accidents and are most likely to have the most accurate record keeping system. This reported significance does not infer any causal relationship between certification levels and accident incidence. Based on the data received, the first null hypothesis (there are no significant statistical relationships between certification levels of aquatic program directors and the incidence of accidents within YMCA aquatic programs) was accepted.

With regard to the other null hypotheses stated in Chapter I, all three hypotheses are accepted, based on the data received in this study.

**Hypothesis Two.** There are no significant statistical relationships between the length of experience as an aquatic professional and the incidence of accidents within YMCA aquatic programs.

Regarding years of experience, significance could only be found in the 1984 category (.02) and total three year category (.03) where the victim was transported to a hospital (and spent one night) when comparing these accidents with total professional experience (Table 4). The category of accidents where an accident report was filed yielded a significance of .06 during the three year period, while the next closest level of significance was at the .27 level (Table 4).

**Hypothesis Three.** There are no significant statistical relationships between tenure (of position) of aquatic program
TABLE 4

Professional Experience by Categories A, B, and C

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
</tr>
</thead>
<tbody>
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<td>C</td>
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<td>15.51</td>
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</tbody>
</table>

**KEY:**
- Category A--where injury occurred and an accident report was filed
- Category B--where victim was transported to hospital for further treatment but released on the same day
- Category C--where victim was transported to hospital, and was required to spend a minimum of 1 night in the hospital
* significance found in this category
+ unable to compute due to small N size
directors and the incidence of accidents within YMCA aquatic programs.

Regarding professional tenure, .10 was the closest significance value found for any of the accident categories (whether it was an individual or collective basis); this occurred when comparing accidents with the 1983 category of hospitalization/released on the same day (Table 5).

Hypothesis Four. There are no significant statistical relationships between multiple aquatic certifications and the incidence of accidents within YMCA aquatic programs.

In terms of the MANOVA statistical treatment for directors with multiple certifications (YMCA and Red Cross), no significance could be found when utilizing the different certifications as independent variables (Table 6). Effects of Red Cross certification found no significance (.11, .10 and .11) for the years 1984-82 in the category where an accident report was filed, but no further follow-up care was necessary (Table 7); effects of YMCA certification also elicited results of no significance (Table 8). When the data are analyzed according to the constant of adjusting the mean scores for interception (Table 9), significance was found in the category where victims are transported to hospitals (but released the same day). The collapse of the certification levels to one constant allows one to infer on a general basis only; namely, that certification (for one injury category only) appears to be related to an increased sense of potential injury severity as evidenced by the securement of medical
### TABLE 5

Tenure of Position by Categories A, B, and C

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
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<td>A</td>
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<td>C</td>
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</tr>
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<td>+</td>
<td>.72</td>
<td>.61</td>
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<tr>
<td>df</td>
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<td>40</td>
<td>8</td>
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<td>128</td>
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<td>+</td>
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<td>65.15</td>
<td>+</td>
<td>181.48</td>
<td>128.51</td>
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</table>

**KEY:**
- Category A--where injury occurred and an accident report was filed
- Category B--where victim was transported to hospital for further treatment but released on the same day
- Category C--where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
* significance found in this category
+ unable to compute due to small N size
**TABLE 6**

**MANOVA Analysis**

**Effect of YMCA by Red Cross**

<table>
<thead>
<tr>
<th></th>
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<th>1983</th>
<th>1982</th>
</tr>
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<tbody>
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</tr>
</tbody>
</table>

Significance Value for F = 3.24
D.F. = (3, 16)
p = .05 level

**KEY:**
- Category A—where injury occurred and an accident report was filed
- Category B—where victim was transported to hospital for further treatment but released on same day
- Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
+ unable to compute due to small N size

**TABLE 7**

**MANOVA Analysis**

**Effect of Red Cross**

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Significance</td>
<td>.11</td>
<td>.51</td>
<td>.55</td>
</tr>
<tr>
<td>F</td>
<td>2.18</td>
<td>.85</td>
<td>.78</td>
</tr>
</tbody>
</table>

Significance Value for F = 3.24
D.F. = (4, 16)
p = .05 level

**KEY:**
- Category A—where injury occurred and an accident report was filed
- Category B—where victim was transported to hospitals for further treatment but released on same day
- Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
+ unable to compute due to small N size
### Table 8

**MANOVA Analysis**

**Effect of YMCA**

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>.83</td>
<td>.91</td>
<td>.94</td>
</tr>
<tr>
<td>B</td>
<td>.72</td>
<td>.68</td>
<td>+</td>
</tr>
<tr>
<td>C</td>
<td>.92</td>
<td>.98</td>
<td>.96</td>
</tr>
</tbody>
</table>

**Significance Value for F =** 2.85

**D.F. = (5, 16)**

**p = .05 level**

**KEY:**
- Category A—where injury occurred and an accident report was filed
- Category B—where victim was transported to hospital for further treatment but released on same day
- Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital

+ unable to compute due to small N size

### Table 9

**MANOVA Analysis**

**Effect of Constant**

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>.00</td>
<td>.02*</td>
<td>.83</td>
</tr>
<tr>
<td>B</td>
<td>.00</td>
<td>.02*</td>
<td>+</td>
</tr>
<tr>
<td>C</td>
<td>.00</td>
<td>.44</td>
<td>.30</td>
</tr>
</tbody>
</table>

**Significance Value for F =** 4.49

**D.F. = (1, 16)**

**p = .05 level**

**KEY:**
- Category A—where injury occurred and an accident report was filed
- Category B—where victim was transported to hospital for further treatment but released on same day
- Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital

+ unable to compute due to small N size
care at a level beyond that of immediate first aid (emergency room care at hospitals).

**Analysis of Other Pertinent Data**

Chi Square analyses were computed for variables within the survey in comparison to the incidence of injuries in each reported category. No significance was found when comparing the percentage of time spent "on deck" by directors when directly supervising aquatic activities. A significance level of .03 was found in 1982 where victims were transported to hospitals and spent a minimum of one night in the hospital (Table 10). Those who did not allow diving in their facilities had significance levels of .0038 and .0022 for categories "A" and "B" during 1984, levels of .0035 and .0001 for the year 1983, and levels of .06 and .0037 during 1982 for the same accident categories. The three year total of 1982-84 reported a significance level of .01 (Table 11). This suggests that those who did not allow diving at all in their facilities reported a lessened frequency of accidents.

In terms of the amount of users per week, the only area where a significant difference could be found (.0011) was during 1983 where victims were transported to hospitals and released on the same day (Table 12). Other categories analyzed (or limited) where no significance could be found included the following: participants per year (except for category "B" for 1983 which was .03 level; see Table 13), the percentage of time the director spends on aquatic related activities (Table 14), facilities where there was an existence of a one meter diving board (Table 15), facilities which allowed diving in
TABLE 10

Hours Spent "On Deck" Per Week by Categories A, B, and C

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>Total</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>Total</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>ABC</td>
<td>ABC</td>
<td>ABC</td>
<td>ABC</td>
<td>ABC</td>
<td>ABC</td>
<td>ABC</td>
<td>ABC</td>
<td>ABC</td>
<td>ABC</td>
</tr>
<tr>
<td>Significance</td>
<td>.60</td>
<td>.30</td>
<td>.73</td>
<td>.77</td>
<td>.66</td>
<td>.91</td>
<td>+</td>
<td>.74</td>
<td>.45</td>
<td>.95</td>
</tr>
<tr>
<td>df</td>
<td>378</td>
<td>105</td>
<td>21</td>
<td>441</td>
<td>288</td>
<td>108</td>
<td>+</td>
<td>342</td>
<td>182</td>
<td>28</td>
</tr>
<tr>
<td>$X^2$</td>
<td>369.90</td>
<td>111.78</td>
<td>16.67</td>
<td>418.73</td>
<td>277.53</td>
<td>88.16</td>
<td>+</td>
<td>324.50</td>
<td>183.28</td>
<td>16.48</td>
</tr>
<tr>
<td>Significance Value for $X^2$</td>
<td>424.05</td>
<td>129.63</td>
<td>32.67</td>
<td>490.67</td>
<td>328.29</td>
<td>132.97</td>
<td>+</td>
<td>385.84</td>
<td>214.19</td>
<td>41.34</td>
</tr>
</tbody>
</table>

KEY: Category A—where injury occurred and an accident report was filed
Category B—where victim was transported to hospital for further treatment but released on the same day
Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
* significance found in this category
+ unable to compute due to small N size
### TABLE 11
No Diving Allowed by Categories A, B, and C

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th></th>
<th></th>
<th>1983</th>
<th></th>
<th></th>
<th>1982</th>
<th></th>
<th></th>
<th>Category Totals</th>
<th>Total Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Significance</td>
<td>.0038*</td>
<td>.0022</td>
<td>.6362</td>
<td>.01*</td>
<td>.0035*</td>
<td>.0001*</td>
<td>+</td>
<td>.02*</td>
<td>.06</td>
<td>.0037*</td>
<td>.89</td>
</tr>
<tr>
<td>df</td>
<td>36</td>
<td>10</td>
<td>2</td>
<td>42</td>
<td>32</td>
<td>12</td>
<td>+</td>
<td>38</td>
<td>26</td>
<td>4</td>
<td>28</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>62.73</td>
<td>27.50</td>
<td>.90</td>
<td>64.22</td>
<td>57.74</td>
<td>40.63</td>
<td>+</td>
<td>57.24</td>
<td>37.79</td>
<td>15.52</td>
<td>.34</td>
</tr>
<tr>
<td>Significance Value for $\chi^2$</td>
<td>50.46</td>
<td>10.31</td>
<td>5.99</td>
<td>58.10</td>
<td>46.16</td>
<td>21.03</td>
<td>53.35</td>
<td>38.08</td>
<td>9.49</td>
<td>9.49</td>
<td>41.34</td>
</tr>
</tbody>
</table>

**KEY:**
- Category A—where injury occurred and an accident report was filed
- Category B—where victim was transported to hospital for further treatment but released on the same day
- Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
- * significance found in this category
- + unable to compute due to small N size
<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
</tr>
</thead>
<tbody>
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<td></td>
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<td>B</td>
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</tr>
<tr>
<td>Significance</td>
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<td>.89</td>
<td>.97</td>
</tr>
<tr>
<td>df</td>
<td>102</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>$X^2$</td>
<td>99.32</td>
<td>20.91</td>
<td>1.26</td>
</tr>
<tr>
<td>Significance Value for $X^2$</td>
<td>126.28</td>
<td>43.77</td>
<td>12.59</td>
</tr>
</tbody>
</table>

KEY: Category A--where injury occurred and an accident report was filed
Category B--where victim was transported to hospital for further treatment but released on the same day
Category C--where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
* significance found in this category
+ unable to compute due to small N size
### TABLE 13

Participants Per Year in Thousands by Categories A, B, and C

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>A</td>
<td>.38</td>
<td>.50</td>
<td>.36</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>ABC</td>
<td>ABC</td>
<td>ABC</td>
</tr>
<tr>
<td>df</td>
<td>400</td>
<td>125</td>
<td>25</td>
</tr>
<tr>
<td>df</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>df</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x²</td>
<td>497.65</td>
<td>120.81</td>
<td>26.89</td>
</tr>
<tr>
<td>x²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value for x²</td>
<td>447.34</td>
<td>151.80</td>
<td>37.65</td>
</tr>
</tbody>
</table>

**KEY:**
- Category A—where injury occurred and an accident report was filed
- Category B—where victim was transported to hospital for further treatment but released on the same day
- Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
- * significance found in this category
- + unable to compute due to small N size
TABLE 14
Percentage of Work Week Spent in Aquatics by Categories A, B, and C

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Significance</td>
<td>.74</td>
<td>.77</td>
<td>.67</td>
</tr>
<tr>
<td>df</td>
<td>342</td>
<td>95</td>
<td>19</td>
</tr>
<tr>
<td>$X^2$</td>
<td>324.18</td>
<td>84.53</td>
<td>15.74</td>
</tr>
<tr>
<td>Significance Value for $X^2$</td>
<td>385.84</td>
<td>118.74</td>
<td>30.14</td>
</tr>
</tbody>
</table>

KEY: Category A--where injury occurred and an accident report was filed
Category B--where victim was transported to the hospital for further treatment but released on the same day
Category C--where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
* significance found in this category
+ unable to compute due to small N size


<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th></th>
<th></th>
<th>1983</th>
<th></th>
<th></th>
<th>1982</th>
<th></th>
<th></th>
<th>Category Totals</th>
<th>Total Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>Total ABC</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>Total ABC</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Significance</td>
<td>.37</td>
<td>.43</td>
<td>.20</td>
<td>.07</td>
<td>.29</td>
<td>.11</td>
<td>+</td>
<td>.32</td>
<td>.20</td>
<td>.96</td>
<td>.62</td>
</tr>
<tr>
<td>df</td>
<td>36</td>
<td>10</td>
<td>2</td>
<td>42</td>
<td>32</td>
<td>12</td>
<td>+</td>
<td>38</td>
<td>26</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>37.54</td>
<td>10.10</td>
<td>3.13</td>
<td>55.71</td>
<td>35.90</td>
<td>18.04</td>
<td>+</td>
<td>41.27</td>
<td>31.51</td>
<td>0.60</td>
<td>2.59</td>
</tr>
<tr>
<td>Significance Value for $\chi^2$</td>
<td>50.96</td>
<td>18.31</td>
<td>5.99</td>
<td>58.10</td>
<td>46.16</td>
<td>21.03</td>
<td></td>
<td>53.35</td>
<td>38.88</td>
<td>9.49</td>
<td>9.49</td>
</tr>
</tbody>
</table>

**KEY:**
- Category A—where injury occurred and an accident report was filed
- Category B—where victim was transported to hospital for further treatment but released on the same day
- Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
- * significance found in this category
- + unable to compute due to small N size
the deep end (Table 16), or facilities which allowed diving in the shallow end of the pool (Table 17). In addition, throughout all of the crosstab tables and Chi Square analyses, no analysis was able to be performed for the year 1983 where victims were transported to hospitals for a minimum of one night. This was due to the fact that there were no accidents of this type reported in that year and category by all of the YMCA professionals who were surveyed. Across certification levels, little significance could be found in the analyses of accidents by tenure and accidents by years of experience by the different levels of YMCA certification and different levels of Red Cross certification. Three findings of significance are reported in Tables 20 and 32 at the .04, .05 and .03 levels respectively (Tables 18-33, Appendix F). These findings appear to be more closely related to N size than to incidence of accidents.
**TABLE 16**

Diving Allowed at Deep End By Categories A, B, and C

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Significance</td>
<td>.39</td>
<td>.44</td>
<td>.87</td>
</tr>
<tr>
<td>df</td>
<td>18</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>X²</td>
<td>18.94</td>
<td>4.77</td>
<td>.02</td>
</tr>
</tbody>
</table>

**KEY:**
- Category A—where injury occurred and an accident report was filed
- Category B—where victim was transported to hospital for further treatment but released on the same day
- Category C—where victim was transported to a hospital, and was required to spend a minium of 1 night in the hospital

* significance found in this category
+ unable to compute due to small N size
<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>Total ABC</td>
</tr>
<tr>
<td>Significance</td>
<td>.46</td>
<td>.32</td>
<td>.41</td>
<td>.11</td>
</tr>
<tr>
<td>df</td>
<td>98</td>
<td>5</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td>$X^2$</td>
<td>17.81</td>
<td>5.79</td>
<td>0.01</td>
<td>28.66</td>
</tr>
</tbody>
</table>

**KEY:**
- Category A—where injury occurred and an accident report was filed
- Category B—where victim was transported to hospital for further treatment but released on the same day
- Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
- * significance found in this category
- + unable to compute due to small N size
CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to analyze a variety of selected factors which were hypothesized as having an effect on the incidence of accidents within aquatic environments (only related to YMCAs). To the knowledge of the author of this study (through extensive review of pertinent literature), no other studies exist which pertain directly to an analysis of certification levels with incidence of accidents. The study utilized two written survey instruments returned by YMCAs which were from a selected seven state midwest region.

The first instrument was sent to 161 YMCAs in a nine state midwest region. Of the 135 respondents who returned the first instrument, 71 YMCAs were asked to complete a second instrument. Of the second instruments mailed, 61 were returned and all but 10 yielded data appropriate for examination.

Hypothesis Testing

Of the four null hypotheses tested, all were accepted, based on the data received in this study. The accepted hypotheses stated that there were no significant statistical relationships between:

1. the certification levels of aquatic program directors and incidence of accidents within YMCA aquatic programs.
2. the length of experience as an aquatic professional and the incidence of accidents within YMCA aquatic programs.
3. the tenure (of position) of aquatic program directors and the incidence of accidents within YMCA aquatic programs.
4. multiple aquatic certifications and the incidence of accidents within YMCA aquatic programs.

**Data Analysis**

Crosstabs were generated and chi square analysis calculated to extract data for selected factors in addition to the stated hypotheses. Based on the data received, no significant statistical differences could be found when comparing the incidence of accidents with various levels and types of aquatic certifications, the years of professional experience, the amount of time spent in a specific position, or combinations of these factors. The number of users per week and per year, the existence of springboard diving facilities, and the time spent by the director directly supervising aquatic activities did not appear to have a role in accident incidence; however, the exact nature of the role(s) was not clear. When diving was not permitted in a facility, there was a significant relationship regarding incidence of accidents.
Suggestions and Recommendations

Recommendations regarding future research examination of this topic include the following:

1. utilize a more populated section of the country, or conduct the study on a nationwide basis, or conduct the study within a major metropolitan association of YMCAs or group of metropolitan associations as compared to independent YMCAs.

2. conduct the study by making comparisons between different sections of the country.

3. increase the N size (and potential frequency reporting) by surveying a larger number of YMCAs. In many instances within the study, the N size and frequency was too small to analyze data and/or formulate conclusions.

4. increase the longitudinal span of years by a 10 year study.

5. conduct the study exclusively within independent YMCAs.

6. conduct the study comparing metropolitan associations with independent YMCAs.

7. examine factors associated with subordinate staff members (certifications/qualifications, hiring procedures, and/or pre-employment orientation, in-service training, etc.) and their effects on aquatic safety.
Dear Sir:

I am writing to you in regard to my graduate studies here at the University of Nebraska at Omaha. I am a Graduate Assistant pursuing a Master's Degree in Recreation/Leisure Studies. As a potential thesis research topic, I am investigating the possibility of a multi-state, safety survey related to YMCA aquatic programs.

Prior to attending UNO, I served for two years as an aquatic professional at the Sidney YMCA in Ohio. I plan to continue my aquatic career in the YMCA upon completing my masters, thus my topic is of significant interest and relevance to me personally.

It would be a tremendous help if you would complete the "Preliminary Survey" that is enclosed. As you will notice, I have enclosed a self-addressed stamped envelope. Please return within one week if at all possible.

If you have any questions, please feel free to contact me here at UNO at (402) 554-2539. My thanks for your time, help, and cooperation.

Sincerely,

J. B. Smith
Graduate Assistant-Aquatics
PRELIMINARY SURVEY

1. Does your YMCA have an aquatic facility?  ____ Yes  ____ No
   If answer is no, skip all questions, sign name and position at bottom and please return.

2. How many aquatic facilities do you have?
   ____ 1  ____ 3
   ____ 2  ____ more than 3

3. What type of aquatic facility(ies) do you have?
   ____ indoor pool  ____ lake/pond
   ____ outdoor pool  ____ other

4. How long has your aquatic facility been in use?
   ____ less than 1 year  ____ 5-10 years
   ____ 1-2 years  ____ more than 10 years
   ____ 3-4 years

5. What are the dimensions and the shape of the aquatic facility?

6. At a future date, would you be willing to take the time to answer a survey about your aquatic facility regarding the total number of participants, the certification of employees, accidents, etc.?*  ____ Yes  ____ No

   *If you are willing to participate in this study, neither you nor your YMCA will, at any time, be identified. Information received in a future survey will be used for statistical analysis only. Also, if you participate in the future survey, a copy of the results of the study will be sent to you (at no charge) for participating in the study.

NAME:  ____________________________________________________________

POSITION:  ________________________________________________________
February __, 1985

Contact Person
Position
YMCA Name
Address
City, State, Zip Code

Dear __________:

This letter is in reference to previous correspondence dated October 11, 1984, regarding my thesis project and the preliminary survey which you completed and returned.

I have selected your YMCA as one that I will survey with my final research instrument. This survey should be completed by the individual at your YMCA who is directly responsible for the activities conducted in your indoor swimming pool. If you have any questions regarding the instrument, please feel free to contact me here at UNO (402-554-2539) or at my home (402-346-6877) at any time. I would appreciate that you have the survey completed and returned in the enclosed envelope within one week if possible.

Again, I would like to reiterate that all information is confidential and all data will be used for statistical analysis only. Neither you nor your YMCA will be identified at any time. For completing this survey, I will send you a copy of the results of my study when they become available.

My thanks to you for your help, time, and cooperation.

Sincerely,

J. B. Smith
Graduate Assistant-Aquatics
SECTION I--PERSONAL DATA SHEET

(To be completed by individual who is directly responsible for aquatic programming)

1. Demographic Data:
   - Male Age: ______  __20 years or younger ___36-40 yrs.
   - Female ______ 21-25 yrs. ___41-45 yrs.
   - 26-30 yrs. ___46-50 yrs.
   - 31-35 yrs. ___51 yrs. or more

2. Title of professional position: ___________________________________

3. Educational level completed:
   - high school ______ post high school (number of yrs. of each)
   - degree(s) (please circle) A.A./ B.S./ B.A./ M.S./ M.A.
   - other (specify) ______________________________________
   - educational specialization (i.e., history, mathematics, physical education, etc.) ______________________________

4. What is your highest level of YMCA aquatic certification?
   - YMCA Aquatic Director ______ YMCA Lifesaving/Lifeguarding
   - YMCA Aquatic Instructor ______ YMCA Specialist Instructor
   - YMCA Lifesaving/ Swimming Instructor (specify) ______________________________

5. What is your highest level of Red Cross aquatic certification?
   - Red Cross Water Safety ______ Red Cross Lifeguarding
   - Instructor-Trainer ______ Red Cross Advanced Lifesaving
   - Red Cross Water Safety Instructor (specify) ______________________________
   - Red Cross Lifeguarding Instructor ______________________________

6. If you have other aquatic certifications, please list them in the space provided. ____________________________________________________________

7. How long have you held the position of direct responsibility for the direction of aquatic programs at your YMCA?
   - years ______ months

8. How long have you been employed as a full-time aquatic professional (total number of years and months in all aquatic positions--exclusive of part-time and seasonal employment)?
   - Years ______ Months

9. How many hours per week do you spend personally supervising the activities that are conducted in your YMCA's indoor pool (hours spent "on the deck")?
   - Hours ______

10. What percentage of your total work time is devoted exclusively to your position as the director of aquatic programming? _____ %

11. Approximately, what is the average number of total hours you spend each week on the job? ______ Hours

12. How many total hours per week combined do other persons have direct supervision of the indoor swimming pool (assistants, volunteers, etc.)?
   - Hours ______
SECTION II--POOL DATA SURVEY

13. During an average week, approximately how many people use the indoor swimming pool at your YMCA?

- 0-99
- 100-249
- 250-499
- 500-999
- 1,000-1,999

14. Rounded off to the nearest thousand, how many persons use the indoor swimming pool at your YMCA each year?

15. What is the shape of the indoor swimming pool at your YMCA?

- rectangular
- T-shaped
- L-shaped
- other (specify)

16. What is the length and width of the indoor swimming pool at your YMCA?

<table>
<thead>
<tr>
<th>Length</th>
<th>Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 feet</td>
<td>25 meters</td>
</tr>
<tr>
<td>50 feet</td>
<td>80 feet</td>
</tr>
<tr>
<td>60 feet</td>
<td>100 feet</td>
</tr>
<tr>
<td>70 feet</td>
<td>150 feet</td>
</tr>
<tr>
<td>75 feet</td>
<td>other—distance =</td>
</tr>
</tbody>
</table>

17. What are the maximum and minimum depths of your indoor swimming pool at your YMCA?

- feet—maximum (deepest point)
- feet—minimum (most shallow point)

18. In a typical year, how many weeks is the indoor pool at your YMCA open for use? ___ weeks

19. What type and how many diving boards are present at your indoor swimming pool?

- none
- 1 meter
- 3 meter
- other—specify

20. Check the areas where diving is permitted:

- deck—shallow
- 1 meter board
- no diving permitted
- deck—deep
- 3 meter board
- other—specify

21. How many aquatic related accidents occurred in each of the last three years in each of the following categories:

   a. first aid was administered, an accident report was filed, but victim was not transported to a hospital for followup care.
   
   ___ 1984    ___ 1983    ___ 1982

   b. the victim was transported to a hospital, treated and released the same day.
   
   ___ 1984    ___ 1983    ___ 1982

   c. the victim was transported to a hospital, treated and was required to spend a minimum of one night in the hospital.
   
   ___ 1984    ___ 1983    ___ 1982

   d. as a direct result of aquatic factors, the victim died.
   
   ___ 1984    ___ 1983    ___ 1982
APPENDIX C

SOURCE: Proceedings of Tenth National YMCA Aquatic Conference Report

(Indiana University of Pennsylvania, August 10-14, 1983).
Any Lifesaving/Guarding certification will be accepted.

I. Y-BAL: Basic Aquatic Leadership (8 hours):
   A. Done locally
   B. Content
      1. Y---Values
      2. Y---History and philosophy
      3. Basic mechanics---Bio-Mechanics
      4. Laws of learning, group theory, styles of teaching
   C. Conducted locally
   D. Sanctioned by Field Agent
   E. No renewal necessary

II. P.O.O.L. (Pool Operator on Location): if no other certification is desired, it is recommended that the person take the aquatic safety course (4 hours). P.O.O.L. course--8 hours. For custodians, YMCA staff or anyone managing a swimming facility.
   A. Deals with:
      1. Energy cost effectiveness
      2. Chemical cost effectiveness
      3. Filtration coast effectiveness
   B. Sanctioned by Aquatic Commissioner
   C. No renewal necessary

III. AQUATIC FACILITY MANAGER:
   A. Prerequisites: Lifesaving/guarding, B.A.L., P.O.O.L., minimum age 20. Course content 18 hours. For anyone managing an aquatic facility. Content geared toward supervision and administration. Sanctioned by Aquatic Commissioner. No renewal necessary. Up-date available.
      1. Training in fiscal management
      2. Training in marketing and promotion
      3. Training in scheduling
      4. Training in conflict resolution
      5. Training in writing policies, job descriptions
      6. Training in legal implications regarding the facility and program
      7. Training in insurance coverage
      8. Training in leadership training

IV. AQUATIC SPECIALTIES:
   A. Prerequisites: Lifesaving/guarding, B.A.L.
   B. Minimum age: Instructors, 17 years of age; Aquatic Leader, 15 years of age

V. INSTRUCTOR--LIFESAVING/LIFEGUARDING:
   A. Prerequisites: Lifesaving/Lifeguarding, B.A.L., age 18
   B. Course: 10-12 hours (parts of former B.A.L.)
   C. Course sanctioned by commissioners
VI. MASTER INSTRUCTOR:

A. Prerequisites: Current swimming instructor and lifesaving/lifeguarding certifications, age 20, 300 teaching hours recognized in an aquatic program, renew every three (3) years, minimum hours 15 to 18, emphasis is on teaching teachers

B. Course includes:
   1. Pool operation and public relations
   2. Stroke analysis
   3. YMCA literature and supplies
   4. Teaching methodology
   5. Methodology lab (pool)
   6. Review of specialty models
   7. Aquatic clinic administration
   8. Classroom presentations
   9. Analysis of progressive program
  10. Analysis of lifesaving/lifeguarding program
  11. Evaluation and testing

VII. AQUATIC ADMINISTRATOR:

A. Prerequisites: Age 21, aquatic facility manager and master instructor, geared for YMCA professionals, renew every five (5) years

B. Course includes:
   1. United Way relationship
   2. Writing board reports—statistics
   3. Work with committees and boards
   4. Legal implications
   5. Standards of performance
   6. Budgeting
   7. Profile of administrator
      a. Type of leadership
      b. Organizational analysis
   8. Time management
   9. Camp waterfront
  10. Competitive swimming—parent organizations
  11. Scuba
  12. Special aquatic swimming events

C. Sanctioned by Aquatic Commissioners
AQUATIC REORGANIZATION- PROPOSAL #2

FIRST AID

C.P.R.

LIFESAVING LIFEGUARDING

AQUATIC SPECIALTIES

LIFESAVING INSTRUCTOR

SWIMMING INSTRUCTOR

AQUATIC FACILITY MANAGER

AQUATIC DIRECTOR

AQUATIC ADMINISTRATOR

P.O.D.L. - Pool Operator on Location
PROPOSAL #2

FIRST AID: Any certification will be accepted—Red Cross, Emergency Medical Technician, Paramedic, etc.

C.P.R.: Any certification will be accepted—Red Cross, American Heart Association, etc.

P.O.O.L. (Pool Operator on Location): If no other certification is desired, the person must take aquatic safety course (4 hours), P.O.O.L. course (8 hours). For custodians, YMCA staff, and anyone managing a swimming facility. Instructed by Aquatic Director. Renew every three years. Deals with:
- energy cost effectiveness
- chemical cost effectiveness
- filtration cost effectiveness

LIFESAVING/LIFEGUARDING: Prerequisite—First aid or C.P.R., minimum age 15 years. Instructed by Lifesaving Instructor, Aquatic Instructor, or Aquatic Administrator. A prerequisite for Aquatic Facility Manager.

INSTRUCTOR-LIFESAVING/LIFEGUARDING: Prerequisite—Lifesaving/Lifeguarding. Must be 18 years of age, minimum hours 18, including lifesaving and lifeguarding. Course content as is (will remain the same). Renew every three years.

AQUATIC SPECIALTIES: Preschool/Synchronized/Special Populations/Diving

AQUATIC DIRECTOR: Prerequisites—current swimming instructor and lifesaving/lifeguarding institute, age 20 with 300 teaching hours, renew every three years. Emphasis is on teaching teachers. Course includes: Pool operation and public relations; stroke analysis; YMCA literature and supplies; teaching methodology; methodology lab (pool); review of specialty models; aquatic clinic administration; classroom presentations; analysis of progressive program; analysis of lifesaving/lifeguarding program; evaluation and testing.

AQUATIC FACILITY MANAGER: Prerequisites—lifesaving/lifeguarding, P.O.O.L., aquatic director; minimum age 20; course content 18 hours. For anyone managing an aquatic facility without YMCA certification. Content geared toward supervision and administration. Course taught by Aquatic Director. Renew every three years. Content includes:
Training in fiscal management
Training in marketing and promotion
Training in scheduling
Training in conflict resolution
Training in writing policies, commissions, job descriptions
Training in insurance coverage

AQUATIC ADMINISTRATOR: Prerequisites—age 20; aquatic facility manager and aquatic director. Conducted by Aquatic Commissioner. For professionals only, certified five years.
Course content:
United Way relationship
Writing board reports/statistics
Work with committees and boards
Legal implications
M.B.O.
Budgeting
Profile of administrator
Types of leadership
Organizational analysis
Time management

MISCELLANEOUS INFORMATION

1. CROSSOVER: YMCA Crossover is available for those current Red Cross Water Safety Instructors who wish to enter the YMCA Aquatic Program. Successful completion of the course will result in a certificate in B.A.L., swimming instructor and lifesaving/lifeguarding instructor.

2. CAMP WATERFRONT DIRECTOR: Minimum age 21, current YMCA lifesaving/lifeguarding instructor, current YMCA swimming instructor

3. CAMP ASSISTANT: Minimum age 18, current lifesaving/lifeguarding certification, current swimming instructor

4. CURRENT AQUATIC INSTRUCTORS (A.I.) are automatically made Master Instructors

5. CURRENT AQUATIC DIRECTORS (A.D.) will become Aquatic Administrators by attending an update

6. RENEWAL: If a person wants to renew in the seminar or certification area, he/she currently has, all he/she needs to do is attend that portion of the seminar or certification that deals with updated materials, take and successfully complete the appropriate test, either water, written, or both. It will be
possible to renew by participation as an instructor in the same course.

7. We want more detailed information in manuals for instructors so they can adequately manage the training of leaders in their respective seminars. This means rewriting most of the manuals to put more meat on the bones.

8. Recommend that the National Council implement this plan as soon as possible.
APPENDIX D

SOURCE: Millard Freeman, YMCA National Director for Underwater Activities, Norcross, GA.
YMCA AQUATIC DIRECTOR SEMINAR OUTLINE--MODEL INSTITUTE

I. Aquatic Administration (Classroom) 2.5 hours
   A. Facilities
      1. Design
      2. Sanitation
      3. Filtration
      4. Operation of swimming pools
   B. Leadership and leadership training
      1. Hiring staff, application, interviewing, contracts
      2. Staff pre-training
      3. Staff in-service training
      4. Staff supervision
      5. Staff in operation (communication, staff meetings, etc.)
   C. Profile of an administrator
      1. Types of leadership (autocratic, creative, laissez-faire, etc.)
      2. Organizational analysis—consultation and hierarchical structures

II. Progressive Program (Pool) 4 hours
   A. Philosophy of program (mind/body/spirit concept)
   B. Need for program (fitness, upgrading, etc.)
   C. Lectures series
   D. Skills levels
      1. Use of floatbelts, kickboards, pole techniques, etc.
      2. Polliwog, minnow, fish, flying fish, shark skills
      3. Series swim

III. Handicapped Swim Program (Classroom) 2 hours
   A. Description of Program—introduction of manual
   B. Administration
      1. Need
      2. Staffing and training
      3. Scheduling—time, space, facility
      4. Financing—staff costs, equipment, promotion
      5. Evaluating program (collecting data, information necessary to evaluate)
   C. Practical experience
      1. Demonstration (if possible)
      2. Candidate participation—optional, but whenever possible, candidates should be given opportunity to experience program
IV. Waterfront (Classroom) 1 hour  
A. Planning the waterfront facility  
B. Docks, mooring, shelters and equipment  
C. Maintenance  
D. Staff and staff training  
E. Program  

V. Preschool program (Classroom) 1.5 hours  
A. Description of program—introduction to manual  
B. Administration  
1. Need  
2. Staffing and training  
3. Scheduling—time, space, facility  
4. Financing—staff costs, equipment, promotion  
5. Evaluating program (collecting data, information necessary to evaluate)  
C. Practical experience  
1. Demonstration (if applicable)  
2. Candidate participation—optional, but whenever possible, candidates should be given the opportunity to participate  
D. Interpretive material—outlines, forms for record keeping or registration, or other materials to hand out to candidates  

VI. Lifesaving Workshop (Pool) 1 hour  
A. Interpretation of philosophy underlying YMCA lifesaving program  
B. Clarification of YMCA lifesaving skills  

VII. Competitive swimming (Classroom) 1 hour  
A. Description of program—organization of swim team  
B. Administration  
1. Need  
2. Staffing and training—use of parent groups  
3. Scheduling—time, space, facility  
4. Financing—costs, equipment, promotion  
5. Evaluating program (collecting data, information necessary to evaluate)  
C. Interpretive material—outlines, forms for record keeping, other pertinent materials to hand out to candidate to help in organization of swim team  

VIII. Synchronized Swimming (Pool) 2.5 hours  
A. Description of program—introduction of manual  
B. Administration  
1. Need  
2. Staffing and training  
3. Scheduling—time, space, facility
4. Financing—staff costs, equipment, promotion
5. Evaluating program (collecting data, information necessary to evaluate)

C. Practical experience
1. Demonstration
2. Candidate participation—optional, but candidates should be given opportunity to experience program

D. Interpretive material—outlines, forms for record keeping, other materials to hand out to candidates

IX. Diving (Pool) 1 hour
A. Description of program—introduction of manual
B. Administration
1. Need
2. Staffing and training
3. Scheduling—time, space, facility
4. Financing—staff costs, equipment, promotion
5. Evaluating program (collecting data, information necessary to evaluate)

C. Practical experience
1. Demonstration
2. Candidate participation—optional, but whenever possible, candidates should be given opportunity to experience program

D. Interpretive material—outlines, forms for record keeping or registration, or other materials to hand out to candidates

X. Scuba (Pool) 2 hours
A. Description of program—introduction of manual
B. Administration
1. Need
2. Staffing and training
3. Scheduling—time, space, facility
4. Financing—staff costs, equipment, promotion
5. Evaluation program (collecting data, information necessary to evaluate)

C. Practical experience
1. Demonstration—use of mask, fins and snorkel
2. Candidate participation—optional, but whenever possible, candidates should be given opportunity to experience program

D. Interpretive material—outlines, forms for record keeping or registration, or other materials to hand out to candidates

XI. Specialty Aquatic Swimming Events (Classroom) .5 hours
A. Learn-to-Swim campaigns (organization, scheduling, staffing, promotion, evaluation)
B. Other special events (100 mile swim, Christmas tree swim, turkey swim, staff marathon, etc.)

XII. Record Keeping and Materials (Classroom) 1.5 hours
A. Progressive swimming--master cards, parent report forms, registration techniques, etc.
B. New computerized system for registration and record keeping of leadership, lifesaving, etc., new emblems
C. Materials available from Association Press and/or other sources

XIII. Examination--take home, open book examination or project to be assigned as research
YMCA AQUATIC INSTRUCTOR INSTITUTE OUTLINE

I. Pool Operation and Public Relations (Classroom) 1 hour
   A. Interpretation of water conditions
   B. Interpretation of sanitation rules
   C. Air temperature relationship to pool water
   D. Testing chlorine and pH—demonstration
   E. Miscellaneous materials that help to interpret pool operation to the public

II. YMCA Literature and Supplies (Classroom) 1 hour
   A. Supplies and materials available from Association Press and other sources (bibliography)
   B. New computerized system of record keeping
   C. New emblems; procedure of obtaining
   D. YMCA organization

III. Progressive Program (Pool) 4 hours
   A. Philosophy of program (mind/body/spirit concept)
   B. Need for program (fitness, upgrading, etc.)
   C. Lecture series
   D. Skill levels
      1. Use of floatbelts, kickboards, pole techniques
      2. Polliwog, minnow, fish, flying fish, shark skills
      3. Series swim

IV. Lifesaving (Pool) 2 hours
   A. Principles and patterns of class organization (drills, formations, maximum use of pool and deck space in lifesaving class period)
   B. Methods of teaching lifesaving
   C. Skills and tools that a good lifesaving instructor needs—knowledge, teaching plans, presentation of material, etc.
   D. Differences between Red Cross and YMCA programs
   E. Review of skills that are unique to YMCA lifesaving

V. Teaching the Porpoise Swimming Program (Pool) 1.5 hours
   A. Review of skills in porpoise program with demonstration (emphasis on treading kicks, overarm sidestroke, inverted breaststroke, racing turns—front and back, water stunts). Other phases of program covered elsewhere. Movie suggested for smallcraft section.
   B. Format (2 plans)
      1. Break into small groups and participants do skills—assign leader to each group
      2. Use of station method—three or four instructors and rotate groups to each station teaching different sections at each station

70
VI. Stroke Analysis (Pool) 1.5 hours
A. Utilization of physical principles and kinesiology
   1. Break down into component parts—front crawl, back crawl, breaststroke, butterfly (use of bent arm techniques, whip kick, etc.)
B. Participation of candidates at time permits

VII. Methodology (Classroom) 3 hours
A. Teaching methods
   1. Command
   2. Part-whole
   3. Whole-part
   4. Reciprocal
   5. Task
   6. Problem solving
   7. Guided discovery
   8. Small group
   9. Station
B. Development of a training experience
   1. Content and design
   2. Environment and learning

VIII. Methodology Lab (Pool) 2 hours
A. Practical application of teaching methods
B. Carry out assignments given in methodology section

IX. Record Keeping (Classroom) 1 hour
A. Progressive swim program—master cards, registration techniques, parent report forms

X. Examination (to be developed)
APPENDIX E
**SECTION I - PERSONAL DATA SHEET**
(To be completed by individual who is directly responsible for aquatic programming)

1. Demographic Data:
   - Sex: Male
   - Age: 20 years or younger
   - Female
   - 21-25 yrs.
   - 26-30 yrs.
   - 31-35 yrs.
   - 36-40 yrs.
   - 41-45 yrs.
   - 46-50 yrs.
   - 51 yrs. or more

2. Title of professional position: **Aquatic Director**

3. Educational level completed:
   - high school
   - post high school (number of yrs of each)
   - degree(s) (please circle) A.A./ B.S. / B.A. / M.S. / M.A.
   - other (specify)
   - educational specialization (e.g., history, mathematics, physical education, etc.)

4. What is your highest level of YMCA aquatic certification?
   - YMCA Aquatic Director
   - YMCA Lifesaving/Lifeguarding Instructor
   - YMCA Aquatic Instructor
   - YMCA Specialist Instructor
   - YMCA Lifesaving/Swimming (specify)

5. What is your highest level of Red Cross aquatic certification?
   - Red Cross Water Safety Instructor
   - Red Cross Lifeguarding Instructor-Trainer
   - Red Cross Lifesaving/Swimming (specify)

6. If you have other aquatic certifications, please list them in the space provided.

7. How long have you held the position of direct responsibility for the direction of aquatic programs at your YMCA?
   - Years
   - Months

8. How long have you been employed as a full-time aquatic professional (total number of years and months in all aquatic positions-exclusive of part-time and seasonal employment)?
   - Years
   - Months

9. How many hours per week do you spend personally supervising the activities that are conducted in your YMCA's indoor pools (hours spent "on the deck")?
   - Hours

10. What percentage of your total work time is devoted exclusively to your position as the director of aquatic programming?
    - %
11. Approximately, what is the average number of total hours you spend each week on the job?  
70 hours

12. How many total hours per week combined do other persons have direct supervision of the indoor swimming pools (assistants, volunteers, etc.)?  
0 hours

SECTION II- POOL DATA SURVEY

13. During an average week, approximately how many people use the indoor swimming pools at your YMCA (total "head count" per week)?

<table>
<thead>
<tr>
<th>Head Count Range</th>
<th>Number</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-99</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>100-249</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>250-499</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>500-999</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1,000-1,999</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2,000-2,999</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3,000-3,999</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>4,000-4,999</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>5,000 or more</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

14. Rounded off to the nearest thousand, how many persons use the indoor swimming pools at your YMCA each year?  
1,000

15. What are the shapes of the indoor swimming pool at your YMCA?

<table>
<thead>
<tr>
<th>Shape</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectangular</td>
<td>2</td>
</tr>
<tr>
<td>L-shaped</td>
<td>0</td>
</tr>
<tr>
<td>T-shaped</td>
<td>0</td>
</tr>
<tr>
<td>Other (specify)</td>
<td>0</td>
</tr>
</tbody>
</table>

16. What is the length and width of the indoor swimming pool at your YMCA?

<table>
<thead>
<tr>
<th>Lengths (number of each)</th>
<th>Widths (in feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 feet</td>
<td>25 meters</td>
</tr>
<tr>
<td>60 feet</td>
<td>80 feet</td>
</tr>
<tr>
<td>70 feet</td>
<td>100 feet</td>
</tr>
<tr>
<td>75 feet</td>
<td>150 feet</td>
</tr>
<tr>
<td>Other-distance</td>
<td>30 feet A</td>
</tr>
<tr>
<td></td>
<td>33 feet B</td>
</tr>
</tbody>
</table>

17. What are the maximum and minimum depths of your indoor swimming pool at your YMCA?

<table>
<thead>
<tr>
<th>Maximum Depth</th>
<th>Minimum Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 feet</td>
<td>3 feet</td>
</tr>
<tr>
<td>6 feet</td>
<td>3 1/2 feet</td>
</tr>
<tr>
<td>7 feet</td>
<td>3 feet</td>
</tr>
</tbody>
</table>

18. In a typical year, how many weeks is the indoor pool at your YMCA open for use?  
50 weeks
19. Please answer the following questions regarding your indoor pools.

<table>
<thead>
<tr>
<th>Pool &quot;A&quot;</th>
<th>Pool &quot;B&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length (in feet)</td>
<td>Length (in feet)</td>
</tr>
<tr>
<td>Width (in feet)</td>
<td>Width (in feet)</td>
</tr>
</tbody>
</table>

Diving Boards (# of each)
- 1 meter
- 3 meter
- Other (specify)

Check Areas Where Diving is Permitted:
- Diving is not permitted in this pool
- Diving is not permitted in this pool
- Deck shallow
- Deck shallow
- Deck deep
- Deck deep
- 1 meter board
- 1 meter board
- 3 meter board
- 3 meter board

20. How many aquatic related accidents occurred in each of the last three years in each of the following categories:

a. First aid was administered, an accident report was filed, but victim was not transported to a hospital for follow-up care.
   - 1984
   - 1983
   - 1982

b. The victim was transported to a hospital, treated and released the same day.
   - 1984
   - 1983
   - 1982

c. The victim was transported to a hospital, treated and was required to spend a minimum of one night in the hospital.
   - 1984
   - 1983
   - 1982

d. As a direct result of aquatic factors, the victim died.
   - 1984
   - 1983
   - 1982

PLEASE RETURN TO:

CAMPUS RECREATION
SCHOOL OF HEALTH,
PHYSICAL EDUCATION AND RECREATION
UNIVERSITY OF NEBRASKA AT OMAHA
OMAHA, NEBRASKA 68182

[Signature]
Box A-3
SECTION I - PERSONAL DATA SHEET
(To be completed by individual who is directly responsible for aquatic programming)

1. Demographic Data:
   Sex:  X Male  Age:  20 years or younger  36-40 yrs.  
   Female  21-25 yrs.  41-45 yrs.  
   26-30 yrs.  46-50 yrs.  
   31-35 yrs.  51 yrs. or more  

2. Title of professional position: ________________________________

3. Educational level completed:
   High school  Post high school (number of yrs. of each)
   - degree(s) (please circle)  B.A. / B.S. / M.S. / M.A.
   - educational specialization
     (i.e. history, mathematics, physical education, etc.)

4. What is your highest level of YMCA aquatic certification?
   YMCA Aquatic Director  YMCA Lifesaving/Lifeguarding
   YMCA Aquatic Instructor  YMCA Specialist Instructor
   YMCA Lifesaving/Swimming (specify)

5. What is your highest level of Red Cross aquatic certification?
   Red Cross Water Safety  Red Cross Lifeguarding
   Instructor-Trainer  Red Cross Advanced Lifesaving
   Red Cross Water Safety  Other(s) (specify)
   Instructor  

6. If you have other aquatic certifications, please list them in the space provided.
   ____________________________________________________________

7. How long have you held the position of direct responsibility for the direction of aquatic programs at your YMCA?
   Years  Months

8. How long have you been employed as a full-time aquatic professional (total number of years and months in all aquatic positions-excluding part-time and seasonal employment)?
   Years  Months

9. How many hours per week do you spend personally supervising the activities that are conducted in your YMCA's indoor pools (hours spent "on the deck")?
   Hours

10. What percentage of your total work time is devoted exclusively to your position as the director of aquatic programming?
    %
11. Approximately, what is the average number of total hours you spend each week on the job?  

45 Hours

12. How many total hours per week combined do other persons have direct supervision of the indoor swimming pools (assistants, volunteers, etc.)?  

106 Hours

SECTION II- POOL DATA SURVEY

13. During an average week, approximately how many people use the indoor swimming pools at your YMCA (total "head count" per week)?  

<table>
<thead>
<tr>
<th></th>
<th>0-99</th>
<th>100-249</th>
<th>250-499</th>
<th>500-999</th>
<th>1,000-1,999</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>2,000-2,999</td>
<td>3,000-3,999</td>
<td>4,000-4,999</td>
<td>5,000 or more</td>
<td>1,000-1,999</td>
</tr>
</tbody>
</table>

14. Rounded off to the nearest thousand, how many persons use the indoor swimming pools at your YMCA each year?  

76,600

15. What are the shapes of the indoor swimming pool at your YMCA?  

<table>
<thead>
<tr>
<th>LENGTH</th>
<th>NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>rectangular</td>
</tr>
<tr>
<td></td>
<td>T-shaped</td>
</tr>
<tr>
<td></td>
<td>other (specify)</td>
</tr>
</tbody>
</table>

16. What is the length and width of the indoor swimming pool at your YMCA?  

<table>
<thead>
<tr>
<th>LENGTHS (number of each)</th>
<th>WIDTHS (in feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 feet</td>
<td>25 meters</td>
</tr>
<tr>
<td>50 feet</td>
<td>50 feet</td>
</tr>
<tr>
<td>70 feet</td>
<td>100 feet</td>
</tr>
<tr>
<td>75 feet</td>
<td>150 feet</td>
</tr>
<tr>
<td>other-distance</td>
<td>other-distance</td>
</tr>
</tbody>
</table>

17. What are the maximum and minimum depths of your indoor swimming pool at your YMCA?  

| 3/4 feet and 1/2 feet-maximum (deepest points) |
| 1/2 feet and 1/3 feet-minimum (most shallow points) |

18. In a typical year, how many weeks is the indoor pool at your YMCA open for use?  

50 weeks
19. Please answer the following questions regarding your indoor pools.

<table>
<thead>
<tr>
<th>Pool &quot;A&quot;</th>
<th>Pool &quot;B&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length (in feet)</strong></td>
<td><strong>Length (in feet)</strong></td>
</tr>
<tr>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td><strong>Width (in feet)</strong></td>
<td><strong>Width (in feet)</strong></td>
</tr>
<tr>
<td>20</td>
<td>18</td>
</tr>
<tr>
<td><strong>Diving Boards (# of each)</strong></td>
<td><strong>Diving Boards (# of each)</strong></td>
</tr>
<tr>
<td>1 meter</td>
<td>1 meter</td>
</tr>
<tr>
<td>3 meter</td>
<td>3 meter</td>
</tr>
<tr>
<td><strong>other (specify)</strong></td>
<td><strong>other (specify)</strong></td>
</tr>
</tbody>
</table>

Check Areas Where Diving is Permitted:
- diving is not permitted in this pool
- deck shallow
- deck deep
- 1 meter board
- 3 meter board
- 1 meter board
- 3 meter board

20. How many aquatic related accidents occurred in each of the last three years in each of the following categories:

a. first aid was administered, an accident report was filed, but victim was not transported to a hospital for follow-up care.
   - 1984
   - 1983
   - 1982

b. the victim was transported to a hospital, treated and released the same day.
   - 1984
   - 1983
   - 1982

c. the victim was transported to a hospital, treated and was required to spend a minimum of one night in the hospital.
   - 1984
   - 1983
   - 1982

d. as a direct result of aquatic factors, the victim died
   - 1984
   - 1983
   - 1982

PLEASE RETURN TO:

CAMPUS RECREATION
SCHOOL OF HEALTH, PHYSICAL EDUCATION AND RECREATION
UNIVERSITY OF NEBRASKA AT OMAHA
OMAHA, NEBRASKA 68182

Attn: J. O. Smith
Box A-4
SECTION I-PERSONAL DATA SHEET
(To be completed by individual who is directly responsible for aquatic programming)

1. Demographic Data:
Sex: Male ______ Female ________
Age: 20 years or younger ______ 21-25 yrs. ______ 26-30 yrs. ______ 31-35 yrs. ______ 36-40 yrs. ______ 41-45 yrs. ______ 46-50 yrs. ______ 51 yrs. or more ______

2. Title of professional position: ________________

3. Educational level completed:
________ high school __________ post high school (number of yrs. of each)
-degree(s) (please circle) A.A. / B.S. / B.A. / M.S. / M.A. __________
-educational specialization __________ (i.e. history, mathematics, physical education, etc.)

4. What is your highest level of YMCA aquatic certification?
YMCA Aquatic Director
YMCA Aquatic Instructor
YMCA Lifesaving/Swimming Instructor
YMCA Lifesaving/Lifeguarding __________
YMCA Specialist Instructor

5. What is your highest level of Red Cross aquatic certification?
Red Cross Water Safety Instructor
Red Cross Water Safety Instructor-Trainer
Red Cross Lifeguarding Instructor
Red Cross Lifeguarding Instructor
Red Cross Advanced Lifesaving Instructor
Red Cross Advanced Lifesaving Instructor-Trainer
Red Cross Lifeguarding Instructor
Red Cross Advanced Lifesaving Instructor
Red Cross Lifeguarding Instructor

6. If you have other aquatic certifications, please list them in the space provided.

7. How long have you held the position of direct responsibility for the direction of aquatic programs at your YMCA?
   ______ Years ______ Months

8. How long have you been employed as a full-time aquatic professional (total number of years and months in all aquatic positions—exclusive of part-time and seasonal employment)?
   ______ Years ______ Months

9. How many hours per week do you spend personally supervising the activities that are conducted in your YMCA's indoor pools (hours spent "on the deck")?
   ______ Hours

10. What percentage of your total work time is devoted exclusively to your position as the director of aquatic programming?
    ______%
11. Approximately, what is the average number of total hours you spend each week on the job? 
53 hours

12. How many total hours per week combined do other persons have direct supervision of the indoor swimming pools (assistants, volunteers, etc.)? 

SECTION II - POOL DATA SURVEY

13. During an average week, approximately how many people use the indoor swimming pools at your YMCA (total "head count" per week)?

<table>
<thead>
<tr>
<th>Number of People</th>
<th>Head Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-99</td>
<td>2,000-2,999</td>
</tr>
<tr>
<td>100-249</td>
<td>3,000-3,999</td>
</tr>
<tr>
<td>250-499</td>
<td>4,000-4,999</td>
</tr>
<tr>
<td>500-999</td>
<td>5,000 or more</td>
</tr>
</tbody>
</table>

14. Rounded off to the nearest thousand, how many persons use the indoor swimming pools at your YMCA each year?

15. What are the shapes of the indoor swimming pool at your YMCA?

<table>
<thead>
<tr>
<th>Length</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectangular</td>
<td>40 feet</td>
</tr>
<tr>
<td>L-shaped</td>
<td>50 feet</td>
</tr>
<tr>
<td>T-shaped</td>
<td>60 feet</td>
</tr>
<tr>
<td>Other</td>
<td>75 feet</td>
</tr>
</tbody>
</table>

16. What is the length and width of the indoor swimming pool at your YMCA?

<table>
<thead>
<tr>
<th>Lengths (number of each)</th>
<th>Widths (in feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 feet</td>
<td>25 meters</td>
</tr>
<tr>
<td>50 feet</td>
<td>80 feet</td>
</tr>
<tr>
<td>60 feet</td>
<td>100 feet</td>
</tr>
<tr>
<td>70 feet</td>
<td>150 feet</td>
</tr>
<tr>
<td>75 feet</td>
<td>other-distance</td>
</tr>
</tbody>
</table>

17. What are the maximum and minimum depths of your indoor swimming pool at your YMCA?

<table>
<thead>
<tr>
<th>Maximum Depths</th>
<th>Minimum Depths</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 feet</td>
<td>2 feet</td>
</tr>
<tr>
<td>12 feet</td>
<td>10 feet</td>
</tr>
</tbody>
</table>

18. In a typical year, how many weeks is the indoor pool at your YMCA open for use?

52 weeks
19. Please answer the following questions regarding your indoor pools.

Pool "A"  
Length (in feet)  
Width (in feet)  
Diving Boards (# of each)  
1 meter  
3 meter  
other (specify)  

---

Pool "B"  
Length (in feet)  
Width (in feet)  
Diving Boards (# of each)  
1 meter  
3 meter  
other (specify)  

---

Check Areas Where Diving is Permitted:  
___ diving is not permitted in this pool  
___ deck shallow  
___ deck deep  
___ 1 meter board  
___ 3 meter board  

---

20. How many aquatic related accidents occurred in each of the last three years in each of the following categories:

a. first aid was administered, an accident report was filed, but victim was not transported to a hospital for follow-up care.
   
   ___ 1984  ___ 1983  ___ 1982

b. the victim was transported to a hospital, treated and released the same day.
   
   ___ 1984  ___ 1983  ___ 1982

c. the victim was transported to a hospital, treated and was required to spend a minimum of one night in the hospital.
   
   ___ 1984  ___ 1983  ___ 1982

d. as a direct result of aquatic factors, the victim died
   
   ___ 1984  ___ 1983  ___ 1982

---

PLEASE RETURN TO:

CAMPUS RECREATION
SCHOOL OF HEALTH, PHYSICAL EDUCATION AND RECREATION
UNIVERSITY OF NEBRASKA AT OMAHA
OMAHA, NEBRASKA 68182
Attn: J. B. Smith
Box F-2
# TABLE 18

Accidents With Tenure by YMCA Certification

YMCA = 0 (No YMCA Aquatic Certification)

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>Total ABC</td>
</tr>
<tr>
<td>Significance</td>
<td>.27</td>
<td>.40</td>
<td>.59</td>
</tr>
<tr>
<td>df</td>
<td>6</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>7.50</td>
<td>2.91</td>
<td>1.87</td>
</tr>
</tbody>
</table>

**KEY:**
Category A—where injury occurred and an accident report was filed
Category B—where victim was transported to hospital for further treatment but released on the same day
Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
* significance found in this category
+ unable to compute due to small N size
TABLE 19

Accidents With Tenure by YMCA Certification

YMCA = 1 (Aquatic Director Certification)

|          | 1984 |  | Total | 1983 |  | Total | 1982 |  | Total | Category Totals | Total Overall |
|----------|------|---|--|------|---|--|------|------|---|------|-----------------|--------------|
|          | A    | B | C | A    | B | C | A    | B   | C | A    | B   | C              |              |
| Significance | .51 | .80 | .76 | .40 | .45 | .24 | +    | .60 | .44 | .16 | .65 | .64 | .45 | .27 | .42 | .45 |
| df       | 70   | 12 | 6 | 60   | 60 | 21 | +    | 54  | 35 | 12 | 5   | 30  | 45  | 20  | 5   | 45  |
| $X^2$    | 68.87 | 7.67 | 3.35 | 61.97 | 60.62 | 25.02 | +    | 50.62 | 35.50 | 16.54 | 3.27 | 26.50 | 54.33 | 23.25 | 4.88 | 45.33 |
| Significance Value for $X^2$ | 90.53 | 21.03 | 12.59 | 79.08 | 79.08 | 32.67 | +    | 72.52 | 49.76 | 21.03 | 11.07 | 43.77 | 61.62 | 31.41 | 11.07 | 61.62 |

KEY: Category A--where injury occurred and an accident report was filed
Category B--where victim was transported to hospital for further treatment but released on the same day
Category C--where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
* significance found in this category
+ unable to compute due to small N size
### TABLE 20

Accidents With Tenure by YMCA Certification

YMCA = 2 (Aquatic Instructor Certification)

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th></th>
<th></th>
<th>1983</th>
<th></th>
<th></th>
<th>1982</th>
<th></th>
<th></th>
<th>Category</th>
<th>Totals</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>Total</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>Total</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>Significance</td>
<td>.53</td>
<td>.11</td>
<td>.70</td>
<td>.37</td>
<td>.35</td>
<td>.54</td>
<td>+</td>
<td>.43</td>
<td>.36</td>
<td>.04*</td>
<td>.34</td>
<td>.29</td>
</tr>
<tr>
<td>df</td>
<td>60</td>
<td>25</td>
<td>5</td>
<td>60</td>
<td>40</td>
<td>16</td>
<td>+</td>
<td>40</td>
<td>28</td>
<td>8</td>
<td>4</td>
<td>36</td>
</tr>
<tr>
<td>( \chi^2 )</td>
<td>58.50</td>
<td>33.65</td>
<td>3.00</td>
<td>63.00</td>
<td>50.16</td>
<td>14.66</td>
<td>+</td>
<td>40.83</td>
<td>30.00</td>
<td>15.71</td>
<td>4.44</td>
<td>40.00</td>
</tr>
<tr>
<td>Significance Value for ( \chi^2 )</td>
<td>79.08</td>
<td>37.65</td>
<td>11.07</td>
<td>79.08</td>
<td>65.15</td>
<td>26.30</td>
<td>+</td>
<td>55.75</td>
<td>41.34</td>
<td>15.51</td>
<td>9.49</td>
<td>50.96</td>
</tr>
</tbody>
</table>

**KEY:**
- Category A -- where injury occurred and an accident report was filed
- Category B -- where victim was transported to hospital for further treatment but released on the same day
- Category C -- where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
- * significance found in this category
- + unable to compute due to small N size
<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Total</td>
<td>ABC</td>
<td>ABC</td>
<td>ABC</td>
</tr>
<tr>
<td>Significance</td>
<td>.40</td>
<td>.68</td>
<td>.30</td>
</tr>
<tr>
<td>df</td>
<td>6</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>$X^2$</td>
<td>5.50</td>
<td>.75</td>
<td>2.40</td>
</tr>
<tr>
<td>Significance Value for $X^2$</td>
<td>12.59</td>
<td>5.99</td>
<td>5.99</td>
</tr>
</tbody>
</table>

**KEY:**
- Category A--where injury occurred and an accident report was filed
- Category B--where victim was transported to hospital for further treatment but released on the same day
- Category C--where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
  - * significance found in this category
  - + unable to compute due to small N size

+ unable to compute due to small N size
### TABLE 22

Accidents With Years in Profession by YMCA Certification

YMCA = 0 (No YMCA Certification)

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th></th>
<th></th>
<th>1983</th>
<th></th>
<th></th>
<th>1982</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>Total</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>Total</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td>ABC</td>
<td></td>
<td></td>
<td>ABC</td>
<td></td>
<td></td>
<td>ABC</td>
<td></td>
<td>ABC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>.27</td>
<td>.40</td>
<td>.59</td>
<td>.25</td>
<td>.21</td>
<td>+</td>
<td>.21</td>
<td>.19</td>
<td>.22</td>
<td>+</td>
<td>.19</td>
<td>.22</td>
</tr>
<tr>
<td>df</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>9</td>
<td>9</td>
<td>+</td>
<td>9</td>
<td>4</td>
<td>2</td>
<td>+</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>7.50</td>
<td>2.91</td>
<td>1.87</td>
<td>11.25</td>
<td>12.00</td>
<td>+</td>
<td>12.00</td>
<td>6.00</td>
<td>3.00</td>
<td>+</td>
<td>6.00</td>
<td>6.00</td>
</tr>
</tbody>
</table>

**KEY:**
- Category A—where injury occurred and an accident report was filed
- Category B—where victim was transported to hospital for further treatment but released on the same day
- Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
* significance found in this category
+ unable to compute due to small N size
TABLE 23

Accidents With Years in Profession by YMCA Certification

YMCA = 1 (Aquatic Director Certification)

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>ABC</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total</td>
</tr>
<tr>
<td>Significance</td>
<td>.83</td>
<td>.92</td>
<td>.12</td>
</tr>
<tr>
<td>df</td>
<td>60</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>( \chi^2 )</td>
<td>49.25</td>
<td>4.53</td>
<td>8.57</td>
</tr>
</tbody>
</table>

**Significance Value for \( \chi^2 \)** | 79.08 | 18.31 | 11.07 | 67.50 | 67.50 | 26.87 | +    | 61.62 | 41.34 | 18.31 | 9.49 | 36.42 | 50.96 | 26.30 | 9.49 | 50.96 |

**KEY:** Category A—where injury occurred and an accident report was filed
Category B—where victim was transported to hospital for further treatment but released on the same day
Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
* significance found in this category
+ unable to compute due to small N size
TABLE 24

Accidents With Years in Profession by YMCA Certification

YMCA = 2 (Aquatic Instructor Certification)

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th></th>
<th>1983</th>
<th></th>
<th>1982</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Total ABC</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>Total ABC</td>
<td>A</td>
</tr>
<tr>
<td>Significance</td>
<td>.24</td>
<td>.25</td>
<td>.06</td>
<td>.23</td>
<td>.27</td>
<td>.32</td>
</tr>
<tr>
<td>df</td>
<td>84</td>
<td>35</td>
<td>7</td>
<td>84</td>
<td>72</td>
<td>24</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>92.80</td>
<td>40.20</td>
<td>13.20</td>
<td>93.00</td>
<td>78.75</td>
<td>26.50</td>
</tr>
<tr>
<td>Significance Value for $\chi^2$</td>
<td>106.31</td>
<td>49.76</td>
<td>14.07</td>
<td>106.31</td>
<td>92.80</td>
<td>36.42</td>
</tr>
</tbody>
</table>

KEY: Category A—where injury occurred and an accident report was filed
       Category B—where victim was transported to hospital for further treatment but released on the same day
       Category C—where victim was transported to a hospital for further treatment and was required to spend a minimum of 1 night in the hospital
       * significance found in this category
       + unable to compute due to small N size

88
TABLE 25
Accident With Years in Profession by YMCA Certification

YMCA = 3 (Lifesaving/Swimming Instructor)

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th></th>
<th></th>
<th>Total</th>
<th>1983</th>
<th></th>
<th></th>
<th>Total</th>
<th>1982</th>
<th></th>
<th></th>
<th>Total</th>
<th>Category Totals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>ABC</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>ABC</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>ABC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>.31</td>
<td>.60</td>
<td>.49</td>
<td>.33</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>df</td>
<td>9</td>
<td>3</td>
<td>3</td>
<td>12</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>10.50</td>
<td>1.50</td>
<td>2.40</td>
<td>13.50</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Significance Value for $\chi^2$</td>
<td>16.92</td>
<td>7.82</td>
<td>7.82</td>
<td>21.03</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
</tbody>
</table>

KEY: Category A--where injury occurred and an accident report was filed
   Category B--where victim was transported to hospital for further treatment but released on the same day
   Category C--where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
   * significance found in this category
   + unable to compute due to small N size
### TABLE 26

Accidents With Tenure by Each Level of Red Cross

Red Cross = 0 (No Red Cross Certification)

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
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<td>B</td>
<td>C</td>
</tr>
<tr>
<td>df</td>
<td>9</td>
<td>3</td>
<td>+</td>
</tr>
<tr>
<td>$x^2$</td>
<td>12.00</td>
<td>4.00</td>
<td>+</td>
</tr>
<tr>
<td>Significance Value for $x^2$</td>
<td>16.92</td>
<td>7.82</td>
<td>+</td>
</tr>
</tbody>
</table>

**KEY:**
- Category A—where injury occurred and an accident report was filed
- Category B—where victim was transported to hospital for further treatment but released on the same day
- Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
- * significance found in this category
- + unable to compute due to small N size
<table>
<thead>
<tr>
<th>Year</th>
<th>Category</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>Total A</th>
<th>Total B</th>
<th>Total C</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1984</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

Significance

<table>
<thead>
<tr>
<th>df</th>
<th>Value for $\chi^2$</th>
<th>0.05</th>
<th>0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10.00</td>
<td>14.96</td>
</tr>
</tbody>
</table>

**KEY:**

- Category A: where injury occurred and an accident report was filed
- Category B: where victim was transported to hospital for further treatment but released on the same day
- Category C: where victim was transported to a hospital, and was required to spend a minimum of one night in the hospital

*Unable to compute due to small N size*
### TABLE 28

Accidents With Tenure by Each Level of Red Cross

Red Cross = 2 (Water Safety Instructor)

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th></th>
<th></th>
<th>Total</th>
<th>1983</th>
<th></th>
<th></th>
<th>Total</th>
<th>1982</th>
<th></th>
<th></th>
<th>Total</th>
<th>Category Totals</th>
<th>Total Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>ABC</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>ABC</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>ABC</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Significance</td>
<td>.35</td>
<td>.42</td>
<td>.88</td>
<td>.18</td>
<td>.55</td>
<td>.18</td>
<td>+</td>
<td>.55</td>
<td>.46</td>
<td>.33</td>
<td>.43</td>
<td>.39</td>
<td>.35</td>
<td>.44</td>
</tr>
<tr>
<td>df</td>
<td>96</td>
<td>24</td>
<td>8</td>
<td>112</td>
<td>80</td>
<td>40</td>
<td>+</td>
<td>80</td>
<td>56</td>
<td>7</td>
<td>7</td>
<td>70</td>
<td>84</td>
<td>42</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>100.62</td>
<td>24.60</td>
<td>4.48</td>
<td>125.31</td>
<td>77.50</td>
<td>47.82</td>
<td>+</td>
<td>70.50</td>
<td>56.25</td>
<td>8.00</td>
<td>6.96</td>
<td>72.50</td>
<td>88.12</td>
<td>42.50</td>
</tr>
<tr>
<td>Significance Value for $\chi^2$</td>
<td>119.85</td>
<td>36.42</td>
<td>15.51</td>
<td>137.41</td>
<td>101.87</td>
<td>55.75</td>
<td>+</td>
<td>101.97</td>
<td>74.45</td>
<td>14.07</td>
<td>14.07</td>
<td>90.33</td>
<td>106.31</td>
<td>58.10</td>
</tr>
</tbody>
</table>

**KEY:**
- Category A—where injury occurred and an accident report was filed
- Category B—where victim was transported to hospital for further treatment but released on the same day
- Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
- * significance found in this category
- + unable to compute due to small N size
<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Significance</td>
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<td>.38</td>
<td>.59</td>
</tr>
<tr>
<td>df</td>
<td>21</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>24.00</td>
<td>6.33</td>
<td>1.90</td>
</tr>
<tr>
<td>Significance Value for $\chi^2$</td>
<td>32.67</td>
<td>12.59</td>
<td>7.82</td>
</tr>
</tbody>
</table>

**KEY:**
- Category A—where injury occurred and an accident report was filed.
- Category B—where victim was transported to hospital for further treatment but released on the same day.
- Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital.
- $*$ significance found in this category.
- + unable to compute due to small N size.
### TABLE 30

Accidents with Years of Experience for Each Level of Red Cross

**Level = 0 (No Red Cross Certification)**

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
<th>Total</th>
<th>Category</th>
<th>Totals</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>ABC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>.23</td>
<td>.36</td>
<td>+</td>
<td>.23</td>
<td>.19</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>df</td>
<td>6</td>
<td>2</td>
<td>+</td>
<td>6</td>
<td>4</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>8.00</td>
<td>2.00</td>
<td>+</td>
<td>8.00</td>
<td>6.00</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Significance Value for $\chi^2$</td>
<td>12.59</td>
<td>5.99</td>
<td>+</td>
<td>12.59</td>
<td>9.49</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

**KEY:**
- Category A—where injury occurred and an accident report was filed
- Category B—where victim was transported to hospital for further treatment but released on the same day
- Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
- * significance found in this category
- + unable to compute due to small N size
### TABLE 31

Accidents With Years of Experience for Each Level of Red Cross

**Level = 1 (Water Safety Instructor-Trainer)**

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th></th>
<th></th>
<th>1983</th>
<th></th>
<th></th>
<th>1982</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>Total ABC</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>Total ABC</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>Total ABC</td>
<td>Category Totals</td>
<td>Total Overall</td>
</tr>
<tr>
<td>df</td>
<td>20</td>
<td>5</td>
<td>5</td>
<td>25</td>
<td>8</td>
<td>+</td>
<td>+</td>
<td>8</td>
<td>6</td>
<td>3</td>
<td>+</td>
<td>6</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>$z^2$</td>
<td>21.00</td>
<td>7.00</td>
<td>7.00</td>
<td>28.00</td>
<td>10.00</td>
<td>+</td>
<td>+</td>
<td>10.00</td>
<td>8.00</td>
<td>4.00</td>
<td>+</td>
<td>8.00</td>
<td>12.00</td>
<td>4.00</td>
</tr>
</tbody>
</table>

**Significance Value for $z^2$**

|       | 21.41| 11.07| 11.07| 27.65| 15.51| +     | +     | 15.51| 12.59| 7.82 | +     | 12.59| 16.92| 7.82 | 7.82 | 16.92 |

**KEY:**
- Category A—where injury occurred and an accident report was filed
- Category B—where victim was transported to hospital for further treatment but released on the same day
- Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
- * significance found in this category
- + unable to compute due to small N size
<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>.28</td>
<td>.42</td>
<td>.26</td>
</tr>
<tr>
<td>df</td>
<td>84</td>
<td>21</td>
<td>7</td>
</tr>
<tr>
<td>(x^2)</td>
<td>91.02</td>
<td>21.55</td>
<td>8.83</td>
</tr>
<tr>
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<td>32.67</td>
<td>14.07</td>
</tr>
</tbody>
</table>

**KEY:**
- Category A—where injury occurred and an accident report was filed
- Category B—where victim was transported to hospital for further treatment but released on the same day
- Category C—where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
- * significance found in this category
- + unable to compute due to small N size
TABLE 33
Accidents With Years of Experience for Each Level of Red Cross

Red Cross = 7 (WSI and Lifeguard Instructor)

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1983</th>
<th>1982</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Significance</td>
<td>.29</td>
<td>.50</td>
<td>.33</td>
</tr>
<tr>
<td>df</td>
<td>24</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>(X^2)</td>
<td>24.00</td>
<td>5.33</td>
<td>3.42</td>
</tr>
<tr>
<td>Significance Value for (X^2)</td>
<td>36.42</td>
<td>12.59</td>
<td>7.82</td>
</tr>
</tbody>
</table>

KEY:
Category A--where injury occurred and an accident report was filed
Category B--where victim was transported to hospital for further treatment but released on the same day
Category C--where victim was transported to a hospital, and was required to spend a minimum of 1 night in the hospital
* significance found in this category
+ unable to compute due to small N size

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REFERENCES


Johnson, R. L. *Basic defenses against aquatic liability.* Unpublished manuscript.


Murphy, M. (1984, August). National Aquatic Program Director, YMCA of the USA. Personal interview.


