EFFECTS OF PUBLIC EDUCATION ON KNOWLEDGE
OF MEDICAL TECHNOLOGY: A
TELEPHONE SURVEY

SUSAN R. DEL BIANCO
Effects of Public Education on Knowledge of Medical Technology: A Telephone Survey

Susan R. Del Bianco
Ottawa University Kansas City

Master's Research Project in Partial Fulfillment of the Requirements for the Degree Master of Arts
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Chairperson: Sibila McClay 5/19/95
Supervisory Committee: W.R. Breystrodek 5/19/95
Director of Graduate Studies: W.R. Breystrodek 5/19/95
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Abstract

This study compared the effects of public education on the knowledge the public has of medical technology. Two-hundred and-two Chicago area suburbanites were randomly selected and assigned alternately to the control and experimental groups, who were later surveyed by telephone. Subjects were given a pre-survey with a post-survey that followed two to six weeks later, both surveys were designed by the researcher. The experimental group was mailed an educational information packet on Medical Technology. Data was analyzed by use of four t-tests. These tests were performed on the following groups: the pre-and post-survey of the control group; the pre-and post-survey of the experimental group; the pre-survey between the control and the experimental groups and the post-survey between the control and experimental groups. It was hypothesized that knowledge of medical technologists (MTs) and their profession would be significantly changed by the education of the general public by means of a mailed educational package about MTs. The results showed that printed material sent out to the general public does make a difference in
gaining knowledge, which proved to be statistically significant after the data was analyzed. From the human resource perspective this study can be used by the HR departments of professional societies and medical facilities. The former to show that recruitment efforts are needed and the latter for PR and employment recruitment.
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Effects of Public Education on Knowledge of Medical Technology: A Telephone Survey

The laboratory provides vital information for patient care. Medical technologists (MTs) support the hospital staff by providing test information used in diagnoses and treatment of illness. In the simplest terms the science of medical technology as defined by Ms. Fagelson, a medical technologist herself for many years, "is that branch of medicine concerned with the performance of the laboratory determinations and analyses used in the diagnoses and treatment of disease and the maintenance of health" (Lindberg, Britt, & Fisher, 1984). A newer more precise definition would be, "an individual who holds a minimum of a baccalaureate degree and is responsible for performing a full range of laboratory tests, confirming the accuracy of test results, and reporting laboratory findings to the pathologist and other physicians" (ASCP, 1995, p. s-9). The laboratory personnel doctors, and nurses work as a team to provide quality healthcare. The medical technologist is the invisible person, behind the scenes, who receives your blood or body fluid sample, tests them, and reports these results to the doctors. The
general public does not realize how many different health care team professionals there are; this demonstrates that there is a need for education of the general public. As the field of medical science advances, new and more elaborate tests will be needed for the diagnosis and treatment of illness. Therefore, it is important that the general public knows about medical technology and the important part this profession plays in their health care. It is the American Society of Clinical Pathology (ASCP) and the American Society of Clinical Laboratory Scientists (ASCLS) that desire to discover how much the general public knows about MTs and their laboratory science. It is hoped that by administering a telephone survey and mailing out educational information materials, the public's opinion and respect of this health profession will be positively increased.

To help inform the general public about the field of medical technology the researcher wrote an article explaining: what part an MT plays in the health care team; a short history of medical technology; some facts about the profession; what may be in the field's future; and any other information about work MTs perform that are not covered in
the professional pamphlets. The researcher made certain that all information that was needed to answer questions on the post-survey was covered in the educational information packet. The information was written in a clear, straightforward manner (see Appendix A).

Review of Literature

The Medical Technology Profession.

Medical technology is one of the newest allied health professions, even though, "Fagelson prefers to date medical technology from the 14th century when a prominent Italian physician at the University of Bologna employed one Alessandra Giliana to perform certain tasks which would now be considered those of the technologist" (Lindberg, et al., 1984, p.4). In the 17th century when microscopes were perfected, the science of medical technology rapidly expanded. As an increased knowledge about the human body, its blood system, and other body fluids became known, a new breed of doctor came into existence, the pathologist. He is sometimes called the doctor’s doctor. By the 19th century hospitals at the University of Michigan, John Hopkins University, and Cook County Hospital in Chicago were in need of these
pathologists. "At the first meeting of the staff of Cook County Hospital in Chicago (1865) the position of pathologist and 'curator of the death house' was established" (Lindberg, et al., 1984, p. 6). At first these pathologists did their own laboratory testing. But as these doctor's responsibilities took more of their time the pathologists began to train their assistants (Jackson, 1958, p. 6) most of whom were men, and had worked directly under them. "One of the first official references to laboratory workers is found in the 1900 census which listed one-hundred technicians, all males, employed in the United States" (Lindberg, et al., 1984, p.9).

With the advent of World War I, a demand for more laboratory workers occurred. Because most of the men that would have been available were in uniform, the pathologists started training nurses and secretaries to fill the void (Lindberg, et al., 1984, p. 10). This was the era that women first entered the medical technology field. Many new discoveries about laboratory sciences were made at this time. Tests became more complex and time consuming to perform, therefore a need for schools of medical technology evolved. Programs were set up
in hospitals to take over the training of these future laboratory workers, the first MTs. The University of Minnesota was the first to establish a school, as far as can be determined (Lindberg, et al., 1984). These first trainees received diplomas from the hospitals where they received their training and usually stayed their entire working life. Later, universities in conjunction with hospitals set up degree programs which were approved by the National Accrediting Agency for Clinical Laboratory Science (NAACLS). Thus, when these students graduated in addition to having a Bachelor's of Science or a Bachelor's of Health Science degree they also have completed a two year hospital internship. By this time most of the graduates were women and so it has remained to this day.

Right after World War II, medical technology instructors began classifying the 11 desired behaviors into three categories needed for this profession. They were cognitive, psychomotor, and affective. As Hudson, Goodwin, and Beck described in a article they wrote (1994);

The cognitive domain includes those behaviors that facilitate the intellectual learning of a body of knowledge; the psychomotor
domain, those behaviors that require neuromotor coordination; and the affective domain, those behaviors that express the values and attitudes of the learner (p. 27).

We are now at the stage of medical technology where instrumentation has speeded up routine testing. The MT of today must not only know how to perform a test but know the theory behind it. This is important because if a new instrument stops functioning, a MT should know where to start looking for possible problems. Among other duties a graduate MT must be able to perform are: the ordering of supplies; performing quality control of instruments and reagents; delegation of jobs to others; managing the everyday operations of a laboratory; plus they must have good interpersonal and communication skills.

At the present time there is a shortage of MTs. Some hospitals have reported that they have ranges from 9.6% in cities to 22.9% in rural areas of positions that go unfilled (Held & Castleberry, 1993), and the situation looks worse for the future. It is imperative that the medical technology profession and its societies institute a recruitment program to get young science minded students to consider medical technology
as a career.

The future of medical technology has both its pros and cons. Because of all the genetic research going on at the present there is a whole new area to investigate. There is a constant flow of new technology and instrumentation being introduced into the laboratory to make the MT's life easier. Another innovation that is taking place is the introduction of bedside testing thus, creating a whole new image for the MT, so this field will no longer be considered the "hidden profession" (Stembridge, 1993). Also, there are many different career paths a medical technologist can follow. A few of these choices are: research; consultation; sales and service; and education. If the medical profession does not recognize how important the MTs are to the health care team, there will not be enough medical technologists to perform the tests for our aging population of the future. Some reasons MTs are leaving the field are: the lack of respect; low pay; no education reimbursements for keeping up to date in the profession; and the constant health hazards. It is suggested that public education of the medical technology profession may provide interest and entry into the
medical technology field, thus alleviating the expected shortage.

**Public Education.**

One of the newest trends being set by hospitals, clinics, schools of medical technology, and even some medical associations is the free education being made available to the general public in the many areas of health care. Because the general public is the main consumer of these medical services and facilities, the institutions were beginning to wonder if the general public realized the hospital and its medical professions' contributions and services available to the community, as well the medical field. Some of the ways these facilities implement the education of health care is by use of health fairs; guided tours through hospital laboratories; community speaking engagements; men's and women's clubs and business sponsorships; career day seminars; or even sending speakers to the local grammar and high schools. Many technologists do not mind devoting some of their free time to these activities to promote their profession and make the general public aware of it (Butera, 1985). In order for education to be effective and achieve its desired goal of improving the general public's opinion of medical
technology for the better, it must reach as many people as possible. There are several other ways in which the general public can be made aware of these upcoming events. One way is by mass media, such as television, radio, or the newspapers. It is a well known fact that educational information that is televised does not reach everyone, (Stone & Siegel, 1986) and not everyone listens to the public announcement stations on the radios, and many people do not even get a newspaper, let alone read the entire newspaper. It is for this reason many hospitals are conducting educational classes on site for the general public. In addition the medical technology profession has instituted National Medical Laboratory Week (NMLW) in the hope of making the general public more aware of their profession. Most of the people in the community that are notified of upcoming events at the hospital are done so by mail. But everyone does not read educational mail unless they are interested in the subject matter or they are made aware of its upcoming presence.

Another method to educate the general public is by a telephone survey followed by a mailed educational information packet. Rogers,
Wiseman & McDonald found that telephone surveys were used very frequently in marketing and the behavioral sciences with success (Loken, Pirie, Viring, & Hinkle, 1987). The reason this method may work is because the subject only has to remember the choices and these surveys usually take less time to administer than written questionnaires.

Even though the acquisition of health knowledge is a prerequisite of good health, it has been a neglected area of research (Stone & Siegel, 1986). The researcher of this experiment feels the best way to measure the general public's knowledge of the field medical technology, plus get their input immediately is to do a telephone survey. This was achieved by giving the subjects a pre-survey, then mailing one group of participants an educational information packet, which they were told was coming, then administering a post-survey. It has been noted, that there has always been some doubt as to whether educational information can increase the general public's awareness and knowledge of medical technology or if the subjects would be able to figure out a correct answer without having had any intervention,
(Muskin, 1990) or if the subjects were survey wise after the pre-survey.

To date there has not been much if any, public education done in the field of medical technology. If a larger population of the general public was made aware of the ability to diagnose illness with a simple blood test maybe more would come in for preventive medicine. Also, neighborhood clinics could be set up for this specific purpose, thus cutting down the cost of some of these procedures and making them more affordable. Therefore, it would be a service to the profession of medical technology to have people who are able to communicate the importance of the laboratory to the general public. Because of the wide range of responsibilities today, a MT must be able to supervise others, as well have the knowledge and ability to operate a clinical laboratory. Many new opportunities are now available in this profession that may appeal to more people if they are aware of this multifaceted field. Many schools of medical technology are requiring that education and writing classes be taken in addition to regular course work by all future MT students. It is hoped that these new standards will make MTs more comfortable in the role of a possible educator to the general public. In
the past teaching the general public about medical technology had been hampered because, "...most clinical instructors had received the majority of their formal instruction in theoretical and the technical aspects of their profession and little training in education" (Beck, Youngblood, & Stritter, 1988). Many clinical instructors are very knowledgeable about their field of expertise but do not know how to relate this information to the lay person. On the other hand, just because a MT has taken several classes in education does not necessarily make them capable to teach.

The general public has not been educated about medical technology. However, Peterson (1988) has noted there has been some studies done between teachers and students, that are used for classroom teaching and learning. These can be compared to the teaching a MT may perform when informing the general public about their profession and their role in the health care team. It also would be advisable for the MT of today to realize a new common theme is emerging, the idea of the teacher as a "thoughtful" professional (Peterson, 1988). Several traits of this type of teacher are an inbred
hallmark of MTs. First, a "thoughtful" professional is always learning and inspires others to do so too (Peterson, 1988). MTs do this as a means of keeping up to date in a profession that is constantly changing. A positive comment made by one instructor was, "By teaching others, I'm kept current on procedures and principles" (LeGrys & Beck, 1990, p. 586). Second, a "thoughtful" professional impresses others with their decision making qualities (Peterson, 1988). A MT has to constantly make important decisions on their own because their work isolates them and they often work alone. The job is also one of high stress and a person must be able to function under these conditions, in fact it is one of the ten most stressful jobs. Third, a "thoughtful" professional has to know how to teach in such a way that they get the information across to those they are instructing (Peterson, 1988). This quality is displayed time and time again when a MT is assigned to teach a new employee the procedures of the laboratory. This assignment takes patience as well as organization since the teaching MT still must perform their regular duties. One instructor made a point when she stated. "There is not enough time to get the work done and properly train students or new
employees” (LeGrys, & Beck, 1990, p. 587). Instructors are supposed to help others to think for themselves and understand what and why they are doing it (Peterson, 1988). But another instructor mentioned, there are always some students who always complain about the effort they have to put in to pass tests, or will not try to think things through for a solution, they just want the answer (LeGrys & Beck, 1990). This can be compared to the general public’s attitude, they want just the facts. However, it seems that a majority of the instructors were happy and proud to pass on their knowledge, not only to future MTs but to the general public in health classes sponsored by the hospitals and clinics. Every year in April, an excellent opportunity arises for the medical technology profession to inform the administrators, other health care team members, students, patients, and the general public about their profession. It is called National Medical Laboratory Week (NMLW) and it was created to recognize unsung heroes (ASCP, 1995, p. s 10).

Knowledge Change.

The general public also has to share the responsibility for its own knowledge. McLellan (1993) suggests, that knowledge of a profession
increases when there is an interaction between that particular profession (medical technology) and the general public. It does not matter if the exposure was while either party was in or out of school (McKellan, 1993). It has also been observed that when some people finish school or reach a point they want to be in their careers they forget about the rest of the individuals in our society and what they do for a living and how important each one of those jobs are. If individuals of a particular occupation are not in the general public's view, knowledge and opinion about these people is very small. It is wise to remember that the public judges the level of the profession on how well the MT present themselves, and it has been shown to be directly related to attitude, behavior, and appearance.

The profession of medical technology received some recognition recently when the city of Milwaukee had an epidemic of Cryptosporidium and twenty-five percent of the city became ill with it. It was the medical technology team at West Allis Memorial Hospital that discovered the cause. "They were proclaimed heroes in the media, winning superb recognition for themselves, their profession, and the
hospital" (Stock, 1993, p. 551).

But not all public knowledge and recognition is good or realistic, and in fact, may tarnish the profession's image in the public's opinion. In a recent television program a case was made against laboratories stating that, "...tens of thousands of blood tests are done on these machines, tests that were ordered by doctors" (Cassette, 1993). It was implied that these tests were unnecessary and inflated healthcare costs. The reporters did not mention to the public that a diagnosis is not dependent on one test alone and usually the same panel of tests are ordered by the doctor later to rule out certain conditions. The insurance company or Medicare are often billed for tests the doctors don't want, or need" (Cassette, 1993). "How often has the question been asked in panic, 'Are you sure? Couldn't the lab have made a mistake?' " (Stock, 1991). Some of these programs brought out cries from the medical technologists of unfair portrayal of their profession. This type of exposure only calls for more public information about medical technology. Misrepresentation generally results from a lack of information or time, a one-sided and emotional story by a talk show guest, or a clumsy
attempt to simplify complex medical subjects for the lay reader/viewer” (Stock, 1991). These are just some examples of how the general public's knowledge of a profession can be changed for better or worst. It is important to see what effect public information regarding medical technology has. In a recent study done on men's motivation to perform the testicle self-examination (TSE), men who had received an educational brochure or had prior knowledge about the test, were found to have a more positive attitude about performing the test. Men without prior knowledge might fail to consider the brochure's information serious and think, "I never heard of this so it must not be important” (Steffen, 1990). Women who were surveyed in questionnaires about breast self-examination gave similar results similarly, women with prior knowledge about breast-self examination (BSE) were also more aware of the use and benefits.

In studies done by telephone surveys on homelessness, Toro, & McDonell (1992) found that several different variables influenced respondents' answers.

Lee, Jones, Lewis, & Younger found that: Those with greater
education attainment and more liberal political orientations were more likely to attribute homelessness to structural causes. Lee further found that respondents and those holding more liberal political views were more likely to feel that the government was not doing enough and to endorse tax increases to help homeless persons (p. 56).

The gender of the participants was also a factor in that compared to men, women thought homelessness was a very serious problem and that it was getting worse (Toro & McDonell, 1992).

There was a higher refusal rate, of 50%, for participation in the homelessness survey (Toro & McDonell, 1992) by men. The health telephone surveys had a better response rate. It seems, if a survey is more relevant and the knowledge gained by the subject or is useful to the person, they are more willing to participate in the survey.

In order for the general public to be able to learn about the field of medical technology, the human resource department responsible for this medical field has to decide which is the best way to get this knowledge across to them. In a study by Stanovich & Cunningham
(1983) about knowledge attainment, two questions were asked, where
does the knowledge come from and is there a difference in the amount
and depth of understanding based on how that knowledge was
presented to the subjects. The subjects were exposed to knowledge
from several different sources. The media selected were printed
material, television exposure, and general knowledge. It was
discovered that differences in exposure to information -- particularly,
written sources of information -- is a significant contributor to differences
in knowledge across individuals. This would suggest that a printed
educational information packet would be most productive in increasing
knowledge about medical technology.

When Parker and Chan (1985) did a survey to compare the general
public's opinion and prestige rankings of allied health professions the
ASCP, ASCLS, and other health professionals were very concerned
about the results. The outcomes were not very flattering to the
profession and disturbed many people.

Medical technologists, with a prestige score of 65, came in third
from the last among the thirteen allied health fields surveyed, topping
only dental hygienists and radiology technologists.

The technologists' prestige score was equivalent to that of a carpenter in the NORC occupational hierarchy. Ranking alongside carpenters and other manual trades may be jarring news for the health professionals. It highlights the need to promote a better understanding and appreciation in the clinical laboratory profession within the health care community as well as outside (pp. 54-55). The results irritated the radiologists so much that their society went on to have a law passed that all radiologists must be licensed to practice. Hopefully, this has raised their profession in the eyes of the public. The medical technologists have been trying for the last five years to do the same.

Explaination of Educational Information Packet

The educational information packet (see Appendix A for complete educational information packet) was developed by several means. Some of the information was researched in old books belonging to medical technology professional societies. Other information came from government census files. Promotional information and gifts were purchased from the ASCP and National Medical Laboratory Week
Committee (NMLWC). Another way information was gained was from hospital employees. Finally, a great deal of the information is common knowledge known to MTs.

The educational packet contained informative reading materials, a word search puzzle pertaining to the field of medical technology, and three promotional gifts. The gifts were a small notepad with the NMLWC logo on it, a colored balloon with a logo on it, and a aqua and purple pin with the theme of the National Medical Laboratory Week (NMLW) on it.

Rationale of Study

In this new age of technology the time is past when doctors had all the knowledge for the diagnosis of illness. The medical technologist is now the person that he turns to for assistance in diagnosis. This survey introduced the general public to the professionals who perform the highly sophisticated tests for the doctors. Therefore, it is to the best interests of the general public to know who these people are and what they do behind those closed doors of the medical laboratory. It was hoped that the knowledge the general public gained would take away
some of the fears and mystery of the laboratory and introduce them to another group of caring people of the health care team.

The survey was of interest and importance to the Human Resource departments (HRD) of two distinct and different groups. One group was the medical technologists and the professional societies that represent them, because it is the HRD that makes up the promotional brochures for the future recruitment of MTs. They wanted to know if their recruitment effort should be expanded, and what was the general public's knowledge and opinion of their profession.

Because recruiting efforts to attract students to the medical professions today still consist of talking with high school students, working booths at county or state fairs, planning hospital visits, presenting awards at science fairs, and promoting the field through pamphlets, billboards, and even T.V. programs (Klosinski, 1995, p. 32).

The second group that found this study of interest and importance was the HRD in hospitals, clinics; Physician Office Laboratories (POL); and administrative services. Hospitals and clinics need these people to
perform the various types of tests that doctors order. POLs not only use MTs for performance of tests but also for consultants since pathologists are not always available. Therefore, these institutions should be aware of the MT's importance and the education that they possess.

**Purpose of Study**

The object of this study was to document the general public's knowledge about the profession of medical technology through the use of a telephone survey administered to a representative sample in the suburban southwest Chicagoland area. The researcher purposed to do a survey about the general public's knowledge about medical technology. This researcher administered two surveys, a pre-and-post, with an educational information packet mailed to the experimental group only, between the two surveys. After the results were tabulated the researcher determined if there was a change in knowledge of the subjects because of the education they had received.

**Hypothesis**

The hypothesis statement is: Based on a pre-and post-survey, the knowledge about medical technologists and their profession would be
significantly changed by education of the general public through means of a mailed educational information package about medical technologist and their profession.

Method

Subjects

The design of the research project was quasi-experimental. There were two-hundred and-two randomly selected south Chicagoland suburbanite subjects, one-hundred and-one for each the control and the experimental group, selected for this experiment. The gender, educational level, and economic standing of the subjects were based on random selection. The researcher intended to use a system that insured random selection of all subjects involved, which was carried out via telephone book listings. Because the names of the south suburbanites from different communities are listed alphabetically in one book, not like large cities, the researcher did not have to go to separate phone books for each town. The selection of names from the telephone book was done by placing each letter of the alphabet on a slip of paper and placing it in a bowl. The researcher then pulled out a slip of paper
and the letter on it told what section of the telephone book to look at to randomly select a name. The selection of the name in this section of the book was picked randomly. This was done for both the control group (no education given) and the experimental group (educational information packet mailed). After each slip of paper was pulled it was returned to the bowl, thus increasing the chances of random selection. This procedure was repeated until all two-hundred and-two subjects were selected. The decision of which subjects were in the control group and which were in the experimental group was done in an alternating fashion. The first name selected was assigned to the control group, the second name was assigned to the experimental group. After the two lists were completed each subject on these lists were called and asked if they would answer a few questions (see Appendix B for introductions to be used). If any subject declined to answer the survey their name was be discarded, crossed off the list and a new name was chosen from the telephone book. This process was repeated until one-hundred and-one subjects for the control group and one-hundred and-one subjects for the experimental group were chosen.
Consent for participation was taken for granted when the subject agreed to answer the questions. The researcher told the participants if they were interested in the results of the study the association would send them the results if they sent the research organization a stamped (.32) self-addressed envelope. To protect the researcher’s privacy, a U.S. Post Office Box was rented.

Measures

Measures were the pre-survey; the education procedure with the questions that will deal with the subjects’ knowledge of medical technologists and their profession; and the post-survey (see Appendix C for complete set of questions for both the pre-and post-surveys). Survey scores were based on the number of correct responses. A predetermined knowledge score was used to compare the results of the pre-and post-surveys (see Appendix D for correct responses and predetermined knowledge scores).

The dependent variables were the knowledge scores of general public based on the pre-and post-surveys of the control and experimental group about medical technologists and their profession.
The independent variable was the mailed educational packet sent to the experimental group about medical technologists and their profession.

**Instruments**

The telephone survey (see Appendix C) acted as both the pre-survey and the post-survey. The pre-survey asked ten general knowledge questions about MTs; two supplementary questions, that were of interest to medical technology professional societies; two questions to help researchers with data collection; and two questions that were of interest to both societies and the researchers. The ten general questions could be used by the HRDs of the various institutions. The four supplementary questions were of interest to the societies because they helped their HRD plan for future public relations and recruitment efforts. They asked if the subject would consider becoming an MT or if they would recommend anyone to enter the profession, what their gender is, and if they had any comments to make. The four questions that helped the researcher with the data were for demographic purposes. These four questions asked the person's gender, occupation, if they knew anyone who was an MT, and if they
had any comments to make about the survey. These questions also acted as a check to see if the subject had paid attention to the questions or just answered the questions at random. The post-survey asked the same as above but had two additional questions for each of the two groups. One was a special question for the experimental group and asked the subjects if they did anything to get additional information about MTs or their profession, after taking the survey and reading the educational information packet. The other question for both groups, asked if the survey aroused their curiosity. The special question for the control group asked the subjects if they did anything to gain information about MTs only it did not ask about the educational information packet. It may be that some of the questions overlap in interest to various societies and human resource fields.

The researcher designed a telephone pre-survey containing sixteen questions on the pre-survey and nineteen questions on the post-survey. See the previous paragraph for an explanation of the three extra questions on the post-survey.

The questions the researcher asked on the telephone were of a
multiple choice format. All the questions except the one that asked what conditions do you think MTs work under, had four choices. Subjects were given a choice of answers. All the answers to the post-survey were found in the educational information packet. The total survey did not take more than five minutes to complete including the explanation and questions.

Procedure

The researcher's experiment used "a survey with a quasi experimental design." The researcher enlisted the aid of several assistants to help make the calls. These assistants were impartial and had no interest in the outcome of the research. Females who assisted the researcher with the telephone survey gave their name as Roberta Sue West. Males who assisted the researcher with the telephone survey gave their name as Robert White. The researcher had set up a four hour training session on a day that was most convenient to the majority of the researcher's assistants. This was the procedure the researcher used to train the assistants. First, the researcher asked that the people who were assisting really wanted to. Second, the researcher
oriented them to what she wanted to accomplish and stressed how important it was that all the rules were followed. Third, the researcher showed assistants how to keep tally of subjects who declined to participate in the research. The researcher asked assistants if there was any point they were still not clear about. Fourth, the researcher went over the introduction speeches, that the researcher wrote, that all research assistants followed when they called the subjects, thus allowing for better conformity. Fifth, the researcher demonstrated the correct telephone behavior and technique for them to use. Sixth, the researcher showed assistants how to mark the questionnaires. Finally, research assistants were asked if they understood the procedures.

The researcher kept a record of subjects called and they were classified into one of four categories. One, if the subject was in the experimental group and chose to participate. Two, if the subject was in the experimental group and declined to participate in the experiment. Three, if the subject was in the control group and agreed to answer the questions. Fourth, if the subject was in the control group and declined to answer the questions. The researcher also kept a record of the
subjects who hung up, thus refusing to participate in the experiment.

The researcher mailed an educational information packet about medical technologists and their profession to the one-hundred and-one subjects who were in the experimental group and answered the survey questions and agree to have the educational packets mailed to them. The educational packet contained information from several different sources. One was from the American Society of Clinical Pathology briefly explaining the careers available for medical technologists and medical laboratory sciences. Another was from the National Medical Laboratory Week Committee discussing the type of laboratory testing and the role of the laboratory in the diagnosis, treatment, and prevention of disease. There was an article written by the researcher that discussed the history of medical technology and anything that was not discussed in the brochures. Three promotional gifts, a colored balloon - white or aqua - a small notepad with the upcoming National Medical Laboratory Week logo on it, and a laboratory pin, were included.

Packaged material for the public education was made before the researcher knew how many of the randomly selected suburbanites
would participate. The researcher then sent these packets about medical technologists and their profession to every subject who was in the experimental group and agreed to answer the questions. Subjects only from the experimental group were asked if they could be sent information about medical technology pertaining to the questions they just answered. The researcher or assistant called each subject back in the experimental group between two and six weeks and asked them if they had received and read the educational information packet the medical association had sent them. If they had not read it, the researcher asked if they would, then asked what would be a convenient time to call them back in about three days. If they had read it the researcher would ask the subjects the same questions that were on the pre-survey plus the two special questions from the post-survey.

The researcher called back subjects from control and the experimental groups between two to six weeks after the pre-survey for the follow-up post-survey. The special questions everyone was asked was if they had done anything to gain more knowledge about MTs or their profession? The second question they were asked was if the
survey aroused their curiosity? All subjects in the experimental group were asked to take the complete post-survey (see Appendix C), but only subjects in the control group that obtained additional knowledge about MTs and their profession were asked to take the complete post-survey. It was noted that only one subject did obtain additional information on their own and thus, only that one answered the complete post-survey. This was done to keep the control group from guessing at answers. Also, it provided the data to compare the two groups to see if education in the form of a mailed educational brochure did make a difference in knowledge of medical technologists and their profession. A predetermined knowledge score was used to compare the results of the pre- and post-surveys. No subjects were told that the researcher would call them back, unless they were in the experimental group and received the informational package and did not initially read it.

If some subjects wanted to know just who was calling, they were told this is a representative from a professional medical association and we are interested in their views to help make the next medical week more beneficial to them. The treatment of all participants was be
accordance with the American Psychological Association rules on ethics.

Data Analysis

The researcher tallied up the scores of each survey for each group and compared these scores to the correct predetermined responses. After all the surveys in each group were graded and a knowledge score assigned to it, these score values were totaled up and divided by the number of participants in that group. This gave the researcher the average knowledge grade. Then the pre-and post-surveys were tabulated by the researcher using four t-tests. Four two-way analyses of variance tests were performed in a similar telephone survey (Loken, et al., 1987), whereas, this researcher's data analyses was evaluated by using only two-tailed t-tests. Four series of t-tests were performed on the control and experimental groups: two, 2-tailed matched pair (also called repeated measures t-tests) -- where the results were from the same group were being compared -- and two 2-tailed independent means t-tests -- where results from two different groups were being compared. One matched pair t-test compared the before (pre-survey)
and after (post-survey) knowledge scores of the control group which received no treatment (informational education packet). These two surveys were designed to see if the surveys alone would change the subject’s knowledge score. The other matched pair t-test compared the before and after knowledge scores of the experimental group which did receive the treatment (informational education packet). These two surveys were designed to see if the educational packet made a difference. One independent means t-test compared the before knowledge scores between the control and experimental groups. These two surveys were performed to determine if there was a difference in each group’s knowledge before the intervention (informational education packet). The other independent means t-test compared the after knowledge scores between the control and experimental groups. This was the t-test that determined if there was significant difference in knowledge scores between the control and experimental groups after the education packet was mailed to the subjects.

The results from these four statistical t-tests told the researcher if there was a change in knowledge of MTs and their profession between
the subjects who did receive the educational information packet and those who did not.

**Results**

The results of this study revealed a statistically significant effect on the knowledge of the general public of medical technology based on whether or not the subject received the treatment, an informative educational packet.

There were two-hundred and-two subjects who completed the research project (see Table 1).

**Table 1  Descriptive Statistics for Subjects Participating in the Survey.**

<table>
<thead>
<tr>
<th>Group</th>
<th>Total No. In Group</th>
<th>Gender of Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>101</td>
<td>Males 30, Females 71</td>
</tr>
<tr>
<td>Experimental</td>
<td>101</td>
<td>Males 32, Females 69</td>
</tr>
</tbody>
</table>

There were forty-five subjects who were originally in the experiment but did not complete it for various reasons (see Table 2).
Table 2 Descriptive Statistics for Subjects Not Participating in the Survey

<table>
<thead>
<tr>
<th>Group</th>
<th>Total No. in Group</th>
<th>Gender of Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdated</td>
<td>7</td>
<td>Males 2 Females 5</td>
</tr>
<tr>
<td>Refused Second Survey</td>
<td>11</td>
<td>Males 1 Females 10</td>
</tr>
<tr>
<td>No Response</td>
<td>27</td>
<td>Males 6 Females 21</td>
</tr>
</tbody>
</table>

A tally was kept of all subjects that had to be called back for various reasons to complete the post-survey (see Table 3).

Table 3 Reasons Additional Calls Had to be Made to Experimental Group Subjects

<table>
<thead>
<tr>
<th>Reasons Subjects Were Called</th>
<th>Number of Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Had to be reminded to read educational packet.</td>
<td>12</td>
</tr>
<tr>
<td>Received educational packet but misplaced it.</td>
<td>10</td>
</tr>
<tr>
<td>Never received educational material.</td>
<td>28</td>
</tr>
</tbody>
</table>

To achieve the one-hundred and-one subjects needed for the control group, 350 subjects were called. A total of 729 calls were made
to complete the first and second survey for this group, thus averaging out to 2.08 calls per subject. To achieve the one-hundred and-one subjects needed for the experimental group 301 subjects were called. A total of 603 calls were made to complete the first and second survey for this group, thus averaging out to 2.00 calls per subject. For both groups some subjects had to be called back several times for the pre-survey. A total of 1,332 telephone calls were made, 729 for the control group and 603 for the experimental group. The percentage response rate for the control was 28.8% (101/350) and for the experimental group it was 33.5% (101/301). The total response rate on the survey was 31% (202/651). A record was kept of all subjects who refused to participate in the experiment and their reasons are presented in Table 4.
Table 4  Telephone Information: Reasons Given by Some Subjects for not Participating in Research or Why Surveys Could not be Completed

<table>
<thead>
<tr>
<th>Excuses</th>
<th>Control Group</th>
<th>Experimental Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refused</td>
<td>106</td>
<td>51</td>
</tr>
<tr>
<td>Not Interested</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>It's Too Involved</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>I Have No Time</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>I'm Too Old</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>I'm Too Sick</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I Don't Understand</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Wrong No. or Party</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>Business</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Hospice/Hospital</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Three Attempts To Contact Subject</td>
<td>89</td>
<td>70</td>
</tr>
<tr>
<td>Incomplete Second Survey</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Duplication of names</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Disconnected Telephone</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Disqualified</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>Subjects Contacted</td>
<td>350</td>
<td>301</td>
</tr>
<tr>
<td>Total</td>
<td>249</td>
<td>200</td>
</tr>
</tbody>
</table>

The various occupations of the control, experimental, and other groups are presented in Table 5.
Table 5 Descriptive Statistics, Occupations of the Control Group, of the Experimental Group, and Other Groups

<table>
<thead>
<tr>
<th>Occupations</th>
<th>Control</th>
<th>Experimental</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Medical</td>
<td>7</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Teachers</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Trades</td>
<td>4</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Services</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Office Workers</td>
<td>8</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Sales</td>
<td>6</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>Management</td>
<td>7</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Finance</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Self-Employed</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Food Industry</td>
<td>2</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Semiskilled</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Unskilled</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Students</td>
<td>3</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Homemakers</td>
<td>29</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>Retires</td>
<td>15</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>4</td>
<td>7</td>
</tr>
</tbody>
</table>

Note. The category Other includes all surveys that did not fall into the research project, such as: outdated, second survey refused, and no responses.
The range of the scores went from 0-10, with zero indicating no knowledge at all about MTs and 10 indicating very knowledgeable about MTs and their profession. Table 6 shows how many subjects from the control and experimental groups were represented in each range of knowledge towards medical technologists and their profession. No individual scores were reported for any tests or tables.
Table 6 Knowledge Average Ratings of Subjects Towards Medical Technology from the Pre-and Post-Surveys from the Control and Experimental Group

<table>
<thead>
<tr>
<th>Range of Scores</th>
<th>Meaning of Score</th>
<th>Number in Group 1*</th>
<th>Number in Group 2**</th>
<th>Score 1*</th>
<th>2**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Survey</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-2</td>
<td>None</td>
<td>101</td>
<td>101</td>
<td>56</td>
<td>29</td>
</tr>
<tr>
<td>3-4</td>
<td>Below Avg.</td>
<td></td>
<td></td>
<td>22</td>
<td>31</td>
</tr>
<tr>
<td>5-6</td>
<td>Average</td>
<td></td>
<td></td>
<td>21</td>
<td>31</td>
</tr>
<tr>
<td>7-8</td>
<td>Above Avg.</td>
<td></td>
<td></td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>9-10</td>
<td>Great Amt. Knowledge</td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Post-Survey</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-2</td>
<td>None</td>
<td>101</td>
<td>101</td>
<td>0</td>
<td>28</td>
</tr>
<tr>
<td>3-4</td>
<td>Below Avg.</td>
<td></td>
<td></td>
<td>6</td>
<td>32</td>
</tr>
<tr>
<td>5-6</td>
<td>Average</td>
<td></td>
<td></td>
<td>37</td>
<td>30</td>
</tr>
<tr>
<td>7-8</td>
<td>Above Avg.</td>
<td></td>
<td></td>
<td>44</td>
<td>11</td>
</tr>
<tr>
<td>9-10</td>
<td>Great Amt. Knowledge</td>
<td></td>
<td></td>
<td>19</td>
<td>0</td>
</tr>
</tbody>
</table>

* = Control Group, ** = Experimental Group

The results of the four supplementary questions that are of great interest to the medical technology professional societies and the various HRDs in the medical field are presented in Table 7.
Table 7: Results of Professional Interest Questions from Experimental and Control Groups

<table>
<thead>
<tr>
<th>Question Description</th>
<th>Question Number</th>
<th>Replies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Y*</td>
</tr>
<tr>
<td>Do you know anyone who is an MT?</td>
<td><strong>Experimental Group</strong></td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Pre 1</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Post 1</td>
<td><strong>Control Group</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>If you were entering the workforce now, would you consider becoming an MT?</td>
<td><strong>Experimental Group</strong></td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Pre 8</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Post 8</td>
<td><strong>Control Group</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>23</td>
</tr>
<tr>
<td>Would you recommend anyone you know becoming an MT who was thinking of a medical career?</td>
<td><strong>Experimental Group</strong></td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Pre 12</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Post 12</td>
<td><strong>Control Group</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>Did you do anything to gain more knowledge about MTs or their profession?</td>
<td><strong>Experimental Group</strong></td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Post 15</td>
<td><strong>Control Group</strong></td>
</tr>
</tbody>
</table>

*Y = Yes, N = No, ND = Made No Difference*
The control group had a higher combined total pre-survey score (383) than the experimental group (231) but this was not enough to make a significant difference. However, the combined total post-survey knowledge score for the control group was (385) and for the experimental group (708). This demonstrated a significant improvement in scores after the education was administered (see Table 8).
Table 8  Survey Data: Predetermined Pre-and Post-Surveys and the Knowledge Score Average for the Control, Experimental, and Other Groups

<table>
<thead>
<tr>
<th>Group+</th>
<th>Total No. in Group</th>
<th>Total Pre-Survey Score</th>
<th>Total Post-Survey Score</th>
<th>Knowledge Score Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>101</td>
<td>383</td>
<td>385</td>
<td>Pre 3.7920 Post 3.8118</td>
</tr>
<tr>
<td>2</td>
<td>101</td>
<td>231</td>
<td>708</td>
<td>Pre 2.2871 Post 7.0099</td>
</tr>
<tr>
<td>3*</td>
<td>40</td>
<td>120**</td>
<td>32**</td>
<td>Pre 3.0000 Post 4.5714</td>
</tr>
</tbody>
</table>

+1 = Control, 2 = Experimental, 3 = Other

*Surveys that were disqualified because of not meeting the study’s standards.

**This data was obtained from subjects from the original experimental group who declined to participate in the second survey or could not be reached for the second survey.

***This data was obtained from subjects that answered both surveys but were disqualified because of too long a time interval between surveys had lapsed.
A series of t-tests were calculated for each of the experimental sets, to determine whether the treatment of sending an informational education packet to the general public significantly improved the knowledge level of the group which received it. Williams (1992, p. 83) states in his text, "that t-tests are used for testing the difference between two population means based on the observed difference between two sample means. The researcher tallied the pre-and post-survey scores for the followings groups: (1) the pre-and post-survey of the control group, (2) the pre-and post-survey of the experimental group, (3) the pre-survey between the control and experimental groups, (4) and the post-survey between the control and experimental groups. The preliminary t-tests revealed the following information. The 2-tailed matched t-test between the pre-and post-survey of the control group revealed no difference. The 2-tailed matched t-test between the pre-and post-survey of the experimental group revealed a significant difference in favor of the educational treatment. The 2-tailed independent means t-test between the control and experimental groups revealed a higher pre-survey knowledge score for the control group
than the experimental group, even though both were randomly chosen. The 2-tailed independent means t-test between the control and experimental groups revealed a significant difference (higher) post-survey knowledge score for experimental group. The results of the t-tests indicated that three tests had a \( p < .0000 \), establishing significance. The \( p \) value was used to show if there was a significant difference, thus demonstrating whether education made a difference in the knowledge scores of the general public.

Note that a significant difference exists between the pre-2-tailed independent means t-test of the control and experimental groups. The control group displays a significantly higher level of knowledge as indicated by a 2-tailed independent t-test value of -4.77 and a \( p \) value of 0.0000 before any treatment was made. This was not done purposely but can only be attributed to random probability. After a treatment has been performed one would wonder whether the treatment (education) itself was enough to overcome this disadvantage. It turns out the treatment did overcome the inequality between the two groups. The experimental group reversed the knowledge level displaying a
significantly higher level of knowledge as indicated with a t value of 11.90 and a p value of 0.0000. The data from the four t-tests are presented in Table 9.

**Table 9 Results of T-tests from the Pre-and Post-Survey Data of the Control and Experimental Groups**

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of Subjects</th>
<th>Mean</th>
<th>Standard Error of Mean</th>
<th>Degree of Freedom</th>
<th>T-test Result</th>
<th>p &lt; .05</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>202</td>
<td>-.0198</td>
<td>.0198</td>
<td>200</td>
<td>-1.0000</td>
<td>.3197</td>
</tr>
<tr>
<td>2</td>
<td>202</td>
<td>4.7228</td>
<td>.2591</td>
<td>200</td>
<td>18.2200</td>
<td>.0000</td>
</tr>
<tr>
<td>3</td>
<td>202</td>
<td>control 3.7920 experimt. 2.8710</td>
<td>control .2168 experimt. .2297</td>
<td>200</td>
<td>-4.7700</td>
<td>.0000</td>
</tr>
<tr>
<td>4</td>
<td>202</td>
<td>control 3.8115 experimt. 7.0099</td>
<td>control .2188 experimt. .1564</td>
<td>200</td>
<td>11.9000</td>
<td>.0000</td>
</tr>
</tbody>
</table>

1 = Pre- and post-survey between the control group

2 = Pre-and post-survey between the experimental group

3 = Pre-survey between the control and the experimental group

4 = Post-survey between the control and the experimental group

*p < .05
A graph displaying the tallies of the pre-and post-surveys is presented in figures 1 and 2. The graph also displays the distribution of the subjects' scores (see Figure 1 for the control group's results and Figure 2 for the experimental group's results). Both of these graphs represent the subject's knowledge in relation to a standard Bell curve.
Figure 1 Change in Scores Representing Control Group's Subject's Knowledge of Medical Technology
Figure 2  Change in Scores Representing Experimental Group's Subject's Knowledge of Medical Technology
At the end of the survey there was a space for the subjects to make a comment about the survey, medical technologists, or their profession. Not many subjects took advantage of this area of the survey (see Table 10 for the comments that were made by the control group and Table 11 for comments made by the experimental group).

**Table 10  Results of "Comments" for the Control Group**

<table>
<thead>
<tr>
<th>Comments</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curiosity was not aroused</td>
<td>61</td>
</tr>
<tr>
<td>Curiosity was aroused</td>
<td>40</td>
</tr>
<tr>
<td>Would like results</td>
<td>8</td>
</tr>
<tr>
<td>Will find out more about MTs</td>
<td>1</td>
</tr>
<tr>
<td>Looking forward to NMLW</td>
<td>2</td>
</tr>
<tr>
<td>Should get more pay</td>
<td>1</td>
</tr>
<tr>
<td>MTs work hard</td>
<td>1</td>
</tr>
<tr>
<td>Need more MTs, so its a less stressful job, and less mistakes will be made</td>
<td>1</td>
</tr>
<tr>
<td>Very thought provoking</td>
<td>1</td>
</tr>
<tr>
<td>Thought it was interesting</td>
<td>1</td>
</tr>
<tr>
<td>Nice survey</td>
<td>1</td>
</tr>
<tr>
<td>Highly recommend survey</td>
<td>1</td>
</tr>
</tbody>
</table>

*Note.* Not everyone made a comment.
Table 11: Results of "Comments" for the Experimental Group

<table>
<thead>
<tr>
<th>Comments</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curiosity was not aroused</td>
<td>36</td>
</tr>
<tr>
<td>Curiosity was aroused</td>
<td>65</td>
</tr>
<tr>
<td>Would like the results</td>
<td>44</td>
</tr>
<tr>
<td>Thought it was interesting</td>
<td>5</td>
</tr>
<tr>
<td>Very informative</td>
<td>3</td>
</tr>
<tr>
<td>Thought provoking</td>
<td>1</td>
</tr>
<tr>
<td>MTs work hard/stressful job</td>
<td>2</td>
</tr>
<tr>
<td>MTs should get more pay</td>
<td>2</td>
</tr>
<tr>
<td>Need more MTs/so less mistakes</td>
<td>2</td>
</tr>
<tr>
<td>MTs need more training</td>
<td>1</td>
</tr>
<tr>
<td>MTs have been unrecognized</td>
<td>2</td>
</tr>
<tr>
<td>Education of the general public should be done more often</td>
<td>2</td>
</tr>
<tr>
<td>It's nice to know who is taking care of us when we are sick</td>
<td>1</td>
</tr>
<tr>
<td>Don't think the patients need to know about everyone who is involved with their health care</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: Not everyone made a comment.
Discussion

The range of the means showed a significant improvement in the general public's knowledge of medical technology after the intervention of public education.

In spite of every attempt being made for a true random selection of subjects there was some sort of difference in sample population's makeup. For some unknown reason there was a significant difference of the pre-survey $p$ value between the control and experimental groups. This may have occurred because the control group may have been test smart. This demonstrates that the control group started out with more knowledge than the experimental group. After the experimental group received its education intervention there was a significant difference between the pre-and post-survey scores. Whereas, when the control group was administered their post-survey there was no change between that group's pre-and post-survey scores. Only one subject had sought more knowledge about MTs on her own in the control group thus her score is the only one that increased.

A surprising fact was revealed, more men were willing to answer
the survey when contacted than women even though, more women than men were contacted, with a 1:2 ratio. The researcher and assistants thought more women would be willing to answer the survey, since in a previous telephone survey it was found that females tend to seek out medical knowledge more than males (Loken, et al., 1987), especially because women usually are the primary care givers for the family.

The distribution of knowledge scores for the pre-survey of the control (no education received) and the experimental (education received) group was multimodal. For the control group twelve subjects had a zero score and seventeen subjects had a score of four. For the experimental group thirty-nine subjects had a zero score, twelve had a four, and eleven had a six. This is a positive skew because the mean is less than the median value. The distribution of the knowledge scores for the post-survey of the control group was multimodal while that of the experimental group was unimodal. For the control group six subjects had a score of zero and eighteen had a score of four. For the experimental group twenty-seven had a score of seven with the remaining falling evenly in a Bell curve. The control group stayed
positively skewed while the experimental group became negatively skewed because its mean was less than the median. It was anticipated that the mean average would be between two and four before the education was received and at six after the education. This statistical information further enforces the hypothesis that education significantly increases knowledge of the general public towards medical technologists and their profession.

Question 7 asked if the general public thought there was a shortage of MTs while question 13 gave some reasons why this may be the cause. These two questions represented a possible cause and effect scenario. According to a mailed survey by Etnyre-Zacker and Minor (1994, p. 184) some of the reasons cited for the high attrition and/or burnout rate of MTs were unrealistic expectations of the profession; limited opportunities for advancement; lack of respect by other health care professionals; under utilization of skills; or marriage and family responsibilities. These results corresponded to the results of this researcher's telephone survey.

Questions 1, 8, and 12 were asked to see if subjects were paying
attention to the survey or just answering to get it over with. It was discovered that most people who received the educational material thought they might like to work in this field and would recommend it to others but after reading the material changed their minds. In the post-survey they would not consider becoming an MT but would not discourage anyone who might want to enter the field.

Even though the correct response to question 10 was that MTs OFTEN work on their own in the laboratory the general public's opinion was that they worked on a team. This revelation enforces what laboratory managers are saying, "That MTs will no longer be working in relative isolation at a bench in a corner of the laboratory." (Doig, 1994, p. 172). Every staff member will be interacting with others in the medical and private sectors.

A telephone survey was selected for this study because it was thought the fastest results could be obtained and the researcher would know immediately if the subject was willing to participate or not. As noted in Salmon's and Nichols's telephone survey (1993) response rates (89.6% to 96.1%) were well over the average for those that are
mailed out (Loken, et al., 1987). This success rate did not correspond to this researcher's of 34.7%. One associate of the researcher, who does many telephone surveys said, "the average rate is one out of every ten calls or about 10%". Thus, the researchers' original expectations that they would have to call about one-thousand subjects per group was greatly reduced.

Telephone surveys include a variety of variables to be taken into consideration when performing research studies. These variables include: when the research was performed (seasonal, time of day, or holiday); the gender, age, and the social and economic status of the participants; the time involved to take the survey; and the simplicity of the survey.

Originally, it was thought that there would be a relationship between a subject's age, occupation, economic or social status. It was also thought that the younger subjects would be more willing to participate in the experiment, which would be beneficial for the MT profession. It was hoped some would be interested enough to investigate medical technology as a profession for them.
The effect of the age variable cannot be ascertained because the subjects were not asked any personal questions besides what their occupation was. In a telephone survey conducted in the Midwest in association with a large health project, "respondent use was selected from each household by asking for the person living in the household between the age of 25 and 74 who had the most recent birthday in the past year" (Loken, et al., 1987, p. 354). In this researcher's telephone survey the respondent would be the first adult eighteen years or older, male or female who answered the telephone.

There was no sure way to tell the person's economic or social status. A hint may be where they lived or their occupation which was written on the survey. Therefore, it cannot be determined if these two factors have any relatedness to the study. It was found that better results were obtained on the questionnaire if no personal questions were asked.

The simpler the survey, the better. Questions that are kept simple and do not repeat or confuse the subject are the best. It was discovered the average length of a telephone survey was 10-15
minutes (Loken, et al., 1987), and this researcher thinks the good results obtained from this survey were because the survey was kept to a five minute average.

It is assumed that when education is conducted by telephone survey in conjunction with mailed educational materials people of many different ethnic, social, and economic backgrounds as well as both genders will be represented and reached. This was a desirable by-product of the randomness of this experiment which allowed for a better representation of the general public with no one ethic, social, economic, or sexual group being favored over another.

The telephone calls were made at all hours of the day but the majority were made between the hours of nine in the morning and seven-thirty in the evening. Because of the time that the calls were placed, subjects that worked day or night shifts had an equal opportunity of being reached and answering their phone. However, it was found that the most responses came on the weekends or during a long holiday weekend, Monday after a national or religious holiday. The researcher thinks this is because people were home from work thus
feeling relaxed, less pressed for time, well rested, and in a better mood.

In order to compensate for experiment mortality time a subject declined to participate in the post-survey of the experiment another subject was randomly selected to replace the declining subject. Another safeguard was not waiting too long to call back between the pre-survey, educational material, and post-survey.

How the researcher interprets the results and why they think they occurred is of great importance to the academic community. Some people, once they reach a position in their careers, stop learning from and about other individuals, their professions and how important they are in the work world. This can be true in any career from a laborer to a top medical professional, education has no boundaries in this. Because of this survey and the importance of this knowledge the researchers think the general public will be more aware and open to future free medical education and more aware of the MT profession.

Limitations of the Study.

There are several important shortcomings that were present in this experiment. I will discuss some of them here.
Not everyone who owns a telephone is listed in the telephone book. This excluded these people from having an equal chance of being randomly selected for this survey.

Then the issue of history arises with the timing of this study which introduces several possibilities. One was the occurrence of National Medical Laboratory Week (NMLW). The researcher and assistants were not able to place all the calls for both groups and surveys before NMLW in April, 1994 and had to do the majority of surveys after that date. This did not seem to have an effect on the results of either the experimental or control groups. In fact, some subjects in the control group, who did not receive the educational information packet, wanted to know how to obtain more information about medical technologists and their profession. This also occurred with the experimental group who did receive the education packet.

Another limitation involving time is that of short term learning versus long term learning retention. This experiment focused on the short term learning — six weeks. There were twenty-eight surveys given to the experimental group in March 1994 who were later given the
post-survey in July. It was discovered this was too long of a time interval to be of any value to this research project. None of these subjects' knowledge of MTs decreased but neither did it increase. Thus, new subjects were randomly selected to replace the outdated surveys that the first subjects answered. At present there is no way of knowing if this education of the general public will have any long term effect. Perhaps a follow up survey in six months to a year could be done to find out.

More factors that may have affected the results of when the research was performed are discussed here. The biggest problem the researcher and assistants found was to be the subject's availability. During the summer when school was out, parents were busy taking children on various outings, during a time they normally would have been home. Another problem connected with school breaks were students, over the age of eighteen, who were home from college. Some of these young adults took the pre-survey but not the post-survey because they had returned to college. An everyday availability problem was not being able to reach all the subjects for the post-survey because
their work schedules were erratic. There was no best time to make the telephone-survey calls, it all depended on the individual.

The researcher feels that the Hawthorne effect (internal validity) may have come into effect for the post-survey replies. "This term, now used to describe situations in which persons who are singled out for special attention end up performing as anticipated only because of the expectations created by the special situation" (Schermherhorn, Hunt, Osborn, 1991, p. 556). This effect may have been minimized by making both groups feel special (Drew, & Hardman, 1988, p. 139).

A threat to internal and external validity may have occurred because of the actual pre-survey being administered to the subjects. This is a very hard thing to correct for. One solution may be to have an additional one-hundred and-one subjects in the experimental group. These subjects would not receive a pre-survey but only the educational material and a post-survey. This would act as an additional control to see if the experimental subjects were influenced by the pre-survey.

In order to avoid bias three steps were initiated by the researcher.
They were the questions being stated in a clear and specific manner, variables of the two groups being controlled, and the researcher who decided which variables were important to control for this experiment to be of the most value. The researcher decided that she would control the random selection of the subjects and who would receive the informational education packet. The problem that arose from mailing the informational education packet to subjects' homes is that the researcher had no control over if the subjects received or read the material. Because of this the, the experiment was a "quasi" experiment.

Some of the subjects may be aware of medical technologists, the profession and the part they play in the health care team because of the next two facts. Most of the schools that teach this allied health field are located on southside of Chicago and its south suburban area. Another possibility for skewed results was that some of the subjects were allied health workers themselves -- including MTs (see Table 5).

Suggestions for Further Research

As most researchers, we would like to have had a larger sample population. Two-hundred and two subjects were chosen because that
was the smallest number the researcher thought would render information that would be of the most value. It is the researcher's hope that this research will be followed up and/or repeated in more depth at a later date.

It would be advantageous for the researcher to have had assistants who were available at different times of the day or night. This would have been beneficial because subjects that work unusual or erratic hours could be reached at their convince.

One or two improvements could be made the way in which the subjects were selected or kept track of. The researcher and/or assistants could list the names of the subjects that were randomly selected in alphabetical order. This would make it easier to check if there were any duplication of names, especially if more than one assistant were doing this task. There is another possibility for the selection of subjects' names to make it less time consuming. Instead of writing up slips of paper with the letter of the alphabet on each one, the researcher and/or assistants could start with letter "A" and progress through the alphabet picking two names at random from each section of
the telephone book. This would be done with each group until the desired amount of subjects were chosen.

The researcher also conducted research training sessions to try to check the internal validity. Men researchers all used the same masculine name and women researchers all used the same feminine name. A question did arise, if particular responses or behavior to the survey depended on whether a male or female administered the survey. Perhaps this is something that can be determined at a later date along with determining if the gender of the subject had any bearing on the knowledge possessed.

General Conclusions

This study investigated the effects of public education on knowledge of medical technology by the use of a telephone survey. There was significant evidence from the data that reflects there is a relationship between the knowledge scores of the general population who receive educational material about medical technology and those who do not. The use of this thesis project is twofold for the human resource departments of medical facilities and medical technology
professional societies.

Medical facilities can use this report as a training tool for their recruitment when looking for prospective employees. First, human resource recruitment employees should be aware of what MTs do and their educational requirements and qualifications. Also, it would help them to ask the right questions when interviewing a prospective MT. From this information a fair pay and benefit package can be constructed. In addition, the public relations department of HR may find this thesis beneficial to find out what the public knows about its laboratory services when making up promotional brochures for its facility. They could explain the qualifications and experience of their laboratory professionals, along with the services offered by their laboratory and explain some of the simpler procedures. These medical facilities could use this thesis as a guideline to make up their own survey to find out what the people who they serve think and what improvements they would like to see.

Human resource departments of professional societies can also get a twofold benefit from this study. One, it can help these societies to
realize how much knowledge the general public has of their profession. Two, it can be used in their recruitment endeavors of new students and adults for this profession. Both are good reasons to consider when making up recruitment brochures in hopes of persuading more young adults, both male and female, who are science minded and have analytical skills needed, to enter the medical technology field.

There were some surprising facts that were revealed from the results of this study. When the subjects were asked if they knew what an MT was many thought they knew. After the data collection, it was discovered most thought they were the people who worked with the fire departments, emergency medical technicians (EMT). Another popular misconception was that they were any allied health professionals -- a generic term -- except nurses. Because most people were not sure who they were it was only reasonable to discover the subjects' were not sure of what MTs' job description was, and what they did. Many subjects thought because MTs were medical professionals who earned more -- over $30,000 a year -- than they actually did. The educational requirements needed to become a medical technologist shocked the
subjects. Many were surprised to discover that MTs had at least the same amount of education as four year registered nurses.

Half the subjects thought there was not enough MTs at present. Older adults usually answered they would not enter the field today whereas, young adults said they would if they had the training. About one-third could not decide if it were a service job, a career, or a profession. When asked what type of conditions they thought MTs worked under the answers ran a gamut from: personal, economical, to health related (see Tables 10 and 11 for more comments).

The answers that were given clearly shows that the general public needs to be educated about medical technologists and their profession.

This study could help improve the image of the medical technologists and their profession.
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Appendix A

Educational Information Packet

Enclose you will find the free promotional gifts and the educational information package which is being sent to you with your permission. We hope you will enjoy this package and that it will be useful to you especially in these times of health care change. The people who put this package together want to thank you again for taking the time to read it.

Information About

Medical Technologists

and Their Profession

Don't you ever wonder how the doctor knows what he knows about our condition? Where all the information that is written on his chart about you comes from? Why those people with the needles are always sticking you? Well the answers to all these questions and more comes from the laboratory. The medical technologist (MT) who receives your blood or body fluid sample tests it and reports the results to your doctor or other medical personnel to put on your chart. These are the invisible
people of the laboratory. They often work alone, must be confident, alert, and make split minute decisions. The laboratory is composed of five main sections, so a MT must know them all, especially if they work a night shift or in a STAT LAB, where all tests must be completed and reported within one hour of arrival in the laboratory. Among the five are chemistry, microbiology, blood banking, hematology, coagulation studies, and urinalysis. They usually do not get any recognition or respect from you or other medical personnel for their efforts in trying to serve you. Medical technology is one of the newest allied health professions. It was not recognized until 1922, when the first American Society of Clinical Pathology (ASCP) was held. When an increased knowledge about the human body and its blood system became known a new breed of doctors came into existence, the pathologist. Sometimes called the doctor's doctor. At first these pathologists did their own laboratory testing. But as these doctor's responsibilities increased and took more of their time the pathologists began to train their assistants, most of who were men at this time, who had worked directly under them. As time went on and the tests became even more
complex and time consuming. Programs were set up in hospitals to take over the training of these first MTs. These first trainees received diplomas from the hospitals they received their training and usually stayed there all their working life. Later, universities in conjunction with hospitals set up degree programs which were approved by the National accrediting Agency for Clinical Laboratory Science (NAACLS). Thus, when these students graduated in addition to having a Bachelor's of Science degree they also have finished a two year hospital internship. By this time most of the graduates were women, and so it has remained to this time.

At the present time there is a shortage of MTs. One hospital stated that 20% of their positions go unfilled, and the situation looks worse for the future. If the medical profession does not recognize how important these people are to the health care team there will not be enough to perform the tests for our aging population in the years to come.

There are many causes why young adults do not enter this health field. Some are personal, some are economic, and some are combination of both. The average MT makes about $25,000 a year,
well under what a two year registered nurse (RN) makes. Most graduates do not see this as a fair return on their education investment. Many other science related fields lure these prospective MTs away with better pay, benefits, and working conditions. Because of the stress involved with this profession there is a high turnover of employees, and the new MTs that replace them must learn quickly from other working MTs. Thus, there is not always a structured training period, this leaves room for improvement in the work that is performed. Added to this, is the fact that once a MT learns a procedure new technology changes it. Many laboratory workers must take continuing education to keep up with this new technology. The cost and time of this education is usually carried by the MT themselves. Finally, we come to one of the saddest reasons the health care field cannot recruit new students, the constant health danger to the MT. Hepatitis and other contagious diseases have always been around but the AIDS epidemic has scared off many possible recruits.

Thus, it is truly a dedicated, caring person who chooses to work in the laboratory and perform the blood and body fluid tests that can
and do save hundreds of lives a year. And when you see those patches on a medical technologist's shoulder, MT ACSP or MT ASCLS, know that person went one step further and took the test to become certified. They are the elite of their profession. So the next time you have to fill out a report asking, "How was the hospital's service?" Remember the Medical technologists and the laboratory.
Fast Lab Facts

- Nine billion laboratory tests are performed in the US each year.
- More than 250,000 medical laboratory professionals are employed in the US.
- Medical laboratory testing is in greater demand than ever before because of the aging of Americans, increased emphasis on early detection and diagnosis, an explosion of new medical technologies, and the resurgence of old diseases and discoveries of new ones.
- Americans are aging and require more tests with greater frequency. More than 12.5% of the US population is over 65 years of age, and the over-85 category, which requires the greatest amount of health care services, is growing by 3% each year.
- As the median age of the American population increases, more emphasis will be placed on laboratory tests needed to understand, diagnose, and manage such "elderly" diseases as Alzheimer's disease and anemias.
Expanding medical knowledge and technological developments increase the need for medical laboratory testing. Organ transplants uncommon just ten years ago, are becoming routine surgeries. Ongoing testing of transplant patients is needed as long as the patient lives.

New and different pathogens are contributing to an increased need for laboratory testing in the US. The identification of new diseases like AIDS, Lyme disease, and hepatitis C, and the resurgence of old foes, like tuberculosis, pose serious threats to the public's health.

The world is becoming a "global village." An unprecedented increase in international travel and immigration is resulting in importation of rare or previously unknown diseases—especially parasitic infections and inherited disorders—and increasing the need for laboratory testing.

Despite an increased demand for laboratory tests, trained medical laboratory professionals are in short supply.

Vacancies in medical technologist staff positions reached 13.8%
in 1992. For staff cytotechnologists, more than one in five positions goes unfilled for lack of trained professionals.

- Laboratory medicine is becoming increasingly sophisticated, requiring a correspondingly well-educated labor force knowledgeable in subjects like biochemistry, microbiology, genetics, histology, parasitology, and cytology.

- Employment in the health services industries will account for 17% of employment growth between 1990 and 2005.

- Opportunities already exist for medical laboratory personnel in hospitals, clinics, private laboratories, research facilities, industry, education, physicians' offices, and the military.
The challenges and rewards of medicine and science—the medical technologist has the best of both worlds.

The medical technologist performs a full range of laboratory tests—from simple pre-marital blood tests, to more complex tests to uncover diseases such as AIDS, diabetes, and cancer. The medical technologist is also responsible for confirming the accuracy of test results, and reporting laboratory findings to the pathologist and other doctors.

Medical technologists work quickly and carefully. They hold life and death in their hands, because the information they give to the doctor influences the medical treatment a patient receives.

In their search for data on a patient’s health, medical technologists do much more than examine specimens through a microscope. They operate complex electronic equipment, computers, and precision instruments costing millions of dollars.

Medical technologists are self-sufficient, precise and thorough. They are trouble-shooters who not only report accurate results, but know when results are incorrect and need to be rechecked.

Medical technologists work in five major areas of the laboratory:
- Blood Banking
- Chemistry
- Hematology
- Immunology
- Microbiology

Job Opportunities

Today, there are more jobs for medical technologists than educated people to fill those jobs. The future long-term employment looks bright—well into the next century. The need is great everywhere throughout the country.

The national average beginning salary for medical technologists is approximately $24,000, although salaries vary by area of the country.

Minimum Degree Required

To find rewards as a medical technologist, you’ll need a baccalaureate degree.

What It Takes To Be A Medical Technologist

All medical technologists have certain common characteristics. They are problem-solvers. They like challenge and responsibility. They are accurate, reliable, emotionally stable, work well under pressure and are able to finish a
You have many choices in pursuing a career in medical technology. While you’re going to school, you can work part-time in a laboratory to earn extra money. And you could start working full-time the day after you graduate.

Certification

To be sure that laboratory workers are competent and able to perform high quality laboratory tests, the Board of Registry of the American Society of Clinical Pathologists gives a national certification exam. Students take this exam after meeting their academic and laboratory education requirements. Those that pass the exam in medical technology may use the initials, MT(ASCP), after their name and wear the blue and white emblems on their lab coats that show they are proficient in their field.

Where Medical Technologists Work

Medical technologists have unlimited choices of practice settings. Hospitals, independent laboratories, clinics, nursing homes, public health facilities, business and industry all currently have positions open for qualified medical technologists.

Opportunities To Specialize

A medical technologist who gains experience in one of the special areas of the laboratory has the opportunity to advance to a special-ist level. These areas of the laboratory are chemistry, hematology, blood banking, immunology and microbiology. In today’s laboratories, areas of scientific exploration are the immune system, cell marker technology, bioengineering and cancer research. In the clinical area, drug testing, therapeutic drug monitoring and bio genetics are just a few of the specialties with openings. In industry, medical technologists are needed for positions in marketing, sales, quality assurance, environmental health and insurance, among others.

Learn More About Becoming A Medical Technologist

Educational requirements/certification requirements: Write to the ASCP Board of Registry, Box 12277, Chicago, IL 60612-0277

Accredited programs in medical technology: National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) 8410 W. Bryn Mawr, Suite 670, Chicago, IL 60631

Scholarships or Loans: Contact school offering accredited programs

A career in medical technology: Visit laboratory professionals at your local hospital or laboratory. Talk with biology teachers and career counselors in your school

This flyer is one in a series describing laboratory careers. For information on a career as a cytotechnologist, histologic technician or medical laboratory technician, write to:

ASCP Board of Registry
Box 12277
Chicago, IL 60612-0277

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In today's modern health care system, the clinical laboratory plays a vital role in the diagnosis, treatment, and prevention of disease. In performing tests on cells, fluids, and tissues, highly educated and trained medical laboratory professionals find the causes and the cures to aid their patients lead happier, healthier lives.

Medical laboratory testing requires sophisticated equipment, special supplies, and, most of all, knowledgeable personnel. Most laboratories are directed by pathologists who are physicians specializing in laboratory medicine. The many types of tests are performed by medical technologists and medical laboratory technicians who may specialize in microbiology, chemistry, hematology, and blood banking, as well as cytotechnologists, histotechnologists and histologic technicians, and phlebotomists. About 9 billion laboratory tests are conducted each year in the US—to screen for abnormalities, diagnose diseases, and monitor treatment procedures.

National Medical Laboratory Week

Screening: During routine physical check-ups, patients are often screened for potential diseases with tests that evaluate many body systems. A few examples are urinalysis, Pap smears, and a wide variety of blood tests. Screening tests may detect unexpected health problems before symptoms arise, allowing early treatment and the best opportunity for a cure.

Diagnostic: If a health problem is suspected or discovered in a screening test, follow-up testing can confirm the diagnosis and provide more precise information regarding treatment. For example, sugar found in a urine sample alerts the physician to a possible diabetic condition and signals the need for follow-up diagnostic blood tests.

Monitoring: After treatment has begun, periodic monitoring tests are performed to insure the patient is recovering or that the condition is under control. In the case of a diabetic patient, frequent, even daily, blood glucose tests may be necessary to maintain control of the condition.
Your Laboratory

Finding Causes... Finding Cures...

1994

National Medical Laboratory Week
Effects of Public Education

Finding Laboratory Words

Search out the hidden laboratory words—written horizontally, vertically, diagonally, forward, backwards, and overlapping—in the puzzle.

Puzzle Clues: On next sheet.
PUZZLE CLUES

bacteria

cells

Chem

CLIA

Clots

cost

CBC

cut

CT

Cytology

data

dial

DML

Fungi

gloves

gown

health

histologic

HT

Infection

mask

MLT

MT

micro

PBT

phlebotomist

professional

PT

QA

QC

Rx

run

Sample

SBB

SI

STAT

technician

technologist

test

tissues
Appendix B
Introduction Used for Telephone Pre-Survey
for the Control Group

Hello, is this the ____________ residence, my name is Roberta SueWest/Robert White. I am not selling anything. I am taking a survey and was wondering if you would answer a few short questions, it should not take more than five minutes. Are you over the age of 18. (If they answer no, ask if there is someone else in the household who is over 18. If someone else is present ask if they would mind answering the questionnaire. If they agree ask what their name is and then continue on with the pre-survey. If no one else is at home ask if you may call back when someone is. Wait for a reply, then say thank you if they agree or decline to participate).

I will give you a choice of four replies with the last one being, I don't know or I am not sure. There are no right or wrong answers, just your honest opinion, so please do not guess the answers.

Thank you again for your time and participation.
Introduction Used for Telephone Pre-Survey for the Experimental Group

Hello, is this the ________________ residence of, my name is Roberta Sue West/Robert White. I am not selling anything. I am talking a survey and was wondering if you would answer a few short questions, it should not take more than five minutes. Are you over the age of 18? (If they answer no, ask if there is someone else in the household who is over 18. If someone else is present ask if they would mind answering the questionnaire. If they agree ask what their name is, and continue on with the pre-survey. If no one else is at home ask if you may call back when someone is. Wait for a reply, then say thank you if they agree or decline to participate.)

I will give you a choice of four replies with the last one being, I don't know or I am not sure. There are no right or wrong answers, just your honest opinion, so please do not guess the answers.

Since you have answered these questions and have shown some interest in this topic may I send you an informational packet about medical technologists? This package will contain several free
informational gifts. What name and address would you like me to send the package to?

Thank you again for your time and participation.
Introduction Used for Telephone Post-Survey for the Control Group

Hello Mr./Ms. _________________, this is Roberta Sue West/Robert White.

Remember a few weeks ago you were nice enough to answer a survey I was taking. I am calling back to ask you a follow up question.

You have helped us with a research project, if you are interested in the results the research organization will mail them to you. Please send them a stamped, self-addressed envelope to:

Medical Survey Results
P.O. Box 162
Willow Springs, Il. 60480-1412

Thank you again for your time and participation.
Introduction Used for Telephone Post-Survey for the Experimental Group

Hello Mr./Ms. ____________________, this is Roberta Sue West/Robert White. I am calling back to ask you if received, and read the informational package that was sent to you about medical technology? Would you answer a few questions now that you have read the informational package? If you have not read it yet, may I call you back in several days? What time would be convenient for you?

You have helped us with a research project, if you are interested in the results, the research organization will mail them to you. Please send them a stamped self-addressed envelope to:

Medical Survey Results
P.O. Box 162
Willow Springs, Il. 60480-1412

Thank you again for your time and participation.
Appendix C

Question and Answers for Pre-Test Survey

Name of Subject: ________________________________

Address of Subject: ________________________________

Person Administering Survey: ________________________________

Miscellaneous Information: ________________________________

What Group Assigned to: Control ______ Experimental ______

Knowledge Score: ______ Date: ______ Time: ______

Effects of Public Education on Knowledge of Medical Technology

1. Do you know anyone who is a medical technologist (MT)?

   (1) yes
   (2) no
   (3) not sure

2. Do you know what a medical technologist (MT) is someone who works:

   (1) in the lab.
   (2) with the fire department.
   (3) works in the ER.
   (4) do not know.
3. Do you know what a medical technologist (MT) does, as their part in the health care team?

(1) assists emergency workers.
(2) prepares patients for operations.
(3) performs and reports test results to medical personnel.
(4) do not know.

4. Which of these roles is played by the medical technologist (MT)?

(1) an important part of the health care team.
(2) are not an important part of the health care team.
(3) are used in place of many other health care team members.
(4) do not know.

5. Do you know which of these educational requirements is needed to become a medical technologist (MT)?

(1) high school graduate.
(2) two year college degree and a hospital internship.
(3) four year college degree and a hospital internship.
(4) do not know.

6. Do you know how much the average medical technologist (MT) makes a year?

(1) less than $20,000
(2) $20,001 to $30,000
(3) more than $30,001
(4) do not know.
7. Based on your knowledge of medical technology occupation, which of the following is true, there are:

(1) enough medical technologists (MTs) at present.
(2) not enough medical technologists (MTs) at present.
(3) enough now, but will not be in future years to come.
(4) do not know.

8. If you were entering the workforce now, would you consider becoming a medical technologist (MT)?

(1) yes
(2) no
(3) undecided.

9. The position of medical technologist (MT) is considered a:

(1) service job.
(2) career.
(3) profession.
(4) do not know.

10. In the laboratory, the medical technologist often works:

(1) on their own
(2) as a team member.
(3) either on their own or on a team
(4) do not know.

11. Do you think the work medical technologists (MTs) perform:

(1) can be trusted.
(2) can not be trusted.
(3) needs improvement.
(4) do not know.
12. Would you recommend anyone you know becoming a medical technologist (MT) who was thinking of a medical career?

(1) yes
(2) no
(3) undecided.

13. What type of conditions do you think medical technologists (MTs) work under one of:

(1) high stress and turnover rate.
(2) which there is no recognition and low wages.
(3) constant personal health dangers.
(4) all of the above.
(5) none of the above.
(6) do not know.

14. Are you a:

(1) male
(2) female

15. What is your occupation: ________________________________

16. Do you have any comments you would like to make about medical technologists (MTs) or their profession? ________________________________
Questions and Answers for Post-Test Survey

Name Of Subject: ___________________________________________

Address of Subject: _________________________________________

Person Administering Survey: ___________________________________

Miscellaneous Information: _____________________________________

What Group Assigned to: Control _______ Experimental _________

Knowledge Score: _______ Date: _______ Time: _________

Effects of Public Education on Knowledge of Medical Technology

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   (2) no
   (3) not sure

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   (2) with the fire department
   (3) in the ER.
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(2) career.  
(3) profession.  
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(2) as a team member.  
(3) either on their own or as a team member.  
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(1) can be trusted.  
(2) can not be trusted.  
(3) needs improvement.  
(4) do not know.

12. Would you recommend anyone you know becoming a medical technologist (MT) who was thinking of a medical career?

(1) yes  
(2) no  
(3) undecided

13. What type of conditions do you think medical technologists (MTs) work under, one of:

(1) high stress and turnover rate.  
(2) which there is no recognition and low wages.  
(3) constant personal health dangers.  
(4) all of the above.  
(5) none of the above.  
(6) do not know.
Special Post-Test Question for the Control Group

14. Did you do anything to gain more information about MTs or their profession?

   (1) yes
   (2) no
   (3) made no difference.

Special Post-Test Question for the Experimental Group

15. After receiving the educational material, did you do anything to gain more information about MTs or their profession?

   (1) yes
   (2) no
   (3) made no difference.

16. Was your curiosity aroused by this survey?

   (1) yes
   (2) no

17. Are you a:

   (1) male
   (2) female

18. Occupation: __________________________

19. Do you have any comments you would like to make about medical technologists (MTs) or their profession? __________________________
    __________________________
Appendix D

Correct Responses to Survey for Knowledge Scores for Pre-Test

1. Answer will be none applicable.

2. #1 is correct

3. #3 is correct

4. #1 is correct

5. #3 is correct

6. #2 is correct

7. #2 is correct

8. Answer will be none applicable

9. #3 is correct

10. #1 is correct

11. #3 is correct

12. Answer will be none applicable

13. #4 is correct

14. Answer will be none applicable

15. Answer will be none applicable
16. Answer will be none applicable

Correct Responses to Survey for Knowledge Scores for Post-Survey

1. Answer will be none applicable.
2. #1 is correct
3. #3 is correct
4. #1 is correct
5. #3 is correct
6. #2 is correct
7. #2 is correct
8. Answer will be none applicable
9. #3 is correct
10. #1 is correct
11. #3 is correct
12. Answer will be none applicable
13. #4 is correct
14. Answer will be none applicable
15. Answer will be none applicable
16. Answer will be none applicable
17. Answer will be none applicable
18. Answer will be none applicable
19. Answer will be none applicable

Points for Correct Number of Responses

Pre-Test 10 Perfect Score
Post-Test 10 Perfect Score

Guide for Knowledge Points

0-2 No Knowledge
3-4 Below Average Knowledge
5-6 Average Knowledge
7-8 Above Average Knowledge
9-10 Great Amount of Knowledge
Appendix E

Training Instructions for Assistants

Helping with Research of the

Effects of Public Education on Knowledge

of Medical Technology

OVERVIEW

I am very glad that you have agreed to assist me in this worthwhile project. The one thing that I cannot stress enough is that you follow all the procedures as I have outlined them. Do not deviate from them in order to ensure conformity and validity of results. The packet in front of you contains all the speeches, tests, tally sheets, and instructions that you will be using during this experiment. These are yours to keep for future reference. Are there any questions you would like to ask?

PROPER TELEPHONE TECHNIQUE

We will now discuss the proper telephone technique to use during this experiment. At some time or another all of us have been asked to answer some questions on the telephone, so please remember how you
reacted and be polite at all times. After reading the proper speech, wait for an answer to determine if the subject will or will not participate. If the subject says, "This is a bad time." you may say, "I'd really like your input. Could I call you back at a more convenient time?" Then, thank them for their time politely no matter what their response is. At no time are you to tell the subjects who you are or what you are surveying. If a subject gets persistent and really wants to know just who you are you may tell them the following:

I am a representative from a professional medical association. This is a survey being done so that you could help assist us with an informational brochure we are planning to sent out to the general public. We are interested in your views because they will help make the upcoming Medical Week more beneficial to you, your families, and your neighbors.

Do any of you have questions as to the telephone procedure?

**SURVEY QUESTIONNAIRE**

There will be a preprinted questionnaire for each subject. All the
question and answers will be in one location to make it easier for you to administer the pre and post-surveys. You as the researcher must explain how you are going to administer the survey to them. First, tell the subjects it should take no more than five minutes to complete the survey, including the explanation. Then, tell them you are going to say MT instead of medical technologist, in order to save time. All subjects that agree to participate in the experiment will be asked if they could be sent an informational package. Then, ask what address they would like the information sent to.

On the top part of the pre-and post-tests, there is an information area that must be filled out by you when you begin each test survey. Most are self explanatory but the one marked miscellaneous information is for memos such as if the subject did not want to participate and why or if they hung up. Does everyone understand how to use the questionnaires?

**TELEPHONE CALL SHEET**

There also is a separate sheet for you to keep by your telephone, it will help you keep track of all the calls you made. On this sheet there
will be a heading for the control and experimental groups, with a column for the number of subjects who accepted and declined to participate in each group. Also there will be a column for the number of subjects who had to be reminded to read the informational package that will be sent to them. Do you have any questions you would like answered at this time?

Because there is an **April 10, 1994 deadline**, I would like each one of us to **make five calls a day**. Please do not make any calls if you are tired, as most people's answers can be influenced if you sound bored or tired.

After post-survey you may **tell all the subjects if they are interested** in the results of the survey they can **send a stamped, self addressed envelope to**:

**Medical Survey Results**  
P.O. Box 162  
Willow Springs, IL 60480-1412

The statistics will be done by me with the assistance of a statistician. Are there any questions or suggestion that you would like to make at this time? Please feel free to ask for my help anytime you
Effects of Public Education

feel it is needed.

We will now have a practice session to review everything we learned during this training session.

Thank you again for your assistance.