# FACTORS INFLUENCING THE CAREER CHOICE OF STUDENTS PURSUING MEDICAL LABORATORY SCIENCE TRAINING

DAVID W. KEEPING

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by

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## Abstract

The medical laboratory science profession in Canada is projecting a human resource shortage. The purpose of this exploratory study is to identify those factors which influenced the career decision-making choices of medical laboratory science students.

A purposive sample of 17 students in a Newfoundland and Labrador medical laboratory science program were recruited and participated in semi-structured interviews. Preliminary findings from these interviews were validated through a respondent focus group. The constant comparison method was used in analyzing the data and deriving a conceptual framework describing the factors which influenced the selection of medical laboratory science.

The results suggest the following conceptual categories represent important factors which influenced the career decision-making of medical laboratory science students: candidate personal interest; occupational characteristics; educational characteristics; resources; influential people; recruiting efforts; and baccalaureate degree educational programs. These factors have significant implications for the medical laboratory science profession, post-secondary system, policy-makers, and career counseling in efforts to promote medical laboratory science and address future health human resource shortages.

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# Chapter 1: Introduction

A human resource shortage has been reported within the health care system of Canada. This shortage extends across professions and includes members of over twenty different allied health professions (Kirby, 2002; Advisory Committee on Health Human Resources, [ACHHR], 1999). The point of interest in this exploratory study is the projected human resource shortage of medical laboratory technologists for whom there has been a 42% decrease in the number of graduates since 1987 (Kirby, 2002). Medical laboratory technologists conduct sophisticated laboratory testing which is a vital element in the Canadian health care system. A human resource deficiency in this profession could have significant implications for diagnostic services and subsequently for effective and efficient health care delivery. Davis (2002) suggested that a drop in numbers of medical laboratory technologists could be attributed to closures amongst Canadian Medical Laboratory Science (MLS) educational programs, downsizing during the 1990s as well as an increasing retirement rate within the workforce. This shortage is not limited to Canada alone as the United States (US) is also experiencing similar human resource challenges in this profession (Klipp, 2000; Foubister, 2000; Stuart, 2005).

The current reality for the MLS profession is an aging workforce, an increasing retirement rate, a decreasing workforce, and an increasing workload associated with an increasing and aging population. All this is happening at a time when there are fewer MLS educational programs in Canada to address the country's human resource requirements (CIHI, 2004; Health Canada, 2002). These conditions indicate that an

insufficient number of MLS professionals are currently employed or being trained to work in the Canadian health system which could have serious repercussions to Canadians because of the critical diagnostic services and contributions the MLS profession makes in the health care system.

Medical Laboratory Science professionals conduct sophisticated laboratory testing on blood, body fluids and tissue that aid physicians in diagnosing, treating and monitoring numerous health related issues. These laboratory tests are a vital part of Canada's health care system. It has been estimated that up to 85% of physicians' decisions concerning patients' diagnoses and treatment are based on the results of MLS testing (Foubister, 2000). An estimated human resource shortage in this profession could have significant implications for the health system and public safety due to the myriad of duties performed by MLS professionals.

The major fields in which MLS professionals practice within health care include Microbiology, Biochemistry, Histotechnology, Hematology, Transfusion Science, Diagnostic Cytology, Clinical Genetics, and Immunology.

Microbiology involves culturing and identifying bacteria, fungi, parasites, and viruses from humans as well as environmental sources. These organisms can lead to significant human morbidity and mortality due to diseases associated with their infection of the human body, such as tuberculosis, necrotizing fasciitis, septicemia, hepatitis, Acquired Immunodeficiency Syndrome (AIDS), Sudden Acute Respiratory Syndrome (SARS), West Nile Virus and Avian Influenza (Bird Flu). Testing associated with these organisms is becoming increasingly important in this age of world travel as pathogens in

virtually any location on earth can be transmitted around the world in a matter of hours. Further to these diseases, antimicrobial susceptibility testing which involves determining the best antibiotic to administer in a given circumstance of infection is also performed in the laboratory. Due at least partly to the overuse of some antibiotics we are seeing more and more examples of bacteria which are increasingly resistant to antibiotics and some to virtually all available antibiotics. Outside the health care environment, microbiology professionals perform environmental testing, for example determining if public drinking water is safe. The importance of timely and accurate public water testing was evident in the tragedy witnessed in Walkerton, Ontario in 2000. Seven people lost their lives and hundreds of others became sick due to the consumption of contaminated water (Canada Online, 2006).

Biochemistry laboratory professionals are involved in the examination of chemical substances within blood and body fluids. Chemical analysis is used to monitor a wide variety of substances such as carbohydrates, proteins, lipids, electrolytes, enzymes, hormones and drugs. The outcome of these tests is pivotal in physicians' diagnoses and treatment of human diseases involving every system in the human body.

Histotechnology laboratory professionals prepare human and animal tissue samples for microscopic examination. These tissue samples are normally collected during surgery, autopsy or biopsy procedures. The tissue is treated to prevent autolysis and putrefaction, processed, sectioned and appropriately stained so that pathologists can perform microscopic examinations. These could lead to patient diagnosis of malignancy, infective processes, metabolic abnormalities, and various other disease processes.

Hematology laboratory professionals deal with analysis of cells found in blood as well as coagulation proteins. This information aids in the diagnosis and treatment of conditions such as anemias, leukemias, thrombocytopathies and coagulation factor related bleeding disorders. Transfusion Science professions detect antigens and antibodies in human blood and provide compatible blood product support where necessary. These laboratory tests are also useful in the treatment of anemias, leukemias, thrombocytopathies, as well as in the diagnosis of hemolytic disease of the newborn and autoimmune disorders.

Diagnostic cytology technologists examine a wide variety of human cells to aid in the diagnosis of various malignancies as well as autoimmune diseases such as Hashimoto's thyroiditis. Clinical genetics professionals analyze human chromosomes, DNA and RNA from cells and body fluids in order to aid in the diagnosis and treatment of both hereditary and acquired genetic disorders, such as Cystic Fibrosis, Down syndrome, hemachromatosis, as well as various malignancies and leukemias. Immunology technologists aid in the diagnosis and treatment of autoimmune and alloimmune clinical disorders as well as facilitating organ transplantation by performing donor and recipient tissue typing procedures.

The majority of MLS professionals (74%) work in public hospitals, while 15.4% are employed in private laboratories and the remaining 10.6% work in various organizations and institutions such as public health laboratories, blood services, and the post-secondary education system (CSMLS New graduate employment survey – 2004, 2005). The MLS profession includes several classifications of laboratory professionals

who are certified by the Canadian Society for Medical Laboratory Science (CSMLS): Medical Laboratory Technologists (MLT); Diagnostic Cytotechnologists; Clinical Genetics Technologists; and Medical Laboratory Assistants (MLA) (CSMLS, 2005a). MLTs normally practice in Microbiology, Biochemistry, Histotechnology, Hematology, Transfusion Science, and Immunology while Diagnostic Cytotechnologists and Clinical Genetics Technologists practice in their specialized fields of Diagnostic Cytology and Clinical Genetics. MLA certification entitles individuals to practice in either of the above laboratories in a pre-analytical capacity, for example data entry, procurement and preparation of specimens, and the preparation of culture media and solutions. This paper will examine the MLT classification in particular, however the observations and recommendations may also be applicable to the other classifications of laboratory workers (Diagnostic Cytotechnologists, Clinical Genetics Technologists and Medical Laboratory Assistants).

In 1997 the CSMLS identified a pending human resource shortage within its profession (Davis, 2001). Davis concluded that Canada would experience a serious deficiency in the number of medical laboratory technologists within the next five to fifteen years. Data based on a retirement age of 55 years indicated that 12% of workers would retire by 2005, another 15.8% by 2010 and a further 16.6% by 2015. Davis estimated that 44.4% of the medical laboratory technologists employed in Canada would be eligible to retire by 2015. In this study, Davis also reported that cutbacks in training programs during the 1990s had significantly reduced the supply of new graduates making it impossible to fill the void left by the retiring workers.

In a follow-up report on medical laboratory technologists' retirement rates, Davis (2002) estimated that 50.5% of the medical laboratory work force will have either retired or will be eligible to retire by 2015. This represented a 6% increase when compared to the 2001 report. Also, as outlined in Table 1.1, the maximum number of Canadian medical laboratory technology graduates, based on the number of program seats (outside the province of Quebec), was reported to be 296 per year with a projected demand of nearly twice that number to fill the expected MLS vacancies caused by retirement (Davis, 2002). Clearly, more graduates will be required to fill the demand for these health care positions associated with employee retirements.

**Table 1.1 National Medical Laboratory Technologists' Training Positions – Outside Quebec**

| Time Frame | Training positions available per year | New graduates required per year | Difference per year | Additional training positions required over 5 years |
|---|---|---|---|---|
| 2007-2011 | 296 | 599 | 303 | 1515 |
| 2012-2016 | 296 | 582 | 286 | 1430 |
| 2017-2021 | 296 | 481 | 185 | 925 |

(Davis, 2002, p.102)

A report entitled "Health Professional Trends in Canada, 1993-2002" by the Canadian Institute for Health Information (CIHI) (CIHI, 2004) supports the findings of Davis regarding MLS human resource concerns. CIHI reports that the mean age of medical laboratory technology workforce increased from 37 to 41 years between 1991 and 2001. Further, CIHI indicates that the medical laboratory technology workforce was

dwindling. There has been a 5.8% decrease in the number of medical laboratory technologists between 1993 and 2002 with a national population size of 19,659 and 18,519 workers respectively. The downward trend started in 1995 and continued until 2000 at which time the numbers began to increase slightly. During this same period there was a 9.1% increase in the population of Canada. These statistics indicate an overall decrease of 13.6% in the number of MLS professionals per 100,000 population in Canada between 1993 and 2002 (CIHI, 2004).

Not only is the Canadian population increasing it is also aging. The fastest growing population group in Canada includes those aged 65 and older. In 2001 there were approximately 3.9 million Canadians 65 and older (about 1 in 8) and by 2021 this number is expected to increase to 6.7 million (about 1 in 5) as baby boomers (those born between 1946 and 1965) enter their senior years. As individuals age they have an increased need for health care services. Those 65 and older have a greater likelihood of hospitalization and more lengthy hospital stays as compared to other age groups (Health Canada, 2002). An aging population will result in overall increased demands on the health care system including the medical laboratory.

As this study specifically investigated one Canadian province, Newfoundland and Labrador population characteristics and MLS human resource indicators were examined. The population of Newfoundland and Labrador is decreasing as evidenced by an approximate 10% reduction in the provincial population between 1991 and 2001 (Statistics Canada, 2005b). The population is expected to continue to drop from 516,000 in 2005 to approximately 495,000 in 2020 (Economic and Statistics Branch, Department

of Finance, Government of Newfoundland and Labrador, 2005). This decrease has been associated with two factors: emigration and low birth rate.

The province has experienced a net negative interprovincial migration in all but four years since 1961 (Newfoundland and Labrador Statistics Agency, 2005a). Between 1972 and 1993 the provincial annual out-migration rate averaged 3600 individuals; it began increasing in 1994 and peaked in 1998 when 12,000 emigrated from the province. Since 1998 out-migration rates have begun to decline with 1,474 people leaving in the 2003-2004 census year (Economic and Statistics Branch, Department of Finance, Government of Newfoundland and Labrador, 2005). This decrease in population impacts upon MLS recruitment strategies because the major age group of individuals who are emigrating are between the age of 15 and 24. For example, in 2004-2005 Newfoundland and Labrador experienced a net loss of 1,875 individuals due to interprovincial migration with 575 individuals immigrating into the province and 2,450 emigrating. Eighty-seven percent (2,129) of those leaving the province were in the 15 to 24 age group (Newfoundland and Labrador Statistics Agency, 2005b). The loss of this cohort of young adults negatively impacts on recruitment strategies for MLS educational programs, as well as other post-secondary programs, because these individuals are prime candidates for attraction into the profession.

In the past, out-migration has been offset by the provincial birth rate, however the province has experienced a declining birth rate since the mid-1960's (Economic and Statistics Branch, Department of Finance, Government of Newfoundland and Labrador, 2005). Newfoundland and Labrador has seen approximately 5% fewer births in 2005 than

2001 (Statistics Canada, 2005a). The province has the lowest Canadian birth rate at 1.3 children per child-bearing age woman which is below the 2.1 rate required to sustain a population which is not experiencing out-migration (Economic and Statistics Branch, Department of Finance, Government of Newfoundland and Labrador, 2005). Clearly this is a serious concern to the province and has far reaching implications for the future.

Similar to the population of Canada, Newfoundland and Labrador's population is aging, however it is experiencing a more aggressive upward shift due to the provincial out-migration of young adults and low birth rates. The median age of 40 in the province was two years above the national average in 2004 and it is expected to increase to age 48 in 2020 (Economic and Statistics Branch, Department of Finance, Government of Newfoundland and Labrador, 2005). Like the increased demands associated with a larger proportion of seniors on the Canadian health care system the same stressors will be exerted upon the provincial system. This demographic could significantly affect the number of medical laboratory procedures performed within the province and nation which could ultimately result in the need for an expanded MLS workforce. This will exacerbate MLS human resource shortages and will make recruitment into the profession of critical concern for those producing MLS graduates.

There were approximately 567 MLS professionals employed in Newfoundland and Labrador in 1999, consisting of approximately 448 (79%) medical laboratory technologists, 45 (8%) medical laboratory assistants, 28 (5%) diagnostic cytotechnologists as well as other medical laboratory professional classifications such as combined laboratory radiography technologist and laboratory technicians (Keeping,

2000). According to Davis (2001) and Noseworthy (2001) this province should graduate a sufficient supply of MLS professionals to keep pace with projected retirements up to the year 2015 if the following assumptions hold true: workers retire at age 55; there is no requirement for an increase in provincial MLS workforce; little provincial out migration; and full subscription to current training positions. These assumptions may not be realized and each will now be examined in detail.

The retirement demographic projections utilized in the above studies were estimations based on professionals starting work at age 20 and retiring at age 55. A study performed by Keeping (2000) which involved a survey of all 567 MLS professionals in Newfoundland and Labrador estimated Newfoundland and Labrador MLS retirement numbers by reviewing the results of 375 respondents' survey questionnaires. This determined the actual retirement intentions of participants. This study suggested there would be a provincial MLS human resource deficiency of approximately 40 positions during the years 2011-2015 using current graduation rates, 100% retention of graduates, and stable workforce requirements. Given that this study may be more accurate in reflecting the actual number of retiring MLS professions there could be insufficient MLS professionals graduating in this province as early as 2011.

The Newfoundland and Labrador Health Boards Association (NLHBA) (2003) reported that even though the population of Newfoundland and Labrador will decline from 516,000 in 2003 to about 502,000 in 2013, the number of individuals over the age of 65 will increase by 31% during this same period. Furthermore, Newfoundland and Labrador has among the highest rates of circulatory disease, cancer, and diabetes as well

as demonstrates high rates of disease associated with activities such as smoking, obesity, and alcohol consumption compared with other Canadian provinces. These statistics suggest that Newfoundland and Labrador's demands on health care overall and MLS diagnostic procedures in particular will increase during this time period and would seem to support the need for greater MLS services and an associated increase in the MLS workforce.

Provincial out migration has been evident in recent years. MLS graduates are moving to other Canadian provinces and beyond to find full-time positions and higher salaries; reportedly 25 to 30 percent higher than those salaries offered in Newfoundland and Labrador (Davis, 2001). Newfoundland and Labrador experienced a 44.4% out migration of newly graduated medical laboratory technologists in 2004 (CSMLS New graduate employment survey – 2004, 2005). This out migration may decrease as more full time positions become available, however this province must ensure it is competitive in remunerating its workforce if MLS graduates are to be retained.

Davis (2002) reported that of the 718 available MLS training positions available in Canada, only 598 (83%) were filled. Table 1.2 demonstrates that Newfoundland and Labrador does not have a favorable history regarding meeting full capacity in available training positions. Over the past 10 years the available seats in the MLS educational program in Newfoundland and Labrador have been filled only once. The reasons for this underutilization of MLS seats are linked with the college's acceptance policies into the medical science common first year and MLS educational program. This will be further explored later in this paper within sections discussing inhibitors of MLS career selection.

**Table 1.2 Utilization of Seats in MLS program in Newfoundland and Labrador**

| Year | Seats Available* | Students Enrolled | Difference |
|---|---|---|---|
| 2005 | 28 | 22 | 6 |
| 2004 | 28 | 24 | 4 |
| 2003 | 29 | 28 | 1 |
| 2002 | 29 | 29 | 0 |
| 2001 | 29 | 19 | 10 |
| 2000 | 29 | 20 | 9 |
| 1999 | 29 | 17 | 12 |
| 1998 | 29 | 20 | 9 |
| 1997 | 29 | 23 | 6 |
| 1996 | 29 | 24 | 5 |

*The change in the number of available program seats reflects variations in the number of positions available during clinical rotations.

(Keeping, unpublished)

Based on Newfoundland and Labrador retirement estimations, high out migration, the possible requirement for an increased workforce and unfilled seats in MLS programs, this province, like other Canadian provinces, does and will have increasing challenges regarding a MLS human resource shortage.

It is clear that MLS human resource planning must occur for the sustainability of Canada's health care system. Currently, considerable human resource planning is taking place within the health system (Decter, 2006; Atlantic Health Human Resources Association, 2005). Many factors associated with the MLS human resource deficiency are beyond the control of decision makers such as the aging workforce, increasing retirement rate, increasing workload associated with our aging population and perhaps out migration. However, there are strategies which can be implemented which could have a positive effect. The creation of new MLS programs and an increase of seats in current MLS educational programs are two suggested methods for addressing the human resource shortage. However, the success of both strategies is dependent on full

subscription to all available training positions throughout Canada. The importance of student recruitment has therefore become a vital issue within the profession. It would be ineffective to create new MLS programs or to increase seats in current MLS programs without first considering the related topic of recruitment of students into these programs, especially where there is evidence that current programs are undersubscribed (Davis, 2002; Keeping, unpublished). With demonstrated and predicted health human resource challenges in Canada every effort must be made to fill each available MLS seat. Previous research which has examined the recruitment of students into the MLS profession studied groups in the United States, and was therefore associated with university based MLS educational programs. This study investigated the factors associated with Newfoundland and Labrador MLS college based students' decision to choose MLS as a career with a view to identifying factors associated with this choice. These factors could be employed by interested individuals in devising recruitment strategies to increase subscription within MLS programs throughout Canada and internationally.

## Study Purpose

It has been suggested that Canada has insufficient MLS graduates to address the projected human resource shortage, therefore every effort must be made to fill all available positions in current and future MLS educational programs. To achieve full subscription in MLS program seats, students must be recruited from potential candidates who are selecting from a myriad of post-secondary educational career choices. Competition for these students is aggressive so the MLS profession must be strongly and

effectively promoted to attract sufficient numbers to fill projected human resource demands. In order to facilitate MLS student recruitment and full subscription of educational seats, this study examined the factors which influenced MLS students' decision-making and the selection of MLS as a career choice. Semi-structured interviews and a focus group were conducted with a purposive sample of students recruited from two cohorts of students enrolled in a MLS program in a public post-secondary college in Newfoundland and Labrador. Grounded theory was used to identify the factors associated with students' selection of MLS as an educational program and career path.

The findings from this study have significant implications for the MLS profession, employers of MLS professionals, health human resource policy-makers, career education and counseling programs within the K – 12 system, as well as the post-secondary education system. The findings are particularly important to these groups because they have an interest maintaining the MLS human resource requirements of our health system.

In the event of a human resource shortage the MLS profession may experience difficulties in performing the daily tasks of the profession. If laboratory jobs go unfilled the turn around times for laboratory results could increase, overtime costs could increase, and workers could be stressed due to an expanding workload. This study will advise the MLS profession and employers of strategies to best promote the MLS profession and assist in recruiting MLS candidates.

Those involved with health human resource policy-making have the ability to make adjustments to workforce size as well as the number of MLS seats in programs.

This paper will outline a variety of MLS human resource issues for the province and the country and offer suggestions for addressing the projected shortfall in workforce requirements. Career counselors in the college and high school system will be advised of projected human resource pressures, the need for filling MLS program seats and the subsequent employment prospects for MLS graduates. Factors associated with MLS career selection will be discussed along with the best career resources and promotional strategies to employ in recruitment efforts.

Each of these groups should take an active part in embracing and implementing strategies to promote the MLS profession as a career path in an effort to improve recruitment into MLS educational programs so that sufficient MLS professionals will be available to fill future human resource demands. The goal of such recruitment strategies would be 100% enrollment in MLS educational programs in both Newfoundland and Labrador as well as other programs throughout Canada.

# Chapter 2: Literature Review

A human resource shortage of MLS professionals is evident within Canada and other parts of the world. The suggestion to increase MLS programs as well as increase seats in current MLS programs may be effective in addressing health human resource needs however these strategies are dependent on attracting students into MLS educational programs. If appropriate numbers of students are not recruited into MLS programs, Canada's current and predicted human resource shortages will continue. Reported under subscription of current MLS seats exacerbates human resource issues. Recruitment of students into MLS programs is therefore integral to addressing Canada's human resource challenges. Effective recruitment strategies should be based on knowledge of factors which current MLS professionals and students report as being influential in their career choice. A review of the literature was performed to determine the body of knowledge currently available relating to these MLS selection factors as well as general career selection theories.

General career selection and decision-making theories are constantly changing as individuals strive to understand the factors and processes associated with career choice. When human survival was based on hunting and gathering, or agriculture, the vocation of adults was primarily determined by age and sex. Currently there are several theoretical approaches which strive to explain human behavior associated with career choice. There are some common aspects among the theories however neither has been accepted as being superior to others. Some theories have been criticized for not being applicable to

women or minority groups as they suggest bias on the basis of gender or ethnicity and are therefore not generalizable. Consequently, the most effective career decision-making process should involve consideration of each of these theories and utilize the portions of each that best informs in particular situations.

Holland's theory of vocational personalities and work environments is based on the principle that there is a reciprocal, influential relationship between individuals and their environments (Holland, 1997). This theory is based on the assertion that career choice is linked with personality, therefore human traits can be associated with particular careers. Holland (1997) identified six personality types which develop as a result of cultural and personal interaction: realistic; investigative; artistic; social; enterprising; and conventional. These are each linked to a set of attitudes, skills and interests which can inform vocational preferences. Individuals are associated with these personality types, usually showing a dominant correlation with one personality type along with secondary weaker linkages with others. Holland contends that individuals with particular personality types tend to associate with others of similar make-up which leads to an environment (environment type) of individuals with similar attitudes, skills and interests. Identifying an individual's personality and environment type can therefore facilitate decisions regarding career choice. In addition, Holland places the six types in a hexagonal structure which informs relationships between types; some types have more elements in common than other types. Holland suggests that career satisfaction is enhanced when an individual's career choice corresponds to their personality traits and when personality and

environmental types are the same or compatible (Spokane, Luchetta & Richwine, 2002; Swanson & Fouad, 1999).

Person-environment-correspondence (PEC) theory is a generalized version of theory of work adjustment (TWA) (Dawis, 2002). Like Holland's theory, PEC is based on the interaction between the person and their environment. However, where Holland's theory emphasizes vocational choice, PEC theory emphasizes vocational adjustment. PEC theory suggests that job satisfaction is equally dependent on an individual's ability to perform a job and the job's ability to fulfill the individual's needs; both the person (P) and the environment (E) have requirements that need to be filled. Linked with P's needs are P's career related skills which have developed over time through training and experience. When the needs of both person (P) and environment (E) are met, satisfaction and maintenance will occur and the individual will tend to remain in a particular environment (career). Where these needs are not met, dissatisfaction is experienced by person (P), environment (E), or both, and adjustment will tend to occur which can require modification of the individual's needs and/or skills, and/or the job's requirements. If these adjustments are unsatisfactory, P/E needs are not met, and the individual may not remain in that particular career. If person (P) or environment (E) is not satisfied, either could initiate severing their interaction. PEC is used to assess an individual's abilities and needs and compare them with various occupations. Also, PEC endeavors to determine an individual's threshold for flexibility which is the ability to adjust to mismatches between individual needs and abilities and the job requirements (Dawis, 2002; Swanson & Fouad, 1999).

Career construction theory is an expanded version of Super's life span, life space approach developmental theory (Savickas, 2002; Swanson & Fouad, 1999). Individuals go through a process of career construction by creating and applying career self-concepts. This process occurs within an individual's social context (environment) which influences individual perceptions of the suitability of various careers. Individuals go through a process of decision-making associated with constructing self-concepts pertaining to their abilities, personality, and values which concludes in a matching career choice. Self-concepts are associated with career preferences which change over time due to social interactions, however become increasingly stable as an individual ages. Super proposed five life stages which individuals move through as their career self-concepts change: growth (ages 4-13) associated with forming a career self-concept; exploration (ages 14-24) associated with fitting into society where young people learn what society expects of them; establishment (ages 25-44) associated with the implementation of self-concept into a career choice; maintenance (ages 45-65) associated with reexamining career experiences; and disengagement (over age 65) associated with discontinuing vocation and planning for retirement. Periodically individuals reconsider their career choice. This tends to result in either revision of their career self-concept and career change if vocation is judged unsatisfying or maintaining a chosen career if the vocation is determined to be acceptable. Career counseling would entail determining both objective information about the individual as well as the individual's subjective impression of their career constructs associated with their abilities, personality and values (Savickas, 2002; Swanson & Fouad, 1999).

Gottfredson's theory of circumscription, compromise and self-creation is a developmental theory which suggests that as children develop an awareness of themselves and their environment they eliminate (circumscribe) career options based on the occupational accessibility or compatibility with their self image (Gottfredson, 2002; Swanson & Fouad, 1999). They tend to choose careers perceived as matching their gender and social class. These responses to society are affected by the individual's genetic make-up, in that individuals exposed to the same stimuli may respond differently dependent on any inherent genetic advantages or disadvantages. Circumscription often prematurely eliminates career choices based on expectations of job prestige and gender. Children continue to narrow their occupational choices, based on social self concept, until age 14 at which time compromise commences in choosing from the remaining acceptable careers. Gender, prestige and field of interest are important factors in the compromise process. Gottfredson aims to prevent or reverse previous unnecessary career elimination. Counseling should include provision of information pertaining to chosen career requirements and availability as well as suggesting alternative career choices which would result in more satisfying career choices (Gottfredson, 2002; Swanson & Fouad, 1999).

Krumboltz's social learning theory of career choice and counseling is associated with four factors which influence career choice (Mitchell & Krumbolz, 1996). An individual's innate genetic make-up resulting from characteristics inherited from parents leads to enhanced or reduced abilities. Second, the environmental conditions and events such as job opportunities, social policies (e.g. affirmative action), occupational rewards,

physical events, natural resources, technological developments, educational system and community influences. Third, the learning experiences which individuals experience result in positive or negative associations with various activities. Lastly, the task approach skills which the individual utilizes during a task, such as their expectations, work habits, cognitive processes and emotional responses. These four factors interact to form generalizations about the self or the world in such a way that career choices are preferred if the individual has succeeded in tasks they perceive as being career associated, if role models were seen as being satisfied in the career, or if influential people have recommended the career. Career choices will be avoided if either of these propositions is negatively experienced, i.e. if one has failed in performance of a career associated task, encountered a dissatisfied role model or are dissuaded by an influential individual. Krumboltz suggests that career counselors should not only assist individuals in identifying their current skills and interests, but also explore new areas of interest (Swanson & Fouad, 1999).

Social cognitive career theory builds on the foundation of Krumboltz's theory but focuses on personal constructs associated with career decision-making (Lent, Brown, & Hackett, 2002). An individual's confidence in their capacity to successfully perform a task (self-efficacy) and their expected outcomes for that task are constructs of their perception of reality. Self-efficacy concepts are dynamic and vary depending on interactions with people and environmental factors or the required task. Positive self-efficacy and career outcome expectations lead to interests in vocational fields. Interests lead to a career choice (goals) that lead to actions enabling career choice. Personal factors

such as gender, race, disability, personality and background influence learning experiences which can modify an individual's perception of their self-efficacy or expected career outcomes which will then modify their interests and career selection. The individual's perception of their self-efficacy regarding particular competencies and their perseverance in attaining their goals is fundamental in their career selection. An accurate match between an individual's self-efficacy beliefs as well as their career outcome expectations and their true interests and skills is associated with satisfying career choices (Lent, Brown, & Hackett, 2002; Swanson & Fouad, 1999).

Other than genetic make-up, the dominant factor in these general career choice theories pertains to the environmental experiences which shape an individual's perception of career choices. All the general career choice theories identified the prominent impact of environment on career choice. Exposure to cultural and social events significantly influence decision making pertaining to career choice. Interactions with society associated with positive experiences regarding a particular career may lead to interest whereas negative experiences may cause one to eliminate a career choice. Over time environmental factors shape attitudes, abilities, personality and self-concept and ultimately impact career choice. The theories suggest that successful and rewarding career choices are made when individuals accurately select careers which are compatible with their career expectations. These studies highlight the importance of exposing career choices to potential candidates in recruiting campaigns. This concept is especially relevant in MLS because due to the behind the scenes nature of the profession it is usually not experienced by the general public. This research utilized a questionnaire

(Appendix C) which sought to identify the perceived influential as well as inhibitory factors, such as individuals or resources, which were associated with selection of MLS as a career choice. This strategy informed the study as to which environmental factors were most influential in MLS career selection.

Following this review of selected general career choice theories, the extent to which the literature pertains to the career choice of MLS will now be examined. Studies which focused specifically on MLS professionals within Canada were not identified in the search of the literature however, several relevant studies based in the United States were enlightening.

The literature relating specifically to MLS career selection factors is informed by Jones (1992) who conducted a survey of 192 MLS professionals employed in North Central Texas to determine their demographic make-up and most influential career selection factors. Data analysis from the 101 respondents suggested that prospective MLS candidates may be positively influenced to select MLS as a career choice by information received from practicing medical technologists, medical technology students, college professors, and college calendars. Perceptions of the MLS profession which were found to be most attractive were availability of jobs, adequate salary, prestige and respect for the profession, and personal interest in science and medicine.

Baldwin and Agho (2003) performed a large quantitative study utilizing data obtained from 1809 questionnaire respondents administered to a cross-sectional sample of students enrolled in six allied health disciplines (medical technologist, dental hygienist, occupational therapist, physician assistant, physical therapist, and respiratory

therapist) at 27 colleges and universities in the United States. They found that exposure to current practicing health care professionals was the most influential factor associated with students' career selection. They also found that high school counselors as well as family and friends were not an important source of information about medical technology educational programs.

Ireh, Savage and Hatch (1995) performed a study based on a stratified random sample of 330 students in four Ohio technical colleges reflecting five technologies, including Health Technology. Twenty randomly selected students from each of the five technology groups were chosen. They completed a survey instrument designed to gather information pertaining to influential experiences and individuals affecting students' career choice. This study also observed that career guidance experts were not an important factor in students' career selection process. They found that wages, interesting courses, previous work experience, professionals currently practicing in occupation, friends and family members (in order of significance) were influential factors in career decision making.

Brown-West (1991) conducted a survey of a stratified random sample of 153 students enrolled in three allied health professions (MLS, dietetics, and physical therapy) at the University of Connecticut which examined factors influencing students' choice of an allied health profession. The need to help others, professional autonomy, opportunities for advancement, professional prestige and income potential were identified as the most influential factors associated with MLS career selection. The author suggested that career counselors should consider the findings identified in the study to develop career

advisement materials with an aim to providing factual information to potential health care students.

Stuart (2002) conducted a two phase study which involved documenting the factors influencing students' decision to enroll in MLS university programs in the United States. Phase 1 of this research involved an exploratory study using semi-structured interviews and a focus group involving seven junior MLS students. Information gained from phase 1 was used to develop a phase 2 questionnaire which was used to survey 274 students in 23 US university-based MLS programs. Opportunities for advancement and job availability were identified as influential MLS job characteristics and family, friends, and college advisors were identified as influential individuals. Stuart also reported that community of origin could be a barrier to MLS career selection in that prospective students choose educational programs in close proximity to their homes. Stuart therefore recommended that MLS educational programs should concentrate on promotional and recruitment efforts within their local geographic regions.

Mishoe, Valeri and Beveridge (1993) conducted a survey of high school seniors in the United States with an aim to develop allied health program recruitment strategies directed toward this population. Surveys were distributed to all senior students who were present on the day of data collection at three public schools in the state of Georgia. They found that lack of knowledge, rather than lack of interest, was the leading cause of enrollment deficiencies in allied health programs. Employment opportunities and salary were identified as influential factors in selection of an allied health career. Foubister's

(2000) article on MLS shortages in the US also identified lack of public knowledge of the profession as a significant reason for MLS human resource difficulties.

Stuart and Fenn (2002) described successful recruiting strategies used in the MLS program at the University of Utah. Lack of public awareness of the MLS profession, as well as low salaries and numerous career choice options available to prospective students were reportedly associated with recruitment challenges by the medical laboratory profession. They found that US MLS educational programs were having difficulty in finding sufficient students to fill all available seats and recommended increasing public awareness and actively recruiting students as two approaches to address low student enrollment.

These studies examined high school students, health care students, MLS students and MLS professionals in an attempt to identify factors associated with selection of MLS as a career choice. The influencing factors which were identified pertained to: MLS occupational characteristics; educational program characteristics; and the opinion of influential people. Three potential barriers to MLS career selection were also identified: geographic location of MLS program in relation to potential students' community of origin; career counselors; and general lack of public awareness of the profession. This study utilized a questionnaire (Appendix C) which determined the MLS career selection factors and barriers associated with MLS career selection in the local cohort of MLS students in Newfoundland and Labrador.

Previous research studies involving MLS career selection have examined United States' participants and programs. Such programs were all university based. This study

involved MLS students enrolled in a public post-secondary college in Newfoundland and Labrador, Canada. Comparison of this study's findings and previous findings may help determine influential factors which are specific to college based programs or to Newfoundland and Labrador. Factors specific to Newfoundland and Labrador could be used for the development of recruitment strategies tailored to effectively serve the local population.

# Chapter 3: Methodology

The purpose of this study was to examine the factors which influenced MLS students' decision-making and choice to pursue MLS as a career. This was an exploratory study which was intended to explore the career selection process and identify associated factors involved in MLS career selection. For this reason a naturalistic research approach was chosen which utilized semi-structured interviews and a focus group conducted with a purposive sample of students. Students were recruited from two cohorts enrolled in a MLS program in a post-secondary public college in Newfoundland and Labrador.

A purposive sample of 24 second and third year students enrolled in a MLS program in a post-secondary college in Newfoundland and Labrador were invited to participate in individual semi-structured interviews. A letter of invitation was sent to each candidate outlining the basis and intent of the study (Appendix A). Each letter of invitation was accompanied by a copy of the demographic information questionnaire (Appendix B) and interview script (Appendix C). A consent form (Appendix D) which obtained written consent from each candidate to participate in the study and clearly outlined the participants' right to withdraw from the study for any reason was included. The college's internal mail system was used for delivering both the invitations to the participants and the responses to the researcher. Ethical review and approval for this study was granted by the Interdisciplinary Committee on Ethics in Human Research (ICEHR) prior to study commencement.

Seventeen of the 24 (71%) individuals who were invited to participate in the interviews agreed to take part in the study. The interview questions were open ended in nature and intended to explore factors associated with MLS career selection. The interviews were audio taped and transcribed. A letter of invitation to participate in a focus group was sent to 15 of the original 17 individual interview participants (Appendix E). Two of the original participants were no longer attending the college. Seven of these individuals agreed to participate in the focus group. The preliminary findings from the initial interviews were presented to the focus group in order to clarify, expand and validate the initial interview results, as well as gain a greater understanding of emergent themes. The focus group discussions were also audio taped and transcribed.

Cohen, Manion, & Morrison (2000) suggest that focus groups are an effective means of obtaining feedback from previous studies. Focus group research may be useful as a validation technique for interviews. Involvement of study participants in the interpretation of data and review of findings facilitates the formulation of meaning. Focus groups lend credibility and validity to a study (Gall, Gall, & Borg, 1999; Merriam & Simpson, 2000).

The trustworthiness of conclusions in this qualitative research was addressed by employing tactics recommended by Miles and Huberman (1994). The study's objectivity or external reliability was demonstrated through: accurately describing research methods and data analysis in detail; participant quotes were provided to support conclusions; and the study's data will be retained by researcher and available for reanalysis for a period of five years. These strategies would allow this research to be

reproduced by others with a reasonable expectation of similar findings. The reliability or dependability of the study over time was demonstrated through: providing a copy of the research questions; use of clear interview questions; and using an appropriate sample of participants from which meaningful data could be obtained. Internal validity or credibility of the findings was demonstrated by the use of multiple modes of data collection (individual interview and focus group) with the interview conclusions verified in the focus group by original interview participants. The external validity or generalizability of the conclusions was fostered by fully describing the research sample, setting and methods used so that comparison could be made with other studies. Also the findings of this study support many of the findings in previous research reported in the literature review.

## Data Analysis

The interview and focus group transcriptions were analyzed with the aid of the computer software Ethnograph v.5.0 (Qualis Research). Data collected during this study was analyzed using the constant comparison method to identify themes "grounded" in qualitative data. Constant comparison entails a continuous process of searching for key issues and "discovering recurrent events or activities in the data" which become thematic categories "so that a model or explanation of the phenomena can emerge that accounts for social processes and relationships" (Cohen et al., 2000, p. 151). An initial review of interviews produced codes for occurrences of pertinent items. The codes were organized, compared and contrasted repeatedly until themes were identified. The themes were then

organized, compared and contrasted for refinement and consolidation. The focus group transcriptions were coded, reviewed, and organized into emerging themes and subsequently compared and contrasted with those of the initial interviews. The codes and themes were repeatedly analyzed, collapsed, compared and contrasted until main thematic categories relating to the raw data emerged which identified the factors associated with participants' decision to choose MLS as a career.

# Chapter 4: Results

A purposive sample of 24 candidates from two classes of MLS students from a public post-secondary college in Newfoundland and Labrador were invited to participate in this study. Seventeen individuals (71%) agreed to participate in the semi-structured interviews. The majority of interview respondents (53%) were between the ages of 20 – 25. Eighteen percent were aged 26 – 30, 18% were between the ages of 31 – 35, and 12% of respondents were aged 36 – 40 years. The respondents were predominately female (76%) and from rural communities (71%). These demographics compare favorably with those of the student cohort enrolled in the MLS program in the public post-secondary college in Newfoundland and Labrador where the majority of students (57%) were between the ages of 20 – 25, 25% were aged 26 – 30, 9% were between the ages of 31 – 35, and 9% were aged 36 – 40 years. The post-secondary student cohort was comprised of 83% female and 72% were from rural communities (Keeping, unpublished). The study respondents were representative of the student cohort which was the focus of this study.

Three of the 17 participants (18%) reported high school graduation as their highest level of education prior to entering the MLS educational program. The majority of the participants (59%) had completed some post-secondary courses. The post-secondary courses reported by the respondents included university, public and private college courses which were not part of the MLS program. Two of the respondents (12%) reported graduating from a college trade level educational program less than two years in

length and two (12%) held undergraduate university science degrees. Table 4.1 presents the demographic characteristics of the study respondents.

**Table 4.1 Demographic Summary of Individual Interview Participants**

| | | N(%) |
|---|---|---|
| Age | 20 – 25 | 9 (52.9) |
| | 26 – 30 | 3 (17.6) |
| | 31 – 35 | 3 (17.6) |
| | 36 – 40 | 2 (11.8) |
| Gender | Male | 4 (23.5) |
| | Female | 13 (76.5) |
| Community of origin | Urban | 5 (29.4) |
| | Rural | 12 (70.6) |
| Educational background entering MLS program | Graduated high school | 3 (17.6) |
| | Completed some post-secondary | 10 (58.8) |
| | Graduated trade level program | 2 (11.8) |
| | Graduated university undergraduate degree | 2 (11.8) |

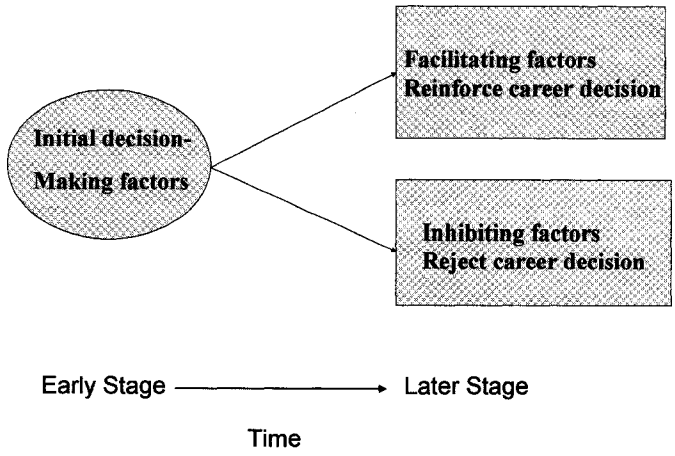
As a means to augment credibility and validity in this exploratory study all seventeen (17) of the initial interview participants were invited to participate in a follow-up focus group interview in which preliminary findings of the individual interviews were presented. The use of focus groups in this manner was intended to gain a greater understanding of the qualitative interview research results as well as obtain feedback on initial observations. Two of the participants were no longer enrolled in the MLS program

at the public post-secondary college and of the 15 remaining participants, seven participated in the focus group session.

An analysis of the data from the interviews identified five categorical factors associated with the decision-making process involved in selecting a career in MLS: personal interest; occupational characteristics; educational characteristics; resources; and influential people (Table 4.2). Also, two additional categorical factors emerged which pertained to inhibiting and facilitating MLS as a career choice (Table 4.3). All seven of these factors are of significance in relation to recruitment of students into MLS educational programs.

The five factors associated with career decision-making were believed to be the elements which initially attracted individuals to the MLS profession. The inhibiting and facilitating factors came into play once individuals were attracted to the profession, by either reinforcing or rejecting the individual's career choice of MLS. These factors have been categorized based on a time continuum (Figure 4.1) with the five decision-making factors being influential in the early stages of career choice when individuals are making preliminary career decisions between the myriad of careers available. The influential and inhibitory factors are influential at a later stage of career choice when individuals are making final decisions regarding their career.

Figure 4.1 Timeline of influential factors associated with MLS career choice




*Personal interest*

A thematic category related to personal interest factors associated with selection of MLS as a career emerged following data analysis. This factor represented items which were personally meaningful for the participants. Within the personal interest category three sub-categories emerged which pertained to: elements of the health care system; participants' need for a career change; and aspects of the MLS profession.

All 17 interview participants reported having an initial interest in a career within the health care system prior to enrolling in the MLS program. Respondents' reported interesting aspects of the health care system and a health career to include: science,

**Table 4.2 Factors associated with MLS career selection**

| Thematic Category | Sub-categories | Number of instances theme coded |
|---|---|---|
| Personal Interest | Health care system | 17 |
| | Career change | 6 |
| | MLS profession | 2 |
| Occupational Characteristics | Employment opportunities | 9 |
| | Job benefits | 2 |
| | Salary | 2 |
| | Altruism | 2 |
| | Diverse work conditions | 2 |
| | Low patient contact | 2 |
| | Satisfaction within profession | 2 |
| | Independent work conditions | 1 |
| | Low stress | 1 |
| Educational Characteristics | Preference for vocational education | 4 |
| | Relatively inexpensive | 1 |
| Career Information Resources | College calendar | 10 |
| | World Wide Web (WWW), Internet | 9 |
| | HRSDC career research program | 6 |
| | CSMLS Promotional pamphlets | 5 |
| | High school job shadowing | 3 |
| | Career fair | 3 |
| | Newspaper article | 1 |
| Influential People | Medical Laboratory Professional | 10 |
| | High school counselor | 5 |

forensics, the medical (physician) field, working in a laboratory, human biology, microscopes, and genetics. Two of the participants also indicated that they perceived the MLS profession in particular as interesting and exciting.

> *I knew from a young age that I wanted to work in a laboratory.*
>
> *I've always been attracted to science and as I became older I developed a huge interest in the medical field. I found med lab really interesting; all the aspects of med lab and the work they do.*

Six interview participants suggested they pursued MLS as a career choice because they were seeking a change in their previous career. Participants reported unsatisfactory working conditions, low wages and the need for a new challenge as rationale for their career change. They believed that pursuing a MLS profession addressed their needs relating to desire for career change in that the working conditions and wages would be improved and there would be a renewed challenge in their work experience.

> *I worked for about sixteen years in a job and didn't like what I was doing.*
>
> *I did child care and personal care in the past and I found it wasn't what I wanted to do for the rest of my life.*

### *Occupational Characteristics*

A second thematic category pertaining to influential occupational characteristics associated with a MLS career selection emerged which suggested the MLS profession

was associated with attractive work-related qualities. This factor represents the traits of MLS work-life which participants perceived as attractive. Related to the occupational characteristics category several sub-categories were identified: attractive employment opportunities; job related benefits; and salary; altruistic occupational qualities; independent and diverse working conditions; low patient contact; apparent satisfaction within the profession; and a low stress environment.

The most common influential occupational characteristic which emerged was that of excellent employment opportunities. The MLS occupation was associated with a high probability of finding a job upon graduation by nine interview participants. The focus group members also believed that the job prospects upon graduation from their MLS program were positive and suggested that a career in MLS was associated with a stable career choice. The focus group respondents also believed that the relationship between educational program and employment was fundamental in their career decision making.

> *The outcome of my research showed that there were going to be jobs for the medical lab technologists. I know there's a good chance I'll get a job with this education.*

Several other thematic factors were identified pertaining to influential occupational characteristics associated with a career in MLS. Two participants suggested that current practicing medical laboratory professionals appeared to be satisfied with their career choice, and in fact some laboratory professionals expressed a passion for the profession.

> *Every one of the [MLS] workers loved their job. You could see the passion they had in the work. They really enjoyed it.*

Two participants suggested MLS was a career associated with enhanced job benefits such as health insurance, annual leave, and sick leave and that these aspects exhibited a positive influence on their career choice. Two participants identified satisfactory salary within the MLS profession as a positive influence in career selection. Two participants suggested they selected MLS as a career choice for altruistic reasons. They indicated that helping other people in their time of need was personally meaningful and positively influenced their career selection.

> *A man asked me what I would like to work at. I said, "nursing or something in the hospital to help people." He suggested the med lab program. I checked into it and decided to do it.*

Two interviewees identified the MLS profession as being diverse. They indicated there were many different employment opportunities in which MLS graduates could find employment. Examples of career opportunities which were available to MLS professionals include: hospitals (within which there were five major disciplines, Hematology, Transfusion Science, Clinical Chemistry, Microbiology and Histotechnology), public health laboratories, immunology, electron microscopy, research, Canadian Blood Services, industrial laboratories (food, oil, and brewery), and education.

> *Through my research I found that there's a lot of areas, besides just the hospital that you can work...environmental, research or stuff like that. There's five or six different hospital disciplines and a lot of areas that I could go into to keep my interest.*

One participant indicated MLS was a profession in which individuals often work independently with little patient contact. The participant believed this was an attractive work environment as they preferred working on their own and did not feel a need to have a great deal of patient contact. Low patient contact was also identified by a second participant as being a positive career selection factor. The focus group participants also believed low patient contact was a positive influential theme associated with a career in MLS and pointed out that MLS professionals have to be understanding and compassionate when dealing with patients, but they believed the main career emphasis was on technical ability.

> *I was looking for a career where I didn't have to deal with the public. I didn't really know a lot about a lab tech's job but I did know they pretty much worked independently.*

One participant suggested the MLS profession was less stressful than other health care professions. They believed a low stress career was a positive influence on their career selection.

> *I thought about respiratory therapy in high school. That was initially what I wanted to do. Then I started to learn about med lab and thought it was a lot more interesting. I thought it was a lot less stressful too.*

These findings would suggest a need to effectively characterize, describe and promote these characteristics to potential recruits.

### *Educational Characteristics*

The third category which emerged from data analysis associated with MLS career selection pertained to the characteristics and nature of the educational requirements associated with MLS training. This factor represents the traits of the MLS education system which participants viewed as attractive. Two subcategories were identified relating to MLS educational characteristics: participants' preference for vocational education and the relatively low cost of public college education.

Four interview participants reported they had pursued university education but were dissatisfied with the experience. The participants indicated they were attracted to a vocational type education which the MLS program offered. Educational curriculum which focused on one vocational area when compared with a broader university science program was more appealing.

> *Universities have a broad scope where I found [public college] was more of a skilled, more of a narrow approach. More selective in what you were doing. That appealed to me.*

One participant indicated that the higher financial cost of a university education compared to a college education was a factor which influenced the selection of a MLS program. Respondents felt the public college post-secondary program was equally valuable as university programs, but at a lower financial cost.

> *I went to the university for a year and I found that I wasn't quite interested in the electives. I found that I couldn't afford to go for too many years.*

The focus group respondents reported a strong preference for a vocational education as opposed to a general university education leading to a degree. They perceived vocational education as more focused, structured, and identified a direct link between the educational program and a professional career upon graduation. The members of the focus group believed university undergraduate degrees were less focused than vocational programs, and did not prepare the university graduate for an identifiable career. The focus group participants believed the college MLS program was better suited to preparing graduates for employment. The two participants who held undergraduate university science degrees indicated their undergraduate degree did not fulfill their career-related needs. They gave personal accounts of not being able to find suitable employment with their university credential.

> *I couldn't find a good job with my degree. A degree is too general.*
>
> *I was at university for four years. I knew that I wasn't going to get a job with it.*
>
> *[Name of university] was too broad for me. I didn't know what I wanted to do. I could do courses forever but it wasn't going toward anything so that's why I stopped.*

### *Career Information Resources*

The career information resources which interview participants utilized in informing their career choice also emerged as a factor associated with MLS career decision-making. A number of career information resources were identified and

described: college calendars; the Internet; Human Resources and Skills Development Canada (HRSDC) career research programs; Canadian Society for Medical Laboratory Science (CSMLS) promotional pamphlets; high school job shadowing; career fairs; and newspaper articles.

A large number of respondents indicated that the college calendar was an important resource in career decision-making.

> *I actually wasn't sure what do in high school so I was looking through the college calendar trying to decide what I want to do when I found information on med lab.*

A number of respondents indicated that information found on the World Wide Web (WWW) and Internet was also useful in decision-making.

> *I went on the government website which showed a good outcome for the future for medical lab.*
>
> *I was looking at college websites to see what kind of programs they offered to see if I would be interested in anything when I discovered medical lab.*
>
> *I just typed into Google "medical lab technology" and found lots of information.*

Respondents also reported Human Resources Development Canada (HRDC) offered career information which supported the career choice of MLS. The HRDC MLS career information was clear, comprehensive, and positive with respect to employment opportunities.

> *HRDC has a full study done on this course and the impressive employment success of people once they're done this course.*

*HRDC gave me a sheet with websites that I could go in and search for careers.*

*I had an employment counselor at HRDC and she informed me about laboratory technology. It sounded interesting cause if I did that I could work for the police force or in the area of DNA, genetics, or a research lab.*

Promotional pamphlets from the Canadian Society for Medical Laboratory Science informed their choice of MLS as a career.

*I came to the college and got their prospectus and pamphlets on the program. They helped with my career decision.*

Respondents reported that involvement in a hospital laboratory job shadowing program during high school had a positive influence on their career selection. The focus group members believed that job shadowing was an effective method for learning about a potential career. However, several in the group were unaware that job shadowing was offered to high school students. Other participants indicated that attending a career fair while in high school was helpful in learning about MLS and in selecting MLS as a career.

*I did go to a couple of career fairs that they had in [name of city]. I found information as to where you could work, salaries, that kind of thing.*

One participant indicated that reading a newspaper article pertaining to the MLS profession influenced their choice of MLS as a career.

*I read a newspaper article in the [name of newspaper] years ago and it had a full page article on lab techs and it described the duties. It described the occupation. I knew then that's what I wanted to do.*

### *Influential People*

The individuals who were influential in the participants' selection of MLS as a career choice emerged as a key factor associated with the career decision-making process. This factor represents those individuals who took part in the participants' choice of career. Data analysis of participants' responses identified two sub-categories of influential people: professionals currently within the MLS profession and high school counselors.

A number of interview participants identified their high school counselors as influential in their career selection.

> *I discussed this course [MLS] with a guidance counselor and she said it sounds like a pretty good career choice.*
>
> *My guidance counselor suggested this career to me.*

However, high school counselors were also perceived by some as demonstrating personal bias toward various educational systems. Respondents believed that some high school counselors unfairly promoted university programs as opposed to college programs, based on a student's high academic achievement.

> *They [guidance counselors] weren't very good at their job, in my opinion, in high school. They just assumed everyone would trot off to university or trade school, depending on what percentile you're in.*
>
> *We were more or less encouraged to go to university and that was it. There were no other options given to us at the time.*

*I went to see a guidance counselor but they really couldn't tell me anything that I didn't already know. He barely knew that the [MLS] program existed.*

The focus group respondents also reported that high school counselors were not familiar with MLS as a career choice. They discussed their experiences pertaining to career selection and suggested that some high school counselors believed higher academically achieving students should attend university. This was perceived as a bias toward university education. The focus group participants did not believe that performance in high school necessarily correlated with performance in college or university. They also identified the relatively high financial cost of attending university compared with college. Focus group respondents suggested that guidance counselors should reconsider their practice of associating high academic achievers with university attendance.

*High achievers were recommended to attend university.*

*Students didn't get an appointment to see the [name of university] university recruiters if they weren't high achievers.*

*If you got good marks you had to go to university. If you're an average student you are supposed to go to college.*

Those currently practicing in some aspect of the MLS profession were also perceived as influential individuals to participants in this exploratory study. The participants indicated they were exposed to these MLS professionals in a variety of ways, such as: HRSDC job search program; meeting with public college MLS faculty; family or

friend references, high school job shadowing, career fairs, or a serendipitous encounter with a MLS professional. Some participants indicated medical laboratory workers currently practicing in the MLS field positively influenced their career decision. The participants valued the opinion of individuals who were "front line" MLS employees because of their familiarity with the profession. Participants also indicated that public post-secondary college students had a positive influence on their career decision-making process. These students were both within the MLS educational program as well as others who were knowledgeable regarding the MLS educational program but were pursuing non-MLS careers.

> *I didn't know this [MLS] program even existed when a friend of mine applied for it, and through that I started researching and finding out more information.*

One participant indicated that a MLS educational program faculty member and another indicated a prospective employer positively influenced their choice of MLS as a career.

> *Well actually I did contact the [name of post-secondary college]. I think it might have been [faculty person] that I was talking to at that time. She was really enthusiastic and she helped me make up my mind about taking med lab.*

*Inhibition and facilitation of MLS career choice*

Further to the five factors which emerged pertaining to MLS career decision-making and selection, Table 4.3 outlines two additional thematic categories which emerged pertaining to factors which were inhibiting or facilitating to MLS as a career choice.

**Table 4.3 Inhibition and facilitation of MLS career selection**

| Thematic Category | Sub-category | Number of instances theme coded |
|---|---|---|
| Inhibitors | Public not aware | 14 |
| | Aggressive competition | 4 |
| | College wait list | 4 |
| | High school peer pressure | 3 |
| | Medical careers intimidating | 1 |
| | Program selection prejudice | 1 |
| Facilitators | MLS professionals visit high schools | 14 |
| | Tour laboratory facilities | 4 |
| | Circulate pamphlets/posters | 3 |
| | Introduce MLS degree | 1 |

*Inhibitors*

Inhibitors of MLS career selection emerged as a significant thematic category and represents elements which could negatively affect MLS career selection. This factor

represents concepts which could hinder an individual from being aware and choosing a career in MLS. Several sub-categories were identified pertaining to this category: lack of public awareness of the MLS profession; competition from other educational institutions; a long wait list for entrance to public post-secondary college; high school peer pressure; a feeling of intimidation in relation to medical careers; and MLS program selection prejudice within the public post-secondary college.

When interview participants were asked to identify factors which would prevent individuals from choosing MLS as a career a main theme emerged. A large number of respondents believed the general public was unaware of the MLS profession. Respondents believed this was due to the "behind the scenes" nature of the work performed; outside of the practice of phlebotomy, MLS professionals usually practice away from the public eye. Focus group respondents very strongly believed that the general public was unaware of the MLS profession. They described instances of relating their area of study to associates who were totally unaware that MLS was a career choice.

> *Even now I find that people ask me what program I'm doing here, I tell them med lab technology and they say - what's that? Most people aren't aware of what we do.*
>
> *The jobs that people see are the ones they are aware of, I wasn't aware of lab techs in high school.*
>
> *Laboratory technologists are in the background, in hospitals, and the patients and the public don't see them. People don't know enough about the [MLS] career and how important it is.*
>
> *People don't know what it [MLS] is. People think you're in here eight hours drawing blood. They do. They don't think that you're actually analyzing samples.*

Some interview participants believed that active recruitment in high schools by university representatives attracted large numbers of high school graduates into the university setting instead of a college based educational program, such as MLS. These respondents stated that they had seen several university recruiters while in high school, but no college recruiters. This lack of recruitment strategy was identified as a strong inhibitor towards selecting the MLS program at the public post-secondary college in Newfoundland and Labrador as a career choice or at least contributed to lack of program awareness. Focus group participants agreed that universities actively recruited high school students, whereas the public college did not.

> *The college wasn't promoted like [name of university] at our high school. We didn't have any representatives come from the college and offer information on these programs.*
>
> *I don't think we had any recruits come to high school from [name of public college]. I know we had them from [name of university].*

The wait list associated with entrance to the common first year of the public college also emerged as an inhibiting factor. The MLS program at the post-secondary public college in Newfoundland and Labrador is a three year program with a common medical science first year followed by two years of study pertaining directly to the MLS profession. Entrance into the common first year was based on a "first come first served policy". Applicants who attained the college-wide minimum academic achievement in high school were admitted into this first year of studies. Four interviewees identified the long wait list to gain entry into the common first year medical science program at the

college as a deterrent to selecting MLS as a career. These interviewees indicated that they waited two to three years before acceptance into the college. They suggested that many prospective students could select an alternate career path instead of waiting so many years for entrance.

> *I applied for the medical laboratory when there was a three year waiting list.*
>
> *After three years of waiting, I finally got accepted. I didn't realize it at the time it was going to take so long because a couple of times I almost changed my mind.*

The focus group respondents agreed that the wait list for the common first year of the college was a negative factor in selecting MLS as a career. Members of the group also indicated they were on the wait list for two to three years. They were very dissatisfied with the amount of time they spent on the wait list and felt the time was wasted. It was suggested that the time used waiting for entrance into the common first year could be spent challenging courses which could be credited toward MLS course requirements. The focus group participants indicated this would have been a constructive way for them to utilize their time while gaining a more advanced standing in the MLS program, but unfortunately they had not received this advice while on the wait list. The participants identified several distance education courses offered by the college, as well as several universities, which could be completed while on a wait list and then used to obtain exemptions from MLS program courses. A focus group member concluded the discussion with the statement "*Advice is nonexistent while on the wait list*".

Some interview participants as well as the focus group respondents identified peer pressure in high school as a factor which could influence MLS career selection. They believed high school students select similar post-secondary educational career paths in an attempt to stay in their current peer groups during post-secondary years. The focus group respondents explained that when high school graduates selected their post secondary education programs, their peers are likely to make similar choices in order to maintain contact. The MLS program in the relatively small college system is not as popular a choice as programs offered by the university by virtue of the small number of students admitted; therefore proportionately low numbers of peers would enroll.

> *A lot of people end up taking courses that their friends are taking. Not too many people take the [MLS] course.*

One participant believed that medical careers were intimidating to many people and felt this would negatively affect MLS career selection.

> *I think the medical field is kind of very intimidating...and maybe the average person may believe that they might not be capable of working in the health care field.*

Admission bias to the MLS program was also seen as inhibitory. One respondent suggested the selection process in the common first year medical science program to admit students into the second year MLS program fosters prejudice against MLS in favor of the other medical science programs. The interviewee believed MLS was perceived as being the default choice for students who had not performed as well as other students.

> *I think that it's [MLS] perceived as being for second-rate students, people who get into lab aren't proud to get into*

> *lab. You're made to think that the smart people get x-ray and the less smarter people get respiratory and then if you can't get either one of them we'll at least put you in lab. How can you expect to have people with pride in their profession, how can someone who goes in to be a policeman and they say, "well the Academy is full why don't you go up to the nursing school we'll get you in there."*

When this opinion was presented to the focus group participants the entire group strongly supported the concept. The selection process for admittance into the MLS program is based on students' academic performance in the common first year of studies. The focus group members believed that most common first year students perceived the MLS program as a student's default choice, to be selected only when one was not intelligent enough to be admitted into other health science programs. The focus group identified the irony of this situation stating that in their opinion the MLS educational program was the more academically challenging of the three career paths which were available at the college. The focus group believed students in the common first year were not aware of the true level of academic difficulty of the MLS program.

### *Facilitators*

The final thematic category relating to MLS career section which materialized from analysis of interview themes pertained to strategies associated with facilitation of MLS career choice. This factor represents concepts which would support choosing a career in MLS. Four sub-categories emerged concerning strategies which could be

utilized in the promotion of MLS as a career choice: MLS professionals visiting high schools; arranging tours of laboratory facilities; circulating MLS promotional pamphlets and posters; and introduction of a MLS degree.

A large number of the interview participants believed MLS professionals should be encouraged to visit high schools to promote MLS as a career choice. They believed the most influential people with respect to encouraging prospective candidates to select MLS as a career choice were MLS specialists currently employed in the MLS profession.

> *I think the best thing to do would be to put out a campaign to the high schools. There should be med lab technologists going around to schools, telling students about lab.*

Focus group participants believed that promotional visits by MLS professionals to high school students would be effective in promoting MLS as a career choice. They felt that this would also be helpful in addressing the lack of public awareness of the profession.

There was discussion regarding the best time to inform high school students about the profession as a career choice. Some participants believed that high school students should be informed early so that appropriate high school courses could be chosen in preparation for the science content in the MLS educational program and meet admission requirements. These participants suggested that grade nine students would be a good target audience. Conversely, some participants believed that high school visits should be aimed at more mature students because they would be more motivated and better prepared to reflect upon career choices. Therefore although there was no consensus with

respect to the best time for MLS professionals to contact high school students, the participants strongly supported this activity needed greater emphasis.

Interview respondents also suggested public tours of MLS workplaces and educational facilities as an effective means of MLS career promotion and increased public awareness of the profession. The participants suggested that MLS professionals associated with MLS advocacy organizations could offer public tours of hospital medical laboratories and MLS program faculty could offer college facility tours to promote MLS. The participants saw MLS advocacy group representatives and college faculty as appropriate individuals to provide laboratory tours and believed they would be influential in promotion of MLS as a career choice. Focus group participants also believed tours of hospital and college laboratory facilities would be beneficial in increasing public awareness of the MLS profession.

> *We should provide a day where the public can come to the college and take a tour of the medical lab facility.*
>
> *I wondered about national and provincial laboratory societies conducting open houses of hospital labs, which are open to the public.*

Other interview respondents suggested the profession should be publicized to a greater extent using pamphlets and/or posters. The participants identified promotional material which was published by the Canadian Society for Medical Laboratory Science. They suggested these materials should be circulated to high school and university students. Focus group participants believed circulating promotional pamphlets and displaying promotional posters within high schools would be a very effective strategy for

promoting the MLS profession. The focus group respondents also suggested that such publicity should also be employed within university settings, as they believed that some university students may have an interest in MLS. The participants believed university students were also a potential pool for recruitment to the MLS profession.

One interviewee suggested the MLS profession could be better promoted if the MLS credential was baccalaureate level. This participant believed university degrees were perceived by the public as having higher status in comparison with college diplomas. This higher status might enhance prospective students' perception and result in an increased likelihood that students would be attracted to the MLS profession.

> *MLS program is not a degree but it should be. A diploma doesn't have the same status.*

The focus group participants agreed there was a public perception that baccalaureate degrees were associated with greater status than college diplomas. They suggested a degree association with the MLS profession would be advantageous in recruiting candidates into MLS educational programs. They further suggested it would be advantageous for students enrolled in a MLS degree based educational program be offered an option to exit the program prior to the four year undergraduate degree with appropriate theory and skills to practice as Medical Laboratory Assistants (MLA). The participants believed this would be an influential factor in MLS career choice as it would create a career ladder for those individuals who were more suited to practice as a MLA. It would make graduate level education an option for individuals who would benefit from

taking their education to higher academic levels. Higher education in the field would perhaps serve as a promotional tool in itself.

# Chapter 5: Discussion

This study examined the factors which influenced MLS students' decision-making and choice to pursue MLS as a career. The results of this study identified five key factors which influenced MLS selection as a career choice. Thematic categories emerged pertaining to MLS candidates' personal interests, occupational and educational characteristics of the MLS profession, resources and influential individuals associated with the career selection process. As well, two thematic categories emerged which identified facilitative and inhibitory factors associated with the decision to choose MLS as a career. These findings could be useful to individuals who are interested in developing strategies to promote the MLS profession as a career path. This discussion will extrapolate the pertinent elements of both the initial interviews and the focus group discussion and present the investigator's interpretation of the findings as well as recommendations directed toward interested stakeholders.

## *Participants' personal interests*

The findings of this study identified a career selection factor associated with personal interests of participants which attracted them to the MLS profession. There were three elements associated with participants' personal interests regarding a career in MLS: interest in health care; interest in aspects of the MLS profession; and need for career change.

The personal interest factor of possessing a general interest in the health care system was reported by all interview participants; some participants also identified a specific interest in the MLS profession. An interest in health care would appear to be a fundamental factor in identifying potential MLS candidates with a demonstrated interest in the MLS profession. The MLS career selection factor of personal interest has been previously identified by Jones (1992) who indicated that the MLS profession was attractive to prospective students who possessed an interest in science and medicine. Personal interest in a particular profession has also been included in several theories pertaining to general career selection as a significant factor associated with career decision-making (Gottfredson, 2002; Lent et al., 2002; Savickas, 2002; Swanson & Fouad, 1999).

The desire for career change also emerged as a personal interest theme. Individuals in this study identified a desire for change in their current career as influencing their selection of MLS as a new career choice. The participants were not satisfied with working conditions, low wages and the challenge in previous careers. They believed that the MLS profession would address these needs. This suggests that potential recruits may come from non-traditional group.

Previous research pertaining specifically to MLS career selection did not identify career change as an influential factor in MLS career decision making, however research on adult education has found this to be a significant reason to pursue education. When Merriam and Caffarella (1999) examined rationale for adult participation in education they found the most frequently cited reasons were job related. When adults currently

engaged in education were surveyed, improving ones' working conditions was the most common reason reported for pursuing further education. In a report by DeJoy (1997) pertaining to the rationale for adult participation in education, career change was identified as a main reason to enroll in educational programs. MLS recruiting strategies should consider targeting non-traditional groups.

### *Occupational aspects of MLS profession*

This exploratory study identified several factors associated with occupational aspects of the MLS profession. The participants identified associations between a career in MLS and attractive employment opportunities, job related benefits, reasonable salary, altruistic qualities, independent and diverse working conditions, low patient contact, apparent job satisfaction within profession, and a low stress environment. These findings support previous research conclusions.

The theme of MLS employment opportunities was strongly supported in this study. Secure, long term employment was identified as a positive factor associated with MLS career choice. This MLS career characteristic of employment security was previously identified by Jones (1992), Mishoe et al. (1993), and Stuart (2002, 2003). Career Search 2004 reported 10 of 12 graduates (83.3%) of the 2002 MLS program at the public college in Newfoundland and Labrador were employed full time in a job directly related to their field of study one year following graduation (Government of Newfoundland and Labrador, 2004). There was participant agreement that the services of

the MLS profession will be required by the public for a long period of time. This can not only be promoted as an attractive MLS career aspect but also suggests that ongoing recruitment and training of sufficient MLS students may be necessary for the long-term sustainability of the health care system.

The theme pertaining to reasonable salary associated with a MLS career was made apparent by this study and supported by Brown-West (1991), Jones (1992), Mishoe et al. (1993) and Ireh et al. (1995) but was not supported by the finding of Stuart and Fenn (2002) who reported that low salary was a reason for recruitment difficulties. This discrepancy could be explained by current differences in MLS salary scales within Canada versus the United States, with Canadian salaries being perceived as satisfactory. Also the earlier studies located in the United States reported MLS salary as acceptable while the latest study suggested salary as inhibitory. Stuart and Fenn (2002) indicated that MLS salaries in the United States have recently fallen significantly behind those of competing professions which they attributed to causing significant challenges when recruiting candidates into the MLS profession. Salaries must remain competitive within geographic regions so that acceptable MLS candidates will not choose a competing profession based on a substantial wage differential.

This study's occupational factor of altruism was previously reported by Brown-West (1991) who identified the need to help others as a positive aspect of the MLS profession for candidates. There is a humanitarian element of the MLS profession which is particularly meaningful to people who want to take a scientific approach to helping others. The myriad of tasks that MLS professionals perform has a profound effect on

patient outcomes. Workers can take pride in the contribution they make to health care as MLS professionals work behind the scenes playing a significant role in patient care. These duties are often performed with the MLS professional never having met the patient and the patient being unaware of the clinical contribution of the MLS worker.

This paper confirms Grant's (unpublished) finding of high career satisfaction amongst current MLS professionals working in Canada. Her data suggests high career satisfaction is even more prevalent in MLS professionals working in Newfoundland and Labrador. The factor of satisfaction within the profession could be pivotal in recruitment strategies because the opinion of MLS professionals emerged from this study as highly influential in prospective students' decision to select MLS as a career.

Other studies (Brown-West, 1991; Jones, 1992) have identified occupational prestige as a factor influencing MLS career selection. The MLS profession was perceived as prestigious and respected. Brown-West (1991) also added professional autonomy and opportunities for advancement as factors in MLS career selection.

Several occupational aspects of the MLS profession emerged as influential to the career decision-making process in this study which were not reported in previous studies. Semi-structured interviews were employed to comprehensively identify the factors associated with the selection of MLS as a career. The MLS profession in Newfoundland and Labrador was associated with good job benefits, diverse and independent working conditions, low patient contact, and less stress than other health care professions. These factors should be included in all promotional strategies particularly within this province.

*Educational Program Aspects of MLS Profession*

Two subcategories relating to MLS career choice selection associated with educational program characteristics were recognized: participants' preference for vocational education and the lower cost of public college education.

Participants stated their preference for a vocational type education based on their perception that public college vocational education was narrower in focus, more structured, and provided a direct link between the educational program and a professional career upon graduation. The participants felt that university programs lacked focus and structure, as well as a connection between topics covered in course material and a future career. The participants, being selected from the MLS program in a public post-secondary college in Newfoundland and Labrador, may not have been aware of Canadian university based MLS programs. There were only two such MLS associated baccalaureate degree programs offered in Canada at the University of Windsor and University of Alberta (CSMLS, 2005c). The participants suggested that an undergraduate degree in a general arts or science area did not fulfill their career-related needs. The focus group respondents also indicated that a university science degree was too broad and did not prepare the graduate for a career. Some participants described personal accounts of not being able to find suitable employment with a university undergraduate degree. The link between education and employment was of significant importance.

The participants considered the relatively low cost of a college based education as a factor of note. This cost factor could be influential in locations similar to Newfoundland

and Labrador which have public college based MLS educational programs. Table 5.1 outlines approximate 2005 – 2006 annual tuition fee for 11 MLS programs offered by colleges across Canada. The average cost of tuition in these college based programs was $3172. Table 5.2 outlines the approximate 2005 – 2006 annual tuition fee for undergraduate MLS or science programs in eight universities across Canada. The

**Table 5.1 College annual tuition fees for Canadian citizens**

| | **Cost** |
|---|---|
| British Columbia Institute of Technology (BCIT) (BCIT, 2006) | $4990 |
| Southern Alberta Institute of Technology (SAIT) (SAIT, 2006) | $4032 |
| Northern Alberta Institute of Technology (NAIT) (NAIT, 2006) | $3310 |
| Saskatchewan Institute for Applied Science and Technology (SIAST) (SIAST, 2006) | $3700 |
| Red River College (RRC) (RRC, 2006) | $3222 |
| Cambrian College (CC) (CC, 2005) | $2925 |
| St. Claire College (SCC) (SCC, 2005) | $1820 |
| St. Lawrence College (SLC) (SLC, n.d.) | $3700 |
| Michener Institute for Applied Health Sciences (MIAHS) (MIAHS, 2005) | $2800 |
| New Brunswick Community College (NBCC) (NBCC, 2006) | $2600 |
| College of the North Atlantic (CAN) (CNA, n.d) | $1795 |
| Average cost of college MLS programs | $3172 |

**Table 5.2 University annual tuition fees for Canadian citizens**

| | Cost |
|---|---|
| University of British Columbia (UBC) (UBC, n.d.) | $4600 |
| University of Alberta (UofA) (UofA, 2005) | $4800 |
| University of Saskatchewan (UofS) (UofS, n.d.) | $4600 |
| University of Manitoba (UofM) (UofM, n.d.) | $3540 |
| University of Windsor (UofW) (UofW, 2006) | $5020 |
| University of Toronto (UofT) (UofT, n.d.) | $7000 |
| University of New Brunswick Fredericton (UNBF) (UNBF, n.d.) | $5008 |
| Memorial University of Newfoundland (MUN) (MUN, 2006) | $2550 |
| Average cost of university MLS and science programs | $4640 |

university costs averaged 46% higher than college tuition at $4640. The less expensive college based education systems could be attractive to those individuals who experience financial pressures during their decision-making and career selection process.

The only educational program associated factor which has been previously reported was that of Ireh et al. (1995) who suggested MLS programs included interesting

course work. The two factors emerging in this study pertained to college versus university learning environments. Previous research studies in the area of MLS career selection were undertaken in the US where all MLS programs were university based. The issue of college versus university educational programs obviously would not be relevant in these studies. Within Canada 11 non-degree MLS programs (outside the province of Quebec) are offered in colleges and institutions (CSMLS, 2005c) therefore this factor could be of promotional value.

### *Resources influencing MLS decision-making*

The career associated informational resources which interview participants utilized in informing their career choice became apparent as an influencing factor in selection of MLS. Within this category several sub-categories were evidenced: college calendars; the Internet; HRDC career research programs; CSMLS promotional pamphlets; high school job shadowing; career fairs; and newspaper articles.

The college calendar, the Internet (in particular the HRDC website), and CSMLS promotional pamphlets were identified as important informational resources which the participants utilized in making a MLS career selection. Individuals involved in attracting students into MLS educational programs should be cognizant of the value of these promotional vehicles in ensuring sound career resource development.

Participants pointed to job shadowing while in high school and attending career fairs as useful activities in selecting MLS as a career. Individuals concerned with high

school students' career choice should be aware that these venues could be effective tools for students with an interest in MLS to gain a better understanding of the profession.

One participant reported that a newspaper article influenced their decision to select a MLS career. Any opportunity to publicize the MLS profession would appear to be helpful toward promoting MLS as a career choice as the profession would only be considered by those aware of its existence.

Previous studies (Jones, 1992) have only identified college calendars as resources associated with MLS career decision-making. The Internet, CSMLS pamphlets, job shadowing, career fairs and newspaper articles which were identified in this research should be considered when promotional materials for MLS recruitment are formulated.

### *Influential Individuals associated with MLS decision-making*

Certain individuals were instrumental in the participants' selection of MLS as their career choice and emerged as a factor associated with MLS career decision-making. Participants identified two categories of influential people: individuals within the MLS profession and high school counselors.

The participants believed that individuals such as MLS professionals, employers, students and faculty from MLS educational programs, those with first hand knowledge of the MLS profession, were influential in selecting MLS as a career. This observation confirms the previous findings of Jones (1992), Baldwin and Agho (2003) and Ireh et al. (1995) who reported that prospective MLS students were influenced most by career

information received from practicing medical technologists, medical technology students, and MLS college professors. Those who promote the MLS profession could benefit from involving MLS practitioners in the recruitment process.

This investigation also appeared to support the findings of Baldwin and Agho (2003) in that family and friends were not significantly influential in MLS career selection. However, Stuart (2002), Ireh et al. (1995) and Brown-West's (1991) found that family and friends were influential in MLS career selection. The reason for these discrepant findings is unclear. It is possible that some previous studies identified family and friends who were themselves members of the MLS profession or for some other reason more knowledgeable regarding the MLS profession as influential individuals. Further research could be performed to more clearly identify influential individuals in the MLS career decision-making process.

The participants had differing views regarding the impact of high school counselors upon selecting MLS. The participants indicated that generally, high school counselors were not familiar with MLS as a career choice. During the individual interviews participants gave examples of both high school counselors who recommended MLS as a career choice as well as high school counselors who suggested the participants attend university because of their high academic achievement. In provinces where MLS educational programs are located in public post-secondary colleges this latter suggestion might inhibit MLS career selection. Focus group respondents suggested that high school career counselors encouraged students to attend university if they were high academic achievers. They felt a prejudice existed in high schools and in the general public that a

university education was "better" than a college education. Ireh et al. (1995) and Baldwin and Agho (2003) supported the opinion that high school counselors were not an important factor in MLS career selection. It is evident that the public college based, non-degree, educational programs would be well advised to promote their programs among the cohort of high school counselors. This would address the perception of high school counselors not being aware of the MLS educational programs. Further, if college MLS programs were promoted properly, using the positive selection factors identified in this paper, the apparent prejudice pertaining to high academic achievers being counseled to attend university programs could be challenged. In order to confirm the participants' perception of high school counselor bias, further study should be performed with a focus specifically on high school counselors and their post-secondary education counseling practices.

The participants expressed differing experiences with their high school counselors pertaining to career decision-making. Suggestions that participants attend a university educational program based on high academic achievement led to what some participants saw as a waste of time and financial resources spent while attending university. Those interested in promoting MLS as a viable career choice for high school students of high academic achievement must make an effort to publicize and promote the MLS profession directly to high school counselors.

*Inhibitors of MLS decision-making*

Inhibitors to the MLS decision-making process emerged as an important MLS career related factor in this research. Several sub-categories were identified pertaining to this topic: lack of public awareness of MLS profession; aggressive competition from other educational institutions; a long wait list for entrance to public post-secondary college; high school peer pressure; intimidation associated with medical careers; and MLS program selection prejudice within public post-secondary college.

This study's most common finding with respect to factors which would inhibit selection of MLS as a career was that the public in general and high school career counselors in particular were not aware of the MLS profession. This lack of knowledge with respect to the MLS profession would be a limiting factor in the attraction of increased candidates to educational programs. This finding supports that of Mishoe et al. (1993) who pointed out that lack of knowledge rather than lack of interest was the leading cause of enrollment vacancies in allied health programs. Stuart and Fenn (2002) and Foubister (2000) also reported that lack of public awareness of the profession is associated with medical laboratory recruiting difficulties. This is an area which should be addressed by MLS educational program recruiters as well as others interested in attracting individuals into the MLS profession such as MLS professional national and provincial societies, employers of MLS professionals, and health human resource policy-makers.

This study identified the recruitment strategies of other post-secondary institutions as a factor which could inhibit students from considering the local public post-secondary college MLS program. The participants indicated that the college did not appear to actively recruit candidates. Educational institutions should examine their efforts regarding MLS student recruitment.

The participants believed that the wait list for the common first year of the public post-secondary college in Newfoundland and Labrador was daunting to those considering MLS as a career. A wait listing of up to three years may encourage many potential MLS candidates to pursue other interests rather than waiting for an available seat within the college. The participants felt that the college should contact students on the wait list and suggest courses the prospective students could challenge while waiting for a seat to become available. The courses could be used as transfer credit courses when the student enters the first year program at the public college. The majority of MLS first year courses are offered through distance education from many educational institutions, as well as through face-to-face classes in various local educational institutions, such as the local university or the Engineering Technology department of the public post-secondary college.

The college's long wait list was associated with its student acceptance policy of "first come first served" whereby individuals who are interested in pursuing Medical Radiography, Respiratory Therapy or MLS, and who have met the minimum entrance criteria, were admitted into a common first year program. Based on this acceptance policy all the students accepted into the common first year may have identified the same

professional career choice (Medical Radiography, Respiratory Therapy or MLS). Upon successful completion of common first year courses, the students compete for seats in their second year of studies in one of the three health science professional programs offered by the college. This second year competition is based on the students' academic performance. The students with the highest academic status would be accepted into their profession of choice, whereas the lower academic achieving students may not be successful in acquiring a seat in their profession of choice. When one considers that all of the common first year students may have made the same career choice when enrolling in their first year of studies one can begin to appreciate faults in this acceptance policy. The student may enter the common first year at the college with a chosen career which they may have little probability of attaining.

This common first year acceptance policy was not only problematic for students, but it also did little to address enrollment challenges in the MLS program. All common first year seats were filled due to the long college wait list, but the 28 seats within the MLS program were rarely filled. As suggested previously, every effort must be made to fill all available seats in MLS programs so that the human resource needs of the health care system can be met. The class size for the second year of the MLS program was usually in the low twenties (Table 1.2); for example, in 2005 and 2004 there were 22 and 24 second year MLS students enrolled respectively. This data suggests the college should review its acceptance procedure for the health sciences programs so that when students are accepted into the common first year program they are at the same time accepted into their profession of choice. This would admit a proportionately larger number of common

first year students who wish to pursue MLS as a career compared with students who wish to pursue other allied health career paths based on the current public post-secondary college seat allocation of 28 in MLS and 12 in both Medical Radiography and Respiratory Therapy. The number of students accepted into the college's common first year should reflect this 2.3 to 1 ratio of students who can be accepted into their second year of professional studies. This would address the college's acceptance policy in that students would have better opportunity to access the educational program of their choice as well as the probability of enrollment in the MLS program increasing.

The participants suggested that peer pressure in high school was a factor preventing selection of MLS as a career, based on high school graduates selecting the same post secondary educational institution as their peers in order to continue high school contacts. The participants believed that this prevented some high school graduates choosing MLS because it was offered in a relatively small public college compared with the local university. The belief that medical careers may be intimidating also emerged as an inhibiting factor pertaining to a career in MLS.

The participants believed that educational program selection prejudice was evident as an inhibitor to MLS career selection. The selection process in place at the public post-secondary college in Newfoundland and Labrador for admittance into the MLS program was based on students' academic performance in the common first year of studies. The participants suggested that the majority of common first year students perceive the college's MLS program as a student's default choice only to be selected when one has not performed well enough to be admitted into Medical Radiography or

Respiratory Therapy. The focus group stated that the majority of students in the common first year were not aware of the level of academic difficulty of the MLS program. The reason for such misconception was the selection process which was used at the college for entrance into the MLS program. There were 28 seats available in the MLS program, 12 seats available in both of the Medical Radiography and Respiratory Therapy programs. When common first year students were competing academically for these seats at the end of the first year of studies, students perceived that it was more difficult to be admitted into Medical Radiography or Respiratory Therapy due to the relatively few seats available. The MLS second year program was capable of admitting 28 students and as reported previously, it was rarely at full capacity. Therefore, if common first year students were poor academic achievers, they may not be accepted into their profession of choice, due to their low academic performance, but they would have an opportunity to be admitted into the MLS program due to the availability of seats. Many students choose to enroll in the MLS program as a second or third career choice, rather than waiting for a seat to become available in their first career choice. These students may also choose to repeat common first year courses to increase their academic standing but in some cases this strategy was ineffective in gaining the student entrance into their career of choice.

This selection process resulted in a cohort of students in the MLS program who were disproportionately low academic achievers. Also, some students who entered the colleges' common first year with the intention of entering the Medical Radiography or Respiratory Therapy professions could feel pressure to select the MLS program; an educational program that these students had no previous intention of pursuing. This data

suggests the selection process used at the college could be examined and possibly modified for the benefit of the MLS program and the students. As suggested above, at the same time that students were admitted into the common first year program, they could also be admitted into their profession of choice, that of Medical Radiography, Respiratory Therapy or MLS. A possible negative effect of such a change in admittance into the common first year could be the possibility of a wait list developing for admittance into the second year of the medical sciences programs; but the existing apparent unjust situation, which the participants believed prejudices the MLS program and disregards some students' career choices, could be rectified.

### *Facilitators of MLS careers*

Promotion of MLS as a career choice emerged from the data as an important aspect of recruitment. Four sub-categories became apparent which were associated with promotion of MLS: MLS professionals visiting high schools; tours of laboratory facilities; circulating MLS promotional pamphlets and posters; and introduction of a MLS degree.

Many participants identified promotional visits by MLS professionals to high schools as an effective method for promoting MLS as a career choice. This would also help address the public awareness issue regarding the MLS profession. The participants believed that individuals such as MLS professionals, employers, and students and faculty from MLS educational programs, all of whom had first hand knowledge of the MLS profession were most influential in selecting MLS as a career. This opinion was

supported by the participants' views regarding the efficacy of high school visits in association with MLS career selection. The promotion of MLS career selection by various MLS practitioners through high school visits could be expected to be a convincing venue for MLS recruitment activities.

The participants also believed that promotional materials such as pamphlets and posters would be a compelling strategy for promoting the MLS profession. The circulation of promotional material should occur in association with promotional visits by the MLS professionals. The focus group participants suggested that promotional material should be circulated within university settings because some university students may be interested in MLS as a career. The participants believed that tours of a hospital or college laboratory facilities would also be beneficial in increasing public awareness of the MLS profession.

The participants appreciated that there was a public perception that a baccalaureate degree carried a higher status than a college diploma. They felt that it would be advantageous, from the prospective of attracting individuals into the college MLS program, for students to be offered an option to exit following three years of study with a college diploma, or to exit following four years of study with a bachelor degree. A degree option would have a positive influence in attracting individuals into the MLS educational program. The college should investigate the facilitation of such a move toward the option of a degree exit in the MLS program. This may be an opportune time for such a change in MLS curriculum because the certifying body for the MLS profession, the CSMLS has recently introduced a new MLS competency profile which

will become effective in 2010 (CSMLS, 2005b). The new competency profile, which was created using stakeholder input, includes several new categories of competencies which demand significant MLS program curricular changes in order to address the new knowledge, skills and attitudes. It is conceivable that two and three year Canadian MLS programs, which are currently filled to capacity with relevant educational material will be required to incorporate new courses to address the increase in the profession's body of knowledge. This could result in the lengthening of the Canadian MLS programs from two or three years to three or four years.

### *Summary of Factors*

This study identified factors associated with MLS career selection which could be effective in the development of recruitment strategies at the national and provincial levels. Some of the MLS career selection factors pertained primarily to the province of Newfoundland and Labrador. The following factors associated with MLS career selection could be important in all sites to individuals interested in recruiting larger numbers of MLS professionals. Table 5.3 categorizes influential factors with their most applicable MLS stakeholders.

**Table 5.3 MLS influential factors and applicable stakeholders**

| Factor | Relevant interested sector |
|---|---|
| Personal interest | Career counselors |
| Occupational | Career counselors<br>MLS education programs<br>MLS advocacy associations<br>MLS employers<br>Government officials |
| Resources | Career counselors<br>MLS education programs<br>MLS advocacy associations |
| High school visits | MLS advocacy associations<br>MLS education programs |
| Recruitment efforts | MLS advocacy associations<br>MLS education programs |
| Education linked with employment | Career counselors<br>MLS education programs |
| Influence of counselors | Career counselors<br>MLS education programs |
| Baccalaureate degree offering | MLS education programs<br>Provincial government |

### *Personal Interest*

The profession of MLS was found to be attractive to individuals who have an interest in health care as well to those who were seeking a change in their current career. These factors pertain to a large group of individuals who could be potential MLS professionals. Career counselors in high school and post-secondary education systems can concentrate on this cohort for the most significant impact from recruitment efforts.

### *Influential Occupational Factors*

Excellent employment opportunities, job related benefits and salary, altruistic occupational qualities, independent and diverse working conditions, low patient contact, job satisfaction, and a low stress environment were identified in this research as influential factors associated with the MLS profession. These occupational factors should be vigorously promoted to all MLS candidates to maximize recruitment efforts. All those with an interest in promoting the MLS profession, such as MLS post-secondary institutions, MLS national and provincial professional advocacy associations and societies, MLS employers, government officials, and career counselors should be familiar with these influential MLS factors. It is recommended that all recruitment strategies and promotional material identified in this research should highlight the identified occupational factors associated with the MLS profession.

### *Promotional Resources*

Potential MLS candidates would find educational institutions' calendars, CSMLS promotional pamphlets and posters, and information on the Internet useful when seeking information pertaining to career choice. Organizations and individuals with an interest in increasing the number of MLS professionals within Canada such as post-secondary education institutions, professional advocacy associations and societies, and career counselors should ensure that these promotional resources are factually accurate and readily available to the public. MLS promotional material should be distributed to high school students as well as post-secondary students in an effort to attract individuals who are not satisfied with their current post-secondary educational choice. University students were seen as a prime market segment for such promotional strategies.

Participation in job shadowing programs and career fairs along with placing promotional information in newspapers were also identified as significant in recruiting prospective students into the MLS profession.

### *High School Visits by MLS Professionals*

The public, in general, and high school counselors, in particular, were not aware of the MLS profession. This was perceived to be the primary factor which obstructs selection of MLS as a career choice. The study identified that those individuals who were in some way part of the MLS profession (front line workers, college instructors,

students) were the most persuasive individuals in attracting others into the MLS profession. The study also identified that personal visits to high schools were the most powerful activity associated with recruiting individuals to the MLS profession. Therefore MLS professions who were interested in the promoting the profession should be enlisted to play a part in promotional visits to their local high schools. Organizations responsible for advocacy within the MLS profession, such as the CSMLS and the provincial medical laboratory advocacy societies should be urged to facilitate the implementation of such visits by their members who express an interest in promoting the MLS profession. MLS professionals within post-secondary institutions could also accept a leading role in these activities. During promotional visits, MLS professionals should discuss aspects of the profession with prospective MLS students as well as circulate significant resource material and publicize the occupational characteristics which have been identified.

### *Increase Recruitment Efforts*

Administrative officials in public colleges should facilitate increased student recruitment into their MLS programs, with an aim to make MLS programs as well publicized as competing educational programs. MLS recruitment should include the involvement of influential individuals such as MLS students and faculty, enlisted by the college to take part in these activities. MLS associated attractive occupational characteristics and influential resources should also be part of these student recruitment efforts.

### *Education and employment linked*

MLS students appear to have a preference for a vocational education over general university education. The nature and cost of vocational education programs and the direct connection between graduation from a post-secondary educational institution and gainful employment were strongly dominant MLS career selection factors. These should be promoted by individuals such as career counselors as well as post-secondary educational institutions during MLS recruitment activities.

### *Influence of high school counselors*

There were conflicting views relating to the impact of high school counselors upon selecting MLS as a career choice. Some participants stated that their high school counselor was a positive factor in selecting MLS as a career choice, while other participants stated that their counselor suggested they attend a university program, based on the students' high academic achievement. The counselors' recommendation to attend university may prevent students from pursuing a MLS career in provinces such as Newfoundland and Labrador where the MLS educational program is based in a community college. Further research should be performed to confirm this assumption. In community college based educational programs it is recommended that MLS programs be promoted within the high school career counselor community in an effort to address

the apparent prejudice pertaining to high academic achievers in high school being counseled to attend university programs.

### *Expansion of MLS degree offering*

Participants viewed baccalaureate degrees as positive influences when making career decisions despite a preference for vocational educational programs. Post-secondary colleges and institutions in Canada in collaboration with provincial government officials should explore avenues by which students could graduate from their MLS educational programs following four years of study with a baccalaureate degree. Recruitment strategies into the MLS profession would benefit from the positive influence which baccalaureate degrees exhibited on the MLS profession.

### *MLS in Newfoundland and Labrador*

The following factors associated with MLS career selection would be important primarily to individuals interested in increasing the number of MLS professionals in the province of Newfoundland and Labrador. Table 5.4 categorizes factors with their most applicable MLS provincial stakeholders.

**Table 5.4 MLS factors and applicable Newfoundland and Labrador stakeholders**

| Factor | Relevant interested sector |
|---|---|
| Program employment statistics | Career counselors<br>MLS education program<br>MLS advocacy association<br>Government officials |
| Program acceptance policy | MLS education program |
| Wait list counseling | Career counselors<br>MLS education program |

*Provincial College MLS Program Employment Statistics*

Career Search 2004 (Government of Newfoundland and Labrador, 2004) demonstrated that there was a correlation between successful completion of the public post-secondary college MLS program and attaining suitable employment within the MLS profession. This data supported the pursuit of a career in MLS evidenced by the participants' suggesting employment following graduation was a meaningful MLS career selection factor. This information should be conveyed by public college representatives to high school career counselors to publicize and promote MLS as a practical career choice for high academic achievers. This would also be useful information to other groups interested in promoting the profession of MLS in Newfoundland and Labrador such as

the Newfoundland and Labrador Society of Laboratory Technologists (NLSLT) and provincial government officials.

### *MLS Program Acceptance Policy*

The administration of the post-secondary public college should review student acceptance policy into the health sciences programs, with a view to accept students into their profession of choice at the same time as they are accepted into the common first year. This would allow enrollment of proportionately larger numbers of students (2.3 to 1) who have identified MLS as their career choice into common first year. This change in admittance procedure would attend to the inefficiency of the underutilized seats in the MLS program and better address human resource requirements of the health care system. The change could also address the situation of students who entered the college with the expectation of pursuing a chosen profession, subsequently finding themselves in the MLS program as a default choice. The current acceptance procedure apparently fosters a perception that only the lower achieving students should pursue a MLS career. The college should take action on this recommendation for the benefit of the MLS program and the benefit of the students who pursued a career that was not their career of choice.

### *Wait List Counseling*

Students on a wait list for the common first year program should be counseled by college representatives to challenge courses through distance education or other educational institutions which could be used as transfer credit courses upon acceptance into the common first year program.

### *Limitations to Study Findings*

Researchers must be sensitive to biases inherent in the naturalistic approach because all observations are made and filtered through the investigator's values and perspective. The investigator should admit those biases up front, in order for the reader to interpret the findings with the knowledge that the writer possesses predetermined views and opinions (Merriam, 1988). The findings of this study have been interpreted through the lens of a medical laboratory scientist presently employed in the MLS program at the public post-secondary college in Newfoundland and Labrador and frequently associated with this cohort of individuals. Even though steps were taken to avert bias (Appendix A, D & E) the fact that the researcher was instructing and evaluating the study's participants within the MLS program raises the possibility of researcher bias which may influence the participants' responses.

The issue of generalizability is important in naturalistic research because studies are usually carried out in unique situations where the realities, politics, history, values,

social structures etc. of the participants at a particular time are considered when formulating the findings of the study. Can this be generalized to other situations? "Few human behaviors are unique, idiosyncratic and spontaneous" (Berg, 2001, p. 232). We accept the concept that human behavior is predictable; therefore the behavior described within a case study can predict the behavior of other similar individuals. It is thought that by simply reading about cases or situations which are similar to, even different from ones own experiences can deepen ones own understanding of the phenomena being studied (Gall, Gall, &Borg, 1999). In this way the knowledge gained regarding one particular circumstance can shed light onto different situations. This study is based on the experiences and perceptions of one cohort of students in one college, therefore local and provincial factors may be identified which may not be applicable to other provinces or countries.

The study endeavored to identify inhibitors to the MLS career selection process. The participants may not have been the best source of such data as they made a MLS career selection. Inhibitors to MLS career selection may best be identified by those who choose an alternate occupation within the health care field.

### *Conclusion*

The MLS profession is projecting a Canada wide human resource shortage. The importance of recruitment into the profession has become a critical issue to ensure sufficient MLS professionals are available to fulfill future needs of the health care

system. This paper explored the factors associated with students' selection of MLS as an educational program and career path. The investigation sought information pertaining to the identification of influential factors associated with the selection of MLS as a career path in Canada and the identification of strategies to enhance the promotion of MLS as a career choice. The identified factors and strategies associated with MLS career selection could be utilized in renewed recruitment activities which could ultimately result in a positive effect upon the future MLS workforce.

Several factors were identified which could be useful in promoting MLS as a career path: meaningful resources; occupational and educational characteristics; influential individuals; and promotional activities. As well, the inhibitors to MLS career selection were recognized. Strategies which could be used to promote the profession were suggested.

The research resulted in several recommendations directed toward changes in the administration of the MLS program at the public post-secondary college in Newfoundland and Labrador which would result in positive outcomes for both the educational program and the MLS profession in that province.

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**Appendix A – Letter of Invitation – Individual Interviews**
[Insert Date]

Dear Medical Laboratory Science Student

As you know I am an instructor in the Medical Laboratory Science program in which you are enrolled, but you may not realize that I am also a Memorial University of Newfoundland Faculty of Education graduate student who is in the process of completing a thesis entitled "Factors Influencing the Career Choice of Students Pursuing Medical Laboratory Science Training". The outcome of this study will enhance the understanding of why individuals choose Medical Laboratory Science as a profession, which in turn, can be reflected in recruitment strategies for the profession. Within Canada, there is currently a shortage of Medical Laboratory Scientists in the workforce as well as in educational programs. I am writing to invite you to become a participant in this study.

Your involvement in the study would include a personal face to face interview with me, of approximately 20 minutes in duration. This interview would be audio taped. The interview questions are attached and titled "Questionnaire". Please examine them at your convenience. Your identity would be limited to your gender and place of high school education. Your name will be kept confidential.

Following analysis of the personal interviews I would like you to be part of a discussion group of approximately seven students who have participated in the initial interviews. The purpose of this group discussion is for me to present my findings of the initial interviews so that validation of the findings can occur as well as any further, previously unrealized, pertinent information may be discovered. The duration of the group discussion would be approximately one hour. The group discussions will also be audio taped.

All data collected in this study will be kept confidential and anonymous. All identifier information will be destroyed upon study completion.

Your participation in this research study is voluntary and your decision, whether to participate or not, nor your responses during the interviews, will in no way effect your evaluation on any medical laboratory science course.

Your participation in this study will be VERY much appreciated. If you have any questions regarding this study contact me personally in my office, F314 or by phone 758-7651. Please indicate on the enclosed signature page whether you are willing to be included in the project and forward this page to me.

Yours truly,
Dave Keeping

## Appendix B – Demographic Information Form

Participant identification number _____

### Participant Demographic

This section will be completed by the participant immediately prior to the face to face interview:

Age:

____ Under 20
____ 20 – 25
____ 26 – 30
____ 31 – 35
____ 36 – 40
____ Over 40

Gender:

____ Male
____ Female

Where did you complete high school?

____ Urban center (greater than 9,000 people)
____ Rural community (less than 9, 000 people)

What was your educational background prior to enrolling in the medical laboratory program?

## Appendix C – Interview questions - Individual Interviews

Why have you chosen to pursue medical laboratory science as a career?

Please tell me how you came about making the decision to choose or pursue medical laboratory science as a career?

Was your decision to pursue medical laboratory science as a career influenced by anyone or anything in particular?

Did you use any career resources as part of this decision-making process? How did you learn about these resources?

What other type of career resources may have been helpful to you at the time you were making this decision?

How did you initially learn of the medical laboratory science educational program at this college ?

What factors do you believe may prevent some students from becoming aware of medical laboratory science as a career?

What factors do you believe may prevent some students from becoming aware of the medical laboratory science program at this college?

How can medical laboratory science be promoted to students in Newfoundland and Labrador?

**Appendix D – Signature Page**

Study Title: Factors Influencing the Career Choice of Students Pursuing Medical Laboratory Science Training

Name of investigator: Dave Keeping

**To be filled out by the participant:**

I have read the letter of invitation to participate in this study Yes _____ No _____

I have had the opportunity to ask questions regarding this study Yes _____ No _____

I have received satisfactory answers to all of my questions Yes _____ No _____

I have received enough information about this study Yes _____ No _____

I understand that I am free to withdraw from this study at any time and without giving a reason Yes _____ No _____

I agree to take part in this study Yes _____ No _____

Signature of participant _____ Date _____

**To be signed by the investigator:**

I have explained this study to the best of my ability. I invited questions and gave answers. I believe that the participant fully understands what is involved in being in the study, any potential risks of the study and that he or she has freely chosen to be in the study.

Signature of investigator _____ Date _____

Confidential identification number issued to participant _____

Please forward this signature page to:

Dave Keeping
F314, Prince Philip Drive Campus
College of the North Atlantic

**Appendix E – Letter of Invitation – Focus Group Interview**

Dear

I am contacting you because you participated in an interview during the later part of 2004 associated with an educational thesis I am completing entitled "Factors Influencing the Career Choice of Students Pursuing Medical Laboratory Science Training". I appreciate your participation in the interview process and again thank you for volunteering to be part of this study.

You may recall that your involvement in this study would include the personal face to face interview, which has been completed, as well as a group discussion, comprised of the participants of the initial interviews. The purpose of this group discussion will be for me to present my findings of the initial interviews so that validation of the findings can occur as well as any further, previously unrealized, pertinent information may be discovered.

I invite you to participate in this group discussion which will be held in room F314, at the College of the North Atlantic at 11:00 am on Friday, May 20, 2005. I anticipate the duration of the group discussion will be no more than one hour and it will be audio taped.

Your participation in this research study is voluntary and your decision, whether to participate or not, as well as your responses during the discussion group, will in no way effect your evaluation on any College of the North Atlantic course.

Your participation in this study is VERY much appreciated. If you have any questions regarding this study contact me personally in my office, F314, or by phone 758-7651. If you would like to discuss this study with an independent person, please contact Dr. Vernon Curran at the Centre for Collaborative Health Professional Education, Faculty of Medicine, Memorial University of Newfoundland, phone number 777-7542.

All data collected in this study will be kept confidential and anonymous. All research material will be kept under lock, for a period of five years, as required by Memorial University, after which time it will be destroyed.

The proposal for this research has been approved by the Interdisciplinary Committee on Ethics in Human Research at Memorial University. If you have ethical concerns about the research (such as the way you have been treated or your rights as a participant), you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at 737-8368.

Sincerely,
Dave Keeping

## Appendix F - Definitions

Urban: Community with a population greater than or equal to 9000, using the 2001 Census numbers.

Rural: Community with a population less than 9000, using the 2001 Census numbers.