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# Introduction

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## **INTRODUCTION**

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# INTRODUCTION

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## History and Purpose of the Jefferson Longitudinal Study of Medical Education

Medical schools have a social responsibility to monitor the quality of their educational product. In particular, they are obligated to evaluate the effect of any change in the system of medical education (e.g., admissions policies, curriculum, evaluation standards). Assessment of educational outcomes must use empirical data based on a scientific methodology rather than anecdotal observations and personal opinion. Thus, outcome assessment of programs calls for a longitudinal study design that allows for the examination of changes from the beginning of undergraduate medical education, through completion of graduate medical education, and throughout the professional career. This was the spirit in which the Jefferson Longitudinal Study of Medical Education was initiated.

When the Jefferson Longitudinal Study of Medical Education was implemented in 1970, it was envisioned that a comprehensive longitudinal database of medical students and graduates could serve as a valuable source of information. Development of the plan was based on the notion that medical schools have a responsibility to evaluate their own graduates to assure the quality and effectiveness of their educational programs. The Study was implemented at a time when medical education research was still in its infancy and when most other medical schools were not eager to invest resources in such a huge undertaking, which promised few immediate rewards. The title of “longitudinal study” was chosen because of the intention to follow every student from medical school throughout one’s entire professional career.

Throughout the early 1970s, data on demographics, premedical academic performance, and performance measures in medical school were retrospectively collected for students who entered Jefferson Medical College beginning in 1964. The database expanded beginning with the entering class of 1966 (graduating class of 1970) to include measures of clinical competence at Jefferson and after graduation at the end of the first residency year. During the early phases, both retrospective data (for graduates prior to 1970) and prospective data (for students and graduates enrolled in 1970 and thereafter) were maintained in one comprehensive database. This database at the present time contains over 4 million pieces of data on more than 9,000 students and graduates. We believe it to be the most comprehensive, extensive, and uninterrupted database of medical students and graduates that is routinely updated and maintained in a single medical school. The Center for Research in Medical Education and Health Care at Jefferson is the headquarters of the Jefferson Longitudinal Study. Only authorized members of the professional staff of the Center have access to the longitudinal database. Recently, more medical schools than ever before have inquired about our Longitudinal Study, requesting copies of the questionnaires and information about how to set up a longitudinal study. Such outside interest indicates that the Jefferson longitudinal study can serve as a prototype for other medical schools’ longitudinal studies.

Recently the Accreditation Team that reviewed Thomas Jefferson University for the Middle States Commission on Higher Education for the University praised the Jefferson Longitudinal Study and made the following comment: “The Center for Research in Medical Education and Health Care and the Jefferson Medical College are to be commended for their academic interest in outcome data, responsiveness to faculty and department needs and the clear use of data to modify the curriculum and teaching environment...The Center for Research in Medical

Education and Health Care continues to track data from a large number of sources before, during and after student's tenure at the College. Their use of this data has impacted many components of the curriculum, the learning environment, individual student development, and program planning..."

The goals of the longitudinal study can be described in two words: service and research. Service is rendered to the college's administration, faculty, and academic committees by providing them with information to assist their decision making. Service is also provided to students and graduates by identifying those who may need remedial assistance to perform at their fullest potential. Information from the database is also used in conducting research. The four specific goals can be stated as follows:

1. To provide information to the College's administration, for example, by preparing statistics for the College's annual report; by retrieving information on individual student's performance compared to class performance for inclusion in the Dean's letter of recommendation; by assessing the College's educational programs and policies; by preparing self-evaluation information as requested by the Liaison Committee on Medical Education for accreditation; and by responding to inquiries on academic departments and students' performance.
2. To provide objective information to the College's academic committees (e.g., Admissions, Student Promotion, Curriculum) .
3. To provide up-to-date information to faculty advisors and to prepare predictions about students who may be in need of supplementary education, in order to better prepare them for licensure examinations and the challenges of medical school.
4. To address empirically and systematically a variety of complex and contemporary issues raised by educators in general and by medical educators in particular.

### **The Scope of the Database**

The information encoded in the database has been routinely updated. Depending upon whether an issue in medical education becomes contemporary or obsolete, variables have been added or deleted. Despite this dynamic nature, there are some central constructs (e.g., performance measures prior to, during, and beyond medical school) and corresponding variables that have remained relatively unaltered. Examples of such variables are performance scores on the nationally administered standardized tests or examinations taken before medical school (e.g., the Scholastic Aptitude Test [SAT], the Medical College Admission Test [MCAT]), during medical school (e.g., licensing examinations), and after medical school (e.g., licensing and board certification). An important feature is the clinical competence ratings made at the end of the first year of residency training. This point in time was chosen to minimize the inevitable effect of the residency experience on performance when studying the impact of the medical school experience. Furthermore, at this point, the directors of residency programs, or the raters, would have had sufficient opportunities to observe a resident's professional behavior in a variety of clinical situations to make an informed judgment.

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All the variables in the longitudinal database can be grouped into three categories:

1. Data before education at Jefferson, which include demographic, academic, and other admissions data.
2. Data during education at Jefferson, which include course grades, yearly grade point averages, ratings of clinical competence in the third-year clerkships, hospitals of clerkships, performance on Steps 1 and 2 of the United States Medical Licensing Examinations (USMLE, formerly the National Board of Medical Examiners' examinations), coded reasons for any change in academic status (transfer, dismissal, delayed graduation), and responses to the entrance and exit questionnaires on attitudes, personal characteristics, future plans, and preferences.
3. Data after graduation from Jefferson, which include geographic areas and hospitals of residency, specialties pursued in residency, ratings of postgraduate clinical competence, performance on Step 3 of the USMLE (formerly Part III of the National Board of Medical Examiners' examination), geographic and specialty areas of practice after residency, board certification status, types of professional activities, faculty appointments, changes of practice and location, etc. In addition, the graduates' evaluation of their education at Jefferson, their professional concerns, perceived problems, types of activities, types of patients, and research productivities are solicited through questionnaires mailed to graduates five to ten years after medical school graduation. The scope of the longitudinal database is depicted in Figure 1.

### **Key Investigators and Contributors to the Jefferson Longitudinal Study**

The idea of a longitudinal study of medical students and graduates was initiated by Joseph S. Gonnella, M.D. in the late sixties based on a belief that medical schools should be obligated to evaluate their educational program and to assure that the competence, performance, and professional activities of the graduates meet the expected goals of medical schools. The idea was implemented in 1970, and since then Dr. Gonnella has been serving as the principal guardian of the Jefferson Longitudinal Study.

From 1969 to 1972, Elinor Prockop, Ph.D., helped to develop the study and the early versions of the student and graduate questionnaires. Between 1972 and 1983, Jon Veloski, M.S., as the director of the study, automated the study and at the same time broadened its scope by including more complete data on the academic performance of the medical students. In addition to technical improvement in data automation and instrumentation, he started to disseminate information from the longitudinal study through professional journals and meetings. From 1984 to the present, Mohammadreza Hojat, Ph.D., as the director of the study, has continued to refine the study's instruments and to expand the study to include information about students' psychosocial attributes and graduates' professional activities and patterns of practice. Dr. Hojat has served as a catalyst in the preparation of many peer-reviewed publications based on the Longitudinal Study.

Carter Zeleznik, Ph.D., and Mary Herman, Ph.D., both now retired, made substantial contributions to the design of the study's instrumentation and dissemination of the results. Maynard Reinke, M.S., started developing the state-of-the-art computer programs for data

entry, management, and maintenance, and Carol Rabinowitz, B.A., has continued to refine these programs and modify them when needed. Mary Robeson, M.S., has been active in many aspects of the longitudinal study. Gang Xu, Ph.D. (currently residing in China), when working with the Center, made significant contributions in the dissemination of studies using the longitudinal database.

The Longitudinal Study would have been impossible without the willingness of those who shared information with us. First and foremost, we gratefully appreciate the cooperation of thousands of our students and graduates who have participated in the study by completing our questionnaires. The offices of Admissions (current director, Clara A. Callahan, M.D.), Registrar (current director, David Clawson), and Alumni (current director, Phillip Marone, M.D.) have always been helpful in providing us with data. Professional organizations such as the Association of American Medical Colleges (AAMC) and the American Medical Association (AMA) have routinely and continuously provided us with information about our graduates. Finally, we would like to express our sincere appreciation to all the directors of residency programs in more than 570 hospitals and residency training institutions all over the United States who have completed our postgraduate rating form for our graduates.

### **Themes and Purposes of This Document**

The Jefferson Longitudinal Study has been used to address a variety of issues in medical education. Because of this variety, the grouping of the studies into homogeneous themes was not an easy task. After considering several options, we decided to classify them into six themes: 1. admissions (including subsections of standardized tests and academic preparation for medical school); 2. Jefferson evaluations (including subsections of preclinical and clinical components); 3. Postgraduate and career data (including subsections of clinical competence and career specialization); 4. Demographics (including sex, age, and ethnicity); 5. Psychosocial attributes (including personality and other personal qualities); and 6. Professionalism (including empathy, interprofessional collaboration, and lifelong learning).

The themes and their subsections are not mutually exclusive. Therefore, some of the abstracts could be included in more than one theme or subsection. Despite this overlap, each abstract appears only once, based on the focus of the study. Abstracts of the studies that have been published in professional journals are presented by alphabetic order of the authors' names in each subsection.

### **Productivity of the Jefferson Longitudinal Study of Medical Education**

The Jefferson Longitudinal Study of Medical Education has been the most productive longitudinal study of medical students and graduates of a single medical school. This longitudinal study has resulted in 155 publications in peer review journals that are listed in bibliography section at the end of this book. Many of those studies were presented before national or international professional meetings prior to their publication. Also, data from our longitudinal study were also used in a doctoral dissertation, completed by Dr. Mitra Farzaneh at Purdue University in 1985.

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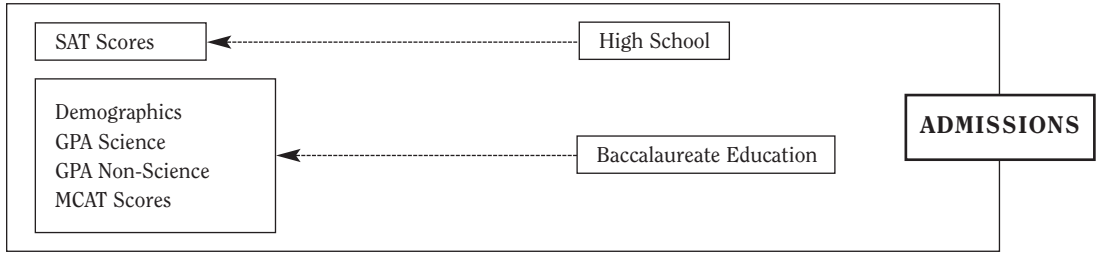
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We and a colleague (James B. Erdmann, Ph.D.) in 1993 served as the invited editors for a thematic issue of *Academic Medicine* on “*Assessment Measures in Medical School, Residency, and Beyond: The Connections*” (*Academic Medicine*, Supplement No. 2, Volume 68, February 1993). In addition to Jefferson, four other medical schools and the National Board of Medical Examiners used their longitudinal data to address the significant link between performance measures in the first two years of medical school and indicators of clinical competence after completing medical school. This supplement subsequently was published as an independent book by Springer Publishing. Also, in 1999 we served as the guest editors of a special section of the *Evaluation & the Health Professions* on the topic of “*Medical Education and the Changes in Health Care:*” (Volume 22, No. 2, June 1999). We were also invited to write a chapter on *Measuring Medical Professionalism* (Oxford University Press, 2005), edited by David Stern, M.D., Ph.D., of the University of Michigan, in which we describe the three scales we developed in our center (*Jefferson Scale of Physician-Nurse Collaboration, Jefferson Scale of Physician Empathy, and Jefferson Scale of Physician Lifelong Learning*) as measures of elements of professionalism. These three instruments for measuring aspects of professionalism in medicine have attracted the attention of many researchers, evident by the number of requests we have been receiving to use the scales in the United States and abroad.

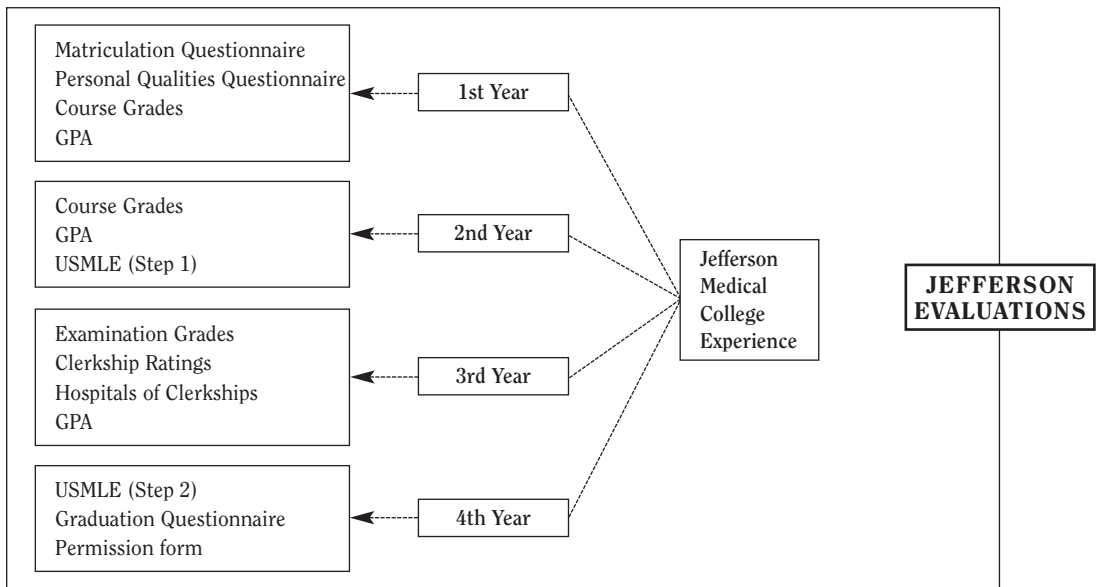
We frequently receive requests for information on our longitudinal study and its findings from other medical schools, residency program directors, our graduates, and other physicians in the United States and abroad. This report was prepared in response to those requests. Also, it will serve as feedback to our graduates who have cooperated with us in completing our questionnaires and forms during medical school and beyond. Abstracts of these studies are presented to help others asking questions similar to those addressed in these studies. We hope this report will, first, provide readers with an appreciation of the value of longitudinal studies in tracking students and graduates and, second, answer some of their questions and raise further questions regarding medical education, leading to further research. After all, there can be no end to scientific inquiry.

**FIGURE 1: SCOPE OF THE DATABASE OF THE JEFFERSON LONGITUDINAL STUDY**

**Data Before Medical School**



**Data During Medical School**



**Data After Medical School**

