
**THE ECONOMIC IMPACT OF THE
UNIVERSITY OF NEW MEXICO
HEALTH SCIENCES CENTER
FY 2001-2002**

March 2003

UNIVERSITY OF NEW MEXICO

BUREAU OF BUSINESS AND
ECONOMIC RESEARCH



THE ECONOMIC IMPACT OF THE
UNIVERSITY OF NEW MEXICO
HEALTH SCIENCES CENTER
FY 2001-2002

March 2003

UNIVERSITY OF NEW MEXICO

BUREAU OF BUSINESS AND
ECONOMIC RESEARCH

Table of Contents

Acknowledgements	1
Executive Summary	2
Introduction	3
Section I	
Overview of the University of New Mexico Health Sciences Center	4
Employment and Earnings	4
Revenues	5
Expenditures	5
Section II	
Economic Impact of the UNM HSC on the New Mexico Economy	6
Methodology	6
Revenue and Expenditure Analysis	8
Economic Impact Results	10
Section III	
Economic Impact of UNM HSC Specialty Services and Educational and Training Programs	11
Specialty Healthcare Services	11
Education and Training	15
Section IV	
Healthcare Workforce Development & Healthcare Access	16
Training New Mexico's Healthcare Professionals	16
Committing Resources to Improving Access to Healthcare for Medically Underserved Areas and/or Populations	22
Section V	
Economic Impact of UNM HSC Technology Transfer	25
Patents	25
Start-ups, Partnerships, and Affiliates	26
Licenses and Royalties	29
Clinical Trials	30
Bibliography	31

Acknowledgements

This study is an effort at developing an expanded analysis of how the University of New Mexico Health Sciences Center (UNM HSC) impacts the economy of New Mexico and the state's future economic development prospects. We wish to thank Dr. Philip Eaton, Vice President for Health Sciences, for his expansive vision of the roles the UNM HSC plays in our economy, and for his willingness to underwrite this study. Not all of the information was available that we might need to thoroughly complete the expanded quantitative analysis, but we are indebted to Ryan Deller, Business Analyst, and Bob Fondino, HSC Budgets Administrator, for providing us with materials and data on UNM HSC operations and programs. They patiently answered our questions, and with their input we were able to develop and refine our methodology. We also wish to thank Linda Easley, HSC Budget Director, who provided continuing encouragement and who patiently answered our many questions in the final days of the analysis. Also critical were Nancy Brandt, Chief Financial Officer, UNM Hospitals, and Jeff O'Malley, Executive Director of Financial Planning and Analysis. Thanks also to Robin Dreisigacker, Manager, Program Development, for her early discussions regarding the project.

Finally, we wish to thank the many busy people, including professional staff and department/program directors who provided incredibly useful information in response to our queries funneled through Ryan Deller. We would like to thank our colleagues in the Association for University Business and Economic Research who responded to our e-mail request and provided some very helpful research leads. Finally, a very big thank you to one of our students, Ashley Leach, for her research assistance and to Tony Sylvester, our Research Scientist, for his assistance.

Executive Summary

The University of New Mexico Health Sciences Center (UNM HSC) is a major employer and economic engine for New Mexico. In FY 2001-2002, the UNM HSC employed approximately 7,500 people for a total payroll of \$383.5 million. Total expenditures for FY 2001-2002 by UNM HSC on goods, services and compensation were \$648.6 million.

The UNM HSC adds new money to the New Mexico economy. In FY 2001-2002, \$318.8 million of the UNM HSC's expenditures were supported by funds attracted from out-of-state. This injection of funds into the New Mexico economy had a total economic impact of \$508.5 million. This total impact was due to an economic impact multiplier of 1.59.

These out-of-state funds supported a total of 6,821 jobs in the New Mexico economy. The wages, salaries and benefits paid to these employees totaled \$251.4 million.

A number of specialty healthcare services otherwise unavailable in New Mexico are provided by the UNM HSC. These specialty services keep expenditures local that would otherwise have been lost if New Mexico residents went out of state to obtain these services.

Education and training opportunities offered by the UNM HSC - which in some disciplines are the only educational programs available in New Mexico - also retain dollars that may otherwise have left the state. The 1,493 medical and healthcare students enrolled in 2001-2002 paid \$2.7 million in tuition and fees, and spent a significant amount on the other expenses related to their education.

The UNM HSC provides opportunities for New Mexico's workforce to pursue careers in healthcare. There are 1,219 former MD students and/or residents of the UNM HSC practicing in New Mexico. Thirty-three percent (33%) of New Mexico's MDs were educated at UNM. The number of College of Nursing Graduates has more than doubled over the last decade, and eighty percent (80%) of all nurses who were educated at UNM stay to practice in-state. As of 1999, 686 PharmD graduates practice in 28 of the 33 New Mexico counties.

Professional healthcare training is especially important in New Mexico, where 29 of the state's 33 counties are designated as Medically Underserved Areas. Graduates of UNM healthcare education programs tend to stay in-state. UNM-trained MDs are practicing in 30 counties statewide, and UNM trained pharmacists in 28 counties.

The UNM HSC concentrates on improving access to healthcare in New Mexico through programs such as Locum Tenens, Specialty Extension Services, and the provision of uncompensated care.

Research at the UNM HSC results in advances in life sciences techniques and technologies which can translate to commercial development. Several start-up biomedical firms trace their existence to developments made at the UNM HSC. Eleven (11) biomedical firms and organizations are in partnership or affiliated with the UNM HSC, and form the core of a Biomedical Research Corridor in New Mexico. Additionally, the UNM HSC has more than 20 patented life science inventions that are available for licensing, and there are another 50 plus patents pending.

Introduction

The University of New Mexico Health Sciences Center (UNM HSC) commissioned the UNM Bureau of Business and Economic Research to perform a study of the economic impact of the Health Sciences Center on the economy of New Mexico for Fiscal Year 2001-2002. This report contains the results of this study and outlines the data and methods used to arrive at these results.

This report presents the results of a traditional economic impact analysis of the extent to which the UNM HSC brings in funds from outside of New Mexico, and these fund's economic impact on the state, along with a number of extensions to this traditional analysis which were considered important elements in the Health Science Center's overall impact in New Mexico. Obtaining sufficiently detailed data to perform a full quantitative analysis of these extended economic impacts was not possible for this report. Nevertheless, this report gives an overview of important ways the UNM HSC makes an impact on the New Mexico economy that are not included in a traditional impact analysis. These extensions are summarized below.

In addition to the traditional economic impacts resulting from the out-of-state funds it brings to New Mexico, UNM HSC creates an additional impact due to specialized services it provides. Those services that are offered through the UNM HSC and that are not offered – or to only a limited extent – elsewhere in the state create an economic impact because they prevent economic leakages. In other words, these UNM HSC services capture the expenditures that would have been lost if New Mexico residents went out of state to obtain these services.

Dollars are also kept in state when people seeking medical training are able to attend an in-state facility. UNM HSC offers a full range of medical and health education for physicians, nurses, pharmacists, physical therapists and others. The UNM HSC captures the funds that would have been lost had New Mexicans gone out of state for these types of education and training. In addition, local expenditures by visitors from out of state to the UNM HSC generate an economic impact.

The role of UNM HSC in training New Mexico's healthcare workforce and in providing healthcare to underserved populations is also discussed.

UNM HSC's role in technology transfer to the community is also discussed. Research at the UNM HSC develops new healthcare techniques and technologies, some of which have commercial potential, as are evidenced in a number of successful partnerships and affiliations with start-up firms, new organizations and entrepreneurial efforts that exist, to some degree, as a result of the activities of the UNM HSC.

SECTION I.

Overview of the University of New Mexico Health Sciences Center

The University of New Mexico Health Sciences Center coordinates the medical and health-related academic, clinical and research activities of the University of New Mexico. The UNM HSC is composed of five interdependent academic and clinical components:

- UNM HSC School of Medicine
- UNM HSC College of Nursing
- UNM HSC College of Pharmacy
- UNM Health Sciences Library and Informatics Center
- UNM HSC Clinical Operations

The UNM HSC Clinical Operations include:

- UNM Hospital
- UNM Children's Hospital
- UNM Carrie Tingley Hospital
- UNM Children's Psychiatric Center
- UNM Psychiatric Center
- UNM Cancer Research and Treatment Center (unit of UNM HSC School of Medicine)

In addition to these central facilities, the UNM HSC provides programs and clinics statewide which provide a variety of basic and specialized medical and health services. Alongside clinical healthcare, research and educational activities take place throughout the facilities and programs of the UNM HSC.

Employment and Earnings

The UNM Health Sciences Center's hospitals, colleges, clinics and other programs employed approximately 7,500 people, or 6,200 FTE, during FY 2001-2002. This includes 770 faculty members at the medical, nursing and pharmacy schools. Total spending on wages, salaries and benefits was \$383.5 million. Of this amount, wages and salaries totaled \$319.3 million, while \$64.2 million in health, dental and retirement benefits made up the balance.

Revenues

The UNM HSC, including UNM clinical operations, brought in a total of \$610.1 million in revenues in FY 2001-2002. Of these funds, \$400.7 million were generated by the clinical and healthcare operations of the UNM HSC's hospitals and clinics, and the remaining \$209.4 million were generated by academic and research programs. Patient care was by far the most significant source of revenues: 55% of total revenues, or \$341.0 million. Other significant sources of revenue were \$74 million in state appropriations, and \$100.6 million in local, state, federal, and private contracts and grants.

Expenditures

The UNM HSC spends millions of dollars annually on supplies, equipment and services. Operating expenses for the fiscal year, including wages, salaries and benefits, totaled \$616.7 million. Fifty-one percent (51%) or \$319.3 million of these operating expenditures were spent on paying the wages and salaries of UNM HSC employees. An additional \$64.2 million in employment benefits brought personnel-related expenses to a total of \$383.5 million, or 61.3% of all expenditures. The remaining \$233.2 million was spent on materials and supplies, utilities, consultants and other services, travel, and other on-going operational costs.

The UNM HSC also incurred capital expenditures of \$13.4 million for capital equipment investment and \$18.5 million for construction and renovation projects. These capital expenses were for the most part funded by balances from previous fiscal years. Including capital expenses, total UNM HSC expenditures for FY 2001-2002 were \$648.6 million. Table 1 summarizes these expenditures.

TABLE 1.
SUMMARY OF UNM HSC FY 2001-2002 EXPENSES
(millions \$)

\$648.6 million total expenditures

Salaries	Benefits	Other Expenses	Capital Equipment	Construction/Renovation
\$319.3	\$64.2	\$233.2	\$13.4	\$18.5

Source: HSC FY 2001-2002 financial records

Table prepared by Bureau of Business and Economic Research, UNM, 2003

SECTION II.

Economic Impact of the UNM HSC on the New Mexico Economy

In the context of a traditional economic impact analysis, the UNM HSC creates economic impacts by bringing out-of-state funds into New Mexico, which are then spent locally. These funds support jobs and income in the State which would not otherwise exist. Funds from New Mexico sources—from Legislative appropriations, local gifts and grants—would presumably have been spent in-state for some alternative purpose or another New Mexico healthcare provider, and hence are not considered to add to the overall level of economic activity in the state.

Economic impacts (supported by out-of-state funds) are composed of direct, indirect and induced effects.

- The *direct impacts* of the UNM HSC are measured by the number of jobs that are generated by UNM HSC activity (including normal operations and new construction or remodeling) and the wages, salaries and benefits paid directly to employees.
- *Indirect impacts* are the result of a “second round” of spending that occurs when the UNM HSC purchases goods and services from local businesses.
- *Induced impacts* occur when employees of both UNM HSC and of the firms that sell goods and services to UNM HSC spend their earnings on local goods and services, leading to further increases in local sales, income and employment.
- The direct, indirect and induced impacts are summed to arrive at the total economic impact.

Methodology

To perform this analysis, data on the UNM HSC’s FY 2001-2002 revenues and expenditures were collected. Staff from the UNM HSC, including UNM Hospitals, provided detailed financial data for FY 2001-2002. These data detailed the sources of revenue and types of expenditures by department or division. Data on revenues included information on the sources of the revenue, and whether all or a portion of a particular revenue stream originated outside of New Mexico.

For the purposes of the economic impact study, the UNM HSC was split into two rough functional units: the educational/research unit and the clinical/hospital unit. These divisions were used to categorize financial data and to assign expenditures to the industrial sectors most closely resembling the actual activities of the various UNM HSC operations.

The educational/research unit encompasses all instructional activity, academic support, student services, institutional support, physical plant, and research activities (including the UNM Cancer Research and Treatment Center). This unit also includes a number of public service programs that are clinical in nature. The educational/research unit was assumed to make expenditures in a pattern similar to that of a public university.

The clinical/hospital unit is composed of UNM Hospital and other clinical operations such as UNM Carrie Tingley Hospital, the UNM Children’s Psychiatric Center, and UNM Psychiatric Center. The clinical/hospital unit was assumed to make expenditures in a pattern similar to that of an average public or private hospital.

For each facility or program within the functional units, a determination was made of what proportion of their total funding originated from outside of New Mexico. The revenue data provided by UNM HSC staff made these determinations possible by clearly delineating the sources of revenues and by providing information on the amount of funds coming from out of state when a particular revenue source consisted of both in- and out-of-state funds. Table 2 summarizes this information for the most significant revenue sources. Federal government funds are considered to be 100% out-of-state, while state and local government funds are 100% in-state. A list of private research contracts with UNM HSC indicated that almost all private grants and contracts originate with firms outside of New Mexico.

TABLE 2.
UNM HSC REVENUE SOURCES
FY 2001-2002

	In-State	Out-of-State
Federal Gov't Appropriations	0%	100%
Federal Gov't Contracts & Grants	0%	100%
State & Local Gov't Appropriations	100%	0%
State & Local Gov't Grants & Contracts	100%	0%
Private Grants & Contracts	1%	99%
Tuition and Fees	91.3%	8.7%
Patient Revenue		
Medicare	0%	100%
Medicaid	26.9%	73.1%
Insurance	33%	67%
Managed Care	70%	30%
Champus, PHS	100%	0%

Source: HSC FY 2001-2002 financial records

Table prepared by Bureau of Business and Economic Research, UNM, 2003

Revenue and Expenditure Analysis

Once the sources of revenues were determined, only the out-of-state proportion of funds was used to calculate the amount of expenditures accredited to each UNM HSC activity that would have an economic impact. These proportions ranged from 26% out-of-state funds for programs related to instruction, up to 73% of out-of-state funds for research programs. Table 3 summarizes the out-of-state percentages of funds for each functional unit defined in this study. For example, of the \$66.5 million spent on research activities, \$48.5 million, or 73%, of expenditures are considered to be supported by out-of-state funds. Using this method, of the UNM HSC total FY 2001-2002 spending of \$648.6 million, \$318.8 million (49.1%) is assumed to have been supported by out-of-state funds.

TABLE 3.
UNM HSC PERCENTAGE OF EXPENSES SUPPORTED
BY OUT-OF-STATE FUNDS
FY 2001-2002

	Out-of-State
Instruction & General	26%
Research	73%
Public Service Programs	42%
Independent Clinical Operations	24%
UNM Hospital	57%

Source: HSC FY 2001-2002 financial records

Table prepared by Bureau of Business and Economic Research, UNM, 2003

For capital equipment and construction expenditures, the out-of-state revenue percentage for the facilities associated with these capital purchases determined the amount of total capital expenses accredited as being supported with out-of-state funds. This proportion was approximately 50%.

Since only the proportion of funds that are spent within New Mexico have an economic impact on the state, the analysis requires a determination of UNM HSC's in-state vs. out-of-state spending patterns. Directly determining whether funds spent by the UNM HSC stay in-state or go out-of-state can be a complicated and labor intensive task. This process would require tracking every transaction made by UNM HSC to see whether the vendor involved has an in-state or an out-of-state address. Additionally, without surveying the individual vendors it can be difficult to determine how much of the UNM HSC-derived revenues stay in New Mexico, and how much is eventually sent out of state. The vendor may simply have a sales office here. A further complication arises because the classifications used for UNM accounting purposes are different from the industrial classifications needed to perform an economic impact analysis. A great deal of effort can be expended in this manner with often questionable results.

For this study, the classification of expenditures by detailed industry, the in-state out-of-state expenditure distribution, as well as the estimation of economic

impacts on output and employment were determined using IMPLAN software. IMPLAN is regional economic modeling and impact analysis software which works with a proprietary New Mexico input-output database. IMPLAN calculates how much of any given expenditure stays in-state and traces the economic impacts on New Mexico industries. IMPLAN is widely used in performing economic impact analyses. BBER has validated IMPLAN results for New Mexico in other studies, where both IMPLAN and BBER's FOR-UNM model have been used to estimate economic impacts.

Economic Impact Results

Following the methodology outlined previously, it was determined that during FY 2001-2002, \$318.8 million of UNM HSC expenditures were supported by funds from outside of New Mexico. These expenditures had a direct economic impact on the state's economy through employment and the purchase of goods and services, and additional impacts through further indirect and induced rounds of spending. The economic impacts of these expenditures are summarized below and in Table 4.

Employment and Compensation Impacts

Funds originating from outside of New Mexico directly supported 4,100 jobs and \$190.5 million in compensation at the UNM HSC during FY 2001-2002. Indirect and induced impacts generated an additional 2,721 jobs in New Mexico, for a total of 6,821 jobs and \$251.4 million in wage, salary and benefits compensation. Thus, for every new job directly created by the UNM HSC, supported by funds external to the state, another 0.66 indirect or induced jobs were created in the state. This yields an employment multiplier of 1.66 ($6,821 \div 4,100 = 1.66$).

Output Impacts

The \$318.8 million in out-of-state funds spent by the UNM HSC during FY 2001-2002 led to additional increases in economic activity of \$189.7 million in indirect and induced rounds of spending. Thus, by attracting \$318.8 million in outside revenue, the UNM HSC generated a total of \$508.5 million in increased output in the New Mexico economy, resulting in an output multiplier of 1.59 ($508.5 \div 318.8 = 1.59$).

TABLE 4.
SUMMARY OF THE IMPACT OF UNM HSC ON THE NEW MEXICO
ECONOMY FY 2001-2002

(millions \$ except for employment)

Impact	Employment	Compensation	Output
Direct	4,100	\$190.5	\$318.8
Indirect/Induced	2,721	\$60.9	\$189.7
Total	6,821	\$251.4	\$508.5

Source: Bureau of Business and Economic Research, University of New Mexico, 2003

SECTION III.

Economic Impact of UNM HSC Specialty Services and Educational and Training Programs

In addition to the economic impacts resulting from the out-of-state funds it brings to New Mexico, UNM HSC creates an additional impact due to specialized services and education and training it provides. Services and education that are offered through UNM HSC and that are not offered – or to only a limited extent – elsewhere in the state create an economic impact because they prevent economic leakages. In other words, these UNM HSC activities capture the expenditures that would have been lost if New Mexico residents went out of state to obtain these services.

Ideally, the revenues UNM HSC captures from specialty services and education would be considered as a direct economic impact and 100% of their expenditures would be included in the first portion of the economic impact analysis (which calculated the impact of out-of-state revenues). Unfortunately, the determination of whether specific services and educational programs actually are – or to what extent they are – preventing leakages warrants a more rigorous analysis than was possible for this report. While many of the specialized services have been identified through informal surveys, data on revenues from specialty services to patients and clients were not collected in the manner needed for their inclusion in the calculation of the overall economic impact of UNM HSC. Therefore, the revenues and expenditures from the identified specialty services were treated in the same manner as other departments in the previous impact analysis; however, enrollment in educational programs and the associated tuition and fees revenues were identified. These figures are presented later in this section.

Specialty Healthcare Services

The following is a summary of programs and services that were identified by an informal survey of School of Medicine department chairs and by others knowledgeable of the departmental activities. Based on the information supplied, the Department of Pediatrics appears to be the source of the majority of the specialized services.

Department of Pediatrics

The Department of Pediatrics offers a number of services and resources that are not readily available elsewhere in New Mexico. Specialties and/or programs offered by the Department of Pediatrics are categorized as children's medical, surgical specialties and children's programs.

Revenues and expenditures for FY 2001-2002 for selected subunits that offer children's medical specialties are presented in Table 5. Actual revenues (from all sources) and expenditures for these subunits in FY 2001-2002 were \$5.3 million. These revenues do not represent economic impact; only the portion of revenues that come from patient services contribute to economic impact on New Mexico. In addition to the children's medical subunits presented in Table 5, Dr. Robert Katz, Chair of the Department of Pediatrics, also identified child psychiatry, emergency services, metabolism, nephrology, radiology and rheumatology as children's medical specialties/programs offered through the Department of Pediatrics as only being found at the UNM HSC. Revenue and expenditure data for these specialties/programs were not available, though Dr. Katz indicated that there are approximately 33 board certified physicians practicing in the Department's children's medical specialties and in many of the specialties these are the only board certified physicians in New Mexico.

TABLE 5.
School of Medicine, Department of Pediatrics

Subunit	Actual Revenues	Actual Expenditures
Adolescent Medicine	\$240,374	\$216,544
Pulmonary	\$1,290,970	\$1,404,046
Dysmorphology	\$509,345	\$469,590
Endocrinology / Nephrology	\$775,749	\$867,651
Gastroenterology	\$413,395	\$414,090
Hematology / Oncology	\$1,720,079	\$1,634,573
Infectious Disease	\$329,200	\$311,971
Total	\$5,279,112	\$5,318,465

Source: Survey of UNM School of Medicine Department Chairs, 2002

Table prepared by Bureau of Business and Economic Research, UNM, 2003

Children's surgical specialties identified by Dr. Katz include neurosurgery, orthopedics, otolaryngology, ophthalmology and urology. Revenue and expenditure data for these services were also unavailable, although, as with children's surgical specialties, a number of these services employed the only board certified physicians in New Mexico.

Children's programs identified by Dr. Katz as offering unique medical specialties are presented in Table 6. In FY 2001-2002 the Center for Development and Disability had actual revenues and expenditures of \$5.9 million. Data on other programs were not collected for this study.

**TABLE 6.
UNM HSC CHILDREN'S SPECIALTY HEALTHCARE PROGRAMS**

Program	Description
Center for Development and Disability	A University center for excellence in developmental disabilities, education, research and service.
Cystic Fibrosis Center	The only nationally accredited program in New Mexico that provides comprehensive care to children and adults with cystic fibrosis.
Ted R. Montoya Hemophilia Program	Provides care and funds for blood product support primarily for adults around New Mexico.
Para los Ninos	The only program in New Mexico that provides comprehensive care for children who are victims of sexual abuse.
Los Pasos	New Mexico's only program that provides guidance, support and care for infants born to mothers who used drugs.
UNM Carrie Tingley Hospital	The state's only program dedicated solely to the rehabilitation of infants and children with a variety of chronic diseases.
Extra Corporeal Membrane Oxygenation (ECMO)	New Mexico's only site where ECMO can be used to treat infants, children and adults with life threatening catastrophic illnesses.
Pediatric Emergency Room	The only emergency room in the state dedicated to children.
UNM Children's Psychiatric Center	The state's only residential children's psychiatric hospital.

Source: Survey of UNM School of Medicine Department Chairs, 2002
Table prepared by Bureau of Business and Economic Research, UNM, 2003

Other Departments

Other departments were identified as having specialized or unique services, which are presented below in Table 7. The total revenues or the revenues from patient services were not identified for this report.

**TABLE 7.
OTHER SPECIALIZED UNM HSC HEALTHCARE SERVICES**

Department	Program / Service
Family and Community Medicine	Center for Community Partnerships
Office of Clinical Affairs	Emergency Management
Emergency Medicine	Operates the Level I Trauma Center Runs the EMS Academy which trains EMT's and paramedics for the state Operates the Lifeguard Air Emergency Service Operates Poison Center with the UNM College of Pharmacy Operates the Center for Disaster Medicine
Department of Radiology	Radioactive iodine treatment of children's thyroid cancer and hyperthyroidism In utero MRI Interventional Neuroradiology Tumor Fusion imaging Defacography
Ob/Gyn	Obstetrics - High risk pregnancy care Obstetrics - Prenatal Diagnosis Services Obstetrics - Teen OB clinic Obstetrics - Milagro Program Specialty Clinic - Breast Disorder Specialty Clinic - Urogynecology
Pathology	Employ the state's only forensic pathologists which deal with unexpected and "shady" deaths (OMI) Employ four hemopathologists which consult for other states Operate the Medical Laboratory Sciences program that allows cutting edge laboratory medicine to stay in New Mexico communities. Renal Pathology Neuropathology Molecular Pathology Molecular Histocompatibility Cytogenetics

Source: Survey of UNM School of Medicine Department Chairs, 2002
Table prepared by Bureau of Business and Economic Research, UNM, 2003

Education and Training

Education and training opportunities offered by UNM HSC - which in some disciplines are the only educational programs available in New Mexico - also retain dollars that may otherwise leave the state. In contrast to specialty services, the enrollment in and revenues from educational and training programs at UNM HSC were easily identified. Total student enrollment in 2001–2002 was approximately 1,493. This includes 486 undergraduate students, 312 graduate students, 390 PharmD students in the College of Pharmacy and 305 medical students. Total student tuition and fees were \$2.7 million.

These students also make significant local expenditures during their education in addition to tuition and fees. The UNM Department of Financial Aid provides sample student budgets for the School of Medicine. These budgets indicate that over and above tuition and fees, the average medical student spends between \$9,284 and \$16,330 per year on room and board, books and supplies, transportation, and other general expenses, depending on whether they live with their parents, on- or off-campus, and which year of school they are in. Expenses for other programs are lower, but still significant.

In addition to the economic impact of these revenues (which are not included in the overall economic impact) there are additional benefits associated with UNM HSC-provided healthcare education and training opportunities which are also not reflected in the economic impact. In addition to enabling New Mexico residents to pursue health sciences professions without leaving the state, UNM HSC graduates often remain to live and work in New Mexico after completing their education. According to Dr. Arthur Kaufman, Chair of the Department of Family and Community Medicine, up to 50% of the graduates of the department's Albuquerque-based rural education and support programs start practices in rural New Mexico. Dr. Kaufman estimates that as high as 80% of the program's rural graduates start practices in rural areas. In addition to providing needed health services in these areas, these services also have economic impacts on the local community.

SECTION IV.

Healthcare Workforce Development & Healthcare Access

The economic health of New Mexico is interdependent on the health and well-being of the state's population and workforce. Access to healthcare is a fundamental part of any economy's infrastructure, and a lack of healthcare is both a societal and economic handicap. UNM Health Sciences Center addresses these issues in New Mexico in a number of ways by training a significant number of New Mexico's healthcare professionals and by committing resources to improving access to healthcare for medically underserved areas and/or populations.

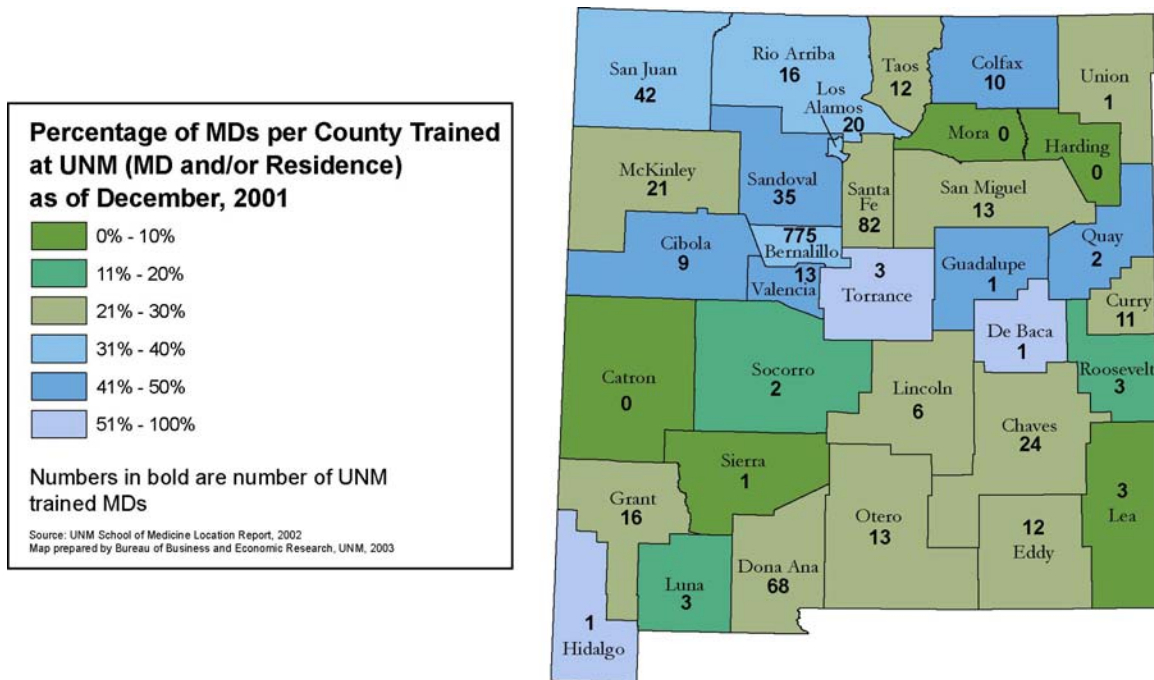
Training New Mexico's Healthcare Professionals

A significant number of graduates from the UNM School of Medicine and from the UNM Colleges of Pharmacy and Nursing stay on to practice in New Mexico. This results in a two-fold contribution by providing healthcare to the state as a whole, and by improving the range of in-state education and employment options to New Mexico residents. Without the UNM Health Sciences Center, people seeking an education in medicine would necessarily have to go out-of-state.

Physicians

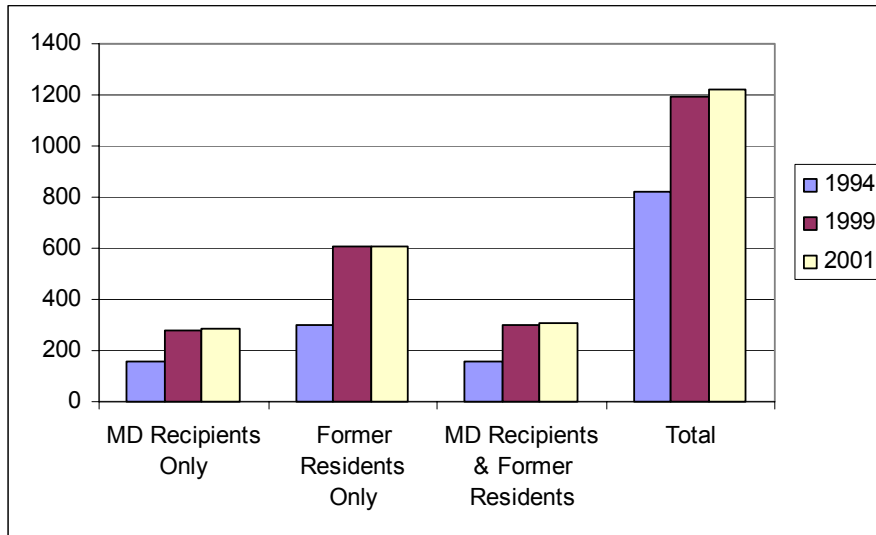
Twenty-five percent (25%) of all students who have earned their MD or were residents at the UNM School of Medicine have stayed on in New Mexico to practice medicine. The 2002 School of Medicine Location Report found that 594 MD recipients are licensed to practice in New Mexico and have an in-state address. If students who completed their residencies at UNM are included, the figure rises to 1,219. This represents about 25% of all students/residents. Statewide, of the 3,704 physicians licensed to practice in New Mexico, 33% were trained at UNM. Map 1 shows the distribution of UNM-trained physicians practicing in New Mexico.

**MAP 1.
PERCENTAGE OF MDs PER COUNTY TRAINED
AT UNM (MD AND/OR RESIDENCE) AS OF
DECEMBER 2001**



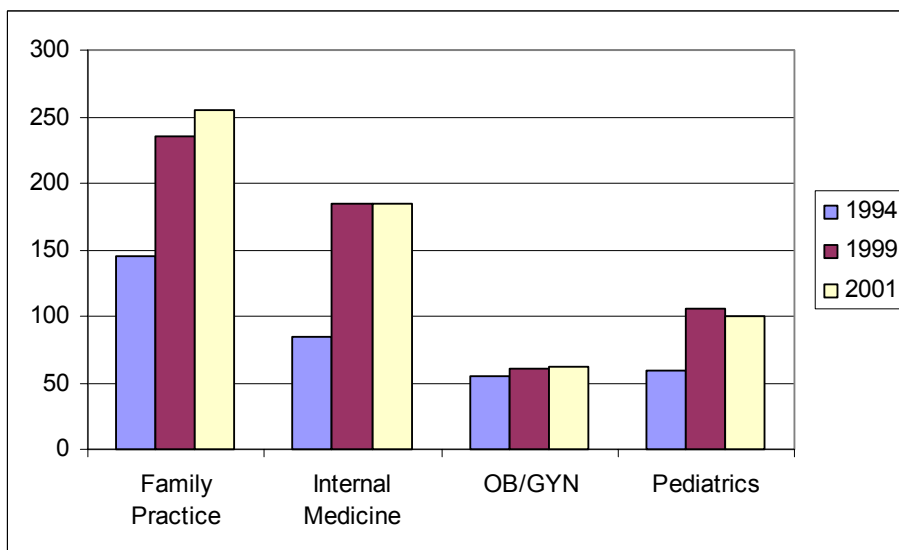
The number of UNM-trained physicians has been increasing in recent years. Over the past 7 years, the number of UNM-trained physicians practicing in New Mexico has grown from 819 to 1,219, a 49% increase. A significant number of these physicians are in Primary Care specialties. These trends are illustrated in Figures 1 and 2.

**FIGURE 1.
UNM TRAINED PHYSICIANS PRACTICING IN
NEW MEXICO 1994 – 2001**



Source: UNM School of Medicine Location Report, 2002
Chart prepared by Bureau of Business and Economic Research, UNM, 2003

**FIGURE 2.
UNM TRAINED PHYSICIANS PRACTICING IN NEW MEXICO IN
PRIMARY CARE SPECIALTIES 1994 – 2001**



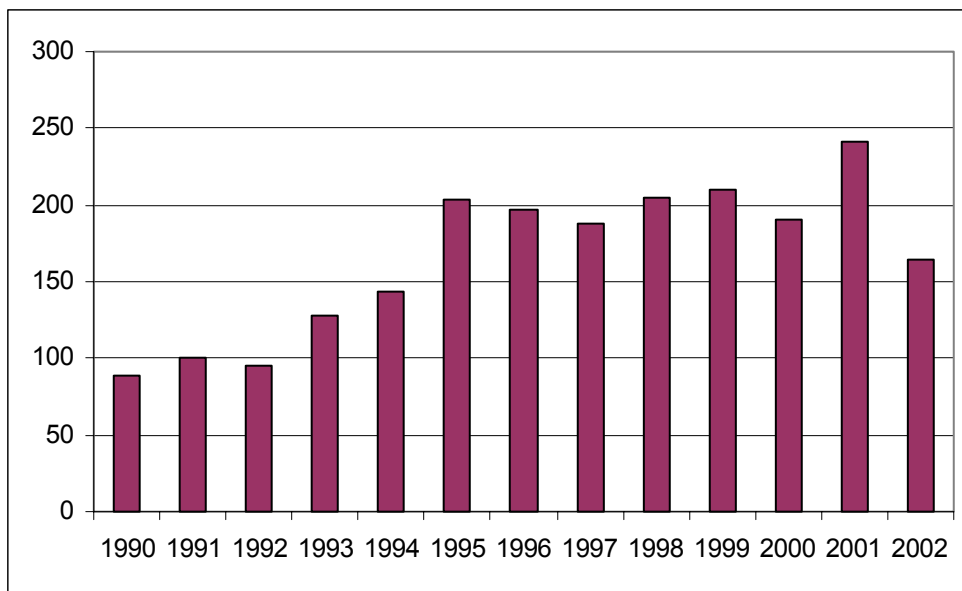
Source: UNM School of Medicine Location Report, 2002
Chart prepared by Bureau of Business and Economic Research, UNM, 2003

Nurses

New Mexico's supply of nurses is at a critical level. The state ranks sixth in the nation for having the lowest numbers of registered nurses per 100,000 people. The UNM Health Sciences Center is addressing this shortage by attempting to increase enrollment, and through offering alternative means of education to students in outlying areas of the state using the Internet. The UNM HSC College of Nursing also concentrates on helping nursing students move beyond the associate degree level into bachelor or master's level programs. Nurses will need these advanced degrees to fill many of the vacancies that exist.

The number of UNM HSC College of Nursing graduates has more than doubled over the past decade. This trend is illustrated in Figure 3. The UNM HSC College of Nursing is by far the largest educator of nurses in the state; 80% of all nurses who are educated at UNM stay to practice in-state.

**FIGURE 3.
COLLEGE OF NURSING GRADUATES 1990 - 2002**



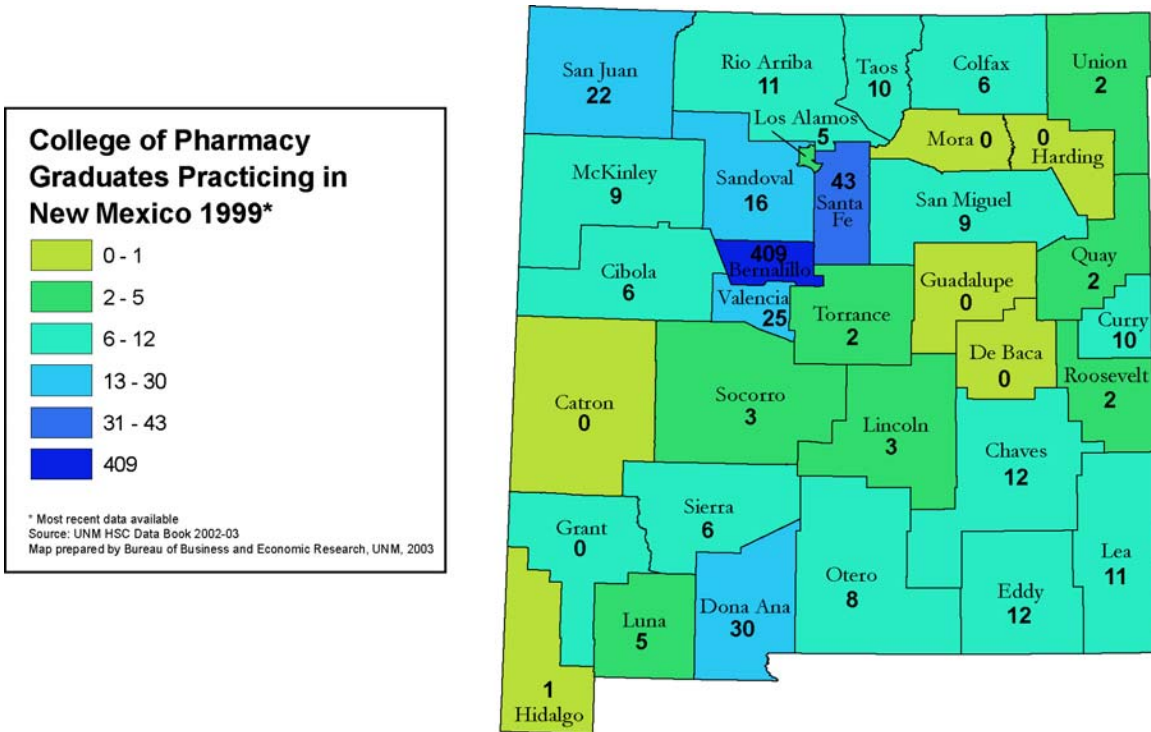
Source: UNM HSC Data Book 2002-03

Chart prepared by Bureau of Business and Economic Research, University of New Mexico, 2003

Pharmacists

The UNM HSC College of Pharmacy trains the majority of the pharmacists in the state. As of 1999, 686 graduates of the UNM HSC College of Pharmacy are practicing in 28 of the state's 33 counties. Forty-six percent (46%), or 35 of 75 students from the graduating class of May 2002 are practicing in New Mexico. Map 2 shows the distribution of UNM-trained pharmacists practicing in New Mexico.

**MAP 2.
UNM COLLEGE OF PHARMACY GRADUATES PRACTICING
IN NEW MEXICO 1999***



Other Certificate and Degree Programs

In addition to the programs for training medical doctors, nurses and pharmacists, UNM HSC offers a number of programs leading to certificates and to bachelor and masters degrees. Table 8 summarizes the programs offered. Most of the students trained under these programs are from New Mexico.

TABLE 8.
OTHER CERTIFICATE AND DEGREE PROGRAMS OFFERED
BY UNM HEALTH SCIENCES CENTER

CERTIFICATE OR DEGREE PROGRAM	STUDENT ENROLLMENT FALL 2002
<u>Graduate Students</u>	
Masters - Public Health	60
Masters - Biomedical Sciences	12
Masters - Occupational Therapy	33
Masters - Physical Therapy	50
Doctoral - Biomedical Sciences	74
	229
<u>Undergraduate - Diagnostic and Therapeutic Sciences</u>	
Dental Hygiene	66
Emergency Medical Services Academy	20
Medical Laboratory Sciences	21
Physician Assistant	23
Radiology/Nuclear Medicine Imaging	20
	150

Source: UNM HSC Data Book, 2001-02

Table prepared by Bureau of Business and Economic Research, UNM, 2003

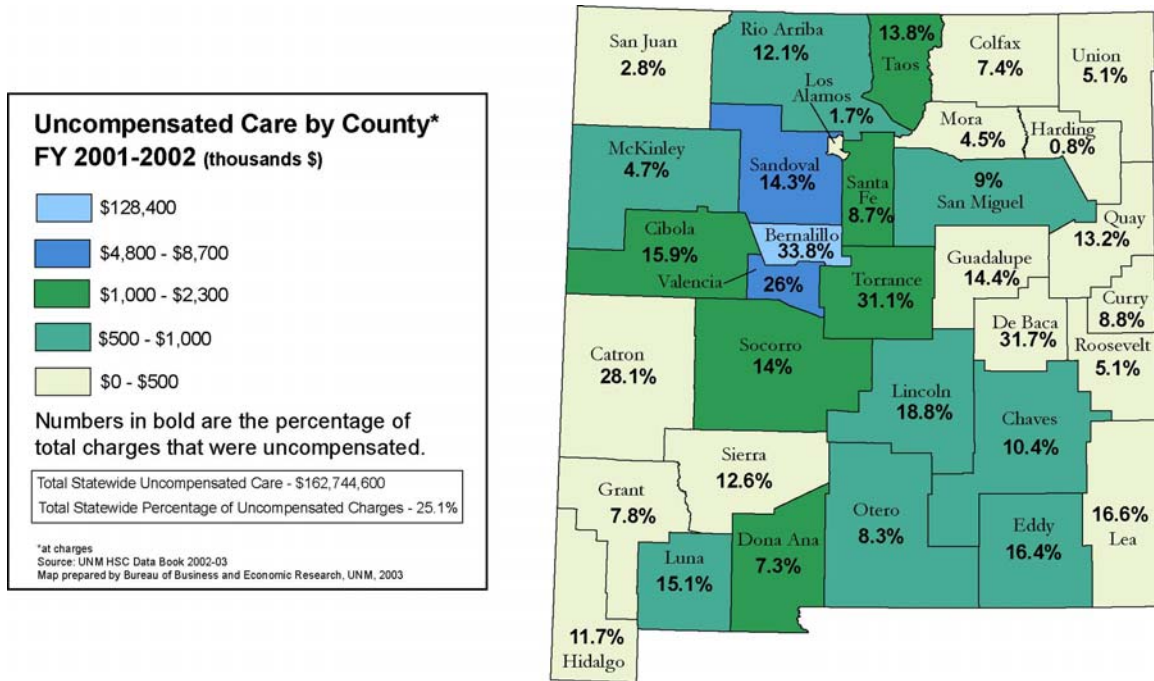
Continuing Medical Education

UNM HSC provides opportunities in ongoing medical education for healthcare professionals at all levels. Two programs active in this area are the Continuing Medical Education (CME) program and the Area Health Education Center (AHEC). CME activities and services include supervised hands-on clinical experiences, targeted training in new operative and other therapeutic techniques, lectures, panel discussions, workshops, symposia, and use of electronic technology. The AHEC provides a variety of workshops and educational opportunities in communities throughout the state, concentrating especially on medically underserved areas.

Uncompensated Care

The UNM Health Sciences Center is the primary institution in New Mexico where healthcare is made available to indigents or other people who are not insured or otherwise unable to pay for their healthcare costs. In FY 2001-2002, the UNM HSC provided patients with \$162.7 million of uncompensated care (at charges) statewide. UNM HSC was not compensated for these charges. Map 5 shows the amount of uncompensated charges by county for FY 2001-2002.

**MAP 5.
UNM HSC UNCOMPENSATED CARE
BY COUNTY FY 2001-2002**



SECTION V.

Economic Impact of UNM HSC Technology Transfer

Patents

UNM Health Sciences Center personnel have registered a number of patents on inventions or techniques developed during research at the UNM HSC. UNM's Science and Technology Corporation (STC) works to commercialize the results of research at the UNM HSC and at the University. Founded in 1995 by the regents of the University, STC is a non-profit organization with an annual operating budget of \$500,000, of this amount, \$300,000 comes from the UNM Health Sciences Center budget.

STC maintains a portfolio of patented life sciences inventions available for licensing. As of September 2001, the STC portfolio of patented life sciences inventions available for licensing contained 26 inventions that originated wholly or partly from research at the UNM HSC. Another 51 inventions had patents pending, while 20 inventions had or were filing for international patents in various countries through the Patent Cooperation Treaty (PCT). See Table 9.

TABLE 9.
UNM HSC PATENT RECORD
AS OF SEPTEMBER 2001*

<u>Year</u>	<u>Number of Patents</u>
1990	0
1991	1
1992	1
1993	0
1994	0
1995	1
1996	1
1997	1
1998	5
1999	5
2000	8
2001	3
Total	26

51 Patents Pending

20 Patents with PCT Status

* Most recent data

Source: UNM Science and Technology Corporation

Table prepared by Bureau of Business and Economic Research, UNM, 2003

Start-ups, Partnerships, and Affiliates

There are a number of start-up companies or organizations in New Mexico that exist, in part, due to the presence of the UNM HSC, through the confluence of UNM HSC's scientific expertise and intellectual property and the commercialization of these research results. UNM HSC is a source of technology, expert personnel, and business knowledge for these firms, which are partners or affiliates of UNM HSC. The firms have an economic impact by creating jobs, often highly paid positions which attract experts in their fields, and by generating tax dollars for the local economy. Currently, these firms employ more than 1,200 people. These firms and organizations are briefly described below, and displayed on the following Map 6.

Partners

Cell Robotics International

Cell Robotics International, Inc., a medical and research products company since 1988, manufactures innovative scientific research instruments that use laser light to transform a microscope from a viewing device into a tool for the physical manipulation and dissection of cells in microspace. The company manufactures, markets, and distributes the Lasette® Plus, the only FDA-cleared alternative to the needle or steel blade currently available for drawing a capillary blood sample. Cell Robotics employed just over 20 people in 2002, and has yearly revenues of over \$1.5 million.

Concise Logic

Concise Logic, the UNM Science and Technology Center's first company, now employs about 26 people and will soon move into larger offices in the Science and Technology Park on University Boulevard. Concise Logic will produce software developed by UNM's Microelectronic Research Center for the computer chip industry.

EthicsRx

EthicsRx provides ethics services and products that are specially attuned to the ethical challenges encountered by health professionals. The firm currently employs two people.

Exagen

Exagen is a start-up molecular diagnostics company with the mission to develop and clinically validate novel molecular diagnostic products based on the discovery of multi-feature gene and protein biomarkers for early detection, prediction of clinical outcomes and therapy monitoring in cancer and emerging infectious diseases. The firm currently employs three people.

InLight Solutions

InLight Solutions is a firm which researches, develops, and commercializes sensor-based measurement systems for life sciences applications. InLight Solution began as Rio Grande Medical Technologies in 1993 with the vision that people with diabetes could better manage their health through noninvasive glucose measurement systems. Working with Sandia National Laboratories and the University of New Mexico School of Medicine, the founders brought together the people, technology, and corporate partnership needed to make this vision a reality. InLight has 100 employees, most of whom hold MDs or PhDs. The firm has yearly revenues of \$10 million.

Lumidigm

A spin-off of InLight Solutions, Lumidigm was established as a separate, privately held company in 2001 to make lives simpler and safer through the development of superior biometric products, such as the LightPrint™ sensor. When researchers at InLight Solutions discovered light passes through every human's skin differently, they realized the potential for significant advances in human identification. Lumidigm scientists further realized this technique worked equally well on any skin surface, including fingers, palms, wrists, and forearms. The firm employs 11 people.

New Mexico Cancer Care Alliance

In 2001, the New Mexico Cancer Care Alliance was formed by several cancer treatment groups in Albuquerque to provide better care to cancer patients. The Alliance will link healthcare groups and provide a centralized process to organize clinical trials and their locations in the state. The Alliance anticipates that its research will provide fertile ground for future technology transfer and start-up firms. Efforts are underway to hire an executive director for the Alliance.

Nuclear Education Online

The University of New Mexico College of Pharmacy together with the College of Pharmacy and College of Health Related Professions at the University of Arkansas for Medical Sciences have established a new educational program to meet the needs for specialists in the field of nuclear pharmacy. The one-person Nuclear Education Online program will use Web-based learning technology with local preceptors to increase the availability and accessibility of education for students and pharmacists interested in this specialty.

Technology Commercialization International

Technology Commercialization International, Inc. is a 10-employee privately held corporation organized to provide innovative solutions in the field of medical technology. TCI is in the business of commercializing nuclear medicine products and medical devices to detect and improve the diagnostics and treatment of human diseases including cancer, cardiac diseases and others. The firm has sales in the \$4 to \$5 million range.

TriCore Reference Laboratories

TriCore Reference Laboratories is a not-for-profit organization employing 758 people, formed from a regional laboratory consolidation effort. The sponsors of TriCore, including the UNM HSC, Presbyterian Healthcare Services, and St. Vincent Hospital have formed a strong regional lab capable of contracting for services at competitive rates. TriCore provides laboratory services to the sponsor hospitals and clinics and to physicians, hospitals, employers, and other healthcare providers throughout New Mexico, eastern Arizona, and southern Colorado.

Affiliations

Lovelace Respiratory Research Institute

The Lovelace Respiratory Research Institute is a private biomedical research institute, employing 306 people, dedicated to the reduction of the nation's substantial respiratory health burden. With its diverse research capabilities, its close working relationships with UNM HSC and other universities and laboratories, and its endowed and sponsored

research programs, the Lovelace Respiratory Research Institute is one of the nation's largest independent, non-profit biomedical research organizations.

National Center for Genome Resources

In collaboration with users worldwide, NCGR creates biological databases and analytical software tools to accelerate and enable discovery. NCGR's research projects often grow out of the biological questions that UNM HSC's partners are trying to answer. NCGR employs 40 people.

**MAP 6.
UNM HSC PARTNER AND AFFILIATE
FIRMS AND ORGANIZATIONS
FY 2001-2002**

THE UNIVERSITY OF NEW MEXICO HEALTH SCIENCES CENTER



Building a Biomedical Research Corridor in New Mexico



Note: This spring, TVI Community College, started offering Associates Degree of Science with an emphasis in Biotechnology; currently has approximately 70 students enrolled who will utilize the HSC's laboratories for practical biotechnology experience.

Licenses and Royalties

A number of UNM HSC inventions have been licensed by industry for commercialization. Two types of revenue come from licensing, the annual licensing fee and royalties produced from successful sales of the product. Licensing fees have not become a large source of revenue; a typical licensing deal with Axiom Biotechnologies brought in from \$50,000 to \$100,000 a year. Royalties have also been slow to develop; most licenses had not generated any royalties as of June 2001. A list of UNM HSC licensing deals follows:

Rio Grande Medical Technologies (now InLight Solutions) of Albuquerque, NM: methods and apparatus for biological analysis were licensed to the company in 1985. These inventions were developed by Drs. Robinson, Eaton, Ward, and Haaland. Additionally, an oximeter for reliable clinical determination developed by Dr. Robinson was licensed to RGMT. Licensing agreements ending Dec. 31, 2002, generated income of \$66,708 to the UNM HSC during FY2001-2002.

Axiom Biotechnologies of San Diego, CA: drug-discovery start-up company that licensed a method for rapid handling of laboratory samples, invented by Larry Sklar, Bruce Edwards and Fritz Kuckuck of the University's pathology/cytometry department. License fee paid; no royalties. There is no record of a contract or of payments in UNM HSC's current list of research contracts.

Bioseparations Inc. of Tucson, AZ: diagnostics start-up company that has licensed a method for labeling chromosomes for the detection of genetic anomalies, invented by Gloria Sarto and Donald Thompson of the obstetrics and gynecology department. Product sold; no royalties. Contract ended in 1997. Contract file indicates negative activity in FY 2001-2002 of -\$2,461.

Convergent Nanogenetics of Albuquerque, NM: start-up company that licensed a method for enhancing detection of germs or infectious agents, invented by Curtis Thompson and Joseph Spidle of the UNM pathology department and University of California-San Francisco researchers Donna Albertson and Richard Seagraves. No royalties; company out of business. There is no record of contract or payment in current UNM HSC contract list.

Internutria, a Connecticut bottling company: licensed a glycerol hydration beverage for athletes, invented by Paul Montner, formerly with UNM Health Sciences Center. License fee paid; product sold; no royalties; company out of business. There is no record of contract or payment in UNM HSC's current database on research contracts.

MesoSystems of Richland, WA: biotechnology company with a facility in Albuquerque that has licensed unique detection systems. No inventor listed.

US Surgical: Company now owned by Tyco Corporation licensed a system for applying a deformable plastic lip, multipurpose surgical tools and exerting forceps, a nerve anastomosis sling developed by Drs. Cushman, Kirsh and Zhu. The firm pays the UNM HSC \$120,000 per year in licensing fees.

Clinical Trials

Clinical trials are critical in obtaining the necessary FDA approvals that will allow a drug to be brought to market. Pharmaceutical companies frequently contract with university medical centers to do research and to perform the clinical trials requisite to FDA approval. With FDA approval, the company may decide to site future research and production operations for the drug in proximity to the medical center that did the original clinical trials. UNM HSC has numerous clinical trial agreements with pharmaceutical companies. These agreements bring in revenues, but BBER was unable to identify any firms with local operations among those contracting with UNM HSC for clinical trials.

Bibliography

Association of Academic Health Centers, "The Economic and Social Impact of Academic Health Centers," Washington, DC. Association of Academic Health Centers, 1990.

Beck, Rogers, Donald Elliott, John Meisel, and Michael Wagner, "Economic Impact Studies of Regional Public Colleges and Universities," *Growth and Change*, Vol. 26 (Spring 1995), pp. 245-260.

Biotechnology Industry Organization, "Basic Data About Economic Impact of Biomedical Research And Critical Impact Technology Transfer Mechanisms," Basic Research Funding, November 13, 2001, <http://www.bio.org/laws/impact.html>.

Bluestone, Barry, *Umass/Boston: An Economic Impact Analysis*, University of Massachusetts at Boston, January 1993.

Booth, G. Geoffrey, Jeffrey E. Jarrett, "The Identification and Estimation of a University's Economic Impacts," *Journal of Higher Education*, Volume 47, Issue 5 (Sep.-Oct., 1976), 565-576.

Brown, Kenneth H. and Michael T. Heaney, "A Note On Measuring The Economic Impact of Institutions of Higher Education," *Research in Higher Education*, Vol. 38, No 2, 1997.

Clinch, Richard P. and Daniel A. Gerlowski, *The Economic Impact of the University System of Maryland: A Fiscal Perspective*, University of Baltimore, Jacob France Institute Merrick School of Business, February 2002.

Commonwealth Fund, *Contributing to the Community: The Economic Significance of Academic Health Centers and Their Role in Neighborhood Development*. Harkness House, New York, 1987.

Council on Biomedical Research and Development, New York Academy of Medicine, "Technology Transfer: Collaborate, Don't Compete," November 19, 2001, <http://www.zurichmednet.org/clusternews/Collaborate.htm>.

Crispin-Little, Jan, "The Economic And Fiscal Impact of the University of Utah Health Sciences Center," Report for the Office of the Senior Vice President for Health Sciences, University of Utah Bureau of Economic and Business Research, September 2001.

Dorsett, Rebecca A. and William C. Weiler, "The Impact of an Institution's Federal Research Grants on the Economy of Its State," *Journal of Higher Education*, Vol. 53, Issue 4 (Jul.-Aug., 1982), 419-428.

Ernst and Young Economic Consulting and Quantitative Analysis, *The Economic Contributions of The Biotechnology Industry to the U.S. Economy*, Report Prepared for the Biotechnology Industry Organization, Ernst and Young, May 2000.

Feller, Irwin and David Roessner. "What does industry expect from university partnerships?" *Issues in Science and Technology*, Fall 1995:80-85.

Goldberg, Carey, "Across the Country, Universities Generate a High-Tech Economic Boom," *New York Times*, p.1, October 8, 1999 (as reproduced by <http://www.zurichmednet.org/clusternews/Development.htm>, November 19,2001).

Griffin, Tom "The Day They Sold the 'U', A Fable: Economic Impact of UW," http://www.washington.edu/alumni/columns/top10/day_sold.html, November 13, 2001.

Hall, Bronwyn H., Albert N. Link, and John T. Scott, "Barriers Inhibiting Industry from Partnering with Universities: Evidence from the Advanced Technology Program." *Journal of Technology Transfer*. June 2000.

Hall, Bronwyn H., Albert N. Link, and John T. Scott, "University Research Partners," manuscript, February 16, 2000.

Houston Branch of Federal Reserve Bank of Dallas, "Economic Impact of the Texas Medical Center on Southeast Texas, Houston Business," Federal Reserve Bank of Dallas, October 2001.

Jaffe, Adam B., "Real Effects of Academic Research." *The American Economic Review*, December 1989, p.957-970.

"John Hopkins Economic Impact in Maryland," http://www.jhu@edu/news_info/reports/impact, November 13, 2001.

Kramer, Peter B., Sandy L. Scheibe, Donyale Y. Reavis, and Louis P. Berneman, "Induced Investment and Jobs Produced by Exclusive Patent Licenses- a Confirmator Study," <http://www.autm.net/pubs/journal/97/5-97.htm>, December 12, 2001.

Koppelman, Lee, Fred Rosenberg, Edith Jones, Ruth Klein, "The Economic Impact of The University at Stony Brook," University at Stony Brook Center for Regional Policy Studies.

Lasker Foundation, "Exceptional Returns: The Economic Value of America's Investment in Medical Research," <http://www.laskerfoundation.org>, May 2000.

Lillis, Charles M. and David Tonkovich, "The Impact of Grant and Research Money on a State Economy," *Journal of Higher Education*, Vol. 47, Issue 5 (Sep.-Oct., 1976), 577-587.

Link, Albert N., "A Suggested Method for Assessing the Economic Impacts of University R&D: Including Identifying Roles for Technology Transfer Officers," *Journal of the Association of University Technology Managers*, Vol. XI, 1999. <http://www.autm.net/pubs/journal/99/methods.htm/>.

Link, Albert N. and John T. Scott, "Public Private Partnerships: Stimulating Competition in a Dynamic Market," *International Journal of Industrial Organization*, 2001.

Nelson, Richard R., "Institutions Supporting Technical Advance in Industry," *American Economic Review*, May 1986, p.186-189.

Select, Wilson, "What Does Industry Expect From University Partnerships?" December 13, 2001.

Shane, Donea and staff of the New Mexico Consortium for Nursing Workforce Development, *State of the Nursing Workforce in New Mexico, Annual Report – July 2001*, Report funded by the New Mexico Board of Nursing with funds appropriated by the 1999 Legislature (SB 83).

Shepherd, Shawn, "New Mexico State University: All the Right Ingredients for Economic Development," *New Mexico Business Journal*, June 2002.

"Summary of Study by Professor Peter Gordon", USC School of Policy, Planning and Development, http://www.usc.edu/ext-relations/unipark/build_dev_impact2.html, November 19, 2001.

Tornatzky, Louis G., Denis O. Gray, Stephanie A. Tarant, Cathy Zimmer, "Who Will Stay And Who Will Leave? Policy and Research Recommendations," Report of The Southern Technology Council, May 2001.

Tripp-Umbach & Associates, *The Economic Impact of AAMC Member Institutions*, Washington D.C, Association of American Medical Colleges, New York, November 1996.

Trune, Dennis R., "Comparative Measures of University Licensing Activities," *The Journal of the Association of University Technology*, 1996, <http://www.autm.net/pubs/journal/96/5-96.htm>.

Varga, Attila, "Local Academic Knowledge Transfers and the Concentration of Economic Activity," *Journal of Regional Science*, Vol. 40, No. 2, 2000, pp. 289-309.

U.S. Census Bureau, Profile of Selected Economic Characteristics, http://factfinder.census.gov/servlet/QTTTable?_ts=24406570427, November 21, 2001.

University of Alberta “Spin-off Companies Make a Difference.”

University of California, San Diego, “Economic Impact.”

University of Cincinnati Medical Center Economic Impact Study,” November 13, 2001, <http://medcenter.uc.edu/impact.ucm>.

University of New Mexico Bureau of Business and Economic Research, *The Economic Impact of the University of New Mexico on the New Mexico Economy FY 00*, January 2001.

University of New Mexico Health Sciences Center, *Health Sciences Center Data Book, 2001-2002 and 2002-2003*.

University of New Mexico Health Sciences Center, *Research and Public Service Projects, Program Summaries for FY 2002*.

University of New Mexico Institute for Public Policy, *Health Care Professionals in New Mexico*, December 1998.

University of New Mexico Science & Technology Corporation, *Life Science Technology Portfolio, September 2001*.

University of New Mexico School of Medicine, *Location Report 2002: MD Recipients and Former Residents*

University of Texas Office of Institutional Research, “The University of Texas Medical Branch: Economic Impact, Facts And Figures,” November 13, 2001, http://www.utmb.edu/facts_and_figures/economicimpact.htm.

Valencia, Veronica, “Everyone Deserves a Nurse,” *UNM-Quantum 2002*