Medical Research and the Location of High-tech Medical Firms

Summary Report

Prepared for the National Association Of Corporate Real Estate Executives

By
The Center for Economic Development Research
College of Business Administration
University of South Florida

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Executive Summary

This summary report contains relevant data provided in the complete report, and reports selected relationships among three components of high-tech medical complexes in regions: Employment in high-tech manufacturing, L, university research grant funding, U, and employment in government and private research laboratories, R. The following findings are of interest:

1. High-tech medical products and drug manufacturing is highly concentrated. The top 20 cities, ranked by total workers, employ 70 percent of all workers in the US.

2. Most employment and sales is concentrated in the largest cities.

3. The largest cities are home to top-ranked university health sciences research programs, ranked by quality and by the amount of grant funding received.

4. Statistical evidence indicates that high-tech medical firms are attracted to areas with large funded university and medical school research programs. Private and government research labs are attracted to areas with large high-tech medical firms.

5. The increase in high-tech medical employment sales from a $1 million increase in funded university biomedical research depends upon city size: a city of 1 million persons gains 65 workers; a city of 3 million gains 145 workers, and a city of 5 million gains 225 workers.

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Introduction and Objective of the Study.

Objective of the Study.

This study is designed to answer two related questions. The first question is whether the knowledge infrastructure in a region is important in the growth of high-tech medical industries in the region. The related question is whether investment in a region's knowledge infrastructure will lead to growth in sales and employment in high-technology medical firms.

Two components of the knowledge infrastructure, higher education and private R&D facilities, are quantified for 358 US geographic areas and their impacts on employment and sales of 5,054 high-tech medical products firms are quantified.

Importance of the Results.

There is a great deal of interest in understanding the factors that are responsible for the growth of high-technology sectors in today's metropolitan areas. Interest stems from a realization that the dynamics of high-tech firms are different from those of traditional industrial and service sectors, and from an understanding that high-tech business investments and jobs are associated with local income growth and business profitability. Business and public sector planners require better forecasts of high-technology growth and better tools to aid in the retention of technology-based firms and to stimulate the recruitment of high-tech businesses to the area. Businesses that benefit from proximity to high-technology sectors—suppliers and service firms that use the products developed by high-tech firms, are also interested in gaining a better understanding of the location dynamics of high-tech firms.

Issues of Location of High-technology Industries.

Industry-Based Advantages to Location of High-tech firms.

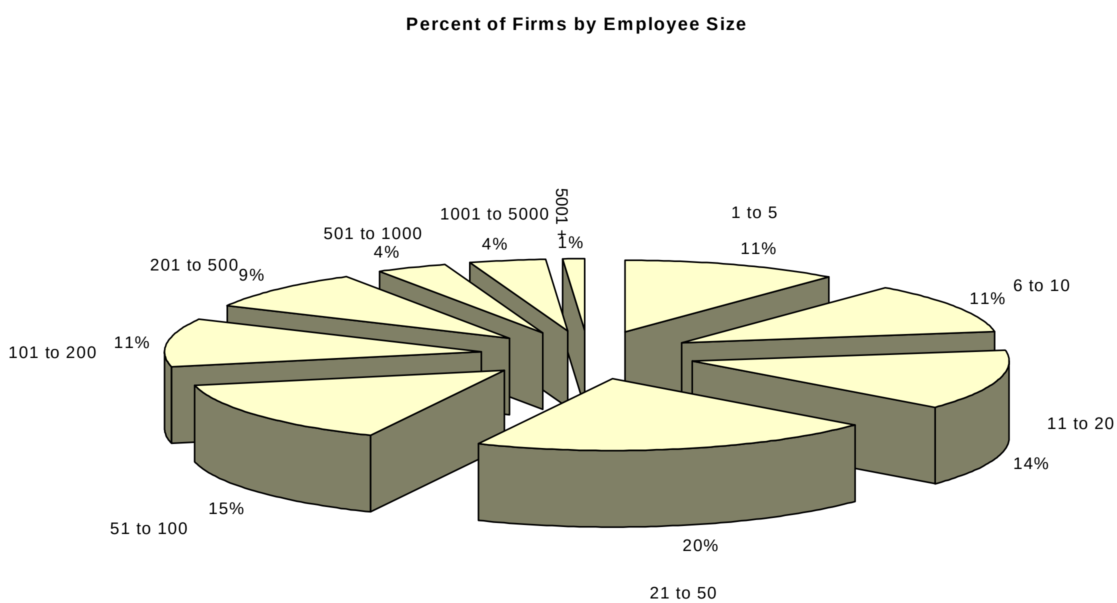
One aspect of high-tech businesses--an observed clustering in certain locations--has generated significant interest among economic developers and academicians. The clustering of high- technology firms suggests that significant benefits from the presence of similar businesses redound to technology leaders—benefits referred to as localization economies or industry agglomeration effects.

Several possible industry localization economies have been identified. One such factor is the nature of the workforce employed by the industry. The presence of an industry cluster creates a pool of employment opportunities for highly-sought-after scientists and technicians and facilitates collaboration and the transference of information between firms. Concentrations of skilled workers and entrepreneurs tend to facilitate information flows crucial to innovation.

Related to workforce are considerations of the scope of the markets for the industries' products. Agglomeration expands the market for specialty products that lower costs for other firms but need a large market to generate sufficient product demand. And clustering of firms is convenient to customers who can compare prices and products, and to suppliers who can market to similar companies within the region.

Research indicates that small businesses tend to innovate more than large businesses. Small businesses also must depend upon the local infrastructure to supply technology, finance, and other support that large businesses are able to generate themselves. The majority of high-tech medical firms are small in terms of sales and employment. . Chart 1 displays the size composition of high-technology firms. One quarter had fewer than 10 employees, and two thirds had 100 or fewer employees.

Chart 1



Source: CorpTech Technology Guide, 1997

The Importance of New Knowledge to High-tech Industries.

The literature points to the importance of a local knowledge-based infrastructure that helps high-tech firms to conduct their operations and to adapt as technology changes. Scientific information is especially important for high-tech firms that must remain at the edge of rapidly expanding technologies. The knowledge infrastructure is comprised of educational research institutions and private and government-sponsored R&D laboratories. Research has demonstrated a connection with patents and other innovation measures.

Educational institutions play several roles in high-technology business development. Universities graduate the skilled workers needed to generate new scientific and technological information. Universities conduct basic and applied scientific research. Research conducted by educational institutions is especially important in health sciences. The following table shows that health sciences research was largest single category of R&D expenditures in 1996.

TABLE 4

R&D Expenditures in Science and Engineering at Universities and Colleges, 1996($mill)

Total	22,995.00
Basic Research	15,467.00
Applied R&D	7,529.00
Physical Sciences	2,260.00
Environmental Sciences	1,478.00
Mathematical Sciences	289.00
Computer Sciences	702.00
Life Sciences	12,697.00
Psychology	372.00
Social Sciences	1,104.00
Other Sciences	419.00
Engineering	3,675.00

Source: Table 4 from the full report. US National Science Foundation, Survey of Research and Development Expenditures at Universities and Colleges, Annual.

Educational research expenditures are only a fraction of private R&D as businesses respond to rapid advances in knowledge and in consumer demand for medical services to rush new products and services to market. Private industry expenditures for R&D in 1996 were over twice the expenditures of the Federal Government and dwarfed university-sourced R&D.

Performance Sector of R&D Expenditures 1996

	Expenditures	Funded by the Federal Government	Funded by Industry	Funded by Universities
Total	193206			
Federal Government	16450			
Industry	139579	20931	118648	
Industry FFRDCs	2273			
Universities and Colleges	23134	14285	1710	4457
University and College FFRDCs	5405			
Other Nonprofit Institutions	5340	2871	895	
Nonprofit FFRDCs	1575			

Source: Table 5 of the full report. National Science Foundation, National Patterns of R&D Resources, Annual

Location Trends in High-Technology Medical Industries.

The pharmaceutical and medical equipment industries promise to make important contributions to regional growth in coming years. Continuing growth in manufacturing of medical products, and of the associated manufacturing employment reflects the increased demand for medical services by consumers. As personal income rises, and with the development of ever-larger range of treatments and medical products appropriate for new segments of the population, the demand for high-tech medical products will increase. Table 1 in the full report shows employment in the seven medical industries examined in this study has risen by 26 percent over the past decade. High-tech medical manufacturing businesses have been primary drivers of the US economy over the past decade.

Employment Trends: High-Tech Medical Products and Other Selected Manufacturing Industries

	Employment 1987	Employment (1000s) 1996	Percent Change
All Manufacturing	18,950	18,666	-1.5
Selected Manufactured Products			
Engines/Turbines	87	70	-19.5
Special Industrial Machinery	169	192	13.6
General Industrial Machinery	240	265	10.4
Computers/Office Equipment	328	259	-27.0
Communications Equipment	260	258	-0.8
Electronics	546	588	7.7
High-tech Medical Products	598	754	26.1
Drugs	175	207	18.3
Lab apparatus/Furniture	20	16	-20.0
Analytical Instruments	36	37	2.8
Optical Instruments/Lenses	23	21	-8.7
Medical Instruments/Supplies	159	268	68.6
Opthalmic Goods	26	26	0.0
Commercial Physical Research	159	179	12.6

Source: Table 1 from the full report. U.S. Bureau of Labor Statistics, Employment and Earnings: {http://stats.bls.gov/ceshome.htm}

In 1996 1,694,356 employees worked in the seven SIC codes classified in this report as high-tech medical industries. Of this number 454,181 workers, one quarter of the total, lived and worked in the urban complex that extends from New York City through Newark New Jersey, Trenton New Jersey, Philadelphia, Pennsylvania, and Wilmington, Delaware. Another 217,318 resided in California. 532,043 individuals worked in facilities located in the Midwest.

High-tech Medical Employment: Top 20 Cities

Metropolitan Area	Education RK	Population N	R&D R	Employment L
Philadelphia, PA-NJ PMSA	393	4952929	1713	159691
Wilmington-Newark, DE-MD PMSA	0	550892	63	124294
Cincinnati, OH-KY-IN PMSA	51	1597352	0	111634
Los Angeles-Long Beach, CA PMSA	691	9127751	747	103434
Chicago, IL PMSA	494	7733876	2117	83649
San Francisco, CA PMSA	672	1655454	21052	74250
Minneapolis-St. Paul, MN-WI MSA	170	2765116	1053	66094
Boston, MA-NH PMSA	598	3263060	5952	65175
New York, NY PMSA	942	8643437	929	53514
St. Louis, MO-IL MSA	297	2548238	3005	41809
Saginaw-Bay City-Midland, MI MSA	0	403301	0	40388
Newark, NJ PMSA	35	1940470	10354	38898
Benton Harbor, MI MSA	0	161434	0	32722
Danbury, CT PMSA	0	199315	0	32400
Rochester, NY MSA	119	1088037	260	31786
Indianapolis, IN MSA	97	1492297	3725	30334
San Diego, CA MSA	253	2655463	4616	24757
Brockton, MA PMSA	0	246082	174	20903
Cleveland-Lorain-Elyria, OH PMSA	106	2233288	65	20399
Phoenix-Mesa, AZ MSA	0	2746703	10	20135

Sources: Table 7 of the full Report. Education Rank; Gourman's 1996 Graduate School Ratings
Population: Us Department of the Census: Population Estimates
Employment and R&D: CorpTech US Technology Guide

Within each region, the high-tech medical sector is further concentrated into one or more metropolitan areas. Table 2 reports high-tech medical employment in and around Boston totaled 125,570 in 1996. The greater New York City area employed another 171,350 workers in that year. Most of the medical employment in the Mid-Atlantic States falls in the 75 mile-long corridor between New York City and Philadelphia. 187,120 individuals were employed in high-tech medical firms located in the Philadelphia-Trenton medical complex. Philadelphia is home to SmithKline Beecham and Wyeth-Ayerst Laboratories. Nearly 149,839 people work in medical firms in the Chicago area, home to Abbot Labs, Baxter Healthcare, and Allegiance Corporation. Los Angeles and environs employed 105,010 people, and San Francisco, Oakland, San Jose, and the small cities located nearby were workplaces for 80,979 high-tech medical workers. Of the smaller cities, Indianapolis is headquarters for Eli Lilly and Co., Dow Chemical is in Saginaw-Midland, and Cincinnati is home to Procter and Gamble, Inc. All employment within the metropolitan area or within 75 miles of its central business district is included in these figures. Industrial clustering is apparent from the table. About 25 percent of the population of the 358 cities resides in the top twenty cities, but they hold 70 percent of high-tech medical employment.

As shown in the following table, large metropolitan areas and the universities and medical colleges located therein also received the lion's share of educational grand funding.

Educational Grant Funding: Top 10 Areas

Metropolitan Area	Index of Education Quality	Total Sponsored Funding	Total Educational Funding	Education as Fraction of Total
Los Angeles-Long Beach	691	449,140,723	311,636,472	0.693850404
New York, NY PMSA	942	837,150,550	436,917,988	0.521910889
Chicago, IL PMSA	494	292,186,881	219,837,394	0.752386258
Philadelphia, PA-NJ	393	439,159,471	333,529,968	0.759473472
Washington, DC-MD-VA-WV	218	504,553,781	90,772,930	0.179907343
Detroit, MI	75	75,299,416	51,727,344	0.686955447
Houston, TX	271	235,056,833	169,744,429	0.722142074
Atlanta, GA	137	122,795,908	115,313,900	0.939069566
Boston, MA-NH	598	1,013,483,204	391,187,703	0.38598341
Dallas, TX	72	94,850,292	89,503,149	0.943625445
Total: Top 10 Areas		4,063,677,059	2,210,171,277	0.543884577
Sample Totals-360 Places		10,644,191,590	6,946,984,580	0.652654973

Source: Table 6 of the full report. Federal Awards Assistance Data System, US Census Bureau, Annual

Aggregate data demonstrate the high degree of concentration of high-tech medical activity within the United States. There appears to be a relationship between employment, private R&D activity, educational grant funding, and the ranking of the universities and medical colleges across geographic areas. Statistical analysis was carried out across the 358 individual areas covered in the study in order to ascertain the nature of the relationship between employment and the knowledge infrastructure.

This Report: High-tech Medical Firms and the Knowledge Infrastructure.

Methodolgy.

The academic literature has established that educational and private research activity in states and metropolitan areas leads directly to innovations in a wide variety of industries. But the evidence on the impacts of research on employment and sales in high-tech industries is equivocal and incomplete. The failure to establish a clear link between the level of research conducted by educational and private institutions and the sales and employment of high-tech industry stems from the failure to specify the type of research and the industrial sector that uses the research.

Past studies have used broad-based two-and three digit SIC codes and estimates of total research activity. This study specifies a set of seven two and three digit high-tech medical industries and correlates the locational patterns of these industries with expenditures on health sciences research. It demonstrates that high-tech medical firms locate in areas with well-developed knowledge infrastructures.

Data.

- The study uses employment and sales data on the population of 5,054 US high-tech medical firms in 79 Standard Industrial Classification (SIC) codes from CorpTech's 1997/98 US Technology Guide. The CorpTech Guide is a business directory of high-technology companies. The Guide contains a description by the firm of its activities. From this description, CorpTech can select all high-tech firms who describe their activities in terms of high-technology biological, health and pharmaceutical products and services. The Guide provides a complete census of all high-tech firms in the US, identified by the zip code in which the firm is located. The Guide also provides firm-specific information on employment size, sales volume, type of product and service, and executive contact information for each firm. Firm SIC code is reported. Three variables are constructed from the CorpTech database:
  - i) Levels of high tech medical sales and employment by metropolitan area, *L(u)*. 5,054 firms classified in one of seventy-nine 4-digit SIC codes are selected to produce a complete census of high-tech medical firms in the US. Total employment is 1,694,356.
  - ii) Total employment of private research laboratories by metropolitan area, *R(u).* All firms that describe their activities as research and development, or that provide research services to other firms, or that operate a unit devoted to research are selected as research firms. 630 R&D laboratories are listed in the CorpTech Guide.
  - iii) Total sales of firms reporting the seventy-nine 4-digit SIC classifications, by region are represented by the variable *S(u)*. Total sales are $83.5 billion for the 5,054 firms; an average of slightly over $16 million per firm. Sales per worker averaged over $49,000 in 1997.

Of 4,980 firms that actually reported employment and sales amounts rather than ranges, 1,580 were in SIC 384, medical devices and apparatus, 1,212 were in SIC 382, instruments, and 870 were in SIC 283, drugs. These three 3-digit SIC codes contained 74 percent of all firms reported.

- The US Census Bureau reports the 1997 dollar volume of grants to all recipients by the following categories: educational institutions, private corporations, small businesses and units of government at the local, state, and federal level. The data base is maintained by the Bureau's Government Division through the Federal Assistance Awards Data System. Location of recipients is reported by zip code. The variables *U*, *Gc*, *Gs*, and G_g represent total grant funding, in $100 millions of dollars, received by educational institutions, corporations, small businesses, and governmental units. 184 of the 358 places report receiving educational grants in 1997.
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- *The Gourman Report: 1996 Graduate School Ratings* ranks 122 US colleges of medicine annually. The *Report* also publishes rankings of the top 30 domestic university graduate programs in biochemistry, the top 26 programs in biomedicine, the top 40 programs in botany and microbiology, the top 40 programs in 36 programs in genetics, and the top 35 programs in neuroscience. The report combines rankings for medical colleges and life-science departments and colleges and universities published in the 1996 *Gourman Report* to construct an academic ranking variable for each city in the sample, *RK*.

- The cost of labor in each city is measured by estimated annual payroll per worker as reported in County Business Patterns for 1996. The variable is designated as *w*. Total annual payrolls for each of seven–digit SIC codes are summed and divided by total employment in the seven sic codes to construct average cost of labor. In places where not all SIC codes report employment only those SIC codes reporting employment are utilized. In those places with no high-tech medical employment, the average annual payroll for all manufacturing employment is utilized.

- MSA population estimates are available from the US Census Bureau are designated by the variable *N.*

- The three variables *L(75), N(75), and U(75)* are incorporated in the study to capture the impacts of high-tech medical activity, city size economies, and educational grant activity occurring in areas whose central business districts are located within 75 miles of each of the geographic areas included in the study.

358 places in the continental US and Hawaii, ranging in size from a New England town of 10,000 persons to metropolitan New York, Boston, and Los Angeles, reported positive amounts of one or more of the three variables *U, R*, and *S* and *L*. The 358 places are incorporated as individual observations in the statistical analyses performed in the study. The variables *w*, *Gs, Gc, Gg*, and *N, L75, N75*, and *U75*, as well

as certain interactive combinations of *U,R,S,* and *L* are used as instrumental variables in the statistical analyses.

Statistical Analysis.

Analysis of the data used in the report is reported in three steps. The univariate relationships between the variables is presented as a series of simple correlation coefficients. The relative strength of variables in single equations explaining *L* and *S, U*, and *R* is reported by stepwise OLS regression analysis. The interrelationships between *U*, *R*, and *L* and *S* are examined in the context of a three equation simultaneous equation system.

The following table presents correlation coefficients between the four quantities of interest in the study: Total sales, *S*, and total employment, *L*, of high-tech medical manufacturing firms, sponsored funding received by educational institutions, *U*, and employment in private and government-sponsored R&D facilities, *R*. All variables are measured across 358 distinct geographic areas.

Correlation Coefficients
358 places

	S	L	U	R
S	1.0	.82	.47	.44
L		1.0	.64	.45
U			1.0	.56
R				1.0

Correlation between the variables of interest and some of the instrumental, explanatory variable included in the study are:

Correlation Coefficients
358 places

	RK	Gs	Gc	Gg	W	N	L75	U75
S	.49	.26	.10	.25	.12	.50	.10	.12
L	.65	.37	.15	.43	.13	.63	.04	.06
U	.93	.56	.27	.64	.17	.68	.00	.05
R	.52	.62	.27	.38	.15	.28	.07	.09

RK is the quality of health sciences education in the region.
Gs is grants to small businesses in the region.
Gc is grants to corporations in the region.
Gg is grants to governmental units in the region.
W is wages paid to workers by high-tech businesses in the region.
N is the population of the region.
L75 is total employment in the 75 mile area around the region.
U75 is total university grants in the 75 mile area around the region.

Correlation coefficients indicate moderate correlation between manufacturing activity, educational grants, and R&D employment. The rankings of educational institutions in an area are strongly related to the volume of educational grants received in the area. The activity in surrounding communities, represented by *L75* and *U75*, seems to have little relationship with manufacturing and educational activities in the region. Employment and grant activity are positively related to city size, *N*.

The stepwise ordinary least-squares procedure identifies the added explanatory power of each variable that is significantly related to each of the quantities of interest in the study. Results are reported for *L*, *R*, and *U* in Tables 11 and 11.a in the Appendix . The stepwise procedure for university grants, *U*, identifies the rankings of universities, *RK*, in the area as the most important variable. *RK* explains 87 percent of the total variance. Research activity is largely dependent upon the quality of the educational institution. Educational rankings in turn depend upon the quality of the faculty and the financial resources at the university available to hire and support top academic talent.

An interactive variable, *UN*, the product of the size of the city and total educational grant funding, explains 44 percent of the variance in employment, *L* and 27 percent of the variance in *S*. The presence of private research labs explains and additional 7 percent of the variance in *L* and 9 percent of the variance in *S*.

Sponsored funding to small businesses and to corporations, are strongly related to the level of R&D employment in an area. These quantities measure the degree of innovation and the quantities of outside resources generated for technology development in an area. Total sales and employment in high-tech medical manufacturing, organizations that are customers for the R&D labs, also are important in attracting R&D to an area.

Examination of the correlation coefficients indicates what the descriptive data show. University research, private research labs, and high-tech medical firms locate in the same areas. Stepwise regressions indicate that university research funding is strongly dependent upon the rankings of educational institutions in an area. Private research labs tend to locate near concentrations of high-tech firms, and are spatially correlated with research funding to small businesses and corporations. High-tech medical sales and employment are dependent upon an interactive variable that measures the combination of large research grant funding and large cities.

We have not provided direct information on how the knowledge infrastructure and medical firms are related to one-another. To determine this, the equations explaining sales and labor and the knowledge infrastructure are estimated jointly to provide information on the directions of causation between the components of medical complexes. The joint estimating procedures is referred to as three-stage-least-squares. It operates by incorporating the correlation between the error terms in the individual equations into the variance-covariance matrix that is used to estimate the regression coefficients. Results are presented for sales and for labor vs. *U* and *R*. Tables 12 and 14 in the full report present the results for the three-equation system for *S, U*, and *R* and for the three equation system *L, U*, and *R*.

Results for the to sets of equations are similar. *L* and *S*, measures of manufacturing activity, are significantly related to the interactive product of *N* and *U*. Increased grant funding raises sales and employment, and the impact for a given level of grants is larger for bigger cities. Chart 2 reports the relationship between grants and employment and sales. The chart shows a $1 million increase in grants is associated with 46 additional workers in a city of 100,000 persons. The impact of a $1 million rise in grants in a city of 2.5 million persons rises to 96 employees. Research labs are also related to sales, but are not significant in the labor equation.

The equation for research labs indicates that research labs locate in areas with large concentrations of high-tech manufacturing firms. Research labs are also associated with sponsored funding for small business development. The relationship between research labs and corporate grants and government grants is negative. This finding corroborates findings by others that it is primarily small business entrepreneurial activity that stimulates growth of high-tech businesses.

Grant funding is independent of business activity. Rankings of educational institutions is the prime explanatory variable in the equation for U. The equation provides evidence that university grant funding rises with the presence of private and government-sponsored R&D employment. This result indicates that university researchers may work with and benefit from collaboration with private research labs.

The following table reports selected relationships:

Changes in the Dependent Variables

For the system of equations *L, R, U*:

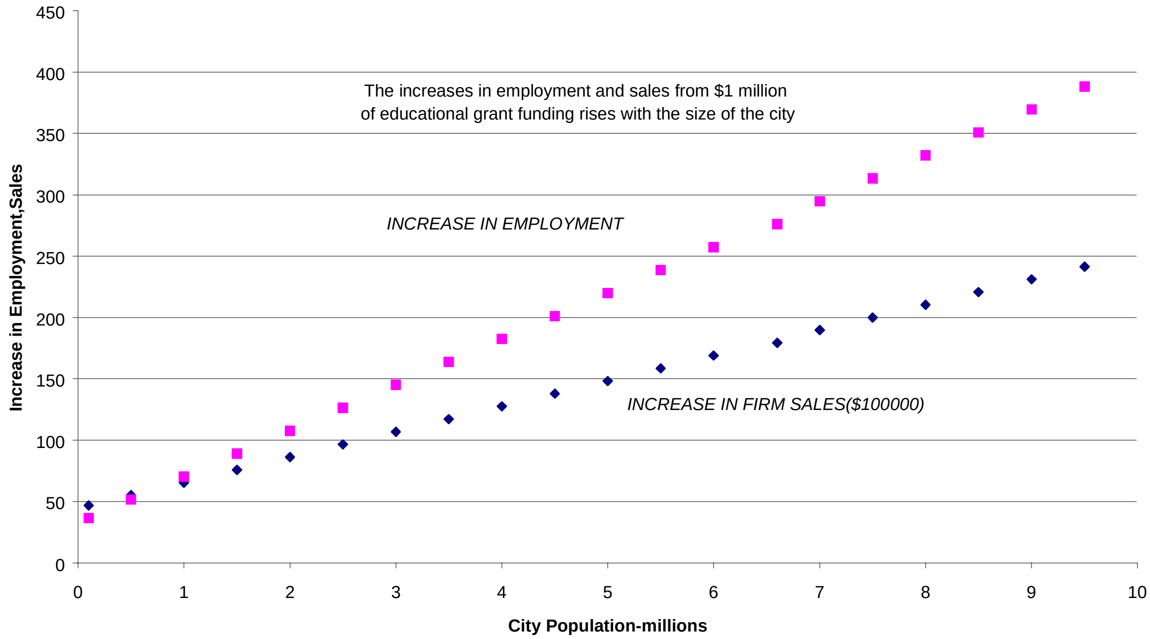
Additional High-tech workers, *L* With $100 million in sponsored Educational funding:	City of 1 million	65 workers
	City of 3 milion	145 workers
	City of 5 million	225 workers
Additional educational grants From 1 additional private Research lab worker:	$36 million education grants	
Additional private research lab Worker from one added high-tech manufacturing worker:	.27 lab workers	

For the system of equations *S, U, R*

Added high-tech manufacturing Sales with $1 million added Education grants:	City of 1 million	$6.4 million
	City of 3 million	$104 million
	City of 5 million	$150 million
Added high-tech manufacturing Sales for one research lab worker		$300,000
Added research worker with $1 million added education grants		.04
Added private research lab workers With $1 million added small business Grants:		.16

CHART 2

Increase in Employment and Sales with $1 Million Educational Grant Funding



APPENDIX

TABLE 2

The Distribution of High-tech Medical Manufacturing in the US

High-tech Medical Employment in Geographic Regions of the US	*Employees*	*High-tech Medical Employment Located in Major Urban Medical Manufacturing Complexes*	*Employees*
New England	190009	Greater Boston Region	125570
Middle Atlantic States	454181	Greater New York Region	171350
		Greater Wilmington/Newark	151802
		Greater Philadelphia	187120
Southeastern States	80876		
Florida	37724		
Middle South States	23111		
Mid-Western States			
Kentucky,Indiana,Ohio,Michigan	287654		
Minnesota,Illinois,Wisconsin,Iowa	208984	Greater Chicago Region	149839
		Greater Minneapolis Region	66942
Missouri, Kansas, Nebraska Arkansas, Louisiana	20185	Greater St. Louis Region	41809
Texas, Oklahoma	49466		
Mountain States/Southwest	56549		
California			
Southern California	135410	Greater Los Angeles Region	105010
Northern California	81908	Greater San Francisco Region	80979
Northwest/Hawaii	17874		
		Medical Employment in Ten Medical Industry Complexes	1038612

Source: CorpTech Guide to High-tech Firms, 1997.

Table 8

Medical R&D Facilities Listing the Largest Employment

Companies Listing Employment at Facility

Company	City	State	Zip	Employment
C.R. Bard, Inc.	Murray Hill	NJ	07974	9,800
Lawrence Livermore National Laboratory	Livermore	CA	94551	8,000
Boehringer Mannheim Corp.	Indianapolis	IN	46250	3,500
Genentech, Inc.	S. San Francisco	CA	94080	3,071
Organon Teknika Corp.	Durham	NC	27712	3,000
Charles River Laboratories	Wilmington	MA	01887	3,000
Monsanto Co. / AG Sector	Saint Louis	MO	63167	3,000
National Cancer Institute	Bethesda	MD	20892	2,600
NABI	Boca Raton	FL	33431	2,400
Fred Hutchinson Cancer Research Center	Seattle	WA	98104	2,100
Dana-Farber Cancer Institute	Boston	MA	02115	2,000
Boehringer Ingelheim Pharmaceuticals, Inc.	Ridgefield	CT	06877	1,900
Chiron Vaccines	Emeryville	CA	94608	1000-2500

Companies Listing Total Parent Employment

Quinta Corp.	San Jose	CA	95112	110,000
3M / Industrial & Consumer New Products Department	Saint Paul	MN	55144	70,687
Elanco Animal Health Co.	Indianapolis	IN	46285	29,200
Bard Cardiopulmonary Products	Haverhill	MA	01832	9,800