

4-1-2002

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Medical Products Industries Clustering in Tampa Bay

Preliminary Report

An Analysis Performed by

CENTER FOR ECONOMIC DEVELOPMENT RESEARCH
College of Business Administration



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April, 2002

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Preface

This study, Medical Products Industries Clustering in Tampa Bay, Preliminary Report, was prepared by the Center for Economic Development Research (CEDR), College of Business Administration, University of South Florida. The Florida Medical Manufacturers Consortium has motivated the study. Pinellas County Economic Development is the coordinating sponsor for the study.

CEDR provides information and conducts research on issues related to economic growth and development in the Nation, in the state of Florida, and particularly in the central Florida region. The Center serves the faculty, staff, and students of the College of Business Administration, the University, and individuals and organizations in the University's service area. CEDR's activities are designed to further the objectives of the University and specifically the objectives of the College of Business Administration.

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EXECUTIVE SUMMARY

The purpose of this research is to describe the clustering of medical products industries in Tampa Bay.

We start with selected primary industries and use the IMPLAN Professional™ input-output model to identify the supplier chains (indirect industries) for the primary industries. The selected primary industries are categorized by segment: 1) the Pharmaceuticals segment, 2) the Biotech segment, and 3) the Medical Devices segment.

To organize the inter-industry relationships, we use three tiers. Tier 1 reflects a greater amount of clustering than does Tier 2. Tier 3 reflects minimal inter-industry linkage.

We find 30 Tier 1 supplier-industries. The top five supplier-industries are: 1) Wholesale Trade, 2) Banking, 3) Real Estate, 4) Communications, except radio and TV, and 5) Maintenance and Repair, other Facilities,

Except the Pharmaceuticals segment, all of the selected primary industries exhibit “clustering” in the sense that they tend to have the same supplier-industries. The Pharmaceuticals segment has only four supplier-industries or supplier-industry groups in common with any industry of the Medical Devices segment or the Biotech segment. (When we exclude Research, Development and Testing Services from the selected primary industries, the Pharmaceuticals segment has only three supplier-industries in common with any industry of the Medical Devices and Biotech segments.)

We conclude that in the sense of a cluster exhibiting common supplier-links, the Pharmaceuticals segment of the selected primary industries for medical products industries’ clustering in Tampa Bay is not a “good fit” with the Medical Devices and the Biotech segments. However, the selected industries in the Medical Devices segment and the Biotech segment exhibit common supplier-linkages.

Based on the input-output analysis, the cluster of medical products firms in Tampa Bay is broadly defined to include the primary industries of the Medical Devices segment and the Biotech segment plus their Tier 1 and Tier 2 supplier-industries. The analysis also supports a narrow definition, which would exclude the Tier 2 supplier-industries and thereby regard Tier 2 industries as tangential to the clustering of medical products firms.

Purpose, Method and Findings

The purpose of this research is to describe the clustering of industries associated with medical products in Tampa Bay.

Harvard economist, Michael Porter, in *The Competitive Advantage of Nations* (1990) and in *On Competition* (1998), develops a model in which competitive advantages are generated by the spatial concentration of firms in an industry as they interact with regional and national factors conducive to their profitability. As applied to a regional economy, Porter's model relates the growth of a regional industry to regional infrastructure, to the spatial proximity of upstream industries that supply inputs into the production process, and to the proximity of downstream customers who purchase the industry's products and services.¹ Porter calls the grouping of an industry along with its upstream suppliers and downstream customers an industry cluster.

In order to develop a picture of the medical products industries' clustering in Tampa Bay, we start with selected primary industries and use the IMPLAN ProfessionalTM input-output model to identify the supplier chains (indirect industries) for the primary industries. The selected **primary industries** are listed below by Standard Industrial Classification (SIC) code and their corresponding IMPLAN sector number. We call the consolidation of primary industries the Medical Products Industries group. The Medical Products Industries group has three segments consisting of:

PHARMACEUTICALS SEGMENT

IMPLAN sector 195, **Drugs** = SICs 2833 (medicinal chemicals and botanical products), 2834 (pharmaceutical preparations), 2835 (in vitro and in vivo diagnostic substances), and 2836 (biological products, except diagnostic substances).

BIOTECH SEGMENT

Part of IMPLAN sector 509, **Research, Development and Testing Services** = SIC 8731 (commercial physical and biological research).²

MEDICAL DEVICES SEGMENT

IMPLAN sector 218, **Gaskets, Packing and Sealing Devices** = SIC 3053 (gaskets, packing and sealing devices).

IMPLAN sector 219, **Fabricated Rubber Products, N.E.C.** = SIC 3060 (fabricated rubber products, not elsewhere classified).

IMPLAN sector 403, **Mechanical Measuring Devices** = SICs 3823 (industrial instruments for measurement, display, and control of process variables; related products), 3824 (totalizing fluid meters and counting devices), and 3829 (measuring and controlling devices, not elsewhere classified).

¹ Porter represents regional competitive advantage as a "diamond," the four corners of which are made up of the competitive nature of the industry, the interaction of firms in the industry with suppliers, the interaction with informed domestic customers, and the traditional country-specific factor cost and supply conditions.

² In addition to SIC 8731, IMPLAN sector 509 includes SIC 8732 (commercial economic, sociological, and educational research), SIC 8733 (noncommercial research organizations), and SIC 8734 (testing laboratories). In the process used to describe the cluster, we cannot model the SICs of IMPLAN sector 509 separately. We address this limitation in the body of this report.

IMPLAN sector 405, **Analytical Instruments** = SIC 3826 (laboratory analytical instruments).³
IMPLAN sector 406, **Optical Instruments and Lenses** = SIC 3827 (optical instruments and lenses).
IMPLAN sector 407, **Surgical and Medical Instruments** = SIC 3841 (surgical and medical instruments and apparatus).
IMPLAN sector 408, **Surgical Appliances and Supplies** = SIC 3842 (orthopedic, prosthetic, and surgical appliances and supplies).
IMPLAN sector 409, **Dental Equipment and Supplies** = SIC 3843 (dental equipment and supplies).
IMPLAN sector 410, **X-ray Apparatus** = SIC 3844 (x-ray apparatus and tubes and related irradiation apparatus).
IMPLAN sector 411, **Electromedical Apparatus** = SIC 3845 (electromedical and electrotherapeutic apparatus).
IMPLAN sector 412, **Ophthalmic Goods** = SIC 3851 (ophthalmic goods).

To measure the “magnitude of clustering,” we introduce into the model a \$100 million increase in the output of each primary industry. We then measure the consequent percentage increase (as a percent of the increased primary output) in other regional industries. The greater the percentage, the more economic activity there is between an indirect industry and the primary industries. To better organize the inter-industry relationships, three tiers are used. Tier 1 relationships occur when an indirect industry’s output increases by more than 1% of the increase in primary output. A Tier 2 relationship is between 0.5% and 1%. Tier 3 fills out the one-page summary of inter-industry relationships, which are presented later in this report.

Because we cannot measure the “magnitude of clustering” for the Commercial Physical and Biological Research industry separately from other industries in its IMPLAN sector scheme (IMPLAN sector 509), we examine the clustering effect with and without sector 509.

Next under, there are two frequency tables for Tier 1 supplier-industries. The statistics in the first table include IMPLAN sector 509, while the statistics in the second table exclude IMPLAN sector 509. Following the tables, we explain our findings.

³ There was no firm in the Laboratory Analytical Instruments industry (SIC 3826) operating in Tampa Bay in 1999.

Tampa Bay

Tier 1 Industries, Frequency by Implan Sector

Including Implan 509, Research, Development and Testing Services

Table 2.1

SIC Code	IMPLAN Sector	Description	Total Frequency	Drugs (Implan 195)	Medical Measuring Devices (Implan 403)	Optical Instruments & Lenses (Implan 406)	Surgical & Medical Instruments (Implan 407)	Surgical Appliances & Supplies (Implan 408)	Dental Equipment & Supplies (Implan 409)	X-Ray Apparatus (Implan 410)	Electrical Apparatus (Implan 411)	Ophthalmic Goods (Implan 412)	Research & Development (Implan 509)	Gaskets, Packing and Sealing Devices (Implan 218)	Fabricated Rubber Products, N.E.C. (Implan 219)	Average All Industries
5000,5100	447	Wholesale Trade	13	1	1	1	1	1	1	1	1	1	1	1	1	1
6000	456	Banking	12		1	1	1	1	1	1	1	1	1	1	1	1
6500	462	Real Estate	12		1	1	1	1	1	1	1	1	1	1	1	1
4810,20,40,50	441	Communications- Except Radio and TV	11		1	1	1	1	1	1	1	1	1	1		1
	56	Maintenance and Repair Other Facilities	11		1	1	1	1	1	1	1	1		1	1	1
	475	Computer and Data Processing Services	10		1	1	1	1	1		1		1	1	1	1
	470	Other Business Services	9	1	1	1	1	1	1			1	1		1	1
7320,31,38,83,89	470	Electronic Components- N.E.C.	7		1	1	1	1	1	1	1					1
3675,6,7,8,9	378	Personnel Supply Services	6				1	1	1				1	1		1
7360	474	Motor Freight Transport and Warehousing	6				1	1	1					1	1	1
4200	436	Legal Services	5				1	1	1	1	1					1
8110	484	Printed Circuit Boards	5		1	1				1	1					1
3672	376	Accounting- Auditing and Bookkeeping	4		1	1							1			1
8720,9990	507	Management and Consulting Services	4	1			1						1			1
8740	508	Paperboard Containers and Boxes	3				1	1	1					1	1	1
2650	164	Synthetic Rubber	3											1	1	1
2822	192	Surgical Appliances and Supplies	2				1	1								
3842	466	Newspapers	2						1			1				
2710	174	Glass and Glass Products- Exc	2													
3210,29,30	230	Containers	2			1						1				
3841	467	Surgical and Medical Instrument	2				1	1								
4830	442	Radio and TV Broadcasting	2						1			1				
8330	458	Job Trainings & Related Services	2					1	1							
8730	509	Research- Development & Testing Services	2	1									1			
2821	191	Plastics Materials and Resins	2											1	1	
4910	443	Electric Services	2											1	1	
	506	Engineering- Architectural Services	2										1		1	
8710	506	Architectural Services	2										1		1	
2720	175	Periodicals	1									1				
2750	179	Commercial Printing	1									1				
1475	44	Phosphate Rock	1												1	
2830	195	Drugs	1	1												
		145		5	8	11	15	15	14	8	9	12	11	11	12	14

Source: This table was constructed by CEDR based on IMPLAN output tables, which are contained in this report.

Use of Table: This table shows the industries in Tier 1 in a particular Sector of the Tampa Bay economy. For example, Real Estate is in Tier 1 in all Sectors except Drugs.

Tampa Bay

Tier 1 Industries, Frequency by Implan Sector

Excluding Implan 509, Research, Development, and Testing Services

Table 2.2

SIC Code	IMPLAN Sector	Description	Total Frequency	Drugs (Implan 195)	Medical Measuring Devices (Implan 403)	Optical Instruments & Lenses (Implan 406)	Surgical & Medical Instruments (Implan 407)	Surgical Appliances & Supplies (Implan 408)	Dental Equipment & Supplies (Implan 409)	X-Ray Apparatus (Implan 410)	Electrical Apparatus (Implan 411)	Ophthalmic Goods (Implan 412)	Gaskets, Packing and Sealing Devices (Implan 218)	Fabricated Rubber Products, N.E.C. (Implan 219)	Average All Industries
5000,5100	447	Wholesale Trade Maintenance and Repair	12	1	1	1	1	1	1	1	1	1	1	1	1
	56	Other Facilities	11		1	1	1	1	1	1	1	1	1	1	1
6000	456	Banking	11		1	1	1	1	1	1	1	1	1	1	1
6900	462	Real Estate	11		1	1	1	1	1	1	1	1	1	1	1
4910,20,40,90	446	Communications- Except Radio and TV	10		1	1	1	1	1	1	1	1	1	1	1
		Computer and Data Processing Services	9		1	1	1	1	1	1	1		1	1	1
7370	475	Other Business Services	8	1	1	1	1	1	1			1		1	1
7320,31,36,83,89	479	Electronic Components- N.E.C.	7		1	1	1	1				1		1	1
3675,6,7,8,9 8110	494	Legal Services	6				1	1	1	1	1				1
4200	435	Motor Freight Transport and Warehousing	6				1	1	1				1	1	1
3672	376	Printed Circuit Boards	5		1	1				1	1				1
7360	474	Personnel Supply Services	4				1	1	1				1		
2650	164	Paperboard Containers and Boxes	3				1	1	1						
8720,8990	597	Accounting- Auditing and Bookkeeping	3	1	1										1
2822	192	Synthetic Rubber	3										1	1	1
3842	499	Surgical Appliances and Supplies	2				1	1							
2710	174	Newspapers	2						1			1			
		Glass and Glass Products- Exc	2												
3210,29,30	239	Containers	2		1							1			
3841	407	Surgical and Medical Instrument	2				1	1							
4830	442	Radio and TV Broadcasting	2						1			1			
8330	499	Job Trainings & Related Services	2					1	1						
8740	599	Management and Consulting Services	2				1					1			
2821	191	Plastics Materials and Resins	2										1	1	
4910	443	Electric Services	2										1	1	
2720	175	Periodicals	1									1			
1475	44	Phosphate/Rock	1											1	
2750	179	Commercial Printing	1									1			
2830	195	Drugs	1	1											
8730	599	Research- Development & Testing Services	1	1											
8710	596	Engineering- Architectural Services	1											1	
			133	5	8	11	15	15	14	8	9	12	11	12	13

Source: This table was constructed by CEDR based on IMPLAN output tables, which are contained in this report.

Use of Table: This table shows the industries in Tier 1 in a particular Sector of the Tampa Bay economy. For example, Real Estate is in Tier 1 in all Sectors except Drugs.

Table 1 is a frequency table for Tier 1 supplier-industries, when IMPLAN sector 509 is included as a primary industry grouping. Because there are eleven primary industries, one industry grouping (IMPLAN sector 509), and the average of all primary industry components, the maximum frequency a supplier-industry can attain is 13.

We find that the medical products industries' clustering in Tampa Bay includes 30 Tier 1 supplier-industries. From Table 1, the 30 Tier 1 supplier-links with the primary industries, in order of frequency, are:

<u>Supplier-industry</u>	<u>Frequency</u>
Wholesale Trade	13
Banking	12
Real Estate	12
Communications – except Radio and TV	11
Maintenance and Repair Other Facilities	11
Computer and Data Processing Services	10
Other Business Services	9
Electronic Components – not elsewhere classified	7
Personnel Supply Services	6
Motor Freight Transport and Warehousing	6
Legal Services	5
Printed Circuit Boards	5
Accounting, Auditing and Bookkeeping	4
Management and Consulting Services	4
Paperboard Containers and Boxes	3
Synthetic Rubber	3
Surgical Appliances and Supplies (also a primary industry)	2
Newspapers	2
Glass and Glass Products excluding Containers	2
Surgical and Medical Instruments (also a primary industry)	2
Radio and TV Broadcasting	2
Job Training and Related Services	2
Research, Development and Testing Services (Commercial Physical and Biological Research, SIC 8731, is a Primary industry that is a part of the Research, Development and Testing Services group.)	2
Plastics Materials and Resins	2
Electric Services	2
Engineering – Architectural Services	2
Periodicals	1
Commercial Printing	1
Phosphate Rock	1
Drugs (Pharmaceuticals) (also a primary industry)	1

Table 2 is a frequency table for Tier 1 supplier-industries, when IMPLAN sector 509 is not included as a primary industry grouping. Because there are eleven primary industries and the average of the eleven industries, the maximum frequency a supplier-industry can attain is 12. We find that the medical products industries' clustering in Tampa Bay includes 30 Tier 1 supplier-industries.

From Table 2, the 30 Tier 1 supplier-links with the primary industries, in order of frequency, are:

<u>Supplier-industry</u>	<u>Frequency</u>
Wholesale Trade	12
Maintenance and Repair Other Facilities	11
Banking	11
Real Estate	11
Communications – except Radio and TV	10
Computer and Data Processing Services	9
Other Business Services	8
Electronic Components – not elsewhere classified	7
Legal Services	6
Motor Freight Transport and Warehousing	6
Printed Circuit Boards	5
Personnel Supply Services	4
Paperboard Containers and Boxes	3
Accounting, Auditing and Bookkeeping	3
Synthetic Rubber	3
Surgical Appliances and Supplies (also a primary industry)	2
Newspapers	2
Glass and Glass Products excluding Containers	2
Surgical and Medical Instruments (also a primary industry)	2
Radio and TV Broadcasting	2
Job Training and Related Services	2
Management and Consulting Services	2
Plastics Materials and Resins	2
Electric Services	2
Periodicals	1
Phosphate Rock	1
Commercial Printing	1
Drugs (Pharmaceuticals) (also a primary industry)	1
Research, Development and Testing Services (Commercial Physical and Biological Research, SIC 8731, is a Primary industry that is a part of the Research, Development and Testing Services group.)	1
Engineering – Architectural Services	1

When the Research, Development and Testing Services group (IMPLAN sector 509) is excluded from the model, the Tier 1 supplier-industries of Table 2 are the same as the Tier 1 industries of Table 1. However, there are some small differences in the “magnitude of clustering” as evidenced by the relative changes in frequencies attained by the industries.

The Wholesale Trade industry is the top Tier 1 industry in the cluster as well as a Tier 1 supplier-industry for each primary industry and primary industry group. We estimate that between 17.4% and 24.3% of Wholesale Trade economic activity in Tampa Bay is linked to the clustering of medical products industries. See the note on the Wholesale Trade on the next page.

Except the Pharmaceuticals segment, all of the selected primary industries or industry groups exhibit “clustering” in the sense that they tend to have the same supplier-industries. The Pharmaceuticals segment has only four supplier-industries or supplier industry groups in common with any industry of the Medical Devices segment and the Biotech segment. The four common supplier-links are 1) Wholesale Trade, 2) Other Business Services, 3) Accounting, Auditing and Bookkeeping and 4) Research, Development and Testing Services. If we exclude Research, Development and Testing Services (IMPLAN sector 509) from the primary industries, the Pharmaceuticals segment has only three supplier-industries in common with any industry of the Medical Devices and Biotech segments.

Thus, we find that in the sense of a cluster exhibiting common supplier-links, the Pharmaceuticals segment of the selected primary industries for medical products industries’ clustering in Tampa Bay is not a “good fit” with the Medical Devices and Biotech segments. However, the selected industries in the Medical Devices segment and the Biotech segment exhibit common supplier-linkages.

Based on the input-output analysis, the cluster of medical products firms in Tampa Bay is broadly defined to include the primary industries of the Medical Devices segment and the Biotech segment plus their Tier 1 and Tier 2 supplier-industries. The analysis also supports a narrow definition, which would exclude Tier 2 supplier-industries and thereby regard Tier 2 industries as tangential to the clustering of medical products firms.

Note on Wholesale Trade

The Wholesale Trade industry is the top Tier 1 industry in the cluster as well as a Tier 1 supplier-industry for each primary industry and primary industry group. The Wholesale Trade industry is defined by SIC codes 5000 and 5100. These codes are aggregated in the IMPLAN model to form IMPLAN sector 447. The IMPLAN model does not offer a more refined examination of sector 447.

However, we have selected several Wholesale Trade components, which seem reasonably related to the clustering of medical products industries. Using 1999 ES202 data (reports submitted by employers with unemployment insurance premiums), we estimate that between 17.4% (by average number of employees) and 24.3% (by average number of firms) of Wholesale Trade economic activity in Tampa Bay is linked to the clustering of medical products industries.

See the worksheet next under for a list of the selected industries and calculation of the estimates.

WHOLESALE TRADE 1999 ES202 DATA FOR TAMPA BAY COUNTIES

MEDICAL RELATED SECTOR	SIC	AVG # OF FIRMS	AVG # OF EMPLOYEES
MEDICAL, DENTAL, AND HOSPITAL EQUIPMENT AND SUPPLIES	5047	338.8	3540.7
OPHTHALMIC GOODS	5048	33.5	146.8
PROFESSIONAL EQUIPMENT AND SUPPLIES, NEC	5049	29.5	130.9
INDUSTRIAL MACHINERY AND EQUIPMENT	5084	414.3	3448.0
INDUSTRIAL SUPPLIES	5085	152.3	1220.4
DRUGS, DRUG PROPRIETARIES, AND DRUGGISTS' SUPPLIES	5122	153.0	1942.6
CHEMICALS AND ALLIED PRODUCTS, NEC	5169	151.3	942.0
NONDURABLE GOODS, NEC	5199	404.8	1583.7
		<hr/>	
		1677.5	12955.1
	FOR ALL WHOLESALE TRADE:	6891.0	74625.0
	MEDICAL RELATED SICs AS A % OF ALL WHOLESALE TRADE:	24.3%	17.4%

Source: THIS TABLE WAS CONSTRUCTED BY CEDR FROM ES202 DATA FOR 1999 TO SHOW THE CATEGORICAL BREAKDOWN OF COVERED EMPLOYMENT AND NUMBER OF FIRMS WITHIN THE WHOLESALE TRADE SECTOR, SICs 50 AND 51.

Note on the Research, Development and Testing Services Major Group

We selected the Commercial Physical and Biological Research industry (SIC 8731) as a primary industry within the Medical Products Industries group. (It is the sole industry selected for the Biotech segment of the Medical Products Industries group.) However, we cannot measure the “magnitude of clustering” for this industry separately from other industries in its IMPLAN sector scheme, i.e. IMPLAN sector 509. Thus, during this research we examine the clustering effect with and without sector 509.

IMPLAN sector 509 consists of four industries and is coincident with Industry Group 873 – Research and Testing Services - of the SIC system.

Using 1999 ES202 data (reports submitted by employers with unemployment insurance premiums), we estimate that there are about 257 firms in Industry Group 873 operating in Tampa Bay. These 257 firms employ, on average, 7,720 workers. The Commercial Physical and Biological Research industry (SIC 8731) comprises almost 21% of the firms of the industry group, but employs less than 9% of those people working for firms in the group.

See the worksheet next under for a breakdown, by number firms and by number of employees, of the Research and Testing Services group in Tampa Bay.

RESEARCH, DEVELOPMENT, AND TESTING SERVICES
1999 ES202 DATA FOR TAMPA BAY COUNTIES

SECTOR	SIC	AVG # OF FIRMS	AVG # OF EMPLOYEES
COMMERCIAL PHYSICAL AND BIOLOGICAL RESEARCH	8731	53.0	674.2
COMMERCIAL ECONOMIC, SOCIOLOGICAL, AND EDUCATIONAL RESEARCH	8732	84.8	5601.2
NONCOMMERCIAL RESEARCH ORGANIZATIONS	8733	40.8	572.3
TESTING LABORATORIES	8734	78.8	872.3
TOTAL RESEARCH, DEVELOPMENT, AND TESTING SERVICES		257.3	7719.9
MEDICAL RELATED SIC 8731 AS A % OF ALL RESEARCH, DEVELOPMENT, AND TESTING		20.6%	8.7%

Source: THIS TABLE WAS CONSTRUCTED BY CEDR FROM ES202 DATA FOR 1999 TO SHOW THE CATEGORICAL BREAKDOWN OF COVERED EMPLOYMENT AND NUMBER OF FIRMS WITHIN THE RESEARCH, DEVELOPMENT, AND TESTING SERVICES SECTOR, SIC 873.

All Primary Industries in Tampa Bay

The following table (next page) summarizes the inter-industry relationships among the ten primary industries or industry groupings and their supplier-industries. The percentages listed are the averages of the percentages for the ten industries or industry groupings taken individually. Tampa Bay consists of Hernando, Hillsborough, Manatee, Pasco, Pinellas, Polk, and Sarasota counties.

The Tier 1 links, in order of “magnitude of clustering,” are:

- Wholesale Trade
- Electronic Components – not elsewhere classified
- Computer and Data Processing Services
- Banking
- Real Estate
- Printed Circuit Boards
- Other Business Services
- Motor Freight Transport and Warehousing
- Maintenance and Repair Other Facilities
- Communications – except Radio and TV
- Accounting, Auditing and Bookkeeping
- Synthetic Rubber
- Personnel Supply Services
- Management and Consulting Services

See the table (next page) for Tier 2 and Tier 3 linkages.

Tampa Bay

Indirect Output Effect resulting from a change in Direct Output for Primary Industry

Output Impact 28-Jan-02
1-Apr-02
8-Apr-02

Implan Model: Medical1999.iap
Type II Multipliers w/ RPC's 100% 1st round

Indirect Output Effect as a percent of \$100 Million change in Direct Output

Copyright MIG 2001

Primary Industries:

Average of
IMPLAN 195, 218, 219,
403, 406, 407, 408, 409
410, 411, 412, and 509

SIC Code	IMPLAN Industry	Description	TIER 1: >1%
5000,5100	447	Wholesale Trade	6.8901%
3675,6,7,8,9	378	Electronic Components- N.E.C.	1.9345%
7370	475	Computer and Data Processing Services	1.8439%
6000	456	Banking	1.6518%
6500	462	Real Estate	1.6333%
3672	376	Printed Circuit Boards	1.5000%
7320,31,38,83,89	470	Other Business Services	1.4494%
4200	435	Motor Freight Transport and Warehousing	1.4151%
	56	Maintenance and Repair Other Facilities	1.2856%
4810,20,40,90	441	Communications- Except Radio and TV	1.2728%
8720,8990	507	Accounting- Auditing and Bookkeeping	1.1867%
2822	192	Synthetic Rubber	1.0733%
7360	474	Personnel Supply Services	1.0700%
8740	508	Management and Consulting Services	1.0575%
			<u>TIER 2: 0.5%-1%</u>
8110	494	Legal Services	0.9871%
3842	408	Surgical Appliances and Supplies	0.8992%
2650	164	Paperboard Containers and Boxes	0.8365%
4910	443	Electric Services	0.7986%
2710	174	Newspapers	0.7748%
7000	463	Hotels and Lodging Places	0.6724%
4830	442	Radio and TV Broadcasting	0.6697%
6200	458	Security and Commodity Brokers	0.6539%
8710	506	Engineering- Architectural Services	0.5673%
			<u>TIER 3</u>
	512	Other State and Local Govt Enterprises	0.4914%
2750	179	Commercial Printing	0.4674%
2720	175	Periodicals	0.4569%
8730	509	Research- Development & Testing Services	0.4406%
2830	195	Drugs	0.4313%
1475	44	Phosphate Rock	0.3866%
5800	454	Eating & Drinking	0.3854%
7350	473	Equipment Rental and Leasing	0.3830%
2821	191	Plastics Materials and Resins	0.3696%
7310	469	Advertising	0.3690%
3210,29,30	230	Glass and Glass Products- Exc Containers	0.3367%
8330	498	Job Trainings & Related Services	0.3331%
6100,6710,20,33,90	457	Credit Agencies	0.3309%
7340	472	Services To Buildings	0.2923%
3469	294	Metal Stampings- N.E.C.	0.2704%
3571	339	Electronic Computers	0.2639%
4311	513	U.S. Postal Service	0.2637%
4500	437	Air Transportation	0.2623%
7530,49	479	Automobile Repair and Services	0.2405%
3841	407	Surgical and Medical Instrument	0.2404%
7334,5,6,7384	471	Photofinishing- Commercial Photography	0.1975%
7510	477	Automobile Rental and Leasing	0.1973%
7690	482	Miscellaneous Repair Shops	0.1888%
7800	483	Motion Pictures	0.1796%
4010,4740	433	Railroads and Related Services	0.1766%
2740	178	Miscellaneous Publishing	0.1701%

All Primary Industries in Tampa Bay
except the Biotech Segment (IMPLAN sector 509)

The following table (next page) summarizes the inter-industry relationships among the ten primary industries or industry groupings and their supplier-industries. The percentages listed are the averages of the percentages for the ten industries or industry groupings taken individually. Tampa Bay consists of Hernando, Hillsborough, Manatee, Pasco, Pinellas, Polk, and Sarasota counties.

The Tier 1 links, in order of “magnitude of clustering,” are:

Wholesale Trade
Electronic Components – not elsewhere classified
Banking
Printed Circuit Boards
Real Estate
Motor Freight Transport and Warehousing
Computer and Data Processing Services
Maintenance and Repair Other Facilities
Other Business Services
Communications – except Radio and TV
Synthetic Rubber
Accounting, Auditing and Bookkeeping
Legal Services

Two industries drop out of the Tier 1 level when the Biotech segment is excluded. These industries are 1) Management and Consulting Services and 2) Personnel Supply Services. This indicates that these industries have a relatively strong link to the Biotech segment. Legal Services moves up from a Tier 2 link to a Tier 1 link when the Biotech segment is excluded.

See the table (next page) for Tier 2 and Tier 3 linkages.

Tampa Bay

Indirect Output Effect resulting from a change in Direct Output for Primary Industry

Output Impact 28-Jan-02
1-Apr-02
8-Apr-02

Implan Model: Medical1999.iap
Type II Multipliers w/ RPC's 100% 1st round

Indirect Output Effect as a percent of \$100 Million change in Direct Output

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Primary Industries:

Average of
IMPLAN 195, 218, 219,
403, 406, 407, 408, 409
410, 411, and 412

SIC Code	IMPLAN Industry	Description	
			<u>TIER 1: >1%</u>
5000,5100	447	Wholesale Trade	7.3573%
3675,6,7,8,9	378	Electronic Components- N.E.C.	2.0998%
6000	456	Banking	1.6469%
3672	376	Printed Circuit Boards	1.6282%
6500	462	Real Estate	1.4993%
4200	435	Motor Freight Transport and Warehousing	1.4670%
7370	475	Computer and Data Processing Services	1.3366%
	56	Maintenance and Repair Other Facilities	1.3145%
7320,31,38,83,89	470	Other Business Services	1.2501%
4810,20,40,90	441	Communications- Except Radio and TV	1.2034%
2822	192	Synthetic Rubber	1.1703%
8720,8990	507	Accounting- Auditing and Bookkeeping	1.1051%
8110	494	Legal Services	1.0070%
			<u>TIER 2: 0.5%-1%</u>
3842	408	Surgical Appliances and Supplies	0.9809%
7360	474	Personnel Supply Services	0.9356%
2650	164	Paperboard Containers and Boxes	0.9044%
2710	174	Newspapers	0.8226%
4910	443	Electric Services	0.8191%
8740	508	Management and Consulting Services	0.7828%
4830	442	Radio and TV Broadcasting	0.7114%
7000	463	Hotels and Lodging Places	0.6766%
6200	458	Security and Commodity Brokers	0.6291%
	512	Other State and Local Govt Enterprises	0.5117%
			<u>TIER 3</u>
2750	179	Commercial Printing	0.4877%
2720	175	Periodicals	0.4826%
2830	195	Drugs	0.4703%
2821	191	Plastics Materials and Resins	0.4026%
1475	44	Phosphate Rock	0.3982%
7310	469	Advertising	0.3917%
5800	454	Eating & Drinking	0.3827%
7350	473	Equipment Rental and Leasing	0.3753%
8330	498	Job Trainings & Related Services	0.3629%
3210,29,30	230	Glass and Glass Products- Exc Containers	0.3418%
8730	509	Research- Development & Testing Services	0.3369%
6100,6710,20,33,90	457	Credit Agencies	0.3105%
8710	506	Engineering- Architectural Services	0.3035%
3469	294	Metal Stampings- N.E.C.	0.2946%
7340	472	Services To Buildings	0.2882%
3571	339	Electronic Computers	0.2833%
4500	437	Air Transportation	0.2646%
3841	407	Surgical and Medical Instrument	0.2621%
7530,49	479	Automobile Repair and Services	0.2364%
4311	513	U.S. Postal Service	0.2143%
7334,5,6,7384	471	Photofinishing- Commercial Photography	0.2022%
7800	483	Motion Pictures	0.1890%
4010,4740	433	Railroads and Related Services	0.1873%
7510	477	Automobile Rental and Leasing	0.1861%
3845	411	Electromedical Apparatus	0.1843%
7690	482	Miscellaneous Repair Shops	0.1839%
2740	178	Miscellaneous Publishing	0.1793%

Pharmaceutical Industries in Tampa Bay

The following table (next page) summarizes the inter-industry relationships between the Pharmaceutical (Drugs) industries and their supplier-industries. The percentages listed are the percent of increased output in a supplier-industry relative to increased output in the Pharmaceutical (Drugs) industries.

The Tier 1 links, in order of “magnitude of clustering,” are:

Drugs
Wholesale Trade
Accounting, Auditing and Bookkeeping
Other Business Services
Research, Development & Testing Services

By order of magnitude, the Pharmaceutical (Drugs) segment is the main beneficiary of an increase in output within their own major industry group. This indicates strong supplier linkages among the three industries of the Pharmaceutical (Drugs) segment.

The Research, Development & Testing Services (IMPLAN sector 509), which contains the Biotech segment (SIC 8731 – Commercial Physical and Biological Research), also exhibits a relatively strong supplier-link with Pharmaceutical (Drugs) segment.

See the table (next page) for Tier 2 and Tier 3 linkages.

Tampa Bay

Indirect Output Effect resulting from a change in Direct Output for Primary Industry

Output Impact 28-Jan-02

Implan Model: Medical1999.iap
Type II Multipliers w/ RPC's 100% 1st round

Indirect Output Effect as a percent of \$100 Million change in Direct Output

Copyright MIG 2001

Primary Industry:

IMPLAN 195
SIC 2830
Pharmaceuticals

SIC Code	IMPLAN Industry	Description	TIER 1: >1%
2830	195	Drugs	5.1064%
5000,5100	447	Wholesale Trade	3.6054%
8720,8990	507	Accounting- Auditing and Bookkeeping	1.3957%
7320,31,38,83,89	470	Other Business Services	1.1548%
8730	509	Research- Development & Testing Services	1.0054%
			<u>TIER 2: 0.5%-1%</u>
2710	174	Newspapers	0.8909%
4830	442	Radio and TV Broadcasting	0.7677%
6000	456	Banking	0.7006%
7370	475	Computer and Data Processing Services	0.6618%
8110	494	Legal Services	0.6529%
6500	462	Real Estate	0.6306%
	56	Maintenance and Repair Other Facilities	0.5802%
2650	164	Paperboard Containers and Boxes	0.5786%
2750	179	Commercial Printing	0.5663%
2720	175	Periodicals	0.5181%
4810,20,40,90	441	Communications- Except Radio and TV	0.5167%
			<u>TIER 3</u>
8740	508	Management and Consulting Services	0.4995%
7310	469	Advertising	0.4225%
4200	435	Motor Freight Transport and Warehousing	0.4190%
7360	474	Personnel Supply Services	0.3895%
6200	458	Security and Commodity Brokers	0.3347%
1475	44	Phosphate Rock	0.3045%
7000	463	Hotels and Lodging Places	0.2979%
4910	443	Electric Services	0.2838%
2740	178	Miscellaneous Publishing	0.2021%
7800	483	Motion Pictures	0.1957%
8710	506	Engineering- Architectural Services	0.1889%
7350	473	Equipment Rental and Leasing	0.1651%
7334,5,6,7384	471	Photofinishing- Commercial Photography	0.1604%
5800	454	Eating & Drinking	0.1499%
7340	472	Services To Buildings	0.1415%
6100,6710,20,33,90	457	Credit Agencies	0.1227%
3221	231	Glass Containers	0.1185%
4500	437	Air Transportation	0.1083%
3993	429	Signs and Advertising Displays	0.1072%
7530,49	479	Automobile Repair and Services	0.1034%
4311	513	U.S. Postal Service	0.0971%
	512	Other State and Local Govt Enterprises	0.0961%
7690	482	Miscellaneous Repair Shops	0.0921%
4953,59,60,70	446	Sanitary Services and Steam Supply	0.0788%
7381,2	476	Detective and Protective Services	0.0759%
4010,4740	433	Railroads and Related Services	0.0758%
7941	486	Commercial Sports Except Racing	0.0737%
7510	477	Automobile Rental and Leasing	0.0722%
2865,9	190	Cyclic Crudes- Interm. & Indus. Organic Chem.	0.0648%
6300	459	Insurance Carriers	0.0586%
2873,4	202	Nitrogenous and Phosphatic Fertilizers	0.0559%
2899	209	Chemical Preparations- N.E.C	0.0492%
	55	Maintenance and Repair- Residential	0.0456%
8220	496	Colleges- Universities- Schools	0.0452%
4920	444	Gas Production and Distribution	0.0428%

Research, Development and Testing Services Industries in Tampa Bay

The following table (next page) summarizes the inter-industry relationships between the Research, Development and Testing Services industries and their supplier-industries. The Research, Development and Testing Services (IMPLAN sector 509) contains the Biotech segment (SIC 8731 – Commercial Physical and Biological Research) of the proposed primary industries for the cluster.

The percentages listed are the percent of increased output in a supplier-industry relative to increased output in the Research, Development and Testing Services industries.

The Tier 1 links, in order of “magnitude of clustering,” are:

- Computer and data Processing Services
- Management and Consulting Services
- Other Business Services
- Engineering – Architectural Services
- Real Estate
- Personnel Supply Services
- Accounting, Auditing and Bookkeeping
- Communications – except Radio and TV
- Wholesale Trade
- Banking
- Research, Development and Testing Services

There is a relatively strong intra-segment supplier-link within the Research, Development and Testing major industry group, as evidenced by the group emerging as a Tier 1 supplier to itself.

See the table (next page) for Tier 2 and Tier 3 linkages.

Tampa Bay

Indirect Output Effect resulting from a change in Direct Output for Primary Industry

Output Impact 1-Apr-02

Implan Model: Medical1999.iap
Type II Multipliers w/ RPC's 100% 1st round

Indirect Output Effect as a percent of \$100 Million change in Direct Output

Copyright MIG 2001

Primary Industry:

IMPLAN 509
SIC 8730
Research &
Development

SIC Code	IMPLAN Industry	Description	
			<u>TIER 1: >1%</u>
7370	475	Computer and Data Processing Services	7.4239%
8740	508	Management and Consulting Services	4.0795%
7320,31,38,83,89	470	Other Business Services	3.6413%
8710	506	Engineering- Architectural Services	3.4694%
6500	462	Real Estate	3.1065%
7360	474	Personnel Supply Services	2.5480%
8720,8990	507	Accounting- Auditing and Bookkeeping	2.0848%
4810,20,40,90	441	Communications- Except Radio and TV	2.0365%
5000,5100	447	Wholesale Trade	1.7512%
6000	456	Banking	1.7055%
8730	509	Research- Development & Testing Services	1.5814%
			<u>TIER 2: 0.5%-1%</u>
	56	Maintenance and Repair Other Facilities	0.9685%
6200	458	Security and Commodity Brokers	0.9273%
4200	435	Motor Freight Transport and Warehousing	0.8442%
4311	513	U.S. Postal Service	0.8081%
8110	494	Legal Services	0.7685%
7000	463	Hotels and Lodging Places	0.6271%
4910	443	Electric Services	0.5724%
6100,6710,20,33,90	457	Credit Agencies	0.5558%
			<u>TIER 3</u>
7350	473	Equipment Rental and Leasing	0.4684%
5800	454	Eating & Drinking	0.4144%
7340	472	Services To Buildings	0.3373%
7510	477	Automobile Rental and Leasing	0.3197%
7530,49	479	Automobile Repair and Services	0.2860%
3210,29,30	230	Glass and Glass Products- Exc Containers	0.2808%
	512	Other State and Local Govt Enterprises	0.2689%
1475	44	Phosphate Rock	0.2586%
2710	174	Newspapers	0.2495%
2750	179	Commercial Printing	0.2438%
7690	482	Miscellaneous Repair Shops	0.2425%
4500	437	Air Transportation	0.2367%
4830	442	Radio and TV Broadcasting	0.2106%
	55	Maintenance and Repair- Residential	0.2078%
7381,2	476	Detective and Protective Services	0.1952%
2720	175	Periodicals	0.1738%
7334,5,6,7384	471	Photofinishing- Commercial Photography	0.1450%
2843	198	Surface Active Agents	0.1288%
6300	459	Insurance Carriers	0.1201%
7310	469	Advertising	0.1196%
3675,6,7,8,9	378	Electronic Components- N.E.C.	0.1159%
3625	359	Relays & Industrial Controls	0.1094%
0271,72	9	Miscellaneous Livestock	0.1013%
4953,59,60,70	446	Sanitary Services and Steam Supply	0.0985%
0780	27	Landscape and Horticultural Services	0.0921%
3672	376	Printed Circuit Boards	0.0899%
2650	164	Paperboard Containers and Boxes	0.0885%
7620	480	Electrical Repair Service	0.0870%
7800	483	Motion Pictures	0.0762%
3544,5	321	Special Dies and Tools and Accessories	0.0748%
5500	451	Automotive Dealers & Service Stations	0.0722%
2740	178	Miscellaneous Publishing	0.0695%

Gaskets, Packing and Sealing Devices Industry in Tampa Bay

The following table (next under) summarizes the inter-industry relationships between the Gaskets, Packing and Sealing Devices industry and its supplier-industries. The percentages listed are the percent of increased output in a supplier-industry relative to increased output in the Gaskets, Packing and Sealing Devices industry.

The Tier 1 links, in order of “magnitude of clustering,” are:

- Synthetic Rubber
- Wholesale Trade
- Motor Freight Transport and Warehousing
- Banking
- Computer and Data Processing Services
- Real Estate
- Plastics Materials and Resins
- Electric Services
- Maintenance and Repair Other Facilities
- Communications except Radio and TV
- Personnel Supply Services

See the table (next page) for Tier 2 and Tier 3 linkages.

Tampa Bay

Indirect Output Effect resulting from a change in Direct Output for Primary Industry

Output Impact 8-Apr-02

Implan Model: Medical1999.iap
Type II Multipliers w/ RPC's 100% 1st round

Indirect Output Effect as a percent of \$100 Million change in Direct Output

Copyright MIG 2001

Primary Industry:

IMPLAN 218
SIC 3053
Gaskets,
Packing, and
Sealing Devices

SIC Code	IMPLAN Industry	Description	TIER 1: >1%
2822	192	Synthetic Rubber	6.2320%
5000,5100	447	Wholesale Trade	5.4633%
4200	435	Motor Freight Transport and Warehousing	3.3166%
6000	456	Banking	1.8543%
7370	475	Computer and Data Processing Services	1.5667%
6500	462	Real Estate	1.5051%
2821	191	Plastics Materials and Resins	1.4949%
4910	443	Electric Services	1.4566%
	56	Maintenance and Repair Other Facilities	1.1679%
4810,20,40,90	441	Communications- Except Radio and TV	1.1473%
7360	474	Personnel Supply Services	1.1143%
			<u>TIER 2: 0.5%-1%</u>
8740	508	Management and Consulting Services	0.9885%
7320,31,38,83,89	470	Other Business Services	0.9762%
4400	436	Water Transportation	0.9241%
2499	147	Wood Products- N.E.C	0.9152%
7000	463	Hotels and Lodging Places	0.7878%
1475	44	Phosphate Rock	0.7764%
8720,8990	507	Accounting- Auditing and Bookkeeping	0.5882%
2650	164	Paperboard Containers and Boxes	0.5115%
			<u>TIER 3</u>
8110	494	Legal Services	0.4973%
4010,4740	433	Railroads and Related Services	0.4810%
5800	454	Eating & Drinking	0.4757%
7350	473	Equipment Rental and Leasing	0.4592%
6200	458	Security and Commodity Brokers	0.4563%
2710	174	Newspapers	0.3631%
7340	472	Services To Buildings	0.3421%
7530,49	479	Automobile Repair and Services	0.3364%
2865,9	190	Cyclic Crudes- Interm. & Indus. Organic Chem.	0.3361%
6100,6710,20,33,90	457	Credit Agencies	0.3318%
8710	506	Engineering- Architectural Services	0.3248%
4311	513	U.S. Postal Service	0.3236%
8730	509	Research- Development & Testing Services	0.3164%
4830	442	Radio and TV Broadcasting	0.3142%
4500	437	Air Transportation	0.3085%
	512	Other State and Local Govt Enterprises	0.2946%
7690	482	Miscellaneous Repair Shops	0.2488%
7381,2	476	Detective and Protective Services	0.2263%
2750	179	Commercial Printing	0.2165%
2720	175	Periodicals	0.2126%
2843	198	Surface Active Agents	0.2100%
4953,59,60,70	446	Sanitary Services and Steam Supply	0.1973%
7510	477	Automobile Rental and Leasing	0.1896%
2819	189	Inorganic Chemicals Nec.	0.1877%
6300	459	Insurance Carriers	0.1751%
7310	469	Advertising	0.1735%
4920	444	Gas Production and Distribution	0.1707%
3544,5	321	Special Dies and Tools and Accessories	0.1596%
2873,4	202	Nitrogenous and Phosphatic Fertilizers	0.1486%
3495,6	304	Miscellaneous Fabricated Wire Products	0.1454%
	511	State and Local Electric Utilities	0.1430%
	55	Maintenance and Repair- Residential	0.1143%

Fabricated Rubber Products (not elsewhere classified) Industry in Tampa Bay

The following table (next under) summarizes the inter-industry relationships between the Fabricated Rubber Products (not elsewhere classified) industry and its supplier-industries. The percentages listed are the percent of increased output in a supplier-industry relative to increased output in the Fabricated Rubber Products (not elsewhere classified) industry.

The Tier 1 links, in order of “magnitude of clustering,” are:

- Wholesale Trade
- Synthetic Rubber
- Motor Freight Transport and Warehousing
- Phosphate Rock
- Banking
- Electric Services
- Computer and Data Processing
- Maintenance and Repair Other Facilities
- Real Estate
- Plastics Materials and Resins
- Other Business Services
- Engineering – Architectural Services

See the table (next page) for Tier 2 and Tier 3 linkages.

Tampa Bay

Indirect Output Effect resulting from a change in Direct Output for Primary Industry

Output Impact 8-Apr-02

Implan Model: Medical1999.iap
Type II Multipliers w/ RPC's 100% 1st round

Indirect Output Effect as a percent of \$100 Million change in Direct Output

Copyright MIG 2001

Primary Industry:

IMPLAN 219
SIC 3061
Fabricated
Rubber
Products, NEC

SIC Code	IMPLAN Industry	Description	
			<u>TIER 1: >1%</u>
5000,5100	447	Wholesale Trade	7.2662%
2822	192	Synthetic Rubber	6.5753%
4200	435	Motor Freight Transport and Warehousing	3.3362%
1475	44	Phosphate Rock	2.1072%
6000	456	Banking	1.6925%
4910	443	Electric Services	1.5375%
7370	475	Computer and Data Processing Services	1.3391%
	56	Maintenance and Repair Other Facilities	1.3112%
6500	462	Real Estate	1.2519%
2821	191	Plastics Materials and Resins	1.2133%
7320,31,38,83,89	470	Other Business Services	1.1022%
8710	506	Engineering- Architectural Services	1.0504%
			<u>TIER 2: 0.5%-1%</u>
7360	474	Personnel Supply Services	0.9538%
4810,20,40,90	441	Communications- Except Radio and TV	0.8300%
8740	508	Management and Consulting Services	0.7810%
6200	458	Security and Commodity Brokers	0.7800%
7000	463	Hotels and Lodging Places	0.6862%
2650	164	Paperboard Containers and Boxes	0.6239%
8720,8990	507	Accounting- Auditing and Bookkeeping	0.6196%
2865,9	190	Cyclic Crudes- Interm. & Indus. Organic Chem.	0.5717%
4010,4740	433	Railroads and Related Services	0.5687%
			<u>TIER 3</u>
8110	494	Legal Services	0.4630%
6100,6710,20,33,90	457	Credit Agencies	0.4129%
7530,49	479	Automobile Repair and Services	0.3981%
5800	454	Eating & Drinking	0.3899%
2873,4	202	Nitrogenous and Phosphatic Fertilizers	0.3829%
4311	513	U.S. Postal Service	0.3462%
2710	174	Newspapers	0.3298%
2819	189	Inorganic Chemicals Nec.	0.3192%
7690	482	Miscellaneous Repair Shops	0.3121%
7350	473	Equipment Rental and Leasing	0.3057%
4400	436	Water Transportation	0.3040%
	512	Other State and Local Govt Enterprises	0.3021%
7340	472	Services To Buildings	0.2913%
4830	442	Radio and TV Broadcasting	0.2837%
7510	477	Automobile Rental and Leasing	0.2549%
4500	437	Air Transportation	0.2545%
8730	509	Research- Development & Testing Services	0.2536%
4920	444	Gas Production and Distribution	0.2532%
4953,59,60,70	446	Sanitary Services and Steam Supply	0.2518%
2843	198	Surface Active Agents	0.2279%
2750	179	Commercial Printing	0.2271%
2899	209	Chemical Preparations- N.E.C	0.2140%
3469	294	Metal Stampings- N.E.C.	0.2114%
2720	175	Periodicals	0.1960%
7310	469	Advertising	0.1566%
6300	459	Insurance Carriers	0.1566%
	511	State and Local Electric Utilities	0.1507%
7381,2	476	Detective and Protective Services	0.1492%
7620	480	Electrical Repair Service	0.1171%
3544,5	321	Special Dies and Tools and Accessories	0.1000%

Mechanical Measuring Devices Industry in Tampa Bay

The following table (next page) summarizes the inter-industry relationships between the Mechanical Measuring Devices industry and its supplier-industries. The percentages listed are the percent of increased output in a supplier-industry relative to increased output in the Mechanical Measuring Devices industry.

The Tier 1 links, in order of “magnitude of clustering,” are:

Wholesale Trade
Electron Components – not elsewhere classified
Printed Circuit Boards
Computer and Data Processing Services
Banking
Real Estate
Maintenance and Repair Other Facilities
Communications – except Radio and TV

See the table (next page) for Tier 2 and Tier 3 linkages.

Tampa Bay

Indirect Output Effect resulting from a change in Direct Output for Primary Industry

Output Impact 28-Jan-02

Implan Model: Medical1999.iap
Type II Multipliers w/ RPC's 100% 1st round

Indirect Output Effect as a percent of \$100 Million change in Direct Output

Copyright MIG 2001

Primary Industry:

IMPLAN 403
SIC 3829++
Mechanical
Measuring
Devices

SIC Code	IMPLAN Industry	Description	
			<u>TIER 1: >1%</u>
5000,5100	447	Wholesale Trade	6.9458%
3675,6,7,8,9	378	Electronic Components- N.E.C.	3.6390%
3672	376	Printed Circuit Boards	2.8216%
7370	475	Computer and Data Processing Services	1.7503%
6000	456	Banking	1.5324%
6500	462	Real Estate	1.3304%
	56	Maintenance and Repair Other Facilities	1.0258%
4810,20,40,90	441	Communications- Except Radio and TV	1.0126%
			<u>TIER 2: 0.5%-1%</u>
7320,31,38,83,89	470	Other Business Services	0.9988%
7360	474	Personnel Supply Services	0.8152%
3571	339	Electronic Computers	0.7634%
4200	435	Motor Freight Transport and Warehousing	0.7227%
4910	443	Electric Services	0.6614%
2710	174	Newspapers	0.6373%
	512	Other State and Local Govt Enterprises	0.6308%
6200	458	Security and Commodity Brokers	0.6139%
7000	463	Hotels and Lodging Places	0.6106%
8740	508	Management and Consulting Services	0.6031%
4830	442	Radio and TV Broadcasting	0.5475%
8110	494	Legal Services	0.5422%
			<u>TIER 3</u>
8720,8990	507	Accounting- Auditing and Bookkeeping	0.4841%
2750	179	Commercial Printing	0.4507%
7350	473	Equipment Rental and Leasing	0.4499%
2720	175	Periodicals	0.3713%
5800	454	Eating & Drinking	0.3496%
7310	469	Advertising	0.3014%
3625	359	Relays & Industrial Controls	0.2962%
4311	513	U.S. Postal Service	0.2906%
2650	164	Paperboard Containers and Boxes	0.2808%
6100,6710,20,33,90	457	Credit Agencies	0.2694%
7340	472	Services To Buildings	0.2645%
8710	506	Engineering- Architectural Services	0.2586%
4500	437	Air Transportation	0.2524%
3469	294	Metal Stampings- N.E.C.	0.2281%
8730	509	Research- Development & Testing Services	0.1997%
3825	404	Instruments To Measure Electricity	0.1975%
7530,49	479	Automobile Repair and Services	0.1972%
3450	289	Screw Machine Products and Bolts- Etc.	0.1916%
3823,4,9	403	Mechanical Measuring Devices	0.1639%
7510	477	Automobile Rental and Leasing	0.1634%
7690	482	Miscellaneous Repair Shops	0.1619%
3210,29,30	230	Glass and Glass Products- Exc Containers	0.1487%
7800	483	Motion Pictures	0.1466%
2740	178	Miscellaneous Publishing	0.1369%
7381,2	476	Detective and Protective Services	0.1350%
	55	Maintenance and Repair- Residential	0.1318%
2821	191	Plastics Materials and Resins	0.1277%
6300	459	Insurance Carriers	0.1268%
7334,5,6,7384	471	Photofinishing- Commercial Photography	0.1233%
3471	295	Plating and Polishing	0.1155%
3544,5	321	Special Dies and Tools and Accessories	0.1028%

Analytical Instruments Industry in Tampa Bay

There was no firm in the Laboratory Analytical Instruments industry (SIC 3826) operating in Tampa Bay in 1999. However, ES202 data for first and second quarters of 2001 (most recent data available) reflects a firm now operating in this industry in Tampa Bay.

Optical Instruments and Lenses Industry in Tampa Bay

The following table (next page) summarizes the inter-industry relationships between the Optical Instruments and Lenses industry and its supplier-industries. The percentages listed are the percent of increased output in a supplier-industry relative to increased output in the Optical Instruments and Lenses industry.

The Tier 1 links, in order of “magnitude of clustering,” are:

- Accounting, Auditing and Bookkeeping
- Wholesale Trade
- Electronic Components – not elsewhere classified
- Printed Circuit Boards
- Computer and Data Processing Services
- Banking
- Maintenance and Repair Other Facilities
- Real Estate
- Glass and Glass Products – excluding Containers
- Communications – except Radio and TV
- Other Business Services

See the table (next page) for Tier 2 and Tier 3 linkages.

Tampa Bay

Indirect Output Effect resulting from a change in Direct Output for Primary Industry

Output Impact 28-Jan-02

Implan Model: Medical1999.iap
Type II Multipliers w/ RPC's 100% 1st round

Indirect Output Effect as a percent of \$100 Million change in Direct Output

Copyright MIG 2001

Primary Industry:

IMPLAN 406
SIC 3827
Optical
Instruments
& Lenses

SIC Code	IMPLAN Industry	Description	TIER 1: >1%
8720,8990	507	Accounting- Auditing and Bookkeeping	5.5756%
5000,5100	447	Wholesale Trade	4.7324%
3675,6,7,8,9	378	Electronic Components- N.E.C.	3.4634%
3672	376	Printed Circuit Boards	2.6855%
7370	475	Computer and Data Processing Services	1.6685%
6000	456	Banking	1.3830%
	56	Maintenance and Repair Other Facilities	1.2924%
6500	462	Real Estate	1.2720%
3210,29,30	230	Glass and Glass Products- Exc Containers	1.2172%
4810,20,40,90	441	Communications- Except Radio and TV	1.1658%
7320,31,38,83,89	470	Other Business Services	1.1497%
			<u>TIER 2: 0.5%-1%</u>
7360	474	Personnel Supply Services	0.8256%
3571	339	Electronic Computers	0.7084%
8740	508	Management and Consulting Services	0.6819%
4200	435	Motor Freight Transport and Warehousing	0.6745%
2710	174	Newspapers	0.6657%
4910	443	Electric Services	0.6571%
6200	458	Security and Commodity Brokers	0.5848%
	512	Other State and Local Govt Enterprises	0.5788%
4830	442	Radio and TV Broadcasting	0.5767%
7000	463	Hotels and Lodging Places	0.5681%
8110	494	Legal Services	0.5547%
			<u>TIER 3</u>
3469	294	Metal Stampings- N.E.C.	0.4512%
2650	164	Paperboard Containers and Boxes	0.4354%
2720	175	Periodicals	0.3880%
2750	179	Commercial Printing	0.3797%
7350	473	Equipment Rental and Leasing	0.3602%
5800	454	Eating & Drinking	0.3206%
7310	469	Advertising	0.3175%
7340	472	Services To Buildings	0.2770%
6100,6710,20,33,90	457	Credit Agencies	0.2623%
3825	404	Instruments To Measure Electricity	0.2228%
4500	437	Air Transportation	0.2040%
3827	406	Optical Instruments & Lenses	0.1873%
7530,49	479	Automobile Repair and Services	0.1662%
3450	289	Screw Machine Products and Bolts- Etc.	0.1648%
8730	509	Research- Development & Testing Services	0.1610%
7510	477	Automobile Rental and Leasing	0.1602%
7690	482	Miscellaneous Repair Shops	0.1457%
7800	483	Motion Pictures	0.1457%
2740	178	Miscellaneous Publishing	0.1441%
3471	295	Plating and Polishing	0.1427%
7381,2	476	Detective and Protective Services	0.1401%
4311	513	U.S. Postal Service	0.1389%
7334,5,6,7384	471	Photofinishing- Commercial Photography	0.1266%
8710	506	Engineering- Architectural Services	0.1264%
3625	359	Relays & Industrial Controls	0.1244%
	55	Maintenance and Repair- Residential	0.1240%
6300	459	Insurance Carriers	0.1081%
3845	411	Electromedical Apparatus	0.1030%
0780	27	Landscape and Horticultural Services	0.0929%

Surgical and Medical Instruments Industry in Tampa Bay

The following table (next page) summarizes the inter-industry relationships between the Surgical and Medical Instruments industry and its supplier-industries. The percentages listed are the percent of increased output in a supplier-industry relative to increased output in the Surgical and Medical Instruments industry.

The Tier 1 links, in order of “magnitude of clustering,” are:

- Wholesale Trade
- Surgical Appliances and Supplies
- Real Estate
- Banking
- Legal Services
- Maintenance and Repair Other Facilities
- Paperboard containers and Boxes
- Motor Freight Transport and Warehousing
- Communications – except Radio and TV
- Other Business Services
- Electronic Components – not elsewhere classified
- Computer and Data processing Services
- Personnel Supply Services
- Surgical and Medical Instruments
- Management and Consulting Services

There is a relatively strong intra-industry supplier-link within the Surgical and Medical Instruments industry, as evidenced by the industry emerging as a Tier 1 supplier to itself.

Also, within the Medical Devices segment, the Surgical Appliances and Supplies industry is a Tier 1 supplier for the Surgical and Medical Instruments industry – and vice versa. (See the table for the Surgical Appliances and Supplies industry.) This is indicative of a substantial link between these primary industries.

See the table (next page) for Tier 2 and Tier 3 linkages.

Tampa Bay

Indirect Output Effect resulting from a change in Direct Output for Primary Industry

Output Impact 28-Jan-02

Implan Model: Medical1999.iap
Type II Multipliers w/ RPC's 100% 1st round

Indirect Output Effect as a percent of \$100 Million change in Direct Output

Copyright MIG 2001

Primary Industry:

IMPLAN 407
SIC 3841
Surgical
& Medical
Instruments

SIC Code	IMPLAN Industry	Description	TIER 1: >1%
5000,5100	447	Wholesale Trade	9.0129%
3842	408	Surgical Appliances and Supplies	5.8407%
6500	462	Real Estate	2.1328%
6000	456	Banking	2.0166%
8110	494	Legal Services	1.9057%
	56	Maintenance and Repair Other Facilities	1.8194%
2650	164	Paperboard Containers and Boxes	1.6549%
4200	435	Motor Freight Transport and Warehousing	1.5807%
4810,20,40,90	441	Communications- Except Radio and TV	1.4783%
7320,31,38,83,89	470	Other Business Services	1.3444%
3675,6,7,8,9	378	Electronic Components- N.E.C.	1.2231%
7370	475	Computer and Data Processing Services	1.1887%
7360	474	Personnel Supply Services	1.1706%
3841	407	Surgical and Medical Instrument	1.0871%
8740	508	Management and Consulting Services	1.0177%
			<u>TIER 2: 0.5%-1%</u>
4910	443	Electric Services	0.9738%
3672	376	Printed Circuit Boards	0.9483%
6200	458	Security and Commodity Brokers	0.9226%
	512	Other State and Local Govt Enterprises	0.8707%
7000	463	Hotels and Lodging Places	0.8496%
3469	294	Metal Stampings- N.E.C.	0.6213%
8720,8990	507	Accounting- Auditing and Bookkeeping	0.5926%
2710	174	Newspapers	0.5754%
			<u>TIER 3</u>
4830	442	Radio and TV Broadcasting	0.4971%
5800	454	Eating & Drinking	0.4675%
2821	191	Plastics Materials and Resins	0.4536%
8730	509	Research- Development & Testing Services	0.4171%
7340	472	Services To Buildings	0.3911%
6100,6710,20,33,90	457	Credit Agencies	0.3816%
7350	473	Equipment Rental and Leasing	0.3674%
2720	175	Periodicals	0.3486%
2750	179	Commercial Printing	0.3432%
4500	437	Air Transportation	0.3187%
7530,49	479	Automobile Repair and Services	0.2929%
7310	469	Advertising	0.2741%
8710	506	Engineering- Architectural Services	0.2641%
8330	498	Job Trainings & Related Services	0.2589%
7690	482	Miscellaneous Repair Shops	0.2480%
7510	477	Automobile Rental and Leasing	0.2303%
7381,2	476	Detective and Protective Services	0.2053%
	55	Maintenance and Repair- Residential	0.1996%
4311	513	U.S. Postal Service	0.1884%
4010,4740	433	Railroads and Related Services	0.1834%
6300	459	Insurance Carriers	0.1815%
3479	296	Metal Coating and Allied Services	0.1732%
3450	289	Screw Machine Products and Bolts- Etc.	0.1713%
4953,59,60,70	446	Sanitary Services and Steam Supply	0.1436%
7800	483	Motion Pictures	0.1360%
2740	178	Miscellaneous Publishing	0.1308%
5500	451	Automotive Dealers & Service Stations	0.1219%
7334,5,6,7384	471	Photofinishing- Commercial Photography	0.1217%

Surgical Appliances and Supplies Industry in Tampa Bay

The following table (next page) summarizes the inter-industry relationships between the Surgical Appliances and Supplies industry and its supplier-industries. The percentages listed are the percent of increased output in a supplier-industry relative to increased output in the Surgical Appliances and Supplies industry.

The Tier 1 links, in order of “magnitude of clustering,” are:

- Wholesale Trade
- Surgical Appliances and Supplies
- Paperboard Containers and Boxes
- Job Trainings and Related Services
- Banking
- Real Estate
- Legal Services
- Motor Freight Transport and Warehousing
- Surgical and Medical Instruments
- Other Business services
- Maintenance and Repair Other Facilities
- Computer and Data Processing Services
- Communications – Except Radio and TV
- Personnel Supply Services
- Electronic Components – not elsewhere classified

There is a relatively strong intra-industry supplier-link within the Surgical Appliances and Supplies industry, as evidenced by the industry emerging as a Tier 1 supplier to itself.

Also, with the Medical Devices segment, the Surgical and Medical Instruments industry is a Tier 1 supplier for the Surgical Appliances and Supplies industry – and vice versa. (See the table for the Surgical and Medical Instruments industry.) This is indicative of a substantial link between these primary industries.

See the table (next page) for Tier 2 and Tier 3 linkages.

Tampa Bay

Indirect Output Effect resulting from a change in Direct Output for Primary Industry

Output Impact 28-Jan-02

Implan Model: Medical1999.iap
Type II Multipliers w/ RPC's 100% 1st round

Indirect Output Effect as a percent of \$100 Million change in Direct Output

Copyright MIG 2001

Primary Industry:

IMPLAN 408
SIC 3842
Surgical
Appliances
& Supplies

SIC Code	IMPLAN Industry	Description	
			<u>TIER 1: >1%</u>
5000,5100	447	Wholesale Trade	5.5787%
3842	408	Surgical Appliances and Supplies	4.8931%
2650	164	Paperboard Containers and Boxes	2.5212%
8330	498	Job Trainings & Related Services	2.3451%
6000	456	Banking	2.1873%
6500	462	Real Estate	2.1494%
8110	494	Legal Services	1.9419%
4200	435	Motor Freight Transport and Warehousing	1.9084%
3841	407	Surgical and Medical Instrument	1.7274%
7320,31,38,83,89	470	Other Business Services	1.7001%
	56	Maintenance and Repair Other Facilities	1.6023%
7370	475	Computer and Data Processing Services	1.5055%
4810,20,40,90	441	Communications- Except Radio and TV	1.3588%
7360	474	Personnel Supply Services	1.2932%
3675,6,7,8,9	378	Electronic Components- N.E.C.	1.0926%
			<u>TIER 2: 0.5%-1%</u>
6200	458	Security and Commodity Brokers	0.9935%
8740	508	Management and Consulting Services	0.9715%
2710	174	Newspapers	0.9641%
7000	463	Hotels and Lodging Places	0.9392%
3672	376	Printed Circuit Boards	0.8472%
4830	442	Radio and TV Broadcasting	0.8342%
4910	443	Electric Services	0.8197%
8720,8990	507	Accounting- Auditing and Bookkeeping	0.7004%
2720	175	Periodicals	0.5758%
3469	294	Metal Stampings- N.E.C.	0.5683%
2750	179	Commercial Printing	0.5570%
			<u>TIER 3</u>
5800	454	Eating & Drinking	0.4927%
7350	473	Equipment Rental and Leasing	0.4611%
7310	469	Advertising	0.4594%
8710	506	Engineering- Architectural Services	0.4584%
6100,6710,20,33,90	457	Credit Agencies	0.3886%
4500	437	Air Transportation	0.3855%
2821	191	Plastics Materials and Resins	0.3563%
7340	472	Services To Buildings	0.3328%
8730	509	Research- Development & Testing Services	0.3269%
7530,49	479	Automobile Repair and Services	0.3067%
4311	513	U.S. Postal Service	0.2748%
7690	482	Miscellaneous Repair Shops	0.2416%
7800	483	Motion Pictures	0.2216%
7510	477	Automobile Rental and Leasing	0.2201%
2740	178	Miscellaneous Publishing	0.2115%
4010,4740	433	Railroads and Related Services	0.1929%
6300	459	Insurance Carriers	0.1825%
7334,5,6,7384	471	Photofinishing- Commercial Photography	0.1762%
7381,2	476	Detective and Protective Services	0.1742%
	512	Other State and Local Govt Enterprises	0.1625%
5500	451	Automotive Dealers & Service Stations	0.1598%
3479	296	Metal Coating and Allied Services	0.1566%
	55	Maintenance and Repair- Residential	0.1418%
4953,59,60,70	446	Sanitary Services and Steam Supply	0.1211%
3993	429	Signs and Advertising Displays	0.1172%

Dental Equipment and Supplies Industry in Tampa Bay

The following table (next page) summarizes the inter-industry relationships between the Dental Equipment and Supplies industry and its supplier-industries. The percentages listed are the percent of increased output in a supplier-industry relative to increased output in the Dental Equipment and Supplies industry.

The Tier 1 links, in order of “magnitude of clustering,” are:

- Wholesale Trade
- Motor Freight Transport and Warehousing
- Real Estate
- Computer and Data Processing Services
- Banking
- Communications – except Radio and TV
- Paperboard Containers and Boxes
- Other Business Services
- Maintenance and Repair Other Facilities
- Job Trainings and Related Services
- Newspapers
- Legal Services
- Radio and TV Broadcasting
- Personnel Supply Services

See the table (next page) for Tier 2 and Tier 3 linkages.

Tampa Bay

Indirect Output Effect resulting from a change in Direct Output for Primary Industry

Output Impact 28-Jan-02

Implan Model: Medical1999.iap
Type II Multipliers w/ RPC's 100% 1st round

Indirect Output Effect as a percent of \$100 Million change in Direct Output

Copyright MIG 2001

Primary Industry:

IMPLAN 409
SIC 3843
Dental
Equipment
& Supplies

SIC Code	IMPLAN Industry	Description	
			<u>TIER 1: >1%</u>
5000,5100	447	Wholesale Trade	15.8925%
4200	435	Motor Freight Transport and Warehousing	2.2294%
6500	462	Real Estate	2.1002%
7370	475	Computer and Data Processing Services	1.9673%
6000	456	Banking	1.9517%
4810,20,40,90	441	Communications- Except Radio and TV	1.6759%
2650	164	Paperboard Containers and Boxes	1.6023%
7320,31,38,83,89	470	Other Business Services	1.5454%
	56	Maintenance and Repair Other Facilities	1.5164%
8330	498	Job Trainings & Related Services	1.3430%
2710	174	Newspapers	1.2536%
8110	494	Legal Services	1.2376%
4830	442	Radio and TV Broadcasting	1.0857%
7360	474	Personnel Supply Services	1.0398%
			<u>TIER 2: 0.5%-1%</u>
1475	44	Phosphate Rock	0.8310%
	512	Other State and Local Govt Enterprises	0.8023%
8740	508	Management and Consulting Services	0.7950%
7000	463	Hotels and Lodging Places	0.7442%
2720	175	Periodicals	0.7309%
4910	443	Electric Services	0.7275%
2750	179	Commercial Printing	0.7179%
7310	469	Advertising	0.5974%
8720,8990	507	Accounting- Auditing and Bookkeeping	0.5910%
			<u>TIER 3</u>
3210,29,30	230	Glass and Glass Products- Exc Containers	0.4509%
5800	454	Eating & Drinking	0.4215%
7350	473	Equipment Rental and Leasing	0.4143%
6100,6710,20,33,90	457	Credit Agencies	0.3566%
7800	483	Motion Pictures	0.3550%
7340	472	Services To Buildings	0.3369%
6200	458	Security and Commodity Brokers	0.3029%
3845	411	Electromedical Apparatus	0.3020%
3675,6,7,8,9	378	Electronic Components- N.E.C.	0.2739%
2740	178	Miscellaneous Publishing	0.2703%
7530,49	479	Automobile Repair and Services	0.2608%
4010,4740	433	Railroads and Related Services	0.2596%
4500	437	Air Transportation	0.2572%
2821	191	Plastics Materials and Resins	0.2472%
7334,5,6,7384	471	Photofinishing- Commercial Photography	0.2456%
7510	477	Automobile Rental and Leasing	0.2160%
3672	376	Printed Circuit Boards	0.2124%
	55	Maintenance and Repair- Residential	0.1920%
4311	513	U.S. Postal Service	0.1832%
7690	482	Miscellaneous Repair Shops	0.1749%
2865,9	190	Cyclic Crudes- Interm. & Indus. Organic Chem.	0.1726%
8730	509	Research- Development & Testing Services	0.1716%
3450	289	Screw Machine Products and Bolts- Etc.	0.1618%
7381,2	476	Detective and Protective Services	0.1584%
2873,4	202	Nitrogenous and Phosphatic Fertilizers	0.1544%
3993	429	Signs and Advertising Displays	0.1514%
8710	506	Engineering- Architectural Services	0.1512%
3844	410	X-Ray Apparatus	0.1482%

X-ray Apparatus Industry in Tampa Bay

The following table (next page) summarizes the inter-industry relationships between the X-ray Apparatus industry and its supplier-industries. The percentages listed are the percent of increased output in a supplier-industry relative to increased output in the X-ray Apparatus industry.

The Tier 1 links, in order of “magnitude of clustering,” are:

Wholesale Trade
Electronic Components – not elsewhere classified
Printed Circuit Boards
Banking
Real Estate
Communications – except Radio and TV
Legal Services
Maintenance and Repair Other Facilities

See the table (next page) for Tier 2 and Tier 3 linkages.

Tampa Bay

Indirect Output Effect resulting from a change in Direct Output for Primary Industry

Output Impact 28-Jan-02

Implan Model: Medical1999.iap
Type II Multipliers w/ RPC's 100% 1st round

Indirect Output Effect as a percent of \$100 Million change in Direct Output

Copyright MIG 2001

Primary Industry:

IMPLAN 410
SIC 3844
X-Ray
Apparatus

SIC Code	IMPLAN Industry	Description	
			<u>TIER 1: >1%</u>
5000,5100	447	Wholesale Trade	10.1279%
3675,6,7,8,9	378	Electronic Components- N.E.C.	7.8382%
3672	376	Printed Circuit Boards	6.0776%
6000	456	Banking	1.8368%
6500	462	Real Estate	1.5795%
4810,20,40,90	441	Communications- Except Radio and TV	1.4733%
8110	494	Legal Services	1.3460%
	56	Maintenance and Repair Other Facilities	1.1666%
			<u>TIER 2: 0.5%-1%</u>
7360	474	Personnel Supply Services	0.9804%
6200	458	Security and Commodity Brokers	0.9223%
3479	296	Metal Coating and Allied Services	0.8501%
7320,31,38,83,89	470	Other Business Services	0.8427%
7370	475	Computer and Data Processing Services	0.8182%
3469	294	Metal Stampings- N.E.C.	0.7774%
7000	463	Hotels and Lodging Places	0.7726%
	512	Other State and Local Govt Enterprises	0.7363%
3571	339	Electronic Computers	0.7184%
4910	443	Electric Services	0.6846%
3572	340	Computer Storage Devices	0.6294%
8740	508	Management and Consulting Services	0.6098%
2710	174	Newspapers	0.5793%
3845	411	Electromedical Apparatus	0.5402%
4830	442	Radio and TV Broadcasting	0.5017%
			<u>TIER 3</u>
4200	435	Motor Freight Transport and Warehousing	0.4631%
8720,8990	507	Accounting- Auditing and Bookkeeping	0.4312%
5800	454	Eating & Drinking	0.4221%
7334,5,6,7384	471	Photofinishing- Commercial Photography	0.3640%
7350	473	Equipment Rental and Leasing	0.3523%
2750	179	Commercial Printing	0.3494%
2720	175	Periodicals	0.3379%
3450	289	Screw Machine Products and Bolts- Etc.	0.3254%
7340	472	Services To Buildings	0.3040%
4500	437	Air Transportation	0.2913%
7310	469	Advertising	0.2762%
3625	359	Relays & Industrial Controls	0.2736%
6100,6710,20,33,90	457	Credit Agencies	0.2650%
3671	375	Electron Tubes	0.2441%
2650	164	Paperboard Containers and Boxes	0.1966%
7530,49	479	Automobile Repair and Services	0.1961%
6300	459	Insurance Carriers	0.1730%
	55	Maintenance and Repair- Residential	0.1554%
7510	477	Automobile Rental and Leasing	0.1549%
8730	509	Research- Development & Testing Services	0.1505%
3577	342	Computer Peripheral Equipment-	0.1398%
3812	400	Search & Navigation Equipment	0.1284%
2740	178	Miscellaneous Publishing	0.1255%
7690	482	Miscellaneous Repair Shops	0.1251%
8710	506	Engineering- Architectural Services	0.1224%
4311	513	U.S. Postal Service	0.1207%
3669	374	Communications Equipment N.E.C.	0.1196%
7800	483	Motion Pictures	0.1175%

Electromedical Apparatus Industry in Tampa Bay

The following table (next page) summarizes the inter-industry relationships between the Electromedical Apparatus industry and its supplier-industries. The percentages listed are the percent of increased output in a supplier-industry relative to increased output in the Electromedical Apparatus industry.

The Tier 1 links, in order of “magnitude of clustering,” are:

Wholesale Trade
Electronic Components – not elsewhere classified
Printed Circuit Boards
Banking
Legal Services
Computer and Data Processing Services
Communications – except Radio and TV
Real Estate
Maintenance and Repair Other Facilities

See the table (next page) for Tier 2 and Tier 3 linkages.

Tampa Bay

Indirect Output Effect resulting from a change in Direct Output for Primary Industry

Output Impact 28-Jan-02

Implan Model: Medical1999.iap
Type II Multipliers w/ RPC's 100% 1st round

Indirect Output Effect as a percent of \$100 Million change in Direct Output

Copyright MIG 2001

Primary Industry:

IMPLAN 411
SIC 3845
Electromedical
Apparatus

SIC Code	IMPLAN Industry	Description	
			<u>TIER 1: >1%</u>
5000,5100	447	Wholesale Trade	8.5949%
3675,6,7,8,9	378	Electronic Components- N.E.C.	5.4755%
3672	376	Printed Circuit Boards	4.2456%
6000	456	Banking	1.7510%
8110	494	Legal Services	1.7175%
7370	475	Computer and Data Processing Services	1.3431%
4810,20,40,90	441	Communications- Except Radio and TV	1.3428%
6500	462	Real Estate	1.3067%
	56	Maintenance and Repair Other Facilities	1.2984%
			<u>TIER 2: 0.5%-1%</u>
7320,31,38,83,89	470	Other Business Services	0.9333%
3572	340	Computer Storage Devices	0.8824%
2650	164	Paperboard Containers and Boxes	0.8530%
6200	458	Security and Commodity Brokers	0.7792%
7360	474	Personnel Supply Services	0.7497%
2710	174	Newspapers	0.7229%
7000	463	Hotels and Lodging Places	0.7206%
3571	339	Electronic Computers	0.7195%
	512	Other State and Local Govt Enterprises	0.6692%
8720,8990	507	Accounting- Auditing and Bookkeeping	0.6408%
4830	442	Radio and TV Broadcasting	0.6262%
3479	296	Metal Coating and Allied Services	0.5858%
8740	508	Management and Consulting Services	0.5730%
4910	443	Electric Services	0.5615%
4200	435	Motor Freight Transport and Warehousing	0.5008%
			<u>TIER 3</u>
2750	179	Commercial Printing	0.4216%
2720	175	Periodicals	0.4210%
7334,5,6,7384	471	Photofinishing- Commercial Photography	0.4103%
7350	473	Equipment Rental and Leasing	0.3985%
5800	454	Eating & Drinking	0.3927%
7310	469	Advertising	0.3446%
4500	437	Air Transportation	0.3207%
3845	411	Electromedical Apparatus	0.2921%
6100,6710,20,33,90	457	Credit Agencies	0.2503%
3469	294	Metal Stampings- N.E.C.	0.2254%
7340	472	Services To Buildings	0.2243%
3625	359	Relays & Industrial Controls	0.2101%
3577	342	Computer Peripheral Equipment-	0.1960%
7800	483	Motion Pictures	0.1662%
3450	289	Screw Machine Products and Bolts- Etc.	0.1636%
8730	509	Research- Development & Testing Services	0.1577%
2740	178	Miscellaneous Publishing	0.1562%
8710	506	Engineering- Architectural Services	0.1537%
7530,49	479	Automobile Repair and Services	0.1520%
7510	477	Automobile Rental and Leasing	0.1467%
7381,2	476	Detective and Protective Services	0.1449%
4311	513	U.S. Postal Service	0.1369%
	55	Maintenance and Repair- Residential	0.1336%
7690	482	Miscellaneous Repair Shops	0.1311%
6300	459	Insurance Carriers	0.1229%
3661	372	Telephone and Telegraph Apparatus	0.1217%
3812	400	Search & Navigation Equipment	0.0925%

Ophthalmic Goods Industry in Tampa Bay

The following table (next page) summarizes the inter-industry relationships between the Ophthalmic Goods industry and its supplier-industries. The percentages listed are the percent of increased output in a supplier-industry relative to increased output in the Ophthalmic Goods industry.

The Tier 1 links, in order of “magnitude of clustering,” are:

- Wholesale Trade
- Newspapers
- Other Business Services
- Radio and TV Broadcasting
- Glass and Glass Products – excluding Containers
- Maintenance and Repair Other Facilities
- Communications – except Radio and TV
- Real Estate
- Banking
- Periodicals
- Commercial Printing
- Management and Consulting Services

See the table (next page) for Tier 2 and Tier 3 linkages.

Tampa Bay

Indirect Output Effect resulting from a change in Direct Output for Primary Industry

Output Impact 28-Jan-02

Implan Model: Medical1999.iap
Type II Multipliers w/ RPC's 100% 1st round

Indirect Output Effect as a percent of \$100 Million change in Direct Output

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Primary Industry:

IMPLAN 412
SIC 3850
Ophthalmic
Goods

SIC Code	IMPLAN Industry	Description	TIER 1: >1%
5000,5100	447	Wholesale Trade	3.7099%
2710	174	Newspapers	2.0665%
7320,31,38,83,89	470	Other Business Services	2.0034%
4830	442	Radio and TV Broadcasting	1.7906%
3210,29,30	230	Glass and Glass Products- Exc Containers	1.7342%
	56	Maintenance and Repair Other Facilities	1.6787%
4810,20,40,90	441	Communications- Except Radio and TV	1.2359%
6500	462	Real Estate	1.2339%
6000	456	Banking	1.2097%
2720	175	Periodicals	1.2086%
2750	179	Commercial Printing	1.1356%
8740	508	Management and Consulting Services	1.0900%
			<u>TIER 2: 0.5%-1%</u>
4200	435	Motor Freight Transport and Warehousing	0.9856%
7310	469	Advertising	0.9854%
7360	474	Personnel Supply Services	0.9598%
7370	475	Computer and Data Processing Services	0.8939%
2650	164	Paperboard Containers and Boxes	0.6908%
4910	443	Electric Services	0.6470%
8730	509	Research- Development & Testing Services	0.5462%
3845	411	Electromedical Apparatus	0.5382%
8720,8990	507	Accounting- Auditing and Bookkeeping	0.5367%
			<u>TIER 3</u>
	512	Other State and Local Govt Enterprises	0.4851%
7000	463	Hotels and Lodging Places	0.4653%
7800	483	Motion Pictures	0.4449%
2821	191	Plastics Materials and Resins	0.4439%
2740	178	Miscellaneous Publishing	0.4437%
7350	473	Equipment Rental and Leasing	0.3945%
6100,6710,20,33,90	457	Credit Agencies	0.3745%
7334,5,6,7384	471	Photofinishing- Commercial Photography	0.3426%
5800	454	Eating & Drinking	0.3278%
7340	472	Services To Buildings	0.2645%
4311	513	U.S. Postal Service	0.2564%
3993	429	Signs and Advertising Displays	0.2490%
8710	506	Engineering- Architectural Services	0.2393%
7510	477	Automobile Rental and Leasing	0.2391%
6200	458	Security and Commodity Brokers	0.2298%
8110	494	Legal Services	0.2177%
4500	437	Air Transportation	0.2097%
7530,49	479	Automobile Repair and Services	0.1901%
3850	412	Ophthalmic Goods	0.1736%
7381,2	476	Detective and Protective Services	0.1697%
7941	486	Commercial Sports Except Racing	0.1485%
3544,5	321	Special Dies and Tools and Accessories	0.1472%
7690	482	Miscellaneous Repair Shops	0.1414%
3827	406	Optical Instruments & Lenses	0.1345%
6300	459	Insurance Carriers	0.1332%
4010,4740	433	Railroads and Related Services	0.1177%
	55	Maintenance and Repair- Residential	0.1139%
4953,59,60,70	446	Sanitary Services and Steam Supply	0.0837%
7920	484	Theatrical Producers- Bands Etc.	0.0784%
1475	44	Phosphate Rock	0.0772%