Strategic Skills Initiative Skills Shortage ID Report Cover Sheet

Economic Growth Region #___2_____: _Northern Indiana_____

Designated Grantee			
Organization Name:	Northern Indiana Workforce Investment Board, Inc.		Telephone Number: 574-239-2380
Address: 401 E Colfax Avenue, Suite 307			Fax Number: 574-239-2386
Address: P.O. Box 1048			Email Address:
City: South Bend	State: IN		Zip+4: 46624-1048
County: St. Joseph	FEIN: 35-1588931		
3. Contact Person			
Mr. Ms.	First Name: Juan		Last Name: Manigault
Dr. Other	Title: President and CEO		Telephone Number: 574-239-2380 x212
Address: 401 E Colfax Avenue, Suite 307			Fax Number: 574-239-2386
Address: P.O. Box 1048			Email Address: Jam200@niwib.com
City: South Bend	State: IN		Zip+4: 46624-1048
Lead Team Members			
Name:	Industry:	Title:	Signature:
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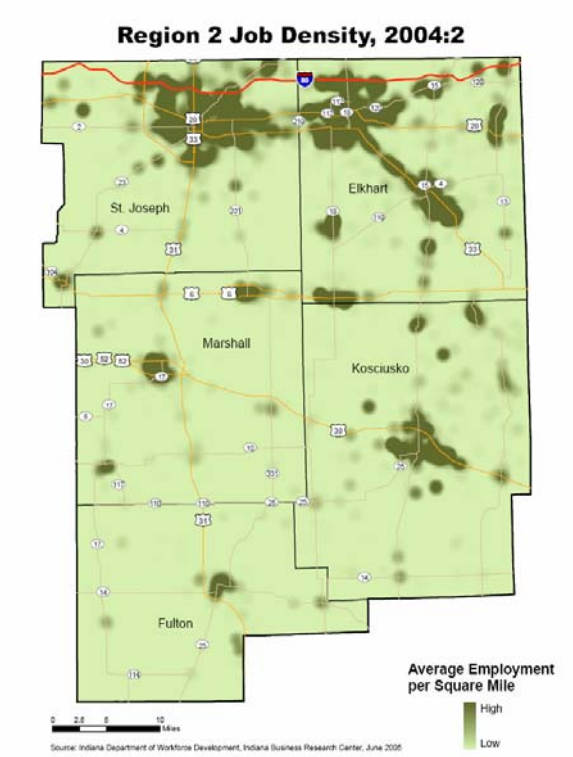
Northern Indiana SSI Phase One – Identification of Strategic Skill Shortages

Signature Page:

Name	Industry	Title	Signature
Juan Manigault	Core Agent	President and CEO Northern Indiana Workforce Investment Board	
Jack Isles	Advanced Manufacturing	General Manager Bull Moose Tube Company	
Brad Bishop	Life Sciences	Director of Corporate Communications Zimmer Corporation	
Jinny Longbrake	Health Care	Director of Human Resources Memorial Hospital	
Michael Busch	Economic Development	Executive Director Fulton Economic Development Corporation	
Lyn Batzer	Education	Dean of Academic Affairs Ivy Tech Community College	
Dave Gibson	Insurance and CBO/FBO	Chairman of the Board Gibson Insurance Group	
Michael Patton	CBO/FBO	President Urban League of South Bend and St. Joseph County	
Federico Thon	CBO/FBO	Assistant to the Mayor Hispanic Chamber of Commerce	
David Findlay	Financial Services	Executive Vice President and CFO Lake City Bank	
Eric Brown	Organized Labor	Vice President, AFL-CIO Central Labor Council	

All counties represented.

Strategic Skills Initiative
Phase One Report



Northern Indiana Workforce Investment Board, Inc.
VISIONARY LEADERSHIP FOR TOMORROW'S WORKFORCE

Juan Manigault
President/CEO
Core Agent
jam200@niwib.com
574-239-2380 ext. 212

Dan Hendricks
Vice President of
Strategic Research & Development
dhendricks@niwib.com
574-239-2380 ext. 229

Chuck Pressler, Ph. D
Director of Research
cpressler@niwib.com
574-239-2380 ext. 231

The Commerce Center, 401 East Colfax Ave., Suite 307, South Bend, IN 46617

The Northern Indiana region has had a long dependence on manufacturing. As we move towards a knowledge-based economy, our region will face tremendous challenges to maintain a strong and viable economy. The solution is the development of a strong vision that incorporates the history of our past, while identifying the opportunities of the future. Globalization and innovation are the key drivers that must incorporate the new technologies---nanotechnological, geo-spatial and biochemical---into our emerging occupations and skill sets. The Strategic Skills Initiative provides our region the opportunity to build a dynamic vision and plan to assure that Northern Indiana participates fully in the economic agenda of the 21st Century.

- *Juan Manigault, President, CEO*
  Northern Indiana Workforce Investment Board

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Executive Summary

Industries: Manufacturing and Health Care Produce Durable Goods and Durable People!

Manufacturing and health care are vital to Economic Growth Region 2 (EGR-2), economically, and, in a way that cannot be ignored, emotionally. Manufacturing has been the main driving force behind the region's economic success for decades and offers the greatest growth opportunities in the years ahead. People in the region have a very strong identification with their manufacturing heritage. The region has already shed much of its low-end functions, resulting in a higher percentage of *advanced* manufacturing in the region than the state average. The Northern Indiana Workforce Investment Board (NIWIB) 2005 State of the Workforce Report, *Competing for Opportunity*, pointed out that the four-county workforce service area enjoys a 17.1% rate of advanced manufacturing compared to the state's 16.0%. Though the EGR now consists of five counties, advanced manufacturing is still of critical importance, and will continue to be essential.

However, the character of advanced manufacturing, that is, what we define by the term "advanced," seems likely to change in the next decade. It is imperative that EGR-2 not only be aware of the dimensions of that change, but also that the region seek to position itself to both participate in and direct that change. Therefore a portion of this report will focus on the future of manufacturing in EGR-2 and the ways in which our partners can develop strategies to keep manufacturing a driving force of the regional economy.

Not all subsectors of manufacturing are growing equally or provide equal value to the economy. While wood products and computer and electronic product manufacturing have declined, positive growth has been seen in the largest sectors. Because of their employment size, growth, wages, and relatively large share of the economy, the EGR-2 Consortium has prioritized the following basic, key subsectors:

- Transportation equipment;
- Miscellaneous Manufacturing –medical equipment;
- Fabricated metal products;
- Plastics and rubber products;
- Machinery manufacturing.

The health care and social assistance industry is not nearly as large as manufacturing. In fact, it employs fewer people than retail sales. However, health care has its own emotional component. It plays a large role in *quality of life*. Direct patient care is never going to be outsourced. Our longer-lived, aging population has more need for it. The accessibility of quality health care is a security factor for families. And it is growing at a steady pace. Unlike manufacturing, where advances in technology can reduce the need for workers, technical advances in health care can actually *increase* the need for workers

because new technologies expand the treatment options available, increase patient longevity, and create higher demand for services.

As with manufacturing, not all sectors within health care are equal. Nursing and residential care facilities actually have fewer employees than they did 10 years ago. EGR-2 has determined, based on employment, growth, wages, and importance to the economy to focus on:

- Ambulatory health care services;
- Hospitals.

21st Century Industries: Emergent Manufacturing Improves Durability for Both Economy and People

While the traditional manufacturing subsectors have permitted EGR-2 to maintain a strong economic position relative to the rest of the state, and to the nation as a whole, certain indicators suggest that this position is somewhat shaky over the long term. Outsourcing, the loss of manufacturing jobs overseas, an engineering "brain drain," and global economic trends have all been cited – by many sources, from Congress to the Kiplinger Letter - as warnings that the traditional American economy is becoming increasingly fragile and volatile. Therefore, it seems necessary that EGR-2 adopt a perspective much broader than one focused on the future of present industries. What is needed is a perspective that maintains the vitality of the current economy and simultaneously proposes a vision of emerging economic activity and the ways in which jobs, education, and people can be translated into successful participants in that future.

A perspective capable of envisioning a transition to an EGR responsive to 21st Century Industries must account for three major drivers of emerging industrial development – globalization, technology, and innovation. And such a perspective should emphasize participation in one or more of the three major, emergent industrial subsectors – geospatial, nanotechnology and biotechnology. In many ways, EGR-2 is uniquely positioned to move successfully into not one, but two of these subsectors – biotechnology and nanotechnology. The challenge is to translate current and short-term jobs and thinking into long-term economic success.

Occupations: Technical Jobs Are New Ticket to the Middle Class

Manufacturing

The manufacturing occupations selected for focus by EGR-2 are vital to the sectors targeted for the region. They were selected based on their strong employment demand, critical need in the cluster sectors, good earnings and benefits, certifiable technical skills, and appropriateness for targeting by the workforce system. The selected manufacturing occupations are:

- First Tier
  - Welders, cutters, solderers, and brazers
  - First-line supervisors of production and operating workers
  - Painters, transportation equipment
  - Computer-controlled machine tool operators, metal and plastic.

- Second Tier
  - Truck drivers, heavy and tractor-trailer
  - Industrial engineering technicians
  - Other production employees – polishers

- Third Tier
  - Cytogenetic technologists
  - Orthotists
  - Orthopedic cast technologists
  - Biostatisticians

The first tier will be the focus for this project. The second tier is listed to acknowledge that there are shortages and to ensure they are not forgotten as we work through resolving first tier issues. While second tier occupations are not our initial priority, if an opportunity arises to quickly address a barrier that will result in an increase in the skill supply, we will seize the opportunity. The third tier consists of emerging occupations, only recently created, that may become the focus of workforce activities in the future. Job descriptions, anticipated demand, and other information regarding these jobs are new and highly susceptible to modification.

Health Care

Technology has also played a large role in the explosion of the health care industry. Health care is a major industry in nearly every region of the country. Aging populations (who require additional services), longer average life spans made possible by better preventative health care, a growing population, more public awareness of health issues, and a greater readiness to utilize services have contributed, but technology has also led to advances that have expanded specialties, diagnostic techniques, and treatment. Health care has gone high-tech! Yet, young people often perceive health care as "dirty work" and women, who used to be the backbone of health care, now have many more career choices than they did in the days when nursing, teaching, and clerical work were virtually their only options.

The occupations selected for focus for the health care industry were also selected on the basis of their strong employment demand, critical need in the cluster sectors, good earnings and benefits, certifiable technical skills, and appropriateness for targeting by the workforce system. They are:

- First Tier
  - Medical assistants
  - Registered nurse
  - Respiratory therapists
  - Medical record and health information technicians, including coders

- Second Tier
  - Radiologic technologists
  - Surgical technologists

- Third Tier
  - Biomedical engineer – surgical instruments
  - Bioinformatics specialists
  - AIDS therapy modelers

As with manufacturing occupations, these tiers do not prioritize the importance of occupations, but rather point to some of the occupations EGR-2 needs to examine both now and in the future.

Methodology

The methodology used to select key industries and subsectors included use of existing studies and reports as well as following the methodology steps outlined in the Strategic Skills Initiative Research and Identification Guidebook. An industry modeling approach was used based on key economic factors. The industries and subsectors that rose to the top in the model were tested against the knowledge and expertise of industry leaders, economic developers, and national/global trends that impact the future of the industries.

Occupations were selected by using staffing patterns, wage data, growth data, and interviews with managers in the field to identify the critical occupations. Secondary literature research provided context to national trends for the occupations. The occupations were tested against focus groups with industry leaders, workforce intermediaries, and others as a "reality test." The University Support Joint Venture team (listed in RGA and hereafter referred to as the "University Research Team") reviewed all data and the final selections for both industries, subsectors and occupations.

Participation and Endorsement of the Regional Consortium

The Consortium first met August 30, 2005. The broad spectrum of community and industry leaders was listed in the RGA. The Consortium was introduced to the purpose, components, and sequencing of the SSI project. They were engaged in a

discussion to extract their knowledge of the region's economy as a starting point to shape research objectives. The members brainstormed occupations with workers in short supply (e.g., medical coder, metal workers); skills in short supply (e.g., higher math, critical thinking); life skills in short supply (e.g., attitude, motivation), and other issues (quality of life, environment).

During the course of research, the Consortia Executive Group members (identified in the RGA) were kept apprised of progress and findings. The Executive Group, particularly the Core Agent, promoted the activities and progress of SSI with the community. Various members of the original Consortium participated in focus groups that were convened as part of the research phase and, in turn, members of the focus groups were invited to join the Consortium.

Following all research and review by the University Research Team*, the final data and draft of this report were presented to the Regional Consortium on October 18 for validation. Members in attendance voted to approve the report for submission.

* The University Research Team consists of economics and marketing professors from Indiana University South Bend and the University of Notre Dame. They have agreed to assist the Strategic Skills Initiative staff of the Northern Indiana Workforce Investment Board in the process of verifying the conclusions of our data analyses.

Section 1: Methodology

Use of Recommended Methodology and Web-Based Training

The Vice President of Strategic Research and Development and the Research Director participated in web-based training offered through DWD. The lessons learned in training and the directions in the guidebook were employed in the development of this report. Indeed, the input from Workforce Associates and our timely dialogues proved pivotal to our efforts.

Explanation of Alternative Methodology

No alternative methodology was used, although additional factors were taken into consideration. For example, value-added estimates were a consideration in selecting industry subsectors. Value-added estimates were determined through use of IMPLAN, a proprietary database that allows computation of the total value an industry sector provides to the community based on employee compensation (wages and benefits); proprietary income; other property type income such as interest, rent, profits, and dividends; and indirect business taxes which includes excise and sales taxes paid by individuals to businesses.

Explanation of Methodology

1. Step One: Selecting the Industries at the Two-Digit Level

Research began at the two-digit level of NAICS by looking at employment, percent of total employment, total earnings, percent of total earnings, and average earnings per job for each industry. The results re-affirmed for EGR-2 what a committee of NIWIB had already prioritized for the workforce service area over a year ago. For each NAICS industry, the committee discussed:

- Size: number of firms, number of workers, percentage of total workforce, percentage of total firms. Size of employment is a reflection of opportunity. Number of establishments is a reflection of potential stability of the industry in the region.
- Growth: not only whether the industry has shown growth over time, but what growth is anticipated based on economic development targets and current events.
- Job Openings: even a sector that is not growing can have many current or future job openings due to attrition and retirements.
- Future Hiring Needs: a combination of growth and attrition.
- Wage Scales: industries that have a high percentage of high paying jobs add wealth to the economy.

- Technology: industries that take advantage of technology are more likely to be sustainable over time.
- Environmental Concerns: public perceptions of impact.
- Organization: industries with active trade or professional associations are easier to work with on solutions.
- Leverage: industries with current initiatives in place are more likely to be successful to work with.

Although the committee did not pursue additional drill-down at that time, the ground was set by community members to prioritize manufacturing and health care and social assistance. When the geography of EGR-2 was issued, local researchers re-examined the previous data elements, now with Fulton County included. The results have not changed. The job concentration map for the region available on the DWD website for EGR-2 shows the importance of manufacturing and health care by county. Manufacturing is top in both employment and wages of every single county. Health care is ranked 2nd or 3rd for either employment or wages in every county. The map may be found at:
http://www.stats.indiana.edu/ssi/maps/top_industries/top3_region2_043.pdf

Extensive quantitative data may be found in the appendices to this report.

The first chart below[1] provides additional reasoning for selecting these industries. Durable manufacturing and hospitals have among the highest percentages of "good jobs." Their proportion of good jobs is greater than their proportion of bad jobs. Bad jobs are poverty-level or low wage. Poverty-wage jobs are defined as those paying less than $8.40 per hour in 2000; jobs paying between $8.40 and $12.60 are considered low-wage. Good jobs are those paying more than $12.60 per hour in 2000. The chart demonstrates that durable goods manufacturing was comprised of 56.4% good jobs, and hospitals had 59.6% in 2000. The average for the economy as a whole was only 48.1% good jobs.

The second chart on the next page reflects upward and downward mobility by subsector. The upward mobility rate is the one-year intra-industry mobility rate from bad to good jobs; i.e., the number of people that were in a bad job one year and in a good job in the same industry the next year, divided by the total number of people in bad jobs in that industry in the first year. For both durable manufacturing and hospitals, the upward mobility rate far exceeds the downward rate. There is a larger spread between their upward and downward rates than for the economy overall. While durable manufacturing has a slightly lower mobility rate than the economy as a whole, and hospitals have the same rate as the overall average, both durable manufacturing and hospitals have a lower downward mobility rate than the economy as a whole, reflecting greater stability for the workers.

[1] "From Bad to Good Jobs?"; Pablo A. Mitnik and Matthew Zeidenberg, Center on Wisconsin Strategy, September 2004

Employment Structure of Twelve Selected Industries, 2000

	Number of Jobs in 2000					Share of Jobs in 2000			
	Bad Jobs			Good Jobs		Bad Jobs			Good Job
Industry	Poverty Wage	Low Wage	Total		Total	Poverty Wage	Low Wage	Total	
Construction	1,088,572	2,146,389	3,234,961	3,835,584	7,070,546	15.4	30.4	45.8	54.2
Durable Manufacturing	1,707,482	3,380,146	5,087,628	6,573,497	11,661,125	14.6	29.0	43.6	56.4
Banking	370,230	720,733	1,090,963	1,079,354	2,170,316	17.1	33.2	50.3	49.7
Hospitals	723,865	1,283,256	2,007,121	2,965,930	4,973,052	14.6	25.8	40.4	59.6
Schools	1,326,937	1,792,731	3,119,668	4,389,613	7,509,280	17.7	23.9	41.5	58.5
Business Services	741,780	820,875	1,562,655	996,645	2,559,300	29.0	32.1	61.1	38.9
Non-food Retail	4,289,749	3,025,633	7,315,382	2,910,302	10,225,684	42.0	29.6	71.5	28.5
Nursing and Personal Care Facilities	676,191	546,092	1,222,283	476,641	1,698,924	39.8	32.1	71.9	28.1
Hotels and Lodging Places	637,058	462,445	1,099,503	386,166	1,485,670	42.9	31.1	74.0	26.0
Food Stores	1,520,857	766,433	2,287,290	635,895	2,923,185	52.0	26.2	78.2	21.8
Child Care	569,727	259,200	828,927	150,554	979,481	58.2	26.5	84.6	15.4
Eating and Drinking Places	3,281,592	1,365,218	4,646,810	903,940	5,550,750	59.1	24.6	83.7	16.3
Entire Economy	29,175,620	31,902,986	61,078,606	56,701,388	117,779,992	24.8	27.1	51.9	48.1

Source: Authors' calculations using data from the CPS-ORG 2000.

Note: Poverty-wage jobs are those paying less than $8.40 in 2000; jobs paying between $8.40 and $12.60 in 2000 are low-wage. Bad jobs are either poverty- or low-wage jobs. Good jobs are those paying more than $12.60 in 2000.

Upward and Downward Mobility Rates in Twelve Selected Industries, 2000-2001.

	Upward Mobility Rate					Downward Mobility Rate				
Industry	All Workers	Dropouts	HS grads	Some College	College grads	All Workers	Dropouts	HS grads	Some College	College grads
Construction	0.23	0.18	0.23	0.28	*	0.10	0.19	0.12	0.06	0.05
Durable Manufacturing	0.20	0.12	0.19	0.23	0.42	0.11	0.25	0.15	0.11	0.04
Hospitals	0.22	0.08	0.16	0.24	0.43	0.12	*	0.29	0.13	0.06
Eating and Drinking Places	0.08	0.04	0.07	0.11	0.17	0.31	*	0.33	0.39	0.14
Banking	0.20	*	0.16	0.20	0.28	0.13	0.00	0.28	0.15	0.05
Hotels and Lodging Places	0.08	0.03	0.07	0.08	*	0.15	*	0.17	0.18	0.09
Nursing and Personal Care Facilities	0.11	0.06	0.10	0.13	0.17	0.12	0.04	0.12	0.16	0.06
Child Care	0.08	0.00	0.05	0.09	0.17	0.17	NA	*	*	0.13
Schools	0.24	0.08	0.12	0.18	0.46	0.12	*	0.35	0.27	0.08
Business Services	0.05	0.02	0.06	0.06	0.10	0.09	0.00	0.19	0.05	0.06
Food Stores	0.08	0.01	0.08	0.10	0.15	0.20	*	0.23	0.19	0.07
Non-food Retail	0.10	0.05	0.09	0.10	0.18	0.17	*	0.21	0.15	0.14
Entire Economy	0.22	0.10	0.20	0.24	0.45	0.17	0.33	0.25	0.20	0.09

Source: Authors' calculations using data from the CPS-ORG 2000-2001.

Notes: * Indicates that the sample size was too small to allow reliable estimation. The upward mobility rate is the one-year intra-industry mobility rate from bad to good jobs, that is, the number of people that were in a bad job in one year and are in a good job in the same industry in the next year, divided by the total number of people in bad jobs in that industry in the first year. The downward mobility rate is defined in an analogous manner.

2. Step Two: Drilling Down For Industry Subsectors

All three-digit subsectors[2] within manufacturing and health care and social assistance were placed in a matrix that included:

- Employment, 4th quarter of 2004
  - Total jobs
  - Percentage share of total jobs (within the 2-digit NAICS industry and/or relative to the total number of jobs in EGR-2)
  - Location quotient (a measure of an industry's concentration in the region compared with its concentration in the US as a whole).

- Job Growth, 4th quarter of 1994 to 4th quarter of 2004
  - Job growth in numbers
  - Rate of job growth over the period
- Shift Share Analysis
  - Change in the number of jobs relative to the general national economy
  - Change in the number of jobs relative to the regional economy
- Wages
  - Total sector wages for 4th quarter of 2004
  - Average weekly wages for 4th quarter of 2004
  - Total value

From this analysis, researchers selected Plastics and Rubber Products, Fabricated Metal Products, Machinery Manufacturing, Transportation Equipment, and Miscellaneous Manufacturing-Medical Equipment on the basis of their high employment, job growth, location quotient, positive shift-share, and good wages. Selection was not purely based on the numbers, but also on inter-connectedness. For example, Plastics and Rubber has a negative job growth, but it is a supplier to Transportation Equipment along with Fabricated Metals. Machinery Manufacturing is relatively small and has had negative job growth, but as a customer, it is connected to Fabricated Metals. It was felt that regardless of the statistics, the suppliers to the largest sector had to be supported in order to grow the dominant key industry, and other customers of the key supplier needed to be supported to keep the supplier ready to meet the needs of the dominant

[2] To avoid confusion, from this point forward only 2-digit NAICs categories will be called "industries." Three-digit categories will be referred to as "subsectors." One four-digit subsector was included: Miscellaneous Manufacturing – Medical Equipment. Considering Miscellaneous Manufacturing as a whole on a five-county basis would keep a very important sector for one county from rising to the top of the analysis. Much of the data was only provided for the 3-digit subsector, and did not break down the 4-digit subsector. Worksheets indicate where 339 or 3391 is being considered. Subsector 3391 is the largest subsector of 339; equivalence is very rough.

subsector. Their mutual linkages make them a cluster. The dominant industries rely on key suppliers, and key suppliers rely on a wider customer base to remain viable.

Ambulatory Health Care Services (excluding mental and dental) and Hospitals were selected as the subsectors of choice for health care. Hospitals and Ambulatory Health Care Services form a cluster because of their common services, customers, and providers. Nursing and Residential Care Facilities is part of this cluster, but it is actually decreasing in size in the region, and, as shown by the tables above, it has a high proportion of "bad jobs," and its downward mobility rate exceeds the upward mobility rate.

Researchers re-affirmed their choices by placing all subsectors in the region into a model that ranks the subsectors against each other and against comparison subsectors. The model for industries was based on:

- Number of jobs (which reflects opportunity);
- Total wages 4th quarter 2004 (total wages paid to all employees for the quarter);
- Total value added; and
- Job growth.

Each subsector was assigned a rank for each factor. The factors were equally weighted, and the ranks added to achieve a cumulative rank. Again, numbers were not the sole consideration. For example, Merchant Wholesalers, Durable Goods was ranked third, but it was not selected because too many of its jobs are low skill and it focuses on moving value created by others. Educational services is important to the region, particularly in Marshall County where it ranks second for both employment and wages, but the researchers elected to focus on private, tax-paying industries that employ large numbers of people in occupations appropriate for intervention by the workforce system. Wood Products Manufacturing was ranked 9th, but it was not selected because it has too many low wage, low skill jobs and has been declining in job growth. Plastics and Rubber ranked 13th, but it was kept in consideration because of its large size, high location quotient, and connection to Transportation Equipment. Machine Manufacturing, ranked 12th, is still on the table although it is relatively small in size and has negative job growth because occupations and skill sets used in the sector are common with the other targeted subsectors. Shift Share and Location Quotient were not ranked, but were taken into the final consideration. The final matrix is on the following page. The first column lists the subsectors, both targeted and comparison. The second column shows the number of people employed in that subsector in EGR-2, and the rank (the subsector that employs the most people is ranked #1). The third column contains the location quotient, followed by total wages in the 4th quarter of 2004 (the highest total wages was ranked #1); average weekly wage (also ranked); valu-added and the appropriate rank; ten-year job growth and rank; shift share analysis; and finally a cumulative rank that adds the rankings for job rank, total wages, weekly wages, value-added, and job growth. The cumulative rank was then ranked, with the lowest cumulative number ranking that subsector as #1.

TABLE 1

Northern Indiana Workforce Investment Board
Strategic Skills Initiative

Strategic Occupational Sectors (SOS)
Quantitative Priorities for EGR2

(Data is 2004 Annual Average, except where noted)

Strategic Occupational Sectors (SOS) EGR2

	Jobs	Rank	LQ[1]	Total Wages, Q4 '04				Total Value Added		Job Growth		Shift Share[2]			Cum	Overall	Clust
31-33 Manufacturing			US	1,000s	Rank	Weekly $	Rank	(in thousands	Rank	1994-2004	Rank	Nat'l	Indu	Reg	Score	Ranking	Rank
336 Transportation Equip.	38573	1	9.04	$474,763	1	$941.36	13	1,545,387	1	6632	1	4766	-8167	10033	17	1	
3391 Miscellaneous Mfg. - Medical	7937	11	5.14	129,716	4	1244.16	4	786,410	4	2331	4	836	-1319	2813	27	2	
332 Fabricated Metal Products	12435	5	3.47	117,200	5	727.81	36	869,821	3	372	16	1800	-2419	991	65	6	1
326 Plastics and Rubber Products	10129	7	5.33	87,061	8	657.79	42	423,101	8	-1855	81	1788	-2474	-1169	146	13	
333 Machinery Manufacturing	3748	23	1.4	46,051	16	932.45	15	234,988	11	-625	73	652	-1384	107	138	12	
Health Care																	
621 Ambulatory Health Care Svcs.	9636	9	0.81	139,485	3	1096.98	7	653,167	5	1842	6	1163	1499	-820	54	4	2
622 Hospitals	10295	6	0.8	100,965	7	745.21	34	406,476	9	1806	7	1267	-205	745	63	5	
For Comparison:																	
334 Computer and Electronic Mfg.	2147	34	0.69	21,071	34	754.57	32	87,786	15	-1128	76	489	-1138	-479	191	15	
423 Merchant Wholesalers, durable	9824	8	1.4	116,690	6	909.81	17	1,262,937	2	1852	5	1189	10	653	38	3	
452 General Mdse. Sales	7884	10	1.13	35,424	22	329.54	72			946	10	1035	-154	64	>129	11	
611 Educational Services	26831	2	1.02	228,665	2	604	50	349,824	10	6380	2	3,051	2,271	1,058	68	7	
722 Food Services and Drinking Place	18337	3	0.87	50,588	14	212	80			659	12	2638	1917	-3896	>109	9	
561 Administrative and Support[3]	11774	4	0.74	65,138	12	365	67			2825	3	1335	2574	-1085	>86	8	
321 Wood Products Mfg.	7,895	12	6.08	76,245	11	732	35	442,126	6	-80	53	1,190	-1,333	63	181	14	
541 Professional, Scientific and Technical Services[4]	7,198	15	0.43	78,999	10	860	21			-811	74	1195	1313	-3319	>120	10	

[1]LQ - Location Quotient. A measure of an industry's concentration in a region compared with its concentration in the US as a whole. An LQ of 0.8-1.2 is not considered to be a significant deviation from 1.0.

[2]Shift Share Analysis - a measure of the change in the number of jobs relative to the general national economy ("natl"), the particular industry in the rest of the country ("indu"), and the specific region ("reg"). The larger the number in the "reg" column, the faster that industry has grown relative to national trends.

[3]Administrative and Support NAICS includes establishments performing functions for other firms, such as security, phone answering, temp placement, collections, etc.

[4]Professional, Scientific, and Technical Services NAICS includes lawyers, accountants, consultants, and other highly-educated advisory or consulting persons.

Total n = 81 NAICS codes
sources: www.stats.indiana.edu/ssi
INPLAN

10.05rev14

Durable goods manufacturing is always susceptible to world economic conditions, and is often the first to be impacted during a recession. EGR-2's largest manufacturing subsector, Transportation Equipment, is sensitive to rising fuel costs (negatively), demographics (positively, as aging baby boomers take to the road), and, interestingly, can be affected by the climate as RVs get pulled into use as temporary housing for hurricane victims.

An analysis of Northern Indiana by Economy.com pointed out that manufacturing will provide the region "the biggest growth opportunities…AM General is doing booming business with the increasing popularity of its civilian Hummer…Thor Industries won a $45 million contract with Cruise America…Demand for RVs is expected to remain strong…Zimmer Holdings, Inc. has experienced enough sales growth to enable acquisition of a Swiss Company in the same line of business." Durable goods manufacturing will likely continue to be the main economic driver in the region for years to come.

3. Step Three: Subsector Verification

The results from the models were then examined against secondary literature[3] and data research and the analysis and choices were reviewed by the University Research Team.

4. Step Four: Occupational Modeling

To select occupations, researchers used staffing patterns for the selected subsectors to identify the largest occupations as a starting point. Then, using data from the SSI website, researchers created a model to examine annual openings (both growth and attrition), wages (mean, entry, and experienced) and ranked the occupations to identify the "best bets" in terms of opportunity, growth, and wages.

5. Step Five: Primary Research

The numerical data were evaluated against:

- Results from a job vacancy survey conducted by ERISS;
- Appropriateness for targeting:

  In addition to deferring occupations that require bachelors degrees or higher, there were also some assumptions made about whether the system will be capable of impacting shortages based on preliminary understanding of potential root causes. It is possible some occupations may be dropped and others that were ranked lower on the list rise to the surface as root causes are identified in the next phase. Occupations that require bachelor's degrees are being indirectly addressed; that is, some of the occupations targeted for SSI are the first rung on a ladder that ultimately

[3] Secondary data included North Central Indiana Region Comprehensive Economic Development Strategy 2001-2005, Competing for Opportunity State of the Workforce Report 2005, Region 2 Economic Development Strategy 2005, Building the Workforce for the 21st Century State of the Workforce Report 2002, numerous magazine articles, state reports, and internet research on the industries.

leads to the four-year degree occupation. Nurses with bachelor's degrees are highly desirable, but medical assistants are a first level, and registered nurses with a two-year degree a higher rung of the ladder leading to BSN. Similarly, industrial engineers are in short supply, and SSI will initially tackle the first rung of the ladder by focusing energy on industrial engineering technicians when it tackles the tier 2 occupations.

"As an individual who has devoted my entire career, both in industry and academia, I have, for some years now, seen an aging workforce in the field of engineering that is not being adequately replaced. This problem is being compounded by fewer and fewer young people choosing to major in engineering and technology disciplines. This later fact is well documented with by the National Center for Educational Statistics. These factors are working together to create critical shortages of the skilled engineers and technologists. These engineers and technologists are the very people needed to support the spectrum of design and manufacturing engineering activities found in industry today. Without an adequate supply of properly educated individuals entering manufacturing, the continuous productivity and quality gains needed to compete in the global marketplace will be significantly impeded."

Mark A. Curtis, Ed.D., Professor and Director
Purdue University College of Technology, South Bend Region

- Focus group input from people in the industry and workforce intermediaries. Focus group participants are identified in the appendices.

  Focus groups were held with:

  - Five advanced manufacturing groups across the region;
  - One medical manufacturing group (Kosciusko County only, because that is where the sector is prominent);
  - Two WorkOne Employer Advisory Councils;
  - One Health Care Summit (attended by representatives from all counties); and
  - Two postsecondary focus groups (IU South Bend and Ivy Tech, which serve the entire region).

  Focus group participants gave input on:

  - Current occupational and skill issues;
  - Future occupational projections;
  - Hard-to-fill openings;

- Criticality of occupations to the industry;
- Skill sets common to the occupation;
- Skill sets most often found lacking; and
- Challenges in recruitment.

6. Step Six: Selection of Occupations

Using the top occupations identified by modeling and primary research, researchers developed a matrix that included, by sector:

- Percentage each occupation comprises of all jobs in each subsector;
- Openings due to growth;
- Openings due to attrition;
- Total anticipated openings;
- Annual job openings total;
- Anticipated overall percentage increase, 2002 to 2012;
- Total percent increase in the sector;
- Entry level wage;
- Mean annual wage; and
- Experienced wage.

The matrix was not a model and the occupations were not ranked or scored, but the data provides another way of re-affirming importance and need identified by the focus groups.

7. Step Seven: Occupational Verification

The University Research Team examined and verified all quantitative data and approved the final analysis and selection of targeted occupations. The 21st Century Strategic Skills Consortium* (formerly the NIWIB Incumbent Worker Council) reviewed and validated qualitative data. The final critical occupation matrices are contained on the next two pages.

8. Step Eight: Appropriateness for the Workforce System

The targeted occupations were confirmed as appropriate for the workforce system by reviewing the targets against NIWIB's occupations in demand. Demand occupations were identified as those determined by NIWIB to offer the greatest potential for reasonably stable, secure and family-supporting employment. NIWIB limits the use of WIA training funds to demand occupations. The list includes all first and second tier health care occupations selected for SSI. It includes all first tier manufacturing occupations and all second tier with the exception of polishers.

*This group serves as an independent Board of Directors to the SSI staff.

TABLE 2

Northern Indiana Workforce Investment Board
Strategic Skills Initiative

Critical Occupations (SOC), Industrial Cluster

Base Year 2002, Projected Year 2012

(SOC = Standard Occupational Classification, created in 2000 by the Bureau of Labor Statistics, Dept. of Labor)

Occupations, by SOC		Openings and Growth, General					Openings and Growth, Specific					Wages		
SOC code	Occupation Title	2002 Base Yr. # emp.	2012 Proj. year # emp	Openings fm growth	Openings fm replace/ attrition	Annual Openings (all sectors)	Focus Sectors (see legend)	2002 Base Yr. # emp.	2012 Proj. year # emp.	Proj. Change	Estimated Sector Annual Openings[4]	Annual Mean	Annual Entry	Annual Experienced
First Tier														
51-4121	Welders, Cutters, Solderers, Brazers	2300	2800	500	650	120	332	430	500	70	15	27533	22447	33440
							333	140	180	40	8	27543	21660	30485
							336	1150	1440	290	40	31266	24148	34825
											total 63			
51-1011	First-line Supervisors of Production and Operating Workers	4740	5430	690	990	170	326	640	610	-30	0	43559	31890	49394
							332	590	660	70	15	54835	28107	68199
							333	190	220	30	5	53652	37965	61496
							336	1070	1290	220	35	49900	35553	57074
							3391	160	250	90	15	43301	31036	49433
											total 70			
51-9122	Painters, Transportation Equipment	680	890	210	180	40	336	540	730	190	total 25	25543	20827	27901
51-4011	Computer-controlled Machine Tool Operator	1290	1430	140	210	40	339	380	570	190	total 25	34364	28131	37033
Second Tier														
53-3032	Truck Drivers, Heavy and Tractor-Trailer	5030	5350	320	820	120	326	100	110	10	8	32722	22267	37949
							332	90	110	20	10	35548	22789	41929
							336	120	140	20	15	34080	25620	38310
											total 32			
17-3026	Industrial Engineering Technicians	220	240	20	50	7	336	100	120	20	5	41649	28464	48242
							339	20	30	10	3	44937	36534	49139
											total 8			
51-9000	Other Production Employees - Polishers[1]						339	1130	1680	550	total 70	32733	22652	37773

[1]This SOC code, when used by NAICS 3391, includes the occupation of "Polisher," a special occupation unique to that industry, and not included in any other SOC. EGR2 has identified that occupation as "critical". Data on change due to growth and attrition are not available.
[4]Data for change in occupations due to growth and attrition are not available on the level of individual NAICS codes. Numbers are approximate.
"First Tier" and "Second Tier" refer to the speed with which the shortages in the occupations may be addressed.

Legend:

326 Plastic and Rubber Products	336 Transportation Equipment Mfg.
332 Fabricated Metal Products	339 Miscellaneous Mfg., including Medical Equipment
333 Machinery Manufacturing	3391 Medical Equipment Manufacturing

Table 3

Northern Indiana Workforce Investment Board
Strategic Skills Initiative

Critical Occupations (SOC), Health Care Cluster

Base Year 2002; Projected Year 2012

(SOC = Standard Occupational Classification, created in 2000 by the Bureau Labor Statistics, U.S. Department of Labor)

Occupations, by SOC		Openings and Growth, General						Openings and Growth, Specific					Wages		
SOC code	Occupation Title	2002 Base Yr. # emp.	2012 Proj. Year # emp.	Openings fm growth	Openings fm replace/ attrition	Total Openings all sectors	Annual Openings all sectors	Focus Sector (see legend)	2002 Base Yr. # emp	2012 Proj. Yr # emp	Proj. Change	Estimated Sector Annual Openings	Annual Mean	Annual Entry	Annual Experienced
First Tier															
31-9092	Medical Assistants	620	860	240	110	360	36	621	500	690	190	19	23340	19736	25142
								622	90	140	50	5	23848	20281	23562
												total 24			
29-1111	Registered Nurses[1]	4040	5240	1200	850	2040	200	621	1070	1480	400	*100*	59827	35888	71796
								622	2440	3070	630	*350*	43396	37544	46322
												total *450*			
29-1126	Respiratory Therapists	180	260	70	60	130	13	622	170	250	80	total 8	41332	32650	45763
29-2071	Medical Record and Health Information Technicians	500	730	230	70	300	30	621	180	300	120	12	22853	17778	25390
								622	240	320	80	8	22256	17149	24809
												total 20			
Second Tier															
29-2034	Radiologic Technologists and Technicians	390	460	80	70	150	15	621	140	170	30	3	39304	29020	44446
								622	250	290	50	5	41308	34616	44655
												total 8			
29-2055	Surgical Technologists	230	300	80	30	110	11	621	80	110	30	3	33645	25619	37659
								622	150	200	50	5	34261	28244	37279
												total 8			

[1] Annual openings were severely understated by available SSI data. Focus groups and actual hiring records of region establishments suggest anticipated openings as above in italics.
"First Tier" and Second Tier refer to the speed with which the shortages in the occupations may be addressed.

Legend:
621 Ambulatory Health Care Facilities
622 Hospitals

Section 2: Selection and Definition of Key Industries and/or Clusters

Definitions and Profiles[4]

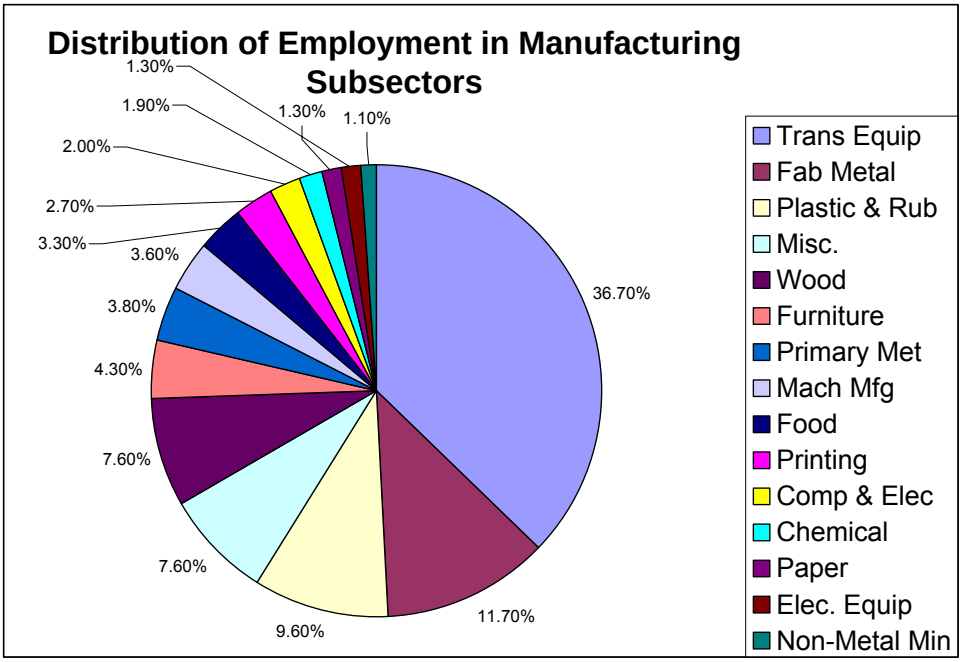
Transportation Equipment

The Transportation Equipment subsector comprises establishments primarily engaged in manufacturing equipment for transporting people and goods. Establishments in this subsector utilize production processes similar to those of other machinery manufacturing establishments - bending, forming, welding, machining, and assembling metal or plastic parts into components and finished products. However, the assembly of components and subassemblies and their further assembly into finished vehicles tend to be a more common production process in this subsector than in the Machinery Manufacturing subsector.

In EGR-2, the subsector is heavily represented by Motor Vehicle Body and Trailer Manufacturing, Motor Vehicle Parts, Motor Vehicle Manufacturing, and Other Transportation Manufacturing.

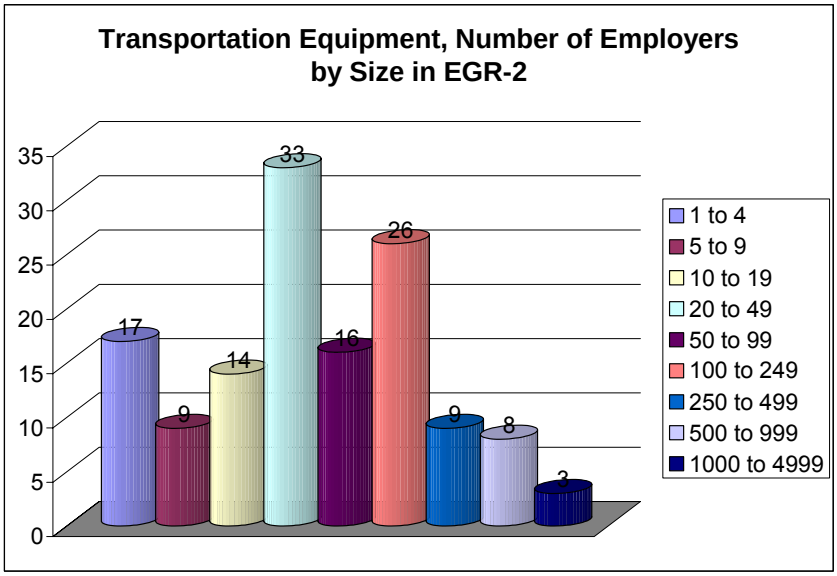
Maps showing the geographic locations of the firms in this subsector can be found at http://www.stats.indiana.edu/ssi/page2.asp along with a list of specific employer names, six-digit NAICS ndustry, address, and annual sales. A click on each firm's name provides a more detailed street map and contact person's name and phone number.

The subsector employs 38,573 people in EGR-2, making it by far the largest of all the manufacturing subsectors as shown in the chart below, Transportation Equipment manufacturing comprises over a third of all manufacturing employment in the region.



[4] Subsector definitions are taken from the NAICS website at http://www.census.gov/epcd/www/naics.html. National projections and sensitivities for subsectors are from http://www.iseek.org/sv/index.jsp

The 137 Transportation Equipment Manufacturing establishments range in size from 1-4 employees up to 1000-4999 employees. Three firms (Honeywell Aircraft, Monaco Coach, Supreme Industries, Inc. are in the 1000-4999 range. Eight firms are in the 500-999 employee size and nine are in the 250-499 range. The rest are small employers, distributed among the 5-9, 10-19, 20-49, 50-99, and 100-249 ranges. Several of the transportation manufacturing firms in EGR-2 are among the top 100 in Indiana in terms of revenue.

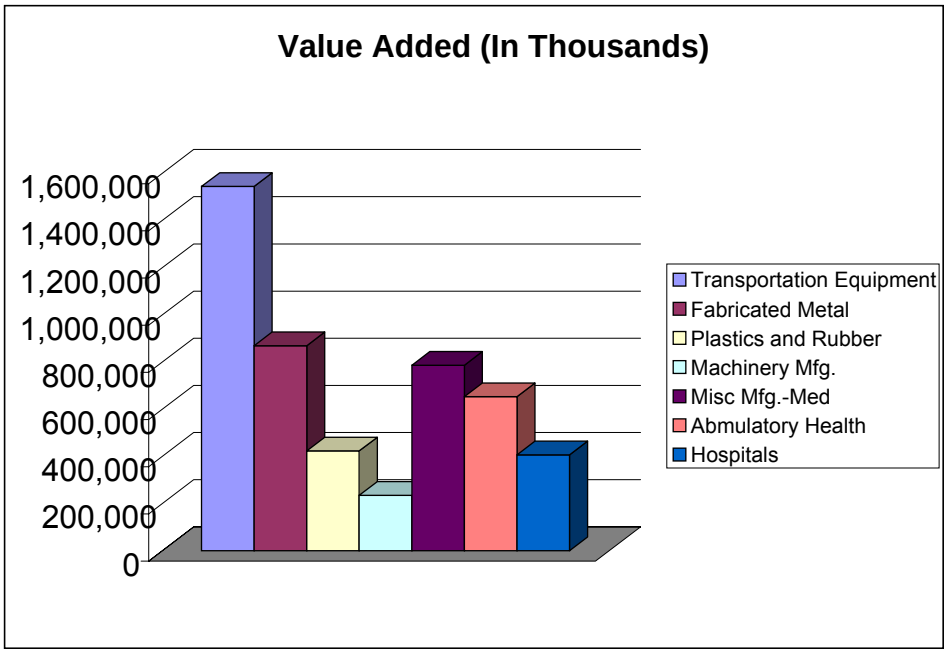


The transportation equipment industry has its ups and downs. Consumers tend to buy in prosperous times and not buy during recessions. During recessions, companies lay workers off. Competition and automation are the main reasons for job losses. Other factors include overseas competition, improved products, interest rates, and safety and environmental regulations.

Positive factors in growth are trade with Latin America, baby boomer spending, improved consumer confidence in American-made products, the need to replace aging cars and airplanes, and a cultural emphasis on leisure and recreation activities. Another positive factor is rapid growth in electronic commerce, expanding shipping delivery services.

Average weekly wages in the subsector are high at $941.36. Total wages paid for the fourth quarter of 2004 were $474,763,000.

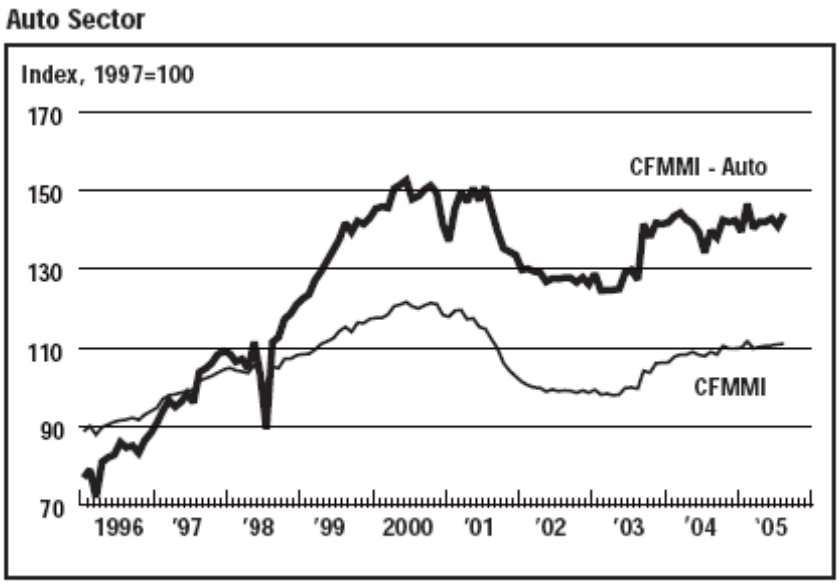
Transportation Equipment Manufacturing has the highest estimated value-added of all the subsectors selected, returning $1,545,387,000 annually into the economy.



Projections for future development in EGR-2 are strong, as noted earlier: "AM General is doing booming business with the increasing popularity of its civilian Hummer…Thor Industries won a $45 million contract with Cruise America…Demand for RVs is expected to remain strong…". According to ED Futures (posted 10/9/05), the profitability of companies depends on their ability to design desirable products.

The Federal Reserve Bank of Chicago's September, 2005, Midwest Manufacturing Index identified two of four regional subsectors in manufacturing that expanded in the region[5] in August. The increase was attributable to a solid increase in regional auto and steel output. "Regional auto output rose 2.2% from its July level…Midwest auto sector production rose 2.2% in August after falling 1.3% in July. The nation's auto output increased 2.7% in August." The chart below describes the auto sector as including both transportation equipment and plastics and rubber. The graph shows a good recovery from the recession.

[5] Seventh Federal Reserve District, which comprises Iowa, Indiana, Michigan, Wisconsin and most of Illinois



Auto Sector CFMMI Components:
Plastics and Rubber Products; Transportation Equipment

Miscellaneous Manufacturing – Medical

In the Medical Device manufacturing industry, scientific disciplines and engineering merge in the creation of innovations that benefit the health care system as well as society at large. Firms in this industry approach the diagnosis and treatment of ailments by providing a wide range of quality products suited to increasingly specialized needs. The Medical Devices manufacturing subsector includes:

- Medical, surgical and dental equipment (including electromedical equipment and related software);
- Furniture, supplies and consumables;
- Orthopedic appliances;
- Prosthetics and assistive devices; and
- Diagnostic kits, reagents and equipment.

Maps of locations and employer names for this subsector may be found at the same website given above for transportation equipment.

Of the 166 miscellaneous manufacturing firms in the region, 50 are in medical equipment. These medical equipment manufacturers, however, employ by far the largest number of workers of all miscellaneous manufacturing subsectors in the region. The majority of the 50 medical manufacturing firms are very small dental labs with less than 10 employees each. The heavy-weights in this subsector include:

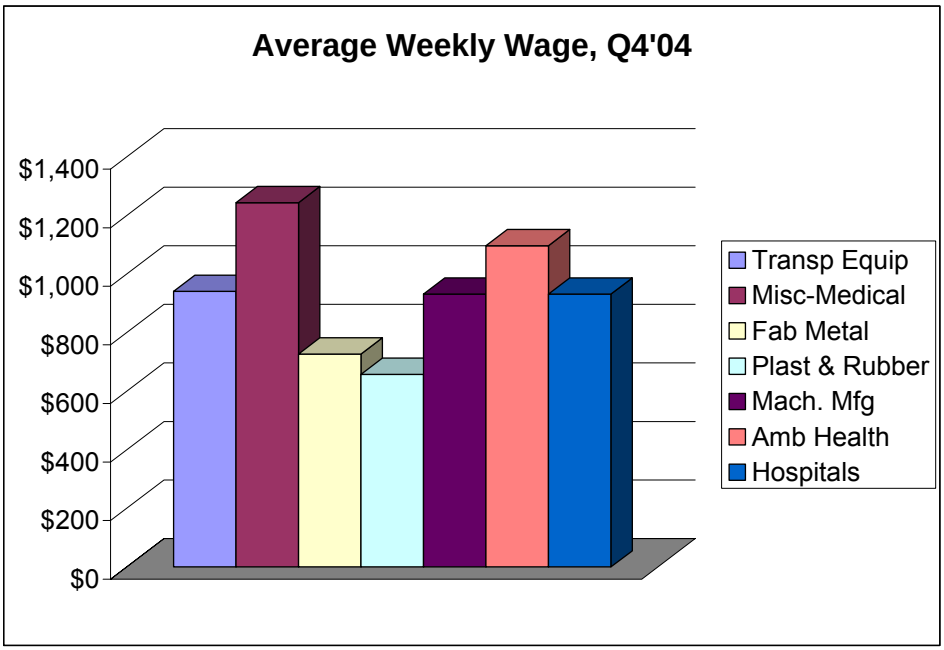
- 1,000-4,999 employee range: BioMet Mfg. Corp; Zimmer Holdings Inc., and Zimmer Inc. All manufacturing orthopedic/prosthetics and all are located in Warsaw. Zimmer is the 9th largest company in Indiana by revenue, and BioMet is 15th;

- 500-999 range: Accra PAC Group (physician and surgeons equipment and supplies - Elkhart); Bayer Diagnostics (surgical and medical instruments - Mishawaka); Biomet Inc. (orthopedic-prosthetic - Warsaw); and
- 25- 499 range: Symmetry Medical (physician and surgeons equipment and supplies – Warsaw).

Nationally, slower than average growth is expected in medical instruments and supplies manufacturing. A decline in employment is expected in measuring and controlling instruments manufacturing. Demand for new medical technologies and medical equipment is expected to grow due to the growing elderly population, but automation and new technologies are increasing production while employing fewer workers. Increasingly, parts of many products are made outside of the United States.

Medical equipment manufacturing is in a "mature phase" of its life cycle. "Capital/labor intensity is medium and the uptake of new technology is high. The industry's globalization level is medium and the trend is faster than the economy. The industry has a medium level of exports…[and] a medium level of imports. Exports are steady and imports are increasing. The level of regulation is high and increasing and government assistance is medium and steady."[6]

There are 7,937 jobs in medical manufacturing in EGR-2 and they pay extremely well. With an average weekly wage of $1,244.16, medical manufacturing surpasses any of the other targeted subsectors.



The outlook for this industry in Indiana is very good. According to the Indiana Health Industry Forum's report, *Critical Mass 2005*,

[6] ED Futures, posted 10/09/05

> "While biopharmaceuticals continue to flourish around the state, the medical device industry has continued its own explosive growth. Employing approximately 19,500 Hoosiers, a number of industry leading medical device manufacturers are found around the state, but the largest and most well-recognized cluster of companies operates in Northern Indiana, where Warsaw is often referred to as the orthopedic capital of the world. Indiana's medical device industry ranges from orthopedic implants and urological products to diagnostic devices. …Perhaps more than any other of Indiana's health industry sectors, the medical device sector is uniquely positioned to take advantage of the state's traditional manufacturing base as part of cluster building efforts. With the appropriate research, development and process adjustments, many of Indiana's traditional manufacturers have the ability to carve out new niches in medical device manufacturing as suppliers to established companies."

Fabricated Metal Products

Industries in the Fabricated Metal Product Manufacturing subsector transform metal into intermediate or end products, other than machinery, computers and electronics, and metal furniture or treating metals and metal formed products fabricated elsewhere. Important fabricated metal processes are forging, stamping, bending, forming, and machining, used to shape individual pieces of metal, and other processes, such as welding and assembling, used to join separate parts together. Establishments in this subsector may use one of these processes or a combination of these processes.

The manufacturing performed in the Fabricated Metal Product Manufacturing subsector begins with manufactured metal shapes. The establishments in this sector further fabricate the purchased metal shapes into a product.

Products from this industry are used in other industries like construction, transportation equipment, industrial machinery, electronics, and utilities. The outlook is affected by the level of business activity in the other industries. It also depends on competition from imports, defense spending, and international markets.

There are 341 firms in this subsector located in EGR-2, employing 12,435 people at an average weekly wage of $727.81. The vast majority of the firms are quite small; a great many have fewer than 20 employees. Only one firm (Syndicate Systems, Inc., a sheet metal fabricator in Middlebury) has over 500 employees. Three other firms fall into the 250-499 employee range: Elkhart Products Corp (plumbing fixtures- Elkhart); Nibco (plumbing fixtures – Elkhart); and Pirod Inc. (towers – Plymouth).

Plastics and Rubber Products

Industries in the Plastics and Rubber Products Manufacturing subsector make goods by processing plastics materials and raw rubber. The core technology employed by establishments in this subsector is that of plastics or rubber product production.

Technology includes molding, forming, spin casting, or extruding of various products. Plastics and rubber are combined in the same subsector because plastics are increasingly being used as a substitute for rubber; however the subsector is generally restricted to the production of products made of just one material, either solely plastics or rubber. As materials technology progresses, plastics are increasingly being used as a substitute for rubber; and eventually, the distinction may disappear as a basis for establishment classification.

Nationally, employment in the rubber and plastic products industry is expected to grow about as fast as the average overall employment growth rate through 2012. Most job growth will be in plastic product manufacturing, which is anticipated to add 128,000 new jobs from nationally 2002 to 2012.

Plastic manufacturers primarily mold plastics for other manufacturing industries that use plastic products to make their goods. Demand from these industries will influence job growth in the plastics industry.

The outlook for the rubber and plastic products industry also depends on consumer demand, automation, and environmental standards. Markets are improving for biodegradable plastics. Researchers also work to find ways of using scrap rubber and plastic for fuel.

Because plastic composites are replacing metal components in many products, producers must update fabrication plants. When manufacturers need to spend money for new equipment, they often automate more jobs. This trend will moderate job growth for hand workers and assemblers. More openings will occur for machine tool operators and setters.

Industrial rubber has grown at a compound rate of 5% in recent years and is expected to continue to grow, while the plastics sector has done less well due to volatility in the resins market. Employers have been faced with rising raw material costs which cuts into their profits.[7]

Plastics and Rubber employs 10,129 people in EGR-2 at an average weekly wage of $657.79. The vast majority of the 138 firms in this subsector are quite small, and clustered around South Bend and Elkhart. The largest firms are:

- 500-999 employee range: Robert Bosch Braking Systems (brake lining – South Bend); and
- 250-499 range: 20th Century Fiberglass (plastics and plastic products – Elkhart); Aker Plastics (hot tubs and spas – Plymouth); Carpenter Co. Inc (plastics/foam – Elkhart); Janco Products (plastics and plastic products – Mishawaka); Nyloncraft (plastics and plastic products – Mishawaka); Nishikawa Standard (weather strips – Bremen)

[7] ibid.

Machinery Manufacturing

Firms in machinery manufacturing design and make products such as gears and levers that apply mechanical force to perform work. They forge, stamp, bend, form, and machine pieces of metal. They weld and assemble to join parts to make products. These processes are similar to metal fabrication. But when making machinery, firms use multiple metal-forming processes to make diverse parts of a machine. Complex assembly operations are required.

Firms specialize in making machinery for particular uses. In machinery production, design is considered part of the production process.

The outlook depends on international trade and stable financial markets. It also depends on the needs of other industries. Most companies in this industry sell machinery and equipment to other manufacturers. They must use new technologies to keep up with the needs of customers. The electronics industry is a major buyer of industrial machinery and equipment. Nationally, machinery manufacturing is anticipated to generate 120,000 new jobs between 2002 and 2012.[8]

Machinery manufacturing is the smallest of the manufacturing subsectors being targeted by EGR-2, with only 3,748 jobs. However, the jobs are quite high paying. With an average weekly wage of $932.45, they pay only slightly less than transportation equipment jobs. Of the 159 firms, all but two have fewer than 250 workers, and most are far smaller than that. Chore Time (poultry equipment and supplies) and Ctb Inc (farm equipment) are both located in Milford, both are in the 500-999 employee range, and both are connected to agriculture rather than to transportation equipment as are the other subsectors. However, they share processes such as forging and stamping metal with fabricated metal products manufacturers.

Ambulatory Health Care

Industries in the Ambulatory Health Care Services subsector provide health care services directly or indirectly to ambulatory patients and do not usually provide inpatient services. Health practitioners in this subsector provide outpatient services, with the facilities and equipment not usually being the most significant part of the production process.

Nationally, faster than average growth in employment is expected in offices of health care practitioners compared to growth rate of all employment. Much faster than average growth is expected in other ambulatory care services such as outpatient centers, home health care providers and medical laboratories.

A growing and aging population, increased public awareness, and the cost-effectiveness of care will spur growth. The demand for home healthcare services will grow. Also, the expansion of outpatient services in drug and alcohol treatment clinics, mental health clinics, and medical rehabilitation centers will create jobs.

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[8] Simran Trana, Purdue Research Foundation, October 6, 2005 presentation

Outpatient care costs less than hospital care. When hospitals merge to reduce costs, more clinics and health care jobs occur outside hospitals. The outlook also depends on public and private health insurance. Whether people can have services often depends on whether the insurance will help pay for treatments that doctors recommend.

Rising malpractice insurance costs are an issue for physicians' offices. Small groups are moving to larger group practices; however, small group practices tend to pay higher wages.

An important trend is toward prevention. When people focus on protecting their health through nutrition and exercise, they need less emergency and surgical care.

There are 977 firms listed on the http://www.stats.indiana.edu/ssi/page2.asp website for ambulatory health care in EGR-2. Mental and dental providers are not being considered; when dental offices and psychologists are excluded, there are still about 750 employers. As would be expected, these are mostly small offices with fewer than 10 people, or even fewer than 5. They are primarily clustered around the South Bend-Elkhart area because that is where the population is clustered and people want their health care close to home. A physical therapy employer, St. Joseph Regional, is shown as having 1000-4,999 employees but this is most likely a classification error. Larger employers in this subsector include:

- 100-249 employee range: Alco Health Services, Mishawaka; American Nursing Care, Mishawaka; Memorial Home Care; South Bend; Nephrology Physicians, Mishawaka; OSMC (physicians and surgeons), Elkhart; South Bend Clinic, South Bend;
- 250-499: Elkhart General Home Care, Elkhart; Nursefinders of Mishawaka, Mishawaka; Elkhart Clinic, Elkhart; South Bend Clinic Opthalmology, South Bend; St. Joseph Visiting Nurse, South Bend; and
- 500-999: South Bend Medical Foundation, South Bend.

The average weekly wage for the 9,636 workers in ambulatory health care is higher than all the manufacturing subsectors except medical device manufacturing at $1,096.98.

Hospitals

Hospitals and residential care firms provide health and special care services to patients. The patients generally stay overnight or longer in the facility for their care. Hospitals provide emergency and general medical care. They offer services such as surgery and psychiatric treatment.

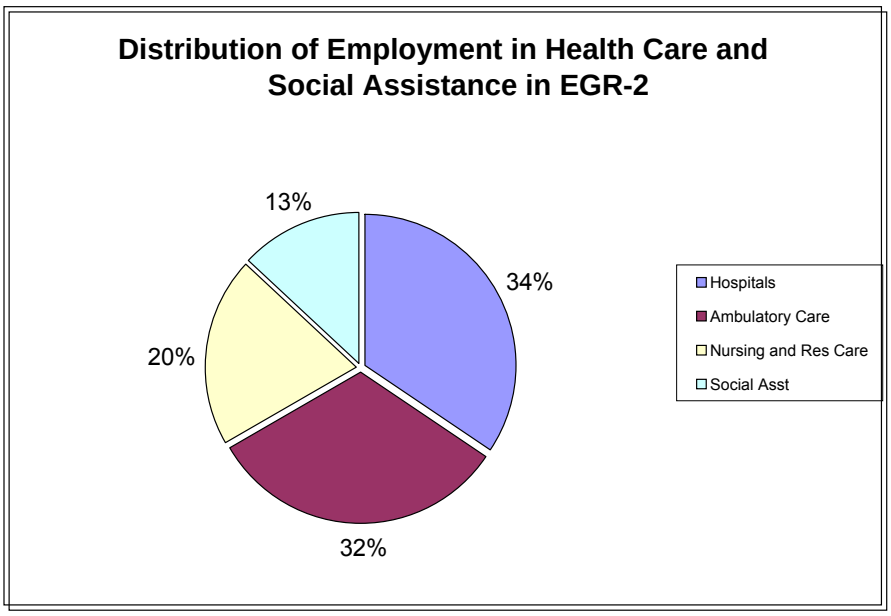
Residential care facilities provide rehabilitation and personal care to patients who need continuous care but do not need to be in the hospital. The subsector also includes group homes and half-way houses.

About average growth in the number of jobs is expected in hospitals through 2012. Faster than average growth is expected in nursing and residential care facilities nationally, which, interestingly, has seen declining employment in EGR-2. Much faster

than average growth is expected in community care facilities for the elderly and other residential care facilities.

In hospitals, the trend is toward more outpatient treatment and shorter hospital stays. Patients are being shifted from hospitals into other facilities for rehabilitation. In addition, hospitals often consolidate to reduce costs. Even with these trends, hospitals will provide many jobs. Jobs will open to replace workers who change jobs or leave for other reasons.

There are several very small employers in this classification, all in the mental health arena. As would be expected, there are few hospitals compared to the numbers of firms in all other targeted subsectors, but collectively they employ 10,295 people at an average weekly wage of $745.21. Hospital employment comprises over a third of all employment in the health care and social services industry.



Hospital average wages are lowered by the large number of low skill/low wage support staff needed to maintain such facilities, such as custodians, groundskeepers, housekeepers, cafeteria workers, and so forth which are not found in ambulatory health care.

The largest hospitals in EGR-2 include:

- 1000-4,999 employee range: Elkhart General, Elkhart; Goshen General, Goshen. Memorial Hospital, South Bend; St. Joseph Regional Medical Center, South Bend;
- 500-999: Kosciusko Community, Warsaw; Madison Center and Hospital, South Bend; St. Joseph Regional, Mishawaka; and
- 250-499: Oaklawn Mental Health, Goshen; St. Joseph Regional, Plymouth; Woodlawn Hospital, Rochester.

Reasons for Selecting Key Industries and Clusters

The reasoning for selection of the manufacturing and health care industries and the identified subsectors has already been described within the earlier description of the methodology. Table 1 contains a matrix showing the number of jobs, location quotient, total wages, weekly wages, value added, job growth over the last decade, and shift share analysis for the targeted subsectors plus several comparison subsectors. The

data presented in the matrix figured heavily into selection, along with input from the Consortium and secondary literature reports. When Consortium members brainstormed the top 15 occupations they believe to have shortages, 14 of the 15 were occupations in the targeted subsectors (the exception was math and science teachers). Existing reports were also examined, including:

- Comprehensive Economic Development Strategy 2001- 2005, Michiana Area Council of Governments;
- Region 2 Economic Development Strategy 2005, Indiana Economic Development Council;
- State of the Workforce Reports 2002 and 2004 for North Central Indiana (due to Fulton County's inclusion in EGR-2); and
- State of the Workforce Reports 2002 and 2005 for Northern Indiana.
- Fulton County Economic Development Corporation 2005-2006 Strategic Plan.
- CAPE III Grant Proposal to Lilly Foundation.

All the manufacturing subsectors demonstrate a significant location quotient, meaning they are more concentrated in EGR-2 than they are in the rest of the nation. The region has no particular significance in ambulatory health care and hospitals, but it is facing significant skill shortages. And, because the entire nation is facing skill shortages in health care, EGR-2 is competing nationally for the best and brightest workers.

All the targeted subsectors, with the exception of plastics and rubber and machinery manufacturing, saw positive job growth from 1994 – 2004, with exceptional growth in transportation equipment. All targeted subsectors except plastics and rubber and ambulatory health care experienced a positive regional shift share (measure of the change in the number of jobs relative to the general national economy). Again, there was exceptionally fast growth compared to the nation as a whole in transportation equipment.

Section 3: Selection and Definition of Critical Occupations and Skill Sets

The world of work is changing faster than we can keep up with. Parents aren't sure how to advise their children and school counselors have difficulty keeping up with emerging industry needs. Youth have so many choices for careers they don't know how to choose, and don't even know about all the options that exist. Educational institutions can't turn curricula around fast enough to keep up with the changing demands of the workplace. A high tech world requires higher levels of basic skills and a greater capacity to learn than ever before. The end result has been a supply/demand mismatch that creates the anomaly of many people unemployed or underemployed while employers complain of skill shortages.

"…while increasing numbers of college graduates were ending up in low-wage service jobs, the nation's economy was generating record numbers of unfilled positions for technicians in high skill/high was technical jobs. The problem was not an undersupply of college graduates, but rather an undersupply of technical skilled graduates."

Kenneth Gray, Getting Real

Following World War II, a college degree became the ticket to success across the nation. Parents encouraged their youth to get a degree, any degree, and want ads gave preference to applicants with a degree, any degree. Education was becoming more valuable, but education didn't necessarily equate to skills. A four-year college degree was used as a proxy for a range of transferable skills, including reading, math, analytical thinking, and problem solving. The thinking that "any degree is a good degree" persists to this day, fostered by parents who advise their children based on their own entry into the workforce 30-40 years ago. Perversely, this has resulted in a workforce that is overeducated for the jobs that exist, yet under-skilled for the technical jobs that exist and are emerging.

Percent of College Educated Workers in High School Jobs: 1971 and 1995

	1971	*1995*
Some University Courses	13%	20%
University Degree	17%	30%

Source: *Getting Real;* Kenneth Gray, 2000, using data from Pryor and Schaffer, 1997

The Northern Indiana Workforce Investment Board's 2005 State of the Workforce Report, *Competing for Opportunity,* described that even while the percentage of individuals in the four-county workforce service area with associate and bachelor degrees is lower than the state and national averages, the supply is still greater than the demand, suggesting misalignment between choice of study and economic realities. According to the report, "many people get degrees in subject areas for which there is insufficient demand in the marketplace and they are destined to be under-employed while high skill jobs go begging."

In recent decades, technology has changed our world in ways we could not have imagined. Manufacturing has enjoyed an unprecedented surge in productivity. Declining employment figures nationally are only partially due to outsourcing and general economic decline; productivity increases resulting from technology and advanced processes played a larger hand in reduced numbers. A 1% increase in national productivity eliminates the needs for about 1.3 million jobs![9] At the same time, workers in manufacturing who have seen their outdated jobs vanishing do not necessarily have the skills to move into the technically skilled jobs that are vacant. The industrial age has not given way to the technology age; the two have just blended, and successful manufacturing is now "advanced" manufacturing.

Consistent with the above, the selected manufacturing and health care occupations that are in short supply in EGR-2 do not require four-year degrees. Rather, there is a shortage of individuals with the technical skills required to fill these good-paying jobs, despite an over-supply of college graduates.

Manufacturing occupations that have shortages in EGR-2 include some that only require a high school diploma for entry, yet the occupations pay very good wages. The selected health care occupations demand higher levels of education than the manufacturing occupations, solid basic skills, and credentials and licensures, yet still do not require four-year degrees.

The occupational profiles below describe the critical skill shortage occupations selected for focus in EGR-2. Shortages in these occupations represent potential bottlenecks for maintaining the vitality of the current economy. Further justification follows the profiles.

The mean annual earnings, entry, and experienced wages in EGR-2 are shown separately for each of the targeted sectors within which the occupation occurs in Tables 2 & 3. Because wages for each of the manufacturing and health care occupations are shown on the charts, this reference to the Tables will not be repeated under the separate descriptions of the occupations below.

The annual mean wage for all first tier manufacturing and health care occupations except one surpasses the self-sufficiency annual wage for an adult and one infant in every county. The exception is medical record techs/coders, but even then, only in

[9] "An Opportunity Lost," Mortimer B. Zuckerman, USNews.com posted 09.20.04

hospitals and only in St. Joseph County. The chart below can be compared with annual mean wages for each occupation in Tables 2 and 3.

EGR-2 Self-sufficiency Standards by County				
Family Size:	**Adult + 1 infant**		**2 Adults + 2 children (1 preschooler, 1 schoolage)**	
	Hourly Wage	Annual Wage	Hourly Wage (per adult)	Annual Wage (family)
Fulton County	$8.43	$17,810	$7.18	$30,340
Marshall County	9.39	19,841	7.28	30,742
Kosciusko County	10.16	21,452	7.47	31,541
Elkhart County	10.44	22,052	8.22	34,737
St. Joseph County	10.81	22,834	8.78	37,099
EGR-2 average self-sufficiency wage:	$9.84	$20,798	$7.79 per adult	$32,892

Occupational Profiles - Manufacturing[10]

Welders, Cutters, Solderers, Brazers

Description of the Work

Welders and solderers use heat to permanently join pieces of metal. Welding is the most common way to permanently join metal parts. In this process, heat applied to metal pieces melts and fuses them together. Soldering and brazing are similar processes that are used on electronic and other small equipment.

Welders plan work from drawings or detailed work orders. In some cases, they use their knowledge of welding and metals to decide how to repair or join metal parts. Once they have information about the job, welders select and set up the equipment. Welders use arc, gas, and flame torches, as well as other types of welding equipment. Solderers generally use soldering irons. Welders perform manual welding, in which they entirely control the work. They also perform semi-automatic welding, in which they use machinery to help perform some tasks. Welders and solderers also repair broken or cracked metal parts. They sometimes fill holes and seams in metal products. When a job is done, they chip or grind off excess weld or solder, using hand or power tools. Welders and solderers also examine their work manually or with instruments to be sure it meets requirements.

The work of arc and flame cutters is closely related to that of welders. However, instead of joining metals, cutters use heat to cut and trim metal objects to specific dimensions. Cutters also cut up large objects, such as ships, cars, or aircraft.

[10] Source for occupational profiles: http://www.iseek.org/sv/11999.jsp

Skills and Credentials Required for Entry

To work as a welder, you must: have a high school diploma or GED; complete a formal training program; complete on-the-job training; and have a good eye for detail. Some states require that welders be certified. Requirements vary by state. While certification is not mandatory in Indiana, it is a prerequisite for many welding jobs, depending on the type of welding required. In addition, educational institutions that train welders are now requiring students to take courses leading to a degree or certificate. Employers prefer applicants who have welding or soldering experience or training – a minimum of two years in the field is a common demand.

Career Pathways

Most welders learn their skills through a formal training program. High schools, professional technical schools, and two-year colleges all offer welding programs. There are also private welding schools and training programs offered by unions. Training can last a few weeks for low-skilled work. It takes many years to be fully-trained.
Some welders go through apprenticeship training. To apply for an apprenticeship, you must have a high school degree or GED and be at least 18 years old. Apprenticeship programs usually consist of three to five years of on-the-job training. In addition, each year you receive at least 144 hours of classroom training.

Some welders learn their skills on the job from an experienced worker. They begin as a helper and gradually learn to operate welding equipment. Some employers will send welders for additional training.

Welders and solderers can advance to more skilled jobs with additional training and experience. For example, they may become technicians, supervisors, inspectors, or instructors. Some experienced welders and solderers open their own repair shops.

Typical Career Path[11]

Lower Level	Mid-Level	Advanced Level	Options
Helper or Apprentice (short term OJ)	Welder (vocational certificate)	Lead Person or Supervisor (extensive experience)	Production Manager (BA/BS degree)
	Assembler or Production Welder (vocational certificate)		Shop Owner

Projections

Nationally, the number of jobs for welders and solderers is expected to grow as fast as average through the year 2012. In EGR-2, this occupation will required an average of 63 new workers per year just in the target sectors! Tables 2 and 3 contain charts that show

[11] Career Pathways Handbook 2005-2006 Edition, Jim Cassio

general openings and growth 2002-2012, and openings and growth within the targeted sectors for the same period. The chart also shows annual mean, annual entry, and annual experienced wage averages for this region.

As long as the economy remains strong, the demand for welders and solderers should remain high. However, if the economy slows, workers in some industries may be laid off or work fewer hours. This is most likely to happen in construction and auto manufacturing.

The increasing use of robots to do tasks will have the most impact on low-skilled manual welders. This is because the jobs that become automated are the simple, repetitive ones. Welders who work on construction projects or in equipment repair are less likely to be affected. This is because their jobs are not as easily automated.

Job prospects should be excellent for welders with the right skills. Many employers report difficulty finding qualified applicants. In addition, other openings will arise as workers retire or leave the occupation for other reasons.

First Line Supervisors of Production and Operating Workers

Description of the Work

First line supervisors direct, help, and train workers. Supervisors have many duties that involve personnel management. For example, they hire, fire, and evaluate employees. They also resolve worker problems or assist workers in solving problems. In addition, supervisors train new employees.

> "Supervision is the key to taking your company to the next level. Companies report to me that they simply cannot gain competitive advantage without well-trained supervisors who can all manage from the same page. The supervisor is critical to mobilizing the workforce to greater productivity and quality gains."
>
> *Carolyn Fermoyle, Program Manager, IU South Bend*

When starting new projects, supervisors estimate the number of workers and the amount of materials needed to complete the project. They may create a budget that shows this information. Before beginning the project, supervisors analyze its requirements. Then they plan and establish work goals. These goals may involve coordinating work with other departments. Supervisors then assign tasks to workers. Supervisors keep records of how work is progressing. If work falls behind schedule, supervisors revise tasks or reassign workers to improve progress.

In manufacturing plants, supervisors make sure the machinery is set up and operating properly. They adjust machinery controls, test machines, and repair or order the repair

of broken machinery. They also create work schedules, oversee workers, and make sure the work is done correctly and on time.

Skills and Credentials Required for Entry

To work as a first line worker supervisor, you must have at least a high school diploma or GED; have work experience in the occupation being supervised; have good communication skills; and be able to direct and motivate people.

Career Pathways

First line supervisors learn most of their skills on the job. A high school diploma or GED is the minimum requirement. Supervisors are often promoted from among the workers they supervise. In manufacturing, experienced supervisors can advance to department head or production manager positions. In order to advance, workers usually need a degree in business or engineering. They also must complete in-house training programs.

Typical Career Path[12]

Lower Level	Mid-Level	Advanced Level	Options
Production worker or helper (short term OJT)	Lead person, foreman or supervisor (extensive work experience)	Production manager (BA/BA degree)	General manager
Machine operator or tender (short term OJT)			Owner

Projections

Nationally, the number of jobs for first line supervisors is expected to grow as fast as average through the year 2012. In EGR-2, 70 openings per year are expected between 2002 and 2012 just in the targeted sectors. Again, the chart in Table 2 provides detail.

Growth will vary by industry. In the manufacturing industry, growth will be slower than average. Some of this change is due to an increase in the use of computers. By using computers, supervisors can analyze work and create schedules more quickly. Thus, supervisors will be able to manage more workers than in the past. In addition, manufacturers are putting workers on self-directed work teams. These teams are expected to reduce the amount of supervision workers require. Despite the slow growth, many job openings will occur as current workers leave this occupation. In EGR-2, more openings will result from attrition than from growth.

[12] Ibid

Painters, Transportation Equipment

Description of Work

Painters of transportation equipment operate or tend painting machines to paint surfaces of transportation equipment, such as automobiles, buses, trucks, trains, boats, and airplanes. They apply designs, lettering, or other identifying or decorative items to finished products using paint brushes or paint sprayers. Painters apply primer over repairs on vehicle surfaces, apply rust-resistant undercoats, and caulk and seal seams. Workers in this occupation buff and wax finished paintwork; lay out logos, symbols, or designs on painted surfaces according to blueprint specifications; and use measuring instruments, stencils, and patterns. Painters mix paint to match color specifications and monitor painting operations to identify flaws. As more vehicles are made from laminates, painters will still be in demand for repair work, which in fact requires more skill than painting the vehicle as a whole.

Skills and Credentials

To work as a painter of transportation equipment, you need on-the-job training. No formal education is required beyond high school. Some previous work-related skill, knowledge, or experience may be helpful but usually is not needed. Employees in this occupation need anywhere from a few months to one year of working with experienced employees There is one recognized apprenticeable specialty associated with this occupation: Painter, Transportation Equipment

Career Pathways

Experienced painters of transportation equipment who have leadership skills may become team leaders or supervisors. Others may become representatives for chemical or paint companies.

Typical Career Path

Lower Level	Mid-Level	Advanced Level	Options
Helper (short term OJT	Painter (moderate term OJT)	Supervisor (extensive experience)	Paint Company Representative

Projections

Nationally, the projected number of jobs for painters of transportation equipment for 2002- 2012 is expected to be in the average range (10-20%). In EGR-2, there will be an estimated annual need of 25 per year. The only targeted subsector in which the occupation occurs is transportation equipment, but they are highly critical to the region's largest manufacturing subsector. A growing population will demand more products and will increase the need for these workers. However, the Clean Air Act will slow growth in some manufacturing industries. This Act limits the amount of fumes, such as those released by paint, that manufacturers can produce. Regardless of factors that slow growth, job openings will occur as current workers leave the occupation. In

EGR-2, however, there are actually anticipated to be more openings resulting from growth than from attrition due to the growth of the transportation equipment subsector.

Computer Controlled Machine Tool Operators

Description of Work

Numerical control machine operators set up and tend computerized machine tools. These machines are programmed to cut and shape parts made of metal or plastic. Numerical control machine operators run computer-controlled machines. These machines cut, shape, drill, or otherwise modify metal or plastic parts. The computer program tells the machine which tools to use and how to use them. Operators mainly set up, tend, and maintain the machines. Operators begin by setting up the machine. They load the machine controller (computer) with instructions or programs. These programs usually are written for operators, but operators occasionally do their own programming. Once the programs are entered, operators select, measure, install, and secure the tools and attachments the machines will use. Operators read blueprints and use their knowledge of the job to select the proper tools. They use hand tools and precision instruments to attach the items. Finally, they attach the work pieces and start the machines.

While the machines are operating, operators may enter commands or adjust machine controls to correct errors. They also may stop machines to change the tools or the setup. When the process is completed, they stop machines to remove the finished products. Operators then measure the finished products to ensure they meet requirements. Numerical control machine operators also maintain the machines. They replace machine tools when they become worn or broken.

Skills and Credentials Required for Entry

To work as a numerical control machine operator, you must have a high school diploma or GED; complete a formal training program; and complete on-the-job training.

Some numerical control machine operators learn their skills through formal training programs. Professional technical schools and two-year colleges offer programs in manufacturing technology. In these programs you learn machine operations, automation, and computer skills. One-year programs award a certificate. Two-year programs usually award an associate's degree. If you complete this type of program, you still need additional on-the-job training.

Some machine operators learn their skills through an apprenticeship. To apply for an apprenticeship, you must have a high school degree or GED and be at least 18 years old.

Apprenticeship programs usually consist of three to five years of on-the-job training. In addition, each year you receive at least 144 hours of classroom training.

Many numerical control machine operators learn their skills on the job. At some jobs an experienced worker leads the training. At others, the employer provides a formal training program. Experience working as a machinist is very helpful for this occupation. Employers often select experienced machinists for training to become numerical control machine operators. Although no special education is required, employers prefer to hire workers who have good basic skills. These skills include reading, writing, and speaking English. Many employers require employees to have a high school diploma or GED. Employers also look for applicants who have strong analytical and communication skills. Mechanical aptitude and experience with machines are also helpful.

Career Pathways

Advancement for operators usually takes the form of higher pay. However, there are also opportunities for operators to advance to new positions. For example, they can run multiple machines. They can become trainees for more highly skilled jobs, such as machinists or numerical control tool programmers. Operators who have good people skills may advance to supervisory jobs.

Typical Career Pathway

Lower Level	Mid-Level	Advanced Level	Options
Helper or apprentice (short term OJT)	Machinist (long term OJT)	Supervisor	Shop manager or owner
Machine Operator (long term OJT	Computer Controlled Programmer		
Welder (vocational certificate			

Projections

Nationally, the number of jobs for numerical control machine operators is expected to grow more slowly than average through the year 2012. The rise in the use of computer-controlled machines will increase employment. Companies are switching to these machines because they improve quality and lower costs.

The average annual openings in EGR-2 through 2012 is anticipated to be 25 in the targeted subsectors. While CNC workers are found in nearly all the targeted subsectors, the clear majority of new openings will occur in one of them: miscellaneous manufacturing – medical equipment.

Occupational Profiles – Health Care

Health care occupations offer many career ladders and lattices. The following pages attempt to describe the "families" of occupations and how they relate to one another.[13] Targeted occupations are highlighted where they occur in family groupings for nursing, therapist, and health information/administrative.

The family maps are followed by Kaiser Permanente's chart of lateral career movement within the health care industry.

> "As the Director of Human Resources at the largest hospital in our region, I experience daily the difficulty of staffing our facility with qualified, skilled care givers both on the technical level and professional level. The most critical being nursing, then respiratory and surgical technicians."
>
> Jinny Longbrake, PHR, Director of Human Resources
> Memorial Health System

[13] Family maps developed by Corporation for a Skilled Workforce

Nursing
Job Family Map

Critical Tasks

Medical Technicians
- ✓ Identifying object and events
- ✓ Monitoring processes

Current Skills Deficiency:
Experience, bilingual

Registered Nurse
- ✓ Monitoring processes
- ✓ Documenting and recording information

Current Skills Deficiency:
Experience, bilingual

Licensed Practical Nurse
- ✓ Assisting and caring for others
- ✓ Performing general physical activities

Current Skills Deficiency:
Experience, bilingual

Surgical Technician
- ✓ Assisting and caring for others
- ✓ Getting information needed to perform the job

Current Skills Deficiency:
Experience, bilingual, employability skills

Medical Assistants
- ✓ Evaluation information against standards
- ✓ Assisting and caring for others
- ✓ Processing information

Nursing Aides
- ✓ Performing general physical activities
- ✓ Assisting and caring for others

Current Skills Deficiency:
Experience, bilingual

Home Health Aides
- ✓ Evaluation information against standards
- ✓ Assisting and caring for others
- ✓ Processing information

Common Skill Sets
- ❖ Medicine
- ❖ Customer and Personal Service
- ❖ Biology
- ❖ English Language
- ❖ Mathematics

Upper Level

Education and Training: Bachelor's Degree plus work experience

Medical Technologist	**Registered Nurse***

Mid Level

Education and Training Associate's Degree or postsecondary vocational award

Licensed Practical Nurse	Surgical Technicians

Entry Level

Education and Training Short-term to Moderate-term on-the-job training

Medical Assistants	Nursing Aides
Home Health Aides	

**Referring to RN with a BA or above*

Education and Training Requirements from Bureau of Labor Statistics, Average Hourly Wage from MCHC Employer Survey

Therapy
Job Family Map

Critical Tasks

Physical Therapist
- ✓ Assisting and Caring for others
- ✓ Establishing and Maintaining relationships

Current Skills Deficiency: Experience, bilingual

Speech Language Pathologist
- ✓ Monitor process, material, and surroundings
- ✓ Evaluating information against the standard

Current Skills Deficiency: Experience, employability skills

Audiologist
- ✓ Problem solving
- ✓ Processing information

Current Skills Deficiency: Experience

Occupational Therapist
- ✓ Assisting and caring for others
- ✓ Providing consultation and advise

Current Skills Deficiency: Knowledge of current practices

Respiratory Therapists
- ✓ Assisting and Caring for others
- ✓ Monitoring processes

Current Skills Deficiency: Experience, employability skills

Physical Therapy Assistants
- ✓ Assisting and Caring for others
- ✓ Gathering information

Current Skills Deficiency: Experience, bilingual

Occupational Therapy Assistants
- ✓ Assisting and caring for others
- ✓ Communicating with other workers

Current Skills Deficiency: Experience, bilingual

Medical Assistants
- ✓ Evaluation information against standards
- ✓ Assisting and caring for others
- ✓ Processing information

Physical Therapy Aides
- ✓ Monitoring processes
- ✓ Performing physical activities
- ✓ Assisting and caring for others

Home Health Aides
- ✓ Evaluation information against standards
- ✓ Assisting and caring for others
- ✓ Processing information

Common Skill Sets
- ❖ Reading Comprehension
- ❖ Decision making
- ❖ Critical thinking
- ❖ Identification of key causes
- ❖ Active listening

Upper Level

Education and Training: Master's Degree to Bachelor's Degree plus work experience

- Physical Therapist
- Speech Language Pathologist
- Audiologist
- Occupational Therapist

Mid Level

Education and Training Associate's Degree or postsecondary vocational award

- **Respiratory Therapists**
- Physical Therapy Assistants
- Occupational Therapy Assistants

Entry Level

Education and Training Short-term to Moderate-term on-the-job training

- **Medical Assistants**
- Physical Therapy Aides
- Home Health Aides

Health Information/Administrative
Job Family Map

Critical Tasks

Pharmacists
- ✓ Using and updating job-relevant knowledge
- ✓ Evaluating information against the standard

Current Skills Deficiency: Experience, employability skills, bilingual

Medical Laboratory Technologist
- ✓ Monitor process, material, and surroundings
- ✓ Evaluating information against the standard

Current Skills Deficiency: Experience, employability skills

Medical Transcriptionsist
- ✓ Recording information
- ✓ Processing information

Current Skills Deficiency: Experience, bilingual

Medical Secretaries
- ✓ Documenting information
- ✓ Interacting with computers

Current Skills Deficiency: Experience, employability skills

Medical Records Coder
- ✓ Processing Information
- ✓ Documenting and Recording Information
- ✓ Interacting with Computers

Billing/Insurance Clerk
- ✓ Gathering information
- ✓ Working with public

Current Skills Deficiency: Experience

Medical Assistants
- ✓ Evaluation information against standards
- ✓ Assisting and caring for others
- ✓ Processing information

Pharmacy Technicians
- ✓ Communicating with others
- ✓ Handling and moving equipment

Current Skills Deficiency: Experience, employability skills, bilingual

Home Health Aides
- ✓ Evaluation information against standards
- ✓ Assisting and caring for others
- ✓ Processing information

Common Skill Sets
- ❖ Reading Comprehension
- ❖ Science
- ❖ Writing
- ❖ Active Learning
- ❖ Mathematics

Upper Level

Education and Training: Md/Phd, to Bachelor's degree plus work experience

- Pharmacists
- Medical Laboratory Technologists

Mid Level

Education and Training Associate's Degree or postsecondary vocational award

- Medical Transcriptionists
- Medical Secretaries
- **Medical Records & Health Information Technician (Coder)**

Entry Level

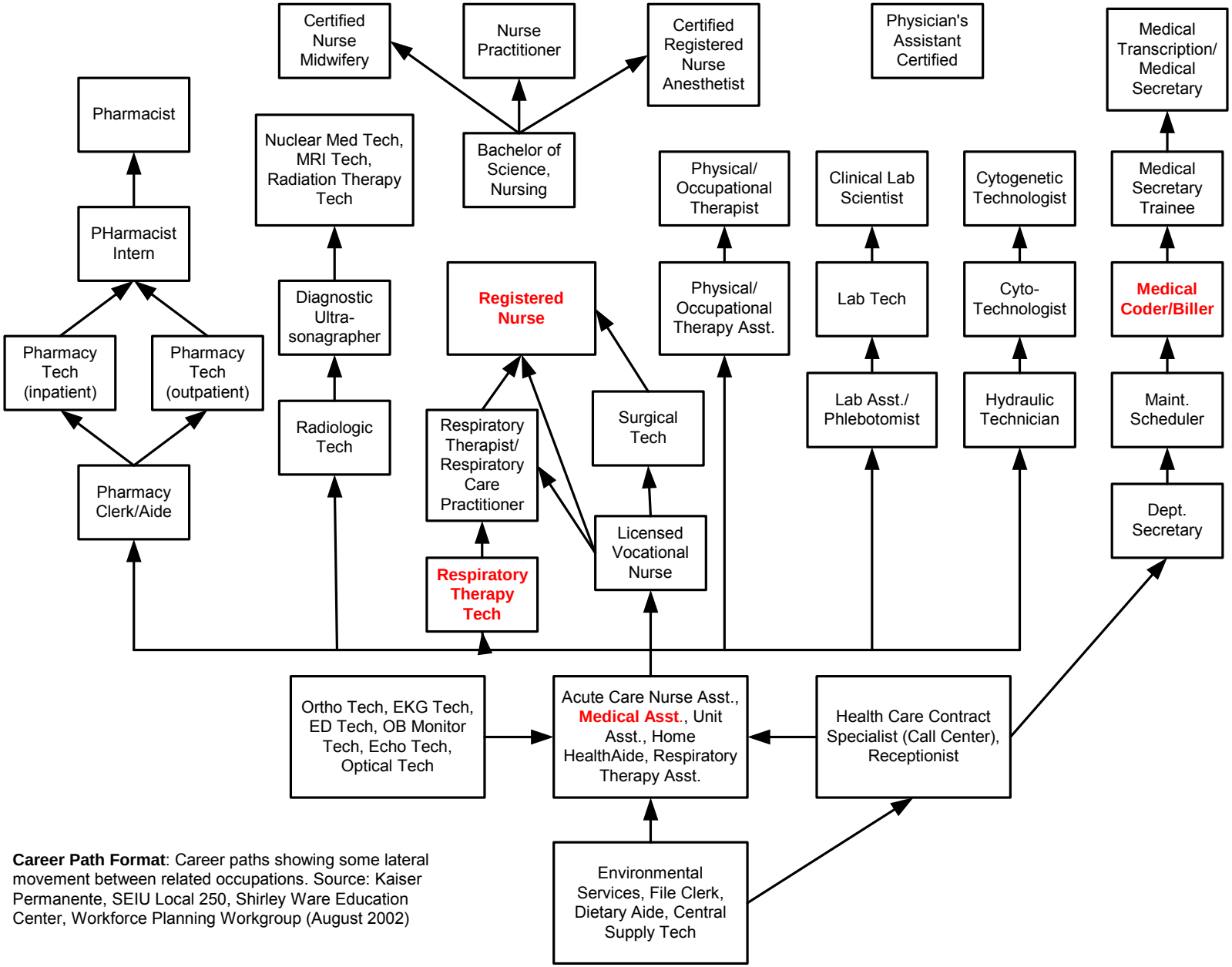
Education and Training Short-term to Moderate-term on-the-job training

- Bill/Insurance Clerk
- **Medical Assistants**
- Pharmacy Technicians
- Home Health Aides

Education and Training Requirements from Bureau of Labor Statistics, Average Hourly Wage from MCHC Employer Survey

** No wage data available from MCHC on Medical Coder, IDES MSA wages used as replacement.*

Figure 2: Kaiser Permanente Lateral Movement Career Path Format

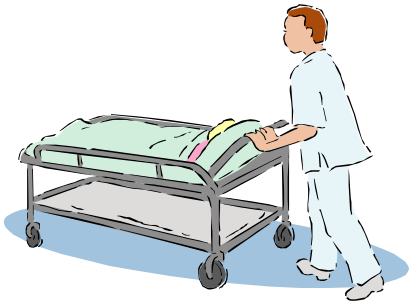


Career Path Format: Career paths showing some lateral movement between related occupations. Source: Kaiser Permanente, SEIU Local 250, Shirley Ware Education Center, Workforce Planning Workgroup (August 2002)

Medical Assistants

Description of Work

Medical assistants help care for patients. They carry out routine treatments, conduct lab tests, and maintain office records. Medical assistants perform a limited number of basic medical duties. These duties vary by state because of differences in state laws. Some states allow medical assistants who have specialized training to draw blood or take x-rays. In most states, assistants take medical histories and record patients' weight, pulse rate, blood pressure, and other vital signs. They explain treatments to patients and prepare them for the exam. Assistants help the doctor during the exam by handing the doctor materials and preparing medications. They also collect and prepare laboratory specimens. Assistants may perform basic lab tests. They also instruct patients about medication and special diets. Additional duties include drawing blood, preparing patients for x-rays, taking EKGs, changing bandages, and removing stitches. After exams, assistants clean the room, dispose of used materials, arrange equipment, and sterilize used instruments. They take classes to keep their knowledge and skills up-to-date.



Assistants also have clerical duties. They answer telephones, greet patients, and update medical records. Assistants fill out insurance forms and schedule appointments. They also arrange for hospital admission and lab services. Some assistants handle billing and bookkeeping. The size of the office determines how much time assistants spend on clerical duties. In larger offices, assistants spend only a little time on clerical work. Assistants are supervised by doctors, other health workers, or office managers.

Skill and Credentials Required for Entry

To work as a medical assistant, you must have a high school diploma or GED; graduate from a medical assisting program; complete an internship; pass exams if taking x-rays; and be able to work as part of a team.

Medical assistants learn their skills through formal training programs. Professional technical and two-year colleges offer medical assisting programs. A one-year program grants a certificate. Two-year programs grant an associate's degree. Courses include anatomy and physiology, medical terminology, medical law, and ethics. Office courses include typing, record keeping, accounting, and insurance processing. Some medical assistants learn all their skills on the job. This option is becoming less common.

Most employers prefer graduates of medical assistant programs, or applicants with experience. They may also prefer applicants who are certified or registered. Other employers hire high school graduates who have related work experience and train them on the job. Employers may have applicants take drug-screening tests.

Employers look for applicants who have basic computer skills. Readable handwriting, attention to detail, and good telephone skills also are important. Some employers prefer applicants who have medical transcription skills. Speaking a second language may be an advantage.

Medical assistants do not need a license. However, some states require medical assistants to take a training program or an exam before doing certain procedures. Drawing blood, giving injections, and taking x-rays are examples of these procedures.

Career Pathways

Medical assistants have two possible routes for advancement. With further training and coursework, medical assistants can advance to other medical positions. For example, they can become nurses or physician assistants. Experienced medical assistants can also advance to other clerical positions. They can become health records technicians, secretaries, or bookkeepers. They may need additional training to advance to these jobs. (See the family chart and lateral movement chart above.)

Projections

Nationally, the number of jobs for medical assistants is expected to grow much faster than average through the year 2012. One factor in this growth is technological advances in medicine. Because of these advances, more disorders can be treated. Another factor is growth in the population, especially in the elderly population. This group is most likely to need medical attention. In addition, some health care providers are shifting tasks from nurses to medical assistants. This will also increase the demand for these workers. Most job openings will be in doctors' offices and clinics. Seven out of every ten assistants work in a doctor's office. Job prospects should be excellent for medical assistants who have formal training or experience.

In EGR-2, the estimated annual openings for medical assistants among hospitals and ambulatory health care is 24 per year, with more than twice as many openings coming from growth rather than attrition.

Registered Nurses

Description of Work

Registered nurses care for patients who are ill or injured. Registered nurses (RNs) work to promote health, to provide treatment prescribed by physicians, and to help patients cope with illness. Nurses work with patients in hospitals, in doctors' offices, and in nursing homes. They work in public health facilities such as government agencies and schools. They also take care of patients in their homes as they recover from illness or accidents. Nurses have a large variety of tasks they can perform. However, the work setting usually determines their daily duties.

Hospital nurses observe patients and carry out medical treatments. They use computerized equipment to monitor patients' vital signs. They record their observations and make clinical decisions based on the physician's orders, or decide when to contact

the physicians if the patient's symptoms change. They also record treatments and other medical data in patients' charts. Nurses also consult with medical staff about ways to prevent infection. Sometimes nurses write and manage patient care plans.
Hospital nurses are usually assigned to one area, such as surgery. In these areas nurses develop critical skills specific to the types of patients in particular unit. For example, surgery nurses prepare rooms and supplies before surgery. They may prepare certain equipment, and they also assist surgeons by passing instruments and other items. Hospital nurses perform many duties that are common to other work settings. For example, they discuss cases with patients' doctors. They maintain a stock of supplies. They also supervise licensed practical nurses and aides. Office nurses prepare patients for exams and check vital signs. They assist doctors with exams when requested. They draw blood and give injections, as do nurses in most settings. Office nurses may also perform routine lab tests and office work.

Public health nurses work to improve the overall health of communities. They provide health care and first aid. They give shots and screenings such as blood pressure tests. Public health nurses develop health education programs. Thus, they teach the public about topics such as nutrition and childcare. In addition, they refer patients to community agencies.

Skills and Credentials Needed for Entry

To work as a registered nurse, you must graduate from a nursing program; complete supervised clinical work experience; pass a national exam; pass a state licensing exam; be able to work as part of a team; demonstrate good critical thinking skills; and have good interpersonal and communications abilities.

There are three training options for registered nurses:

1. Earn an associate's degree in nursing (A.D.N. or A.A.N.). Community and two-year colleges offer these two-year programs.
2. Earn a bachelor's of science degree in nursing (B.S.N.). Colleges and universities offer these four-year programs.
3. Earn a diploma. Hospitals offer these two to three year programs.

In general, graduates of any of the three types of programs qualify for entry-level positions. However, you must also pass national and state exams. Nurses who have a bachelor's degree have more options for jobs. While employers may prefer B.S.N.'s, shortages have forced them to accept associate degree level nurses. Nursing supervisors are nearly always required to have a B.S.N. degree. Focus group participants in EGR-2 noted that "the higher the education level of the nurse…the lower the patient fatality rate."

All states require RNs to be licensed. Some states also require certification for nurse practitioners and nurse anesthetists. Requirements vary by state.

Entry to nursing programs is highly competitive. More and more people are turning to health care professions because they perceive them as secure occupations in a changing economy. "Nursing programs have been flooded with applicants in recent years…low-income working adults with limited educational experience are at a distinct disadvantage in the competition to secure a training slot."[14]

Career Pathways

Registered nurses who have a bachelor's degree have more chances for advancement. Some career paths are open only to nurses with B.S.N. degrees or even advanced degrees. With experience, registered nurses can advance to assistant head nurse or head nurse. From there, they can advance to higher levels of management. However, many management-level nursing jobs require a graduate degree in nursing or health administration.

Within patient care, nurses can advance to nurse practitioner, nurse-midwife, or nurse anesthetist. These specialties require one or two years of graduate school, usually leading to a master's degree. Some nurses move into the business side of health care. For example, they may manage a home health care service. Others teach at colleges or universities.

Projections

Nationally, the number of jobs for registered nurses is expected to increase faster than average through the year 2012. Growth in this occupation will be due in part to technological advances that allow more medical problems to be treated. In addition, the number of older people is expected to increase rapidly. Older people are more likely to need medical care. The number of jobs in hospital nursing is expected to grow more slowly than in other settings. This is because patients are being released earlier from hospitals. In EGR-2, the need for registered nurses is estimated to be as many as 450 per year within the two targeted sectors. Nursing shortages are exacerbated by the aging nursing workforce and high numbers of non-practicing nurses. Nationally, the average nurse is 45.2 years of age as of 2000 and 18% of the people who have received nursing degrees are currently not in nursing. By 2012, the U.S. will have to educate the number of new nurses equal to 50% of those currently working in the profession – and there still will be a shortage.[15]

[14] "Study Explores the 'Right Jobs' for Disadvantaged Workers;" Employment and Training Reporter, 10/03/05
[15] www.nursingadvocacy.org

Respiratory Therapists

Description of Work

Respiratory therapists evaluate, treat, and care for patients with breathing disorders. Respiratory therapists usually evaluate new patients before they treat them. They test patients' lung capacity by having them breathe into an instrument that measures oxygen. They compare the reading with the norm for that patient's age, height, weight, and sex. Therapists also use a blood gas analyzer. This machine measures the levels of oxygen and acidity in patients' blood. They talk to patients and explain to them everything they are doing. This makes patients feel comfortable and helps them to cooperate. Respiratory therapists follow doctors' orders when they treat patients. However, they monitor patients' conditions, and consult with the doctor if there are bad reactions. They may also make treatment decisions.

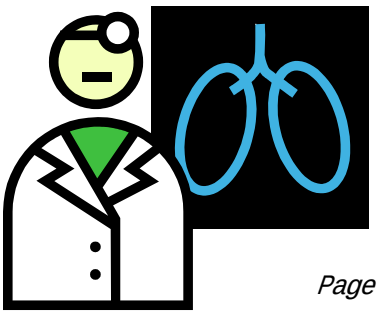
Respiratory therapists operate many different devices to treat patients. For example, they connect patients to ventilators by inserting a tube down their windpipe. Then they set the rate and volume of oxygen that will flow into patients' lungs. Some patients use ventilators and other life support systems at home. Therapists teach patients how to use them and check the equipment.

Respiratory therapists also perform chest physiotherapy to remove mucus from patients' lungs. They place patients in positions to help drain mucus. Then they vibrate their rib cage and tell patients when to cough. When their lungs are clear, therapists may administer inhalants. An inhalant is a liquid medicine mixed with gas. Therapists teach patients how to inhale properly so the medicine is most effective.

Respiratory therapists maintain patients' charts as they treat them. They record the results of evaluations and all treatment notes. They may also keep separate records of materials they use and the charges to patients. They make sure that all safety precautions are followed. In addition, therapists with experience may train and supervise new therapists and other staff. Respiratory therapists sometimes have tasks that fall outside their typical role. They may perform procedures that test heart and lung function, such as stress tests. They may also draw blood samples from patients.

Skills and Credentials Needed for Entry

To work as a respiratory therapist, you must complete a respiratory therapy program and pass exams to become certified. Professional technical schools and two-year colleges offer respiratory therapy programs. Some four-year colleges and universities also offer these programs. Depending on the program, you earn a certificate, associate's degree, or bachelor's degree. Work experience is necessary to become certified.



Most employers require applicants for entry-level jobs to be Certified Respiratory Therapists (CRT). Applicants who are not CRTs must be eligible to take the certification exam. A graduate of any approved program is eligible to take the CRT exam. Most employers require applicants for supervisory or intensive-care jobs to be Registered Respiratory Therapists (RRT). Applicants who are not RRTs must be eligible to take the certification exam. Respiratory therapists must be registered to practice.

High demand is reflected in the speed with which program graduates obtain employment. Nationally, 75% of respiratory care workers found their current jobs within one month, and 42% within one week.[16]

Career Pathways

Respiratory therapists begin by caring for patients with general breathing and lung disorders. They advance to caring for patients with more serious problems. Respiratory therapists with four-year degrees may advance to supervisory or manager jobs.

Projections

Nationally, the number of jobs for respiratory therapists is expected to increase faster than average through the year 2012. Much of the demand for respiratory therapists will be due to the aging population. Older people suffer most from breathing and lung diseases. As their numbers increase, the need for respiratory therapists will increase. In addition, advances in treatment for different types of patients will also increase the demand for respiratory therapists. Opportunities are expected to be best for respiratory therapists who have experience working with infants or cardiopulmonary patients. Cardiopulmonary refers to problems that involve both the heart and lungs.

In EGR-2, the need for respiratory therapists is anticipated to average 8 per year through 2012. Only slightly more than half of the need will be due to growth, with the rest due to attrition.

Medical Record and Health Information Technicians and Coders

Description of Work

Health information technicians collect, code, and maintain medical information about patients. Medical records include all information about patients' visits to hospitals or doctors. For example, records include patients' symptoms, medical history, and test results. They also contain x-rays, diagnoses, and treatment plans. Health information technicians gather and organize all this information. They make sure records are complete and accurate. They also develop organized filing and storage systems that make it easy to store and gather files. Occasionally technicians talk to physicians to get more information about patients.

[16] "Health Professionals Share Their Candid (and Mixed) Feelings About the Field;" Workforce Management; posted 08/09/05

Once records are organized, technicians enter some of the information into computers. For example, they enter the patient's age, gender, history and extent of disease, and treatment. Then technicians assign a code to each diagnosis and procedure. In some hospital settings, because of the sensitivity of coding information, only coders are used who have been trained and degreed specifically in medical coding, a two-year degree, as noted below. They consult a classification manual to find the proper code. Experienced technicians remember the codes. Next, technicians use a computer program to assign patients to a diagnosis-related group, or DRG. The DRG determines the amount of money a hospital receives from insurance companies. If the DRG is incorrectly coded the first time a claim is submitted, hospitals are not permitted to go back and re-code the claim for reimbursement. This means hospitals can loose reimbursement dollars if coders are not accurate. In other words, coders are critical to revenue for hospitals and a shortage of skilled coders directly impacts hospital income.

Health information technicians may be responsible for giving patient records to lawyers and insurance companies. Some technicians maintain special records, called registries. These records are for specific groups of patients, such as those who have cancer, heart disease, or organ transplants. One specialty in this occupation is tumor registrar. These technicians collect and maintain records of patients who have cancer. They prepare reports about cancer patients, such as the number of patients with each type of cancer. Medical researchers and other medical staff use these reports. Tumor registrars also contact patients and their physicians. They gather information such as patients' survival rates. A second specialty in this field is diagnosis and procedure coding. Health information coders or coding specialists do only this type of work.

Health information technicians may also perform other related duties. These may include transcription, processing insurance bills, and handling patient admission and discharge forms. Experienced technicians may train or supervise other medical records staff. Health information technicians are also called medical records technicians.

Skill and Credentials Required for Entry

To work as a health information technician, you must have a high school diploma or GED; graduate from a two-year medical records technology program; be well-organized; and have a good eye for detail.

Most health information technicians have an associate's degree in medical records technology. These programs include courses in anatomy and physiology, medical terminology, and statistics. Courses in database management and coding are also helpful.

Some hospitals and clinics offer on-the-job training to employees who have worked as medical records clerks. However, this type

of training is becoming less common. It is very helpful to have two to four years of experience as a medical records clerk. If you have this experience, you will be a good candidate for health information technology training offered through an employer. Most employers prefer to hire technicians who have completed formal training programs. They also prefer to hire technicians who are registered.

Health information workers find jobs quickly. Nationally, 61% report finding their current jobs within one month, and 29% within one week.[17]

Career Pathways

Experienced health information technicians who have good people skills may become supervisors. They may also advance by specializing in a certain area of the job, such as coding or tumor registry. The "family charts" and lateral movement chart provide additional information about career pathways.

Projections

Nationally, the number of jobs for health information technicians is expected to grow much faster than average through the year 2012.

Much of the demand for health information technicians is due to rapid growth in the health care industry. The number of medical tests, treatments, and procedures that are performed each year is growing rapidly. The demand for technicians will also rise because medical records will be examined by third-party payers, courts, and consumers.

Hospitals will continue to employ the most health information technicians. The fastest growth, however, will be in medical offices. Rapid growth is also expected in nursing homes and home health agencies. More than one third of all technicians work in hospitals.

Descriptions of Critical Skill Sets

The charts on the following pages outline the major O*Net skill sets that are shared by the targeted occupations in manufacturing, and those that are shared by the targeted occupations in health care. Definitions of the skills may be found at http://online.onetcenter.org/skills/.

Within manufacturing, supervisors have very different skill requirements than for frontline employees. It is because of these different skill requirements that employers have found they can't simply take someone who has been excellent in production and expect that person to be a good supervisor over others doing that production work. Manufacturing production workers primarily require **technical skills,** while supervisors need a wide array of **social, basic, systems, and resource management skills.**

[17] ibid.

All three frontline production occupations share skill requirements for equipment selection and operation and control. In fact, those two sets are the only skills identified for painters, while welders and CNC operators also require skills for operation monitoring, equipment maintenance, and quality control analysis.

	Welders	First Line Supervisors	Painters	CNC Operators
Technical Skills				
Equipment Selection	X		X	X
Operation and Control	X		X	X
Operation Monitoring	X			X
Equipment Maintenance	X			X
Quality Control Analysis	X			X
Installation	X	X		
Repairing	X			
Resource Management Skills				
Management of Personnel Resources		X		
Time Management		X		
Management of Material Resources		X		
Social Skills				
Coordination		X		
Basic Skills				
Critical Thinking		X		
Reading Comprehension		X		
Speaking		X		
Writing		X		
Mathematics	X			
Systems Skills				
Judgment and Decision Making		X		

Skill requirements among the health care occupations are much more similar to each other. All have a heavy emphasis on "people skills" such as active listening, speaking, instructing, and social perceptiveness. It is because of this high need for the ability to work with people rather than things that laid-off manufacturing workers are not always able or interested in the growing health care field. Health care occupations are more likely to share skill requirements with first line supervisors of production workers than production workers themselves. Skills that health care occupations share with first line supervisors include critical thinking, time management, reading comprehension, speaking, and judgment and decision making. Health care workers have a very strong need for basic and social skills, and little need for technical skills.

	Medical Assistants	Registered Nurses	Respiratory Therapists	Health Information Techs and Coders
Basic Skills				
Active Listening	X	X	X	X
Speaking	X	X	X	X
Reading Comprehension	X	X	X	X
Active Learning	X		X	X
Learning Strategies	X			
Writing	X	X		X
Critical Thinking		X	X	X
Monitoring		X	X	
Social Skills				
Instructing	X	X	X	X
Social Perceptiveness	X	X		X
Service Orientation	X	X		
Resource Management Skills				
Time Management	X	X	X	X
Technical Skills				
Operation Monitoring			X	
Troubleshooting			X	
Systems Skills				
Judgment and Decision Making				X

While the O*Net system of job descriptions and skill set descriptions is the accepted standard, we found the above scheme to be somewhat confusing, in that the skill labels do not yield much information about just what people with those skills actually do. We developed our own set of skills and descriptors, and then we assigned them to the various occupations we selected for study.

Northern Indiana Workforce Investment Board
Strategic Skills Initiative

Strategic Skills, by Focus SOC

Skill Area	Specific Skills and Skill Sets	51-4121 Welders	51-1011 Supervisors	51-9122 Painters	51-4011 CNC Ops	31-9092 Med. Asst.	29-1111 Nurses
Basic Skills:	Arrive at work on time	x	x	x	x	x	x
	Meet attendance requirements	x	x	x	x	x	x
	Accurately read information in manuals and tables	x	x	x	x	x	x
	Follow instructions	x	x	x	x	x	x
	Demonstrate motivation to work	x	x	x	x	x	x
Interpersonal/ Communications Skills	Listen actively, actually hearing what is said	x	x	x	x	x	x
	Communicate effectively in English	x	x	x	x	x	x
	Show ability to work as a member of a team		x			x	x
	Demonstrate capacity to accept change	x	x	x	x	x	x
	Exhibit an orientation toward service to others					x	x
Math Skills:	Measure and ensure measurements meet specifications	x	x	x	x	x	x
	Add and subtract measurements to 1/16 inch or .5 cc	x	x	x	x		x
	Use tables, diagrams, and graphs to obtain information	x	x	x	x	x	x
	Solve basic arithmetic problems without calculator	x	x	x	x	x	x
	Solve practical problems using percentages and fractions	x	x	x	x		x
Thinking Skills:	Recognize problems and their causes	x	x	x	x	x	x
	Create, implement, and evaluate solutions	x	x	x			x
	Make connections between ideas that seem unrelated		x				x
	Imagine how something works by looking at a drawing	x	x		x	x	x
	Visualize a product by looking at a blueprint	x	x		x		
Technical Skills:	Demonstrate facility with computers and relevant software				x		x
	Translate blueprints and schematics into physical products	x	x		x		
	Equipment selection, maintenance, and repair	x		x	x		
	Ensure product meets specifications and tolerance levels	x	x	x	x		x
	Use technology, tools and information systems effectively	x	x	x	x	x	x
Leadership Skills	Give appropriate feedback in an appropriate manner		x				x
	Administer consistent discipline		x				x
	Management of personnel resources		x				

Sources: O*Net, WorkKeys, www.careerkeys,com and ERISS Job Vacancy Survey

Justification for Selection of Occupations

Documentation that these occupations represent sizeable and on-going demand has been presented throughout the report. Both demand and earnings have been quantified in the tables. Labor market information and data analysis tools are contained in the appendices.

But data are only part of the story. The rest of the story comes from our focus group participants. The focus group input supported the quantitative data and vice versa. In August, we began presenting and brainstorming with our 21st Century Strategic Skills Consortium. Over 40 leaders from many walks of life grouped around 10 tables in a conference room at a resort in the middle of our region. The excitement was palpable as we all thought about the possibilities of a skilled work force. What would that look like? The first and most emotional comments came quickly… "Get workers to come to work on time!" Attitudinal and basic skills needs were quickly echoed, which included math, attendance and listening. Listening was then reiterated and attitudinal issues were repeated from reports of several groups. Groups also talked about many diverse technical skills needed in the work place. We brainstormed with the group for occupations in short supply and came up with a list of 15. Repeated occupations included: nursing, several kinds of medical technicians, CNC machinist, and truck drivers.

WorkOne extended an invitation to their Employer Advisory Councils. Human resource directors seemed genuinely excited that someone wanted to actually listen to their opinions. They started by citing the greatest difficulties they experience, which are getting people to work on time, attendance and motivation. Once we were able to move their discussion to skills in occupational shortages, significant statements stuck-out; "We need painters more than we need welders," stated a HRD from the transportation equipment manufacturing industry. "This is because we put spray guns in the hands of workers applying four coats of enamel on one-half million dollar recreational vehicles and do not have room for error!" The discussion continued identifying occupational and skill shortages of engineering, general labor, and nursing for nursing homes.

The University Research Team (see pg. 7 above) reviewed all the statistical data and concurred with the quantitative and qualitative findings. The team has met with the researchers three times and communicated via e-mail many times to ensure the statistical data is validated.

As a next step on our "listening" tour we invited to focus groups (using letters and personal calls) every manufacturer in the identified industry cluster of advanced manufacturing. Five focus groups were held across the region. As we facilitated these meetings we improved our questions and became better at finding the employer's pain with skill shortages in critical occupations.

Focus groups began with a presentation of SSI and its deliverables. Next we statistically demonstrated why their industry was chosen. Then we turned the meeting over to them

and facilitated each meeting using key questions. Their comments were recorded on the computer and beamed to a screen so all could see and take ownership of what was being recorded. The skill shortages in critical occupations were different depending on the county we were in.

- We started in St. Joseph County. Various machine operators came up as the most difficult to fill position. The need for line supervisors was then discussed along with general labor and other technical support jobs such as maintenance, engineering, mold making and tool and die.
- Elkhart County, the capital of the nation's transportation equipment manufacturing center, provided similar findings, including the need for welders, plumbers, electricians and body repair/painters on the production lines. Process technicians and engineers were also cited as occupations with shortages that are critical to manufacturing's success.
- Marshal County's industrial base consists of a diverse group of manufacturers. Their needs tended to replicate those of St Joseph County.
- Kosciusko County's focus group's interests include a need for workers to do light and heavy labor, operators with skills in mechanics and reading drawings. Because Kosciusko County is the world's capital in orthopedic manufacturing we held a special focus group for that industry and its suppliers. The greatest need readily became apparent when the critical skills of polishers were discussed. A large volume of CNC machinists is critical to this industry as well.
- Fulton County Economic Development provided excellent survey results focusing on the need for higher educated workers to meet the need of future employment. Computer skills and employee motivation were high on their needs list.

Transferable occupations included CNC machinists, supervisors, industrial engineering technicians and truck drivers while polishers and painters are industry specific.

Focus group participants suggested that causes of these shortages include growth, attrition, lack of training opportunities, a perceived devaluation of the job/occupation, lack of educators emphasizing careers on manufacturing, labor marker shortages, workers not willing to invest their own time in training, drug screening, language barriers, long learning curves, and high school students lacking work maturity.

Finally we met with health care industry partners and stakeholders at a heath care summit. Within this cluster we identified two subsectors, hospitals and ambulatory health care facilities, for focus. Each county was represented. Several hospitals brought personnel from human resources as well as nursing and technical services. Twenty-five occupations were identified as experiencing personnel shortages. Nursing, as expected, was at the top the list. After that the numbers varied according to each hospital. All the numbers, except for nursing, were in single digits yet the occupations are critical to the flow of patient care.

Hospital personnel adjust to shortages in these occupations by using training plans in-house, scheduling overtime, outsourcing (at great expense), deferred treatment and partnering with a university.

Two critical causes, among many more, undermine the ability to provide qualified personnel; not enough instructors and not enough clinical spaces. These and other issues will be drilled down to root causes in the next phase.

From the quantitative and qualitative sides we have confirmed that the strategic occupational sectors (SOS) advanced manufacturing and health care are EGR-2's immediate priorities.

The ERISS Job Vacancy Survey provided additional information about the difficulty in filling these critical occupations:

- 46% of employers require 1-3 months to fill an experienced welder/cutter position (32 respondents statewide);
- 22% of employers require 2-4 weeks to fill an experienced painter position (21 respondents statewide);
- 27% of employers take 1-3 months to fill an experienced CNC position (19 respondents statewide);
- 73% of employers require 1-3 months to fill an experienced RN position (39 respondents statewide);
- 57% of employers require 2-4 weeks to fill an experience health records technician position (18 respondents); and
- 63% of employers require 1-3 months to fill an experienced respiratory therapist position (8 respondents statewide).

The Third Tier: Emerging Occupations

First and second tier occupations selected for this report were chosen because they reflect the shortages we need to meet *today.* If we can't ensure our firms are competitive and profitable now, they will not survive to grasp the opportunities that tomorrow's technology presents. There is a third tier that is still being defined, but EGR-2 will be working simultaneously to define that tier as we work on filling shortages for today's jobs. Emerging technologies include nanotechnology, biotechnology, and geospatial technology.

Nanotechnology simply refers to materials and devices that operate at the nanoscale. How might this technology affect our targeted industry subsectors? "Plastic nanocomposites are used for strong, lighter, and rust-proof car components. Toyota recently began using nanocomposites in bumpers that makes them 60% lighter and twice as resistant to denting and scratching. The biomedical field is manufacturing artificial bone composites from nanocrystalline calcium phosphates. These composites are made of the same mineral as natural bone, yet have strength in compression equal

to stainless steel. Nanotechnology is expected to have an impact on nearly every industry. Most near term (1-5 years) applications of nanotechnology are in the form of nanomaterials. These include materials such as lighter and stronger nanocomposites, antibacterial nanoparticles, and nanostructured catalysts. Nanodevices and nanoelectronics are farther off, perhaps 5-15 years, and will have applications in medical treatments and diagnostics, faster computers, and in sensors."[18] The bulk of jobs in nanotechnology are expected to be in life sciences, biotech, polymers, and coatings. In a series of interviews conducted with employers, national stakeholders, industry associations, and educational institutions regarding nanotechnology, most interviewees saw current personnel needs as being for "innovators/product developers" with B.S., M.S., and Ph.D' degrees. They felt the need for technicians is farther down the road (5-10 years).[19]

Biotechnology is also a catch-all name that pervades many industries. According to technology strategists at Battelle, a global science and technology enterprise, genetic-based medical and health care is the top strategic technology. Emerging biotech developments include genetic profiling, DNA identification, therapy/drug developments, biomedical engineering (smart materials and artificial body parts) and genetic modification (engineering of organisms). Biotech careers start with glasswashers and run all the way up to Ph.D. level researchers. They include positions one would not ordinarily think of in biotech, including sales representatives, librarians, and market research analysts. There are many opportunities for technician level workers. Hospitals and ambulatory health care, as well as the manufacturing of medical equipment have been, and will continue to be, impacted by biotechnological developments. A good description of career possibilities may be found at http://www.accessexcellence.org/RC/CC/bio_career_1.html .

Finally, geospatial technologies help us understand where we are spatially on the earth, and what impact we have on the earth's natural and man-made resources. Geospatial technologies include remote sensing, geographic information systems (GIS), and global positioning systems (GPS) technologies. High demand occupational descriptions, wages, and openings by state may be found at http://www.careervoyages.gov/geospatialtechnology-main.cfm . Many high demand careers require B.S. or M.S. degrees, but many do not, including production clerks (short-term OJT), electrical engineering techs (associates degree), transportation and storage managers (related work experience), surveying and mapping techs (moderate OJT), and architectural drafters (postsecondary vocational award). While the demand is not very high in Indiana for geospatial-specific careers, production clerks, transportation managers, and electronic engineering technicians have skills that are transferable to other industries.

[18] Nanotechnology Information Center, http://www.americanelements.com/nanotech.htm
[19] Corporation for a Skilled workforce, 2004

Workforce development will need to work hand-in-hand with economic development to grow these opportunities in EGR-2 and "re-tool" our workforce to work with the new technologies. Even as these technologies mature, there will be many opportunities for technically skilled individuals with less than a four-year degree.

Section 4: Size & Location of Short & Long Term Occupational Shortages

Estimates of Short and Long Term Shortages

Table 5 outlines the current (short term) and projected (long term) gaps in meeting the demand for each of the targeted occupations. Worksheets used to determine the shortages are contained in the appendices to this report. Table 5 may be found below, immediately after Table 4.

Distribution by Geographic Location

It is easiest to explain how geographic distribution was determined by using an example.

Example: first line supervisors occur in all five manufacturing subsectors (see Table 2). We added up the number of workers in each of the five targeted manufacturing subsectors for each county (see Table 4 below). There are 4,128 workers in Marshall county employed in the five manufacturing subsectors, and 73,181 workers in EGR-2 in those subsectors. Thus, Marshall County has 5.6% of all the region's workers in the five manufacturing subsectors. The current gap in first-line supervisors is 55. Marshall County is assumed to have 5.6% of this gap, or 3.08 (rounded to 3).

On the other hand, painters of transportation equipment occur only in subsector 336 (transportation equipment) among the five subsectors. Therefore, we only determined each county's percentage of the region's workers in subsector 336 to determine what percentage to apply to the annual gap for that occupation.

Welders are found in three subsectors, fabricated metals, machinery manufacturing, and transportation equipment. We figured the percentage each county had of the EGR-2 total just for those subsectors to apply to the annual shortage number.

Shortages by county are found in Table 6 (immediately following Table 5. Numbers were rounded so that there would be "whole people" rather than percentages of workers needed in each county.

The majority of the health care shortages are in the most heavily populated counties, Elkhart and St. Joseph, where most of the ambulatory health care firms and hospitals are located. The majority of the manufacturing skill shortages are in Elkhart County, where most of the manufacturing firms are located. The exception is for CNC

machinists, where the shortage is primarily in Kosciusko County, home to the majority of medical equipment manufacturing firms.

TABLE 4

EGR 2 Employment, By County and NAICS Code

	NAICS codes:						
	326 Plastics	332 Fab Metals	333 Machinery	336 Trans Equip.	339 Misc. Mfg.	621 Amb, Care	622 Hospitals
Fulton County							
number of jobs	184	904	223	61	n/a	177	n/a
% of EGR2 sector	1.80%	7.30%	5.80%	0.02%	0.02%	1.80%	
Marshall County							
number of jobs	1861	1212	158	445	452	307	584
% of EGR2 sector	18.20%	9.70%	4.10%	1.10%	5.60%	3.10%	6.20%
Kosciusko County							
number of jobs	1040	862	1015	1642	5402	711	n/a
% of EGR2 sector	10.20%	6.90%	26.70%	4.20%	67.30%	7.30%	
Elkhart County							
number of jobs	4877	6833	1401	30669	1313	2954	3051
% of EGR2 sector	47.90%	55.10%	36.90%	79.10%	16.30%	30.20%	32.60%
St. Joseph County							
number of jobs	2219	2576	1002	5978	852	5632	5711
% of EGR2 sector	21.80%	20.70%	26.40%	15.40%	10.60%	57.60%	61.10%
Total Jobs per Sector	**10181**	**12387**	**3799**	**38795**	**8019**	**9781**	**9346**

TABLE 5

Strategic Skills Initiative
SOC Gap Analysis for EGR-2

	Year 2006					Year 2012				
Health Care	EGR2 Supply	Migration to EGR2	Total New Supply	Current Demand	**Current Gap**	EGR2 Supply	Migration to EGR2	Total New Supply	Future Demand	**Future Gap**
Medical Assistants	31	3	34	45	**11**	40	4	44	55	**11**
Registered Nurses	278	27	305	450	**145**	295	28	323	450	**127**
Respiratory Therapists	0	2	2	10	**8**	2	2	4	14	**10**
Coders - Med Record / Info Techs.	20	2	22	30	**8**	22	2	24	30	**6**

	Year 2006					Year 2012				
Advanced Manufacturing	EGR2 Supply	Migration to EGR2	Total New Supply	Current Demand	**Current Gap**	EGR2 Supply	Migration to EGR2	Total New Supply	Future Demand	**Future Gap**
Welders, Cutters, Solderers, Brazers	47	5	52	120	**68**	60	5	65	120	**55**
First-line Supervisors/Production	90	25	115	170	**55**	100	20	120	170	**50**
Painters of Trans. Equip.	5	5	10	40	**30**	5	5	10	40	**30**
CNC Machinist	9	0	9	40	**31**	13	0	13	30	**17**

TABLE 6

Strategic Skills Initiative

SOC Gap Analysis by County

	Year 2006					Year 2012				
Health Care	Fulton	Marshall	Kosci-usko	Elkhart	St. Joseph	Fulton	Marshall	Kosci-usko	Elkhart	St. Joseph
Medical Assistants	0	1	0	3	7	0	1	0	3	7
Registered Nurses	1	7	5	46	86	1	6	5	40	75
Respiratory Therapists	0	0	1	2	5	0	0	1	3	6
Coders - Med Record / Info Techs.	0	0	0	3	8	0	0	0	2	4

	Year 2006					Year 2012				
Advanced Manufacturing	Fulton	Marshall	Kosci-usko	Elkhart	St. Joseph	Fulton	Marshall	Kosci-usko	Elkhart	St. Joseph
Welders, Cutters, Solderers, Brazers	2	2	4	48	12	1	2	4	39	10
First-line Supervisors/Production	1	3	7	34	10	1	3	7	31	9
Painters of Trans. Equip.	0	0	1	24	5	0	0	1	24	5
CNC Machinist	0	2	21	5	3	0	1	11	2	2

Section 5: Location and Significance of Critical Skill Gaps

The ERISS survey asked employers in EGR-2 what they considered to be the two most common deficiencies among workers now employed in their organizations, and the two most common deficiencies among recent applicants for jobs. The results showed that across all occupations in manufacturing and health care, "thinking critically and logically to solve problems;" "learning, understanding, and applying information and analysis"; and "developing a positive attitude toward change" are common deficiencies among both incumbent workers and job applicants. Math skill deficits are more commonly identified by manufacturers than by health care employers. Deficiencies in reading skills and communicating effectively in English are a greater problem for both manufacturing and health care firms among their incumbent workers than among job applicants.

Two Most Common Deficiencies Identified by EGR-2 Manufacturing and Health Care Employers

Skill Deficiency	% Mfg Firms– Incumbent Workers	% Mfg Firms – Job Applicants	% Health Care Firms- Incumbent Workers	% Health Care Firms– Job Applicants
Reading Skills	**27.32**	12.3	**26.92**	12.04
Math Skills	**30.73**	19.41	13.46	7.41
Communicating Effectively in English	**35.12**	18.87	**28.85**	12.96
Learning, Understanding, and Applying Information and Analysis	**27.32**	**22.1**	**23.08**	**20.37**
Thinking Critically and Acting Logically to Solve Problems	**40.0**	**25.07**	**46.15**	**31.48**
Using Technology, Tools, and Information Systems	16.1	14.56	13.46	13.89
Working in Teams	10.73	11.05	17.31	**24.07**
Developing Positive Attitude Toward Change	**25.37**	**26.42**	**26.92**	**36.11**
None	5.37	13.75	1.92	17.59
Don't Know	.49	7.82	3.85	7.41
Source: ERISS				

If we take the skills charts under the Description of Critical Skill Sets and cross that with the occupational gap by county in Table 6, we can arrive at the most common skill deficiencies by county, highlighted in yellow on the chart below. St. Joseph and Elkhart

have skill gaps in all areas since they have shortages in all the targeted occupations. Fulton and Kosciusko have no shortages of medical assistants, so they have no skill shortage in learning strategies. Fulton and Marshall have no shortages of respiratory therapists or medical records/coders, so they have no shortages of troubleshooting or judgment and decision-making skills.

	Fulton	Marshall	Kosciusko	Elkhart	St. Joe
Basic Skills					
Active listening	X	X	X	X	X
Speaking	X	X	X	X	X
Reading Comprehension	X	X	X	X	X
Active Learning	X	X	X	X	X
Learning Strategies		X		X	X
Writing	X	X	X	X	X
Critical Thinking	X	X	X	X	X
Monitoring	X	X	X	X	X
Mathematics	X	X	X	X	X
Social Skills					
Instructing	X	X	X	X	X
Social Perceptiveness	X	X	X	X	X
Service Orientation	X	X	X	X	X
Coordination	X	X	X	X	X
Resource Management					
Mgt of Personnel	X	X	X	X	X
Time Mgmt	X	X	X	X	X
Mgmt of Materials	X	X	X	X	X
Systems Skills					
Judgment and Decision making				X	X
Technical Skills					
Operation Monitoring	X	X	X	X	X
Troubleshooting			X	X	X

Equipment Selection	X	X	X	X	X
Operation and Control	X	X	X	X	X
Equipment Maintenance	X	X	X	X	X
Quality Control Analysis	X	X	X	X	X
Installation	X	X	X	X	X
Repairing	X	X	X	X	X

For both manufacturing and health care subsectors, the bottom line is profitability and competitiveness. If the skill gaps aren't filled, costs rise, profitability declines and the firm becomes less competitive in the market place.

According to our focus group participants, manufacturers adjust for shortages in key positions by using overtime, outsourcing, "growing their own" and automation. Participants agreed quality and productivity would improve and waste would decrease as skills increased. Competitive positioning should improve as meeting customers' quality, on-time delivery, volume, and price demands is accomplished. The future varies for each industry, its ability to perform, flex, and remain competitive.

Health care summit participants deal with shortages by using training plans in-house, overtime, outsourcing at great expense, deferring treatment, and partnering with a university. The future of hospital care will change because of the aging of the workforce, continued explosion of technology, specialization of hospitals and occupations, multi-tasking requirements placed on staff, patient care becoming more intense due to patients having more acute conditions, and patients possessing have more information.

Section 6: Regional Coalition and Industry Partner Engagement

The components of the SSI initiative were formally presented to the region through the SSI Consortium on August 30, 2005. The Consortium consists of leaders from elected leaders, public servants, educators, and industrial leaders. Industrial leaders were selected to ensure a broad range of industries, but with a focus on manufacturing and health care since these two industries were already known to be critical the regional economy from previous studies. Invitees were listed in the Research Grant Application.

EGR-2 SSI staff approached qualifying data using a several-prong approach.

- First, chamber presidents and economic development directors for each county were interviewed seeking their insights of workforce issues and verifying industrial leaders to invite to focus groups.
- Next, a University Research Team was formed for the purpose of validating and approving the quantitative findings. The Research Team included representatives from institutions across the region.
- Demand side focus groups were identified for each of the two clusters: advanced manufacturing and health care. Human resource and operations/plant managers in each sector were invited to county-wide focus groups for manufacturing in each county (with the exception of Fulton, which was late to come on board, but is now providing input to the report). An additional sector specific focus group was held for medical equipment manufacturing in Kosciusko County.
- Health care subsector employers from all counties were invited to attend a regional health care summit.
- WorkOne staff invited SSI staff to present and facilitate meetings for their Advisory Councils at each WorkOne Center.
- Two supply side meetings were held for Indiana University at South Bend - Extended Learning Services and Ivy Tech Community College - Corporate and Continuing Educational Services.
- Findings from qualitative discussions were reviewed, summarized and presented along with quantitative findings to the 21st Century SSI Consortium for feedback and approval. On October 18, the Consortium voted to formally approve the acceptance of the Strategic Skills Initiative Phase One report.

"The Workforce Investment Board is providing a vital link to our community by identifying the skill gaps that exist in the workforce. Indiana University South Bend is committed to providing relevant training in the region to insure that employers and employees have access to both short term training and long-term educational opportunities to support economic growth and development in the Northern Indiana region. Our relationship with the Workforce Investment Board will help us identify specific critical skill shortages and provide educational opportunities that close the skill shortage gap resulting in increased productivity in existing businesses, attraction of new businesses locating in the region and reduced levels of unemployment. "

Jacqueline Neuman, Director Extended Learning Services, Indiana University South Bend

Postscript -- 21st Century Skills Consortium Attendees

August 30, 2005

1. Bob Abene
2. Doug Anspach – Plymouth Chamber of Commerce
3. Katherine Baert – Smurfit-Stone Container Corporation
4. Lyn Batzer – Ivy Tech Community College
5. Debbie Berger – JobWorks
6. Brad Bishop – Zimmer Corporation
7. Howard Blackwood – WorkOne Center (Employer Services Division)
8. John Booker – J. Booker Consultants
9. Eric Brown – Sheet Metal Workers Local 20
10. Virginia Calvin – Ivy Tech Community College
11. Jay Caponigro – Robinson Community Learning Center
12. Fred Carmel – Vincennes University
13. Dawn Chapla – United Way
14. Debie Coble – Goodwill Industries of Michiana
15. Kay Cochrane - Northern Indiana WIB, Inc.
16. David Daugherty – Goshen Chamber of Commerce
17. David Findlay – Lake City Bank
18. Cindy Fuja – Madison Center
19. Barkley Garrett – Indiana Department of Commerce
20. Diane Horst - Northern Indiana WIB, Inc.
21. Brian Hueni – Crowe Chizek
22. Jack Isles – Bull Moose Tube Company
23. Greg Jones – Indiana Plan
24. Carl Kaser – Kaser Auction Service
25. Fred Lanahan – Indiana Department of Workforce Development
26. Jerry Langley – University of Notre Dame –Mendoza College of Business
27. Paul Laskowski – Chamber of Commerce of St. Joseph County
28. Jinny Longbrake – Memorial Hospital
29. Juan Manigault – Northern Indiana WIB, Inc.
30. Pat McMahon – Project Future
31. Ron Michaelis – International Brotherhood of Electrical Workers
32. Kimberly Nance – Kosciusko Development, Inc.
33. Rebecca Parker – AM General
34. Phil Penn – Elkhart Chamber of Commerce
35. Jean Perrin – Ivy Tech Community College
36. Anna Marie Peters - Northern Indiana WIB, Inc.
37. Chuck Pressler - Northern Indiana WIB, Inc.
38. Tom Primrose – WorkOne
39. Suzanne Randall – Dutchmen Manufacturing
40. Mae Reck - Indiana University South Bend
41. Kathy Sokolowski – USDOL Bureau of Apprenticeships & Training
42. Fred Thon – City of South Bend
43. Barbara White – Northern Indiana WIB, Inc.

Postscript – 21st Century Skills Consortium Attendees

October 18, 2005

Participant	Organization Name
Bob Abene	
Bill Hansen	Brown Mackie College
Sheryl Decker	Brown Mackie College
Fred Thon	City of South Bend
Suzanne Randall	Dutchmen Manufacturing, Inc.
Bill Bradley	Economic Development Corporation
Lola Brysz	Elkhart General Hospital
David Gibson	Gibson Insurance Group
Debie Coble	Goodwill Industries
Beth Firestone	Indalex Aluminum
Barkley Garrett	Indiana Economic Development Corp.
Dave Switzer	Indiana Michigan Power
Greg Jones	Indiana Plan
Grant Black	IUSB
Jacqueline Newman	IUSB
Rob Ducoffe	IUSB
Una Mae Reck	IUSB
Carol Kirkner	Ivy Tech Community College
Lyn Batzer	Ivy Tech Community College
Jean Perrin	Ivy Tech Community College
Debbie Berger	JobWorks, Inc.
Glenn Williams	Laborers International Union
Cindy Fuja	Madison Center
Doug Anspach	Marshall County Industrial Foundation
Karen Dady	Master Metal Engineering
Brian Pyszka	Master Metal Engineering
Jinny Longbrake	Memorial Health Systems
Debbie Remble	Memorial Health Systems
Jayne Mitton	Memorial Hospital
Jerry Langley	Mendoza College of Business
John Booker	National Assoc. of Direct Care Workers of Color, Inc.
Mary Coursey	Oaklawn
Rebecca Loth	Oaklawn
Lynn Forrest	Personnel Management, Inc.
Mark Curtis	Purdue University
Suzanne Wheeler	Purdue University
Lester Fox	Real Services, Inc.
Allison Heyde	Rochester & Lake Manitou Chamber of Commerce
Greg Morris	Rosewood Terrace
Eric Brown	Sheet Metal Workers Local 20
Katherine Baert	Smurfit-Stone Container Corp.

Participant	Organization Name
Andres Valtierra	Transition Resources Corporation
Carl Kaser	United Auto Workers Local
Kathy Sokolowski	USDOL Bureau of Apprenticeships & Training
Fred Carmel	Vincennes University
Jim Laughlin	Vincennes University Elkhart
Craig Toth	WorkOne Center
Brad Bishop	Zimmer Corporation