

**Saginaw Future**

**Transitioning to the  
Medical Device Manufacturing  
Industry**

*Available resources for manufacturers in the  
Great Lakes Bay region*



**April 2008**

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## INTRODUCTION

In the 21st Century, the mid-Michigan region has developed into a major medical cluster. This industry has grown due to the area's unique ability to provide not only high quality of health care to residents, but also high paying health care jobs to residents, and numerous resources to foster and support business opportunities. The Health Care & Social Assistance sector's impact on the Saginaw region's

Health Care & Social Assistance Percentage Shares of Total Employment								
	2001	2002	2003	2004	2005	2006	2007	+/-
Saginaw Midland Bay MWA	14.6	15.4	15.8	15.9	16.9	17.1	17.9	3.3
United States	11.7	12.4	12.8	12.9	12.9	13.0	13.2	1.5

Sources: Bureau of Labor Statistics, Michigan Department of Labor and Economic Growth Office of Labor Market Information

economy has been significant. Strong growth in the Health service sector has continued to solidify the Saginaw Valley area as a hub for medical care for northern and central Michigan. As previously shown, the Saginaw Valley area has a higher percentage of employment in Health Care & Social Assistance when compared to the country as a whole. The

share of Health care employees at the regional level increased from 14.6% to 17.9% creating 2,843 jobs from 2001-2007.

The Economic Impact of Saginaw County Health Care			
	Direct Jobs	Indirect & Induced Jobs	Total
# of Employees	14,749	6,438	21,187
Wages & Salary	\$650,113,985	\$181,346,584	\$831,460,569

Source: 6/06, The Economic Impact of Health Care in Michigan, Partnership for Michigan's Health

Direct economic impact of hospitals, doctors, dentists, nurses and other health care providers	\$1,191,265,340
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Source: 6/06, The Economic Impact of Health Care in Michigan, Partnership for Michigan's Health

The impact has also been felt in the pocket book as the direct impact of health care in Saginaw County amounted to nearly \$1.2 billion in direct and indirect revenue in 2006. The Saginaw Midland Bay MWA impact of health care totaled more than \$1.9 billion for 2006. Health specialization has been identified as an economic opportunity for the

region. A new initiative, led by Saginaw Future Inc. has been working to develop a synergy with Great Lakes Bay's tradition in advanced manufacturing and the developing medical sector.

Nationally, the medical device-manufacturing market has a 6.4% annual growth rate, which naturally provides a substantial potential for job creation. Currently there are 10,000 U.S. medical manufacturing companies that make up a \$170 billion market. Mid-Michigan, with its strong health care presence, and its coveted medical research and higher educational institutions, the area is strategically positioned to claim a stake in this economically attractive market, and has launched the Saginaw Region Biomedical Device Industry Initiative. Its mission is to attract, retain and assist in the expansion of the region's life science industries, medical device and diagnostic firms, and medical service providers in mid-Michigan. With this type of potential, Mid-Michigan businesses wanting to diversify their target industries will want to learn more about the manufacturing aspects and opportunities in this industry.

Medical device manufacturing, as an emerging sector, has become a strong focus throughout Michigan. Efforts similar to this are either beginning or underway in Oakland County, Jackson County, Kalamazoo County and the Grand Rapids area. The Great Lakes Bay region has an equally strong base as any of these locations with the quality companies, institutions and universities that will be presented later. Furthermore, this region is the prime catalyst for all of northern Michigan and a portion of the Upper Peninsula. Lastly, each of these prospective regions do not compete with each other. Clearly, these are opportunities that bring Michigan, as a whole, forward. As one region prospers, so can several. These medical device opportunities are critical for development in the 21<sup>st</sup> century and beyond. But, what is a medical device? The answer is not as simple as it may sound.

Broadly speaking, a medical device can be defined as any object that is intended for use in the diagnosis of disease or its related treatment. It can also be intended to affect the structure of any function of the body - one thing is clear: medical devices do not achieve results through chemical action. This definition is not limited to humans; it includes all animals as well. This definition is important as it includes items inside the body or items used outside the body by medical professionals. It does not include drugs or other chemical agents as they have a different process by which they provide assistance.

Overall, this report is intended to discuss the various resources and levels of assistance that may be needed when considering the manufacturing medical device products. Included within this report is information on existing medical and research facilities in the Great Lakes Bay region, funding assistance, locations for expert guidance for manufacturers specifically and generally, national and international requirements for quality and development, and other pertinent information. This report seeks to guide business owners, entrepreneurs, and Saginaw Future, Inc. , to improved, diversified manufacturing and economic success. This information is intended to provide the reader with knowledge regarding the potential opportunity within the medical device arena as it relates to the mid-Michigan metropolitan region. It includes technical and medical advancements that are currently occurring, the high level of university involvement, the funding potential for manufacturers, and the quality of potential assistance available for those interested in diversifying their customer base.

## CURRENT ECONOMY

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### ***Great Lakes Bay Health Care Sector***

Saginaw County serves as Mid-Michigan's medical center with Covenant HealthCare and St. Mary's of Michigan as the centerpiece, servicing 26 counties surrounding Saginaw County. Covenant HealthCare employs over 4,000 workers and in the area and has established itself as the largest health care provider, and regional leader, providing surgery, obstetric and trauma services. A recent investment of over \$63.1 million has resulted in a state-of-the-art emergency center and other improvements.

St. Mary's is renowned for its heart and burn units, and also offers specialty care in neuro-surgery and cancer treatment. Over the past several years, they have added nearly \$6 million in hi-tech medical equipment. It recently constructed a \$15 million state-of-the-art surgical wing at the hospital's main campus. The Field Neurosciences Institute is dedicated to brain research and injury prevention and Saginaw's Synergy Medical Education Alliance provides accredited residency training programs. The Michigan CardioVascular Institute is the largest group of cardiovascular surgeons in the state.

Bay Regional Medical Center, located in Bay City, offers cutting-edge health care and just recently announced a multi-million dollar expansion project at its main campus. Bay Regional has expended or planned over \$60 million in building expansions, the addition of an imaging services location, and anticipated capital expenditures make it a important resource in the region.

MidMichigan Health is a leader in providing cancer and neuroscience care with a Gamma Knife, the only hospital north of Detroit to provide this service. This investment accounted for \$4 million of their most recent capital planning needs. Through a network of partnerships, MidMichigan also offers mobile diagnostic MRI services, mobile lithotripsy services, radiation oncology services, hemodialysis care, and other specialized services for patients.

Continued growth in the health care sector has provided residents with some of the most advanced medical technologies in the nation. The area has become a hub for medical care, servicing northern and central Michigan residents with four acute care facilities that provide over 1,700 beds. Having this infrastructure in place makes the Mid Michigan region a valuable asset to the medical device manufacturing community.

### ***Great Lakes Bay Manufacturing Sector***

The manufacturing sector still provides a strong base of economic activity in the region and is fortunate to have Fortune 500 companies that provide thousands of jobs to area residents. For example, one of the area's largest employer is Delphi, a Fortune 500 company. Delphi is a world leader in automobile electronics, transportation components and automotive systems technology. The Great Lakes Bay region is also home to the global headquarters of The Dow Chemical Company, another Fortune 500 company. Dow is recognized as one of the worldwide leaders in the production of chemical, plastic and agricultural products. These products serve the food, transportation, medical and construction industries, among others.

The area's advanced manufacturing base continues to diversify, capitalizing on new technologies, processes and opportunities. The Saginaw-Bay-Midland region received 228 patents for new products and devices in 2002, according to the Michigan State University Knowledge Economy Research Team.

### ***Opportunities for the Manufacturing Sector***

Throughout the history of Great Lakes Bay, there has always been a continuous reshaping of the economy using the best of the area's "assets." For example, mid-Michigan's abundant forests and strategic waterways helped launch the region as the world's leader in lumber production, back in the 19th Century. From there, the pioneers discovered the valuable brine that lied beneath the earth, which when coupled with power, helped build the chemical industry. The auto industry's mass-production methods adopted during the core of the early 20th century started the industrial revolution in this region and across the state. To this day, the Great Lakes Bay area's strengths and know-how in advanced manufacturing continues to be a vital and valuable foundation for growth and economic diversification.

As has been discussed, the vibrant and growing health care system is at the heart of the infrastructure built to support our communities. By capitalizing on these "assets," mid-Michigan is once again poised to embrace and foster another era of reshaping — with health care services and medical device manufacturing providing promising opportunities for the regional economy.

The East Central Michigan Healthcare Regional Skills Alliance (RSA) is charged with working closely with the region's health services community and economic development leaders to support:

- A skilled and ready workforce to meet growing employment demands
- Hospitals fully staffed and drawing patients from a 100-mile radius
- Long-term care facilities operating efficiently
- Diversifying manufacturing to include high tech and health related production, in addition to auto related production.

While health care jobs grow in the region, mid-Michigan faces a continuing challenge to maintain and grow manufacturing jobs through diversification of the manufacturing base for existing and new businesses. Recognizing synergies between the region's inherent strengths in health care AND manufacturing, Saginaw Future, Inc., (SFI) has taken the lead in establishing the Saginaw Region Biomedical Device Industry Initiative.

The initiative arose from a study conducted by the Washington Advisory Group, which identified medical manufacturing as a natural for the area and a way to replace a portion of the jobs and economic strength lost from the auto industry. The initiative has a mission of assisting existing manufacturers in obtaining contracts for medical device manufacturing, helping to create new companies for the same, and attracting biomedical companies to the region. The medical device manufacturing industry today looks like this:

- Global Sales of \$150 Billion in 2002 (expected to increase by 15% by 2004).
- \$70 Billion Industry in USA alone
- 80% of all medical device companies have less than 50 employees – much like manufacturing companies in the Saginaw region.

- The manufacture of medical devices requires tight tolerances and stringent quality standards – similar to automotive needs

The bottom line is that many of the technical skills required by the regions manufacturers would transfer well to medical device manufacturing sector. It is important to note, however, that some do not believe that the Medical Device Industry will fulfill the void of automotive sector jobs that have plagued the region. Although the Medical Device Industry is a growing new technology sector, it is important that public officials and citizens of the region understand that the growth and opportunities in this industry are just one piece of the future's regional growth, as are other important sectors like alternative/renewable energy and advanced manufacturing.

## KNOWLEDGE/RESOURCES

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A significant amount of health and medical related research exists in the mid-Michigan region. For example, several universities jointly and separately provide guidance and direction to the life sciences industry. Furthermore, there are also several organizations in the area that exist to provide medical expertise. These collective establishments have created the foundation by which the Saginaw area can provide tremendous opportunity in the medical device field.

Leading the curve in the experimentation and research areas are the local hospitals, as mentioned previously. These institutions are complemented by several smaller institutes and medical centers that provide great opportunity, coupled with university research, for clinical review and medical device testing.

### ***Michigan CardioVascular Institute***

MCVI originated from a merger of The Heart Group, P.C. and Valley Heart Institute of Saginaw. Their combined talents formed one of the largest medical cardiology group practices in the Midwest. The legacy of both practices began in 1979 when cardiac care in the Saginaw community was in its infancy. Since its' inception, several physician practices have merged with MCVI, including the Great Lakes Cardiovascular Surgery, and the Midland Heart Group. Today, there are 17 locations strategically located throughout the state. MCVI's nationally recognized team of cardiologists and surgeons specialize in the latest techniques in heart care and heart disease management. The techniques include electrophysiology, imaging and diagnostic testing, and invasive and interventional procedures. MCVI also participates in many drug and device research studies usually available only to patients living in large metropolitan areas.

### ***St. Mary's of Michigan Seton Cancer Institute***

St. Mary's of Michigan offers experienced cancer specialists, compassionate patient-focused care, and the most advanced cancer-fighting technologies available. St. Mary's of Michigan has accomplished a long list of "firsts" in the region for cancer care:

- First cancer center in northeastern Michigan
- First in region with comprehensive research program
- First to offer stereotactic radiosurgery north of Detroit
- First to have intensity modulated radiation therapy (IMRT) in Saginaw area
- First in region to offer image guided radiation therapy (IGRT), such as for prostates
- Only cancer center to offer B-mode acquisition and targeting (BAT) ultrasound for localizations of the prostate gland

### ***The National Dendrimer and Nanotechnology Center***

Located in Mt. Pleasant, Michigan at Central Michigan University, the Dendrimer Center is a catalyst and focal point for new dendrimer based research and technologies in biomedical, diagnostic and

nano-material applications. The Center is positioned to become a repository for human and environmental safety and toxicity data related to dendrimers and other nanostructures.

In March of 2007, the Center, through Central Michigan University (CMU), completed a 17,000 square foot expansion to the existing incubation facility, supported by CMU and grants from the Michigan Economic Development Corporation and U.S. Economic Development Administration. The Research Facility features state of-the-art chemistry and bio-level laboratories, with facilities immediately available for lease. The current research agenda focuses on several types of dendrimer and nanoscale sciences, such as:

Drug encapsulation, release and disease targeting protocols, which are being established and tested for cancer therapy and anti-inflammatory drug systems using a range of dendrimer carrier structures.  
The use of dendrimers as contrast agents in magnetic resonance imaging applications.  
The use of dendrimers as a catalyst in the production of carbon nanotubes at the lowest temperatures recorded.

The Dendrimer Center has generated a number of new strategic partnerships and collaborative relationships including The Dow Chemical Company, Dendritic Nanotechnologies, Inc., U.S. Army Research Laboratory, Starpharma, and the U.S. Food and Drug Administration, among others. The resulting partnership of university and private industry has sparked numerous collaborative research endeavors and generated millions of dollars in private and public sector investment.

### ***Saginaw Valley State University***

This University plays an integral role in the region as it provides support not only to the medical device manufacturing, but also the region's transformation and prominent focus on the health care industry as a whole. Its Mechanical Engineering program, Crystal M. Lange College of Nursing and Health Sciences, and the satellite location of the Michigan Manufacturing Technical Center (Center for Manufacturing Improvement) provide a wealth of resources for companies or entrepreneurs interested in commercializing their medical device discoveries, or transitioning their current manufacturing capabilities to support medical device manufacturing.

**SVSU Mechanical Engineering Department** is gaining more and more academic recognition across the state, and the country, namely through the work of many faculty that have active research projects in biomaterials, biofuels, alternative energy, manufacturing, numerical modeling, solid mechanics, composites, and rapid prototyping. Especially noteworthy, is SVSU's recent addition of Dr. Allen Freed, a nationally-renowned expert in weightlessness and body mass issues. As a neurosurgeon, Dr. Freed worked at NASA on the Advanced Modeling of Human Tissue using Fractional Order Calculus project. His SVSU endowed position as Spicer Chair of Engineering: Medical device /neurosurgeon, provides an expertise to the region in medical devices and other bio science discoveries. Dr. Freed's specially designed lab can serve as a valuable resource for the region.

Additionally, the Mechanical Engineering Department at SVSU serves as an important resource for entrepreneurs in the region, since its curriculum is intended to foster hands-on skills in experimenting; acquiring, reducing and analyzing data and prototyping systems. Students must complete a year-long senior design project, on behalf of a local business. This comprehensive project includes problem definition, design, purchasing, manufacturing, and testing. Solidica, a

medical device company, has donated equipment to the university to be used on new projects. Few other universities have this kind of realistic, real world senior design project. This requirement has already resulted in new products that are targeted to be manufactured in the region.

**SVSU Independent Testing Laboratory** assists local companies with the resolution of real world issues by providing access and expertise to modern scientific instrumentation and professional SVSU faculty and staff.

**College of Nursing and Health Sciences** serves as the primary educational institution in the region for those interested in the health care field, by offering undergraduate and graduate degrees in nursing, occupational therapy, and medical technology. Each of these programs combines theoretical courses with an extensive clinical experience component to provide thorough professional knowledge and hands-on skills. The College is the health care college of choice for the preparation of baccalaureate and masters level health care professionals in a multi-county region of East-Central Michigan. It provides regional leadership, intellectual support and continuing education for health care professionals. Most importantly, when medical discoveries and medical devices need testing, this college can provide a clinical environment to support the test.

**Matchmaking Services** at SVSU serve as a matchmaker to manufacturers who are looking for support services to help commercialize their discovery and to transition their company into new directions, and into new fields. Testing of technology, identifying potential sources of funding, or simply needing an experienced professional operating in the medical device technology field to talk with, can all be arranged through SVSU.

**MMTC Satellite Office** located in Plymouth, Michigan, operates a satellite office managed by SVSU's Center for Manufacturing Improvement (CMI). The Center works with mid-Michigan manufacturers to plan, implement, and measure improvements to their products and processes, including technical and workforce issues—to achieve increased profits, higher quality, and lower costs. The MMTC/CMI vision is to be the principal source of high performance business and technical assistance for Michigan's small to mid-sized manufacturers and the partner of choice for the economic development community. Since 1991, the MMTC has provided training and implementation assistance to a wide variety of industry sectors. Although their expertise is provided on a “fee for service” basis, they frequently assist businesses in applying for federal and state funds to supplement costs. CMI, through MMTC, provides programs that help increase manufacturer's profitability and productivity.

Specifically, MMTC assists companies with removing cost from their processes through the elimination of waste and implementation of best practices. Entering new markets through market/customer diversification, implementing ISO quality and environmental programs and improving customer responsiveness directly affect retention and development of new sales and CMI can help. Companies often need assistance investing in ERP/MRP systems, new plant and manufacturing equipment and recruiting and training staff. MMTC training includes the following areas of expertise:

- Increase revenue / profitability
- Improve competitiveness
- Accelerate speed to market
- LEAN Business Solutions
- Quality Management Systems
- Six Sigma
- Eureka! Winning Ways
- Costing and Accurate Cost Measurements
- Environmental Management Systems
- Market/Customer Diversification
- Improve Customer responsiveness
- Increase capacity utilization

Currently, SVSU's MMTC Satellite Office is involved in many leading edge projects that demonstrate their value and depth to the community. For example, MMTC/CMI is operating a pilot program at four area hospitals teaching them the concepts, techniques and processes of adopting a six sigma quality program, as well as lean manufacturing processes, both which are typically found in a manufacturing environment. Another initiative underway is MMTC/CMI is preparing to apply for the prestigious Michigan Quality Award, a pre-cursor to the coveted Malcomb Balbridge National Quality Award.

This local resource is invaluable to the manufacturing community in the region, and is extremely important for those that want to transition in to the medical device manufacturing industry, because CMI provides Quality training regarding ISO 13485, the medical device quality standard recognized and required globally.

### ***Central Michigan University***

Central Michigan University has been viewed as the leader in a possible new medical school serving the Great Lakes Bay region. In fact, research is currently being conducted on determining, and justifying, the need for this type of facility. This effort would include a community collaboration inclusive of all local medical facilities, medical institutes and other important stakeholders. This concept would plan for a school focusing on medical needs impacting Michigan residents most – diabetes, heart disease, cancer, etc. As it holds the distinction of being the largest university in Michigan north of Saginaw, it can provide a key economic impact for all of northern Michigan. Furthermore, with the region potentially becoming a medical device manufacturing hub, CMU stands even more firm in supplying quality medical students for an entire sector.

CMU also has a variety of resources that can be offered to the entrepreneur, or to the long established manufacturer, who is interested in pursuing medical device manufacturing projects/work. Between its renowned CMU-RC to its matchmaking services, to its ability to support testing of processes, CMU is a valuable resource for the medical device manufacturing community.

### **CMU Research Corporation**

The Central Michigan University Research Corporation (CMU-RC) is a not-for-profit organization established to facilitate innovative research and development opportunities between the university and high technology companies. CMU-RC is dedicated to:

- Establishing and operating a national center of excellence in the research fields of business intelligence and nano-scale sciences
- The pursuit of innovative, industry-driven applied research opportunities
- Providing mutually beneficial research opportunities to both industry sponsors and university faculty researchers
- Encouraging entrepreneurial activity through CMU-RC business acceleration services

CMU-RC can serve as the single point of contact to help start-up businesses leverage the unique strengths at the National Dendrimer and Nanotechnology Center. Additionally, CMU offers business incubation space which serves as a catalyst for the creation and growth of start-up companies, while at the same time helping to diversify economies, commercialize technologies, create high-paying jobs and build wealth in the surrounding community.

CMU-RC is located in the Center for Applied Research and Technology's (CART) research facility, a 12,000 square foot incubator facility outfitted with high-speed network access and contemporary office space and a 17,000 square foot wet-lab which houses state-of-the-art chemistry and bio-level laboratories. High-tech start-ups at CART's incubator facility offer:

- Secure or shared office space
- Flexible, affordable leases
- Office equipment, including computers, copiers & facsimile
- Central administrative services
- Central conference areas
- Wired for high-speed web access
- Collaborative environment

Tenants will benefit from the low risk experience at the incubator, and also the low cost environment while being able to create ambitious and effective business solutions to gain a competitive advantage. In addition to the amenities available at the incubator, CART tenants will reap the valuable benefits of CMU-RC services including:

- CMU's intellectual assets and facilities
- Eager, affordable and well-trained technical staff
- Financial incentives
- University support at the highest levels
- High-speed Internet connectivity
- Super-computing facilities

#### **Professional Service Providers Corps**

CMU-RC's Professional Service Provider Corps is made up of strategically targeted companies and organizations within the region that provide assistance in the following categories:

- Business & Marketing Plan Development
- Legal Counseling & Intellectual Property
- Design & Prototype Development

- Financial Advising
- Access to Capital
- Management Team Development
- Site Selection throughout the mid-Michigan Region
- Technology Assessment, Support & Services

Additionally, CMU offers additional support to medical device companies through the **Labelle Entrepreneurial Center** (LEC) housed within Central Michigan University's College of Business Administration. The LEC provides assistance, training and expert advice to new and potential small business owners.

**Industrial and Engineering Technology at CMU** CMU's IET department is housed in a state-of-the-art facility that boasts a wide range of labs and research centers focusing on CAD applications, mechanical analysis, and prototype development, and is available to assist companies on their testing needs.

#### **CMRA- Central Michigan Research Alliance**

The Central Michigan Research Alliance has been specifically designed to provide a matchmaking type service. The service helps facilitate strategic meetings between regional innovators and potential customers, partners and corporate and private investors. It is dedicated to fostering the types of strategic relationships between regional innovators and industry leaders that help entrepreneurs and emerging companies grow. The CMRA includes:

- Middle Michigan Development Corporation
- Midland Tomorrow
- Michigan Molecular Institute
- Saginaw Future Inc.
- Central Michigan University
- Saginaw Valley State University

#### **CMU-RC Value Added Services**

The CMU-RC Value Added services include: Business Intelligence (BI) Awareness Session, Faculty Brainstorming, Student Analytical Skills, Proof-of-Concept Projects, Innovation Agreement , Multi-Vendor Technology, Applied BI Research, Socrates Service, Seminars & Forums, Research Committee, and Corporate BI Benchmark.

CMU-RC Business Intelligence Services work with organizations of all sizes to maximize the value of company data collected from automation systems, data warehouses, or even customer relationship management applications. It uses the latest tools to conduct data and text mining, spatial analysis, and advanced analytics. The researchers can also help develop predictive models to better prepare for and anticipate future business activity.

The Great Lakes Bay region is home to several other organizations that provide high-quality resources with an excellent track record for success. These entities help enhance the area's health related infrastructure.

**The Covenant Visiting Nurse Association of Saginaw (VNA)** has expanded to meet the needs of its continued growth. The VNA, located in the City of Saginaw, is a non-profit, community based home health care agency that has provided skilled nursing and other supportive service to the homebound since 1929. The organization added 10 jobs through a \$225,000 investment and is the largest and longest established home care agency serving the Saginaw Valley and surrounding areas with the latest in home care services.

**Mobile Medical Response, Inc. (MMR)** recently invested \$180,000 to open another location in the Village of Chesaning that employs seven full time people. The company provides emergency services in eight Mid-Michigan counties including Saginaw, Bay, Gratiot, and Tuscola. It also manages operations for Iosco County EMS. MMR's Medical Communications Center dispatches ambulance service in eight counties, as well as dispatching FlightCare from St. Mary's and LifeNet of Michigan from Covenant HealthCare in the city of Saginaw. It also provides pre-arrival first aid instruction to callers until ambulance or medical first responders arrive. EMS instruction is also provided at MMR's 6,000 sq. ft. training center in Downtown Saginaw.

**Progressive Medical Imaging (PMI)** is a Tri-Cities based integrated radiological and health service organization. The facility offers a full range of radiological and diagnostic services. The facility, located at 4200 Fashion Square Boulevard in Saginaw Charter Township, includes patient and family resource centers, a training and education facility and state-of-the-art radiological and cardio-vascular diagnostic equipment. PMI offers one of only four Philips Precedence SPECT/CT systems in the entire U.S. This system, which combines powerful nuclear imaging with multi-slice Computed Tomography, offers cutting-edge diagnostic abilities while offering patients a non-invasive and comfortable exam setting. The organization provides a wide range of complimentary skill sets and over 100 years of combined experience in non-invasive and interventional procedures.

**HealthSource Saginaw** is progressing with its \$35 million building replacement and improvement project. Health Source, located on 3340 Hospital Rd. in Saginaw Charter Township, specializes in rehabilitative, mental health and long-term care needs with approximately 320 beds. Saginaw County voters approved a 25-year 0.49 mill tax request for the project in 2005 that provides the funds to rebuild and renovate the 74-year-old facility.



**Health Delivery's** mission is to provide high quality health care to individuals and community groups in Saginaw, Bay and other nearby counties. Services are provided without regard to race, beliefs or ability to pay. We provide health care that is sensitive to the needs of the community by being close to where the patients live, at times that are convenient, and speaking in a language that patients can understand. Today HDI serves over 40,000 individuals throughout fourteen counties in Michigan. We currently operate two year round dental facilities, three adolescent health centers, eight year round medical facilities, two mobile dental units, a mobile medical unit, a school-based health center inside of Saginaw High School, and various seasonal migrant health sites.

**The Aleda E. Lutz VA Medical Center** was established in September 1950 and is dedicated in honor of Lt. Aleda E. Lutz, U.S. Army Nurse Corps, a distinguished female veteran. The Medical Center consists of a single VHA facility with an independent Skilled Care and Rehabilitation (SCR) Center located in Saginaw, Michigan. The VAMC provides primary and secondary medical services, ambulatory surgical services,

and outpatient psychiatric services. Approximately 200,000 outpatient visits were provided at the Saginaw VA Medical Center in the last year to veterans who live in the Central and Northern 35 counties of Michigan's Lower Peninsula.

There are also additional organizations such as **Matrix Pain Management** and the **Saginaw Valley Bone and Joint Center** that can act as a service provider or resource to potential manufacturers.

In general, there are several organizations in the mid Michigan region that can serve as useful resources for entrepreneurs ready to take ideas to the next level. Whether that means creating and determining the engineering process required to manufacture the device, locating local manufacturers capable of producing a product , or finding venture capital to provide seed money to launch the product, all these resources can be found in the mid-Michigan region.

## FUNDING/FINANCING

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A variety of funding and/or financing resources are available for companies interested in transitioning from traditional manufacturing to medical device opportunities. As this is an emerging field, the metropolitan Saginaw area is poised to take advantage of these funding prospects. Several regional organizations exist within the tri-county area that can provide immediate funding or financing options to a prospective manufacturer.

### **MidMichigan Innovation Center**

The MidMichigan Innovation Center (MMIC), based in Midland, can provide funding options through some well-served connections.

The Michigan Pre-Seed Capital Fund is intended to assist hi-tech start-ups at the beginning stages of their existence. This fund can provide access to early-stage capital that can move the company forward quicker. It extends personal entrepreneurial financial commitments up to the point of external investment. Life sciences and manufacturing are two fields that qualify.

Northern Initiatives is an organization that provides business loans, consulting and strategies that can improve profit margins. They serve rural manufacturing businesses and will provide loans to those who are unable to obtain funding through normal lending institutions. They do limit their efforts to the Upper Peninsula, northern Wisconsin, and the northern Lower Peninsula.

They also provide links via their website to foundations, federal grants, small business innovation and research, small business technology, state grants, Michigan State University grant listings, and recent federal grants for manufacturing. They employ a part-time grant writer to assist with their tenants. Venture capital is a key component of manufacturing in an emerging field. The MMIC's website also includes a link to several different organizations in that profession. In each case, the link will highlight the company and their success.

They also provide links to a variety of Michigan angel networks. Angel networks are similar to venture capitalists in that they provide funding/financing for start-up companies. However, they differ in that it is a network of investors not necessarily one company.

### **MichBio**

MichBio is the statewide life sciences trade association. It was formerly known as the Michigan Biosciences Industry Association. This would be the Michigan association for medical device technology manufacturers. Their website highlights the Southwest Michigan First Life Science Fund, a mechanism to provide manufacturers and companies in the life sciences arena with start-up funding and assistance.

**The Michigan Innovation Equipment Depot (MIED)** is a collaborative effort with Pfizer, Ann Arbor SPARK, MichBio and Michigan's Smart Zones. MIED intends to provide start-up life science companies

with equipment resources. The pre-owned equipment can provide a tremendous savings to a company's research and manufacturing initiative.

Interestingly, Ricardo Fuentes, MichBio Trustee, is employed by Dow Corporate Venture Capital. The Dow Companies are clearly attuned to the need for assistance in emerging fields. Their geographic location to the Saginaw Future, Inc. model, and an indirect relationship with MichBio, could be a key component for medical device manufacturers in the region.

### **Michigan Small Business & Technology Development Center**

This entity, headquartered at Grand Valley State University in Grand Rapids, is an excellent resource for funding options. They offer financing basics for new ventures or existing businesses, funding possibilities for technology initiatives, and grants through the Michigan Emerging Technologies Fund.

The MSBtDC provides a basic list of different avenues of funding for new ventures and existing businesses. This list, while simple, provides some wise input on how, when and where to approach organizations or people for funding. Their suggestions range from the individual starting the business to large venture capital firms. They also provide contact information for a variety of other associations or organizations that can help directly or indirectly in any new venture.

In order to help promote technology initiatives, the MSBtDC provides lengthy information and contacts for a variety of aggressive funding options. These include venture capital firms, angel networks and federal and state grant opportunities. Their information proves there is an impressive list of companies interested in investment in the life science industry.

**The Michigan Emerging Technologies Fund (MI ETF)** was created to help expand funding opportunities for companies in the federal innovation research and development arena. The MSBtDC and the Michigan Economic Development Corporation (MEDC) is dedicating up to \$1.4 million in match funds for this broad field. Life sciences and manufacturing are two of the four core areas where this funding is competitively granted. Applications became available early in 2008 and will continue until funds are exhausted.

The MSBtDC can operate as a clearinghouse for any type of manufacturer. By contacting them first, they can provide guidance and advice, then forward the interested party to the "right people." Operating as a valuable resource, they can facilitate conversations with investors, universities, and regulators.

### **FDA**

The Food & Drug Administration is the lead regulatory agency in the US for medical device technology. Specifically, the Center for Devices and Radiological Health (CDRH), a subdivision of the FDA handles the management and requirements for medical devices.

Federal grant funding is available for medical device technology and manufacturing. The programs and general availability change dramatically dependent on budget appropriations. Programs include grants for medical devices, manufacturing, equipment, technology, and a staggering number of other opportunities. All applications are available for completion on-line.

## Venture Capital

Numerous venture capital organizations exist that can provide tremendous assistance to any prospective medical device manufacturer. Indeed, venture capital investing is at record levels nationally with billions of dollars invested over the last several years. The investment in this sector is pursued as a result of market-wide opportunities with an aging population in America and, to a lesser extent, the remainder of the industrialized world. Over 70% of the funding for entities in this emerging sector is a direct result of venture capitalists or “angels.”

One angel organization that exists that is already assisting those in the medical or health related field is the **Blue Water Angels (BWA)**. As with any angel group, or non-affiliated venture capitalist, return on investment is the most important tangible. Blue Water Angels, a group of over 30 individuals, provides a strong opportunity to any potential venture, however, they are very selective in their investments. Requirements include: maximum of \$1 million from BWA, has another deal already in progress, a personal referral from an existing member, and a variety of other matters.

**North Coast Technology Investors** is a premiere venture capital firm based in Michigan that has created a stellar list of successful projects in a variety of industries. One of their premiere projects is their investment and support of Solidica, a technology company that has developed cutting edge sensors that have many applications, including the medical devices. Based in Ann Arbor and Midland, North Coast can provide full service support to qualified entrepreneurs interested in entering the medical device manufacturing sector, including support to provide venture capital, business plan refining, entrepreneur in residence program, and general business experience support from experts in the field, who are part of the North Coast team of seasoned professionals. North Coast can be contacted through the following website:

<http://www.northcoastvc.com/index.html>

Another angel organization that exists that is already assisting those in the medical or health related field is the **Blue Water Angels (BWA)**. As with any angel group, or non-affiliated venture capitalist, return on investment is the most important tangible. Blue Water Angels, a group of over 30 individuals, provides a strong opportunity to any potential venture, however, they are very selective in their investments. Requirements include: maximum of \$1 million from BWA, has another deal already in progress, a personal referral from an existing member, and a variety of other matters. They can be reached through the Mid Michigan Innovation Center:

<http://www.midmichiganinnovationcenter.org/bluewaterangels/index.html>

**EDF Ventures** is “is a leading venture capital firm investing in early-stage healthcare.” They also focus on young technology companies on the verge of technological breakthroughs to address current barriers or “transforming existing markets.” EDF provides a full support of services to these companies to ensure their long term success. They have a successful track record of investments, and can serve as a great partner to the right entrepreneur. They can be reached at:

[http://www.edfvc.com/about\\_us.html](http://www.edfvc.com/about_us.html)

Additionally, the **National Venture Capital Association (NCVA)** provides resources and contact information for prospective users of venture capital. Their membership includes over 450 different firms and angels that provide assistance to all emerging sectors. Lastly, **Vfinance, Inc.**, provides information on other

venture capitalists separated by sector. For example, they can link those in the institutional field with investors, or those in the private sector.

Each of these opportunities in the venture capital side can be very lucrative. Prospective utilizers of this opportunity must make certain that an ROI is possible for the investor as well as creating a solid business plan that shows key paths to success. A significant amount of research must be completed prior to pursuing any angel or venture capitalist, and that research be prepared to be shared with the investor.

## ALL-IN-ONE SUPPORT SERVICE ORGANIZATIONS

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There are many qualified organizations that a prospective manufacturer can contact for medical device technology assistance. Most of these agencies have the ability to provide guidance on an assortment of subjects. Broadly speaking, these would include marketing, research, manufacturing, grants, device requirements, etc. Indeed, as the life science industry continues to grow, the higher the quantity of organizations that will pop up to provide support.

### **MidMichigan Innovation Center**

The MMIC was created with the intention of providing business incubation activities for a wide array of small businesses. Included within their facility is over 100,000 square feet of space that can be used for everything from a “mom-and-pop” to manufacturing. There is 3000 square feet of dedicated manufacturing space available with the possibility of 8000 through adjustments. The MMIC supplies this space for pilot manufacturing. In fact, the current manufacturing tenant will be moving out soon in order to expand their manufacturing needs.

Through this effort, the MMIC supplies all necessary items for a company from telephones to IT to meeting space. Clearly, this opportunity can provide a great deal of assistance to an emerging manufacturer. As they provide such a broad array of opportunities, the MMIC does not supply any general advice to tenants, or provide assistance outside their area of expertise.

### **MichBio**

As mentioned previously, this association serves as virtually all do: advocacy and a clearinghouse for all things related to the life science industry. As a result, they serve as a tremendous resource for medical device questions. MichBio provides educational and training opportunities, general information, advocacy, and discounted prices on certain laboratory products. These are available to members only.

### **Michigan Small Business & Technology Development Center**

The MSBtDC provides excellent assistance through a variety of means. In order to maximize quality response, they have split Michigan into several different regions. Each region has one lead contact that an inquisitive small business owner can utilize for virtually any question. Furthermore, this “on-line counseling” can be separated by business class or type. This allows for a wide set of contact opportunities.

The Center also utilizes a Technology Business Consultant that has the ability to assist in legal, manufacturing, financing, marketing or networking areas. As medical device manufacturing must rely on international standards of quality, and as the field may also ship and receive international products, import/export guidance may also be useful. The MSBtDC also offers this support.

Through strong partnerships with many other organizations, the small business assistance is virtually limitless.

**FDA**

As the national regulatory agency for this field, contact with the FDA should be imperative to any prospective producer, especially those who have not manufactured in the health industry.

The FDA supplies information on essentially any topic related to the medical device manufacturing field. They supply information on resources and pre- and post-market matters. These subjects range from determining whether a particular product is regulated or not, to the reporting requirements upon production of the device. Their advice is certainly not intended to be legal in substance, but certainly appropriate for all manufacturers.

The FDA also regulates problems with any medical device product. As this can be a potentially libelous situation, any manufacturer must become familiar with the FDA's reporting requirements on their devices. This includes not only the requirements for quality and production, but reporting requirements related to problems. Most problems will occur during or after use and those would be reported by the end user. However, a familiarization to the FDA's rules could help offset unexpected surprises. Furthermore, problems discovered in advance of the user's needs are also required to be reported. Failure to do so could result in fines and/or penalties.

A manufacturer can expect the FDA to provide information on various medical devices virtually every day. These can range through any medical device. For example, in any given two-week period, the FDA will produce seven to ten notices dealing with a myriad of medical devices. This includes, but is not limited to, microbiology devices, x-ray equipment, respiratory devices, heart rate monitors, dental mercury devices, latex gloves, labeling regulations, and abdominal systems. To reiterate, medical device manufacturers must maintain a constant knowledge of FDA rules, requirements, and information.

**Saginaw Future Inc.**

In the Great Lakes Bay region, Saginaw Future has made the medical device manufacturing industry a target for growth in the region. As a result, SF has invested in providing usable resources for companies that want to transition from a traditional manufacturing company to this new industry. SF is launching a website that can serve as a valuable resource for such companies, and will be unveiled in the summer of 2008.

## REQUIREMENTS

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There are two main agencies that need to be consulted for medical device requirements: the International Organization for Standardization (ISO), based in Geneva, Switzerland and the US Food & Drug Administration (FDA). The FDA is the lead regulatory agency in the US while the ISO provides the necessary standards for manufacturers creating medical devices internationally.

Medical device technology manufacturing has requirements at all stages of the process. The FDA has regulations to enter the market, quality improvement requirements during manufacturing, and reporting rules that must be complied with during post-production. The field is heavily regulated as it ultimately administers the health of individuals.

The regulations of the FDA are comprised of Title 21 of the Code of Federal Regulations (CFR). Within this information, there are a number of important sections that bear description. These requirements include, but are not limited to, the following:

- CFR 11: Electronic records and signatures
- CFR 803: Medical device reporting
- CFR 814: Premarket approval of medical devices
- CFR 820: Quality system regulations
- CFR 861: Procedures for performance standards
- CFR 895: Banned devices

Of these listed FDA regulations, CFR 820 is arguably the most important. This requirement provides the necessary quality standards to make certain products are being made consistently and appropriately. As many medical devices may be of extremely small size, with room for error being equally small, the FDA wisely considers the quality of these products to be extremely significant.

- The ISO creates the necessary standards to which manufacturers must comply in order to produce quality devices. These requirements include, but are not limited to, the following:
- ISO 13485: a standard for establishing a quality management system for medical device manufacturing
- ISO 15223: a standard for the development and use of symbols on medical devices
- IEC 62366: a standard for establishing a process for medical device manufacturing as it relates to safety

- ISO 14971: a standard for establishing a process that identifies hazards through the entire life-cycle of the device
- IEC 62304: a standard that defines the life cycle for medical device software

The ISO is the overarching standard organization. Their authority includes other organizations and their particular standards. As listed above, the International Electrotechnical Commission (IEC), also has requirements related to medical device technology manufacturing. There are other international organizations that may fall into this category, but the ISO is the key agency, outside of the FDA.

## **APPENDIX A (MISCELLANEOUS SUPPORT SERVICES)**

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### **Business & Marketing Plan Development**

Backus Public Relations Specializing in the development of strategic marketing and public relations plans. Located in Mt. Pleasant, MI, their offices can be reached by calling (989) 773-0816.

Sadler Consulting, LLC Specializing in new business start-ups, Sadler Consulting offers professional expertise in project management, business and marketing plan development, technology scouting, technical writing and editing, grant review and editing, competitive intelligence, and new product and business development. To learn more, call (313) 755-1930.

### **Legal Counseling, Patents, & Intellectual Property**

Law, Weathers and Richardson is a full-service law firm, Law, Weathers and Richardson's Small Business Service Team has developed proven methods of organizing and delivering results-oriented, custom-crafted legal services to fit start-up and small business needs. Their offices are located in Grand Rapids, Michigan.

Butzel Long is a premiere Michigan Law full service firm with a strong IP and technology practice. With offices in six Michigan cities, as well as Florida, New York and Shanghai, Butzel Long has the expertise to protect your future process and product.

### **Technology Assessment & Support**

NexusTech Ventures acts as an extension of university technology transfer offices and leads the marketing and business development of intellectual property to generate and grow license revenues.

Technical Software Consulting, Inc., Incorporated in 1997, is a multi-million dollar enterprise, specializing in services ranging from state-of-the-art e-business application development to network solutions. The company is based in Farmington Hills with branch offices in California, Canada and India.

## APPENDIX B (ORGANIZATIONS AND CONTACT INFORMATION)

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### **MidMichigan Innovation Center**

4520 East Ashman Road  
Suite M  
Midland, MI 48642  
P: (989) 839-2333  
F: (989) 923-1572  
[www.midmichiganinnovationcenter.org](http://www.midmichiganinnovationcenter.org)

### **MichBio**

330 E. Liberty  
P.O. Box 7944  
Ann Arbor, MI 48107  
P: (734) 527-9150  
F: (734) 623-8289  
[www.michbio.org](http://www.michbio.org)

### **Michigan Small Business & Technology Development Center**

Grand Valley State University - Depot 510 West  
Fulton  
Grand Rapids, MI 49504 P: (616) 331-7480  
F: (616) 331-7485  
[www.misbtcdc.org](http://www.misbtcdc.org)

### **International Organization for Standardization**

(ISO) 1, ch. de la Voie-Creuse, Case postale 56  
CH-1211 Geneva 20, Switzerland  
P: +41 22 749 01 11 F: +41 22 733 34 30  
[www.iso.org](http://www.iso.org)

### **National Venture Capital Association**

1655 North Fort Myer Drive  
Suite 850  
Arlington, Virginia 22209  
P: 703-524-2549  
F: 703-524-3940  
[www.nvca.org](http://www.nvca.org)

### **Food and Drug Administration**

**Center for Devices and Radiological Health**  
5600 Fishers Lane  
Rockville, MD 20857-0001  
P: (888) INFO-FDA  
[www.fda.gov](http://www.fda.gov)

### **Medical Device Manufacturers Association**

1350 I Street NW  
Suite 540  
Washington, D.C. 20005  
P: (202) 354-7171  
F: (202) 354-7176  
[www.medicaldevices.org](http://www.medicaldevices.org)

### **Michigan Medical Device and Suppliers Association**

P.O. Box 170  
Howell, MI 48844  
P: (800) 930-5698  
F: (517) 546-3356

Harry Leaver, Executive Director  
Center for Business and Economic Development  
**Saginaw Valley State University**  
7400 Bay Road  
University Center, MI 48710  
P: (989) 964-4000  
[www.svsu.edu](http://www.svsu.edu)

### **Central Michigan University – Research Corporation**

2625 Denison Drive  
Mount Pleasant, MI 48858  
P: (989) 774-2424

## **PARTNERS**

US Small Business Administration

Michigan Works

Michigan Certified Development Corporation

Michigan Economic Development Corporation

America's Small Business Development Center Network

Michigan SmartZones

## APPENDIX C (MISCELLANEOUS INFORMATION)

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### PRIMARY PRIVATE SECTOR EMPLOYERS IN SAGINAW-BAY-MIDLAND COUNTIES

Source: Saginaw Future Inc., Bay Future Inc., Midland Tomorrow

Employer Name	Type of Business	Employees
Delphi	Automotive	XXXX
The Dow Chemical Company	Industrial Chemicals / Consumer Products	5,800
Covenant HealthCare	Medical	4,129
General Motors	Powertrain Automotive	3,613
Dow Corning Corporation	Silicones / Specialty Chemicals	3,343
MidMichigan Medical Center	Medical	3,200
St. Mary's of Michigan	Medical	2,460
Bay Regional Medical Center	Medical	2,000
Meijer	Retail	1,936
AT&T	Communication	1,273
Michigan Sugar Company	Sugar Producer	1,120
Chemical Bank and Trust Company	Financial Services	1,002
Frankenmuth Bavarian Inn Inc.	Restaurant / Hotel	1,000
Wal-Mart	Retail	974
Consumers Energy		945
Midland Mall	Retail	850
Zehnder's of Frankenmuth	Restaurant / Hotel	655
Frankenmuth Mutual Insurance		525
Means Industries	Auto Stampings	489
Quebecor Printing/Pendell Inc.	Commercial & Publication Printing	489
S.C. Johnson and Son	Bags, Wrap, Cutting Sheets, Cleaners	456

\*List does not include government, school or higher academic institution employers.

## APPENDIX D (RECOMMENDED EVENTS AND SPEAKERS)

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### Organizations

Medical Device Manufacturers Association (MDMA)  
Annual Meeting  
June 12-13, 2008  
Washington, D.C.

MDMA  
Link to all upcoming events  
<http://www.medicaldevices.org/public/programs/default.asp>

MichBio  
Link to all upcoming events  
<http://www.michbio.org/Events/>

Michigan Small Business & Technology Development Center  
Link to all upcoming events  
<http://www.gvsu.edu/misbtdc/index.cfm?fuseaction=home.trainingcalendar>

MidMichigan Innovation Center  
Link to all upcoming events  
[http://www.midmichiganinnovationcenter.org/\\_news-events/upcoming\\_events.html](http://www.midmichiganinnovationcenter.org/_news-events/upcoming_events.html)

Saginaw Valley State University  
Link to all upcoming events at the Center for Business and Economic Development  
<http://www.svsu.edu/cbed/home/current-events.html>

Central Michigan University  
Link to all upcoming events at the Research Corporation  
<http://www.cmurc.com/news.htm>

FDA  
Link to all medical device related events  
<http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfTopic/cdrhnew.cfm>

## Possible speakers

Stephen Rapundalo, Executive Director  
MichBio  
330 E. Liberty  
P.O. Box 7944  
Ann Arbor, MI 48107  
(734) 527-9150

Rick Huizer, Director of Product Development  
Stryker Corporation  
3800 E. Centre Ave  
Portage, MI 49002  
(269) 323-7700 x 3232

Harry Leaver, Executive Director  
SVSU Center for Business and Economic  
Development  
7400 Bay Road  
University Center, MI 48710  
(989) 964-4000

Irene Spanos, Senior Business Development  
Representative  
Oakland County  
Building 41 W  
2100 Pontiac Lake Road  
Waterford, MI 48328-0412  
(248) 858-0978

Richard Temkin, District Director  
US Small Business Association  
477 Michigan Avenue Suite 515, McNamara  
Building Detroit, Michigan 48226 (313)  
226-6075

Robert F. Erlandson, PhD  
Professor, Electrical and Computer Engineering,  
Bioengineering  
Director, Enabling Technologies Laboratory  
College of Engineering  
Wayne State University  
5050 Anthony Wayne Drive  
Detroit, MI 48202  
(313) 577-3900

Miller, Canfield, Paddock & Stone  
277 South Rose Street  
Suite 5000  
Kalamazoo, MI 49007  
(269) 381- 7030

Bryan Hughes, Vice President  
P & M Corporate Finance, LLC  
(248) 223-3678  
Anne Taylor, Manager  
Plante & Moran  
(248) 223-3582

Michael D. Witt, PharmD, JD  
President, TEDCo, Inc.  
3301 S. Dort Hwy, Suite 200  
Flint, MI 48507  
(734) 945-8789

Brent Case, Executive Director  
MidMichigan Innovation Center  
4520 East Ashman Road  
Suite M  
Midland, MI 48642  
(989) 839-2333

## APPENDIX E (MEDICAL DEVICE RESOURCES)

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Local/state

[http://www.manta.com/mb\\_53\\_D1\\_9WS/medical\\_equipment\\_device/saginaw\\_mi](http://www.manta.com/mb_53_D1_9WS/medical_equipment_device/saginaw_mi)  
(list of medical device companies in Saginaw)

[http://www.manta.com/mb\\_43\\_D1\\_23/medical\\_equipment\\_device/michigan?show\\_all\\_cities=1](http://www.manta.com/mb_43_D1_23/medical_equipment_device/michigan?show_all_cities=1)  
(list of all in Michigan – by city)

<http://www.cmurc.com/> (CMU based resource center for technology companies)

Bureau of Labor Statistics, Michigan Department of Labor and Economic Growth Office of Labor Market Information

The Economic Impact of Health Care in Michigan, Partnership for Michigan’s Health, June 2006

Hughes, Bryan; Vice President, P & M Corporate Finance; Oakland Economic Conference; presentation conducted on April 23, 2008

Kottamasu, M.D., Sam; Trustee, Central Michigan University

LaMarr, Greg; Marketing Coordinator, Saginaw Future, Inc.

Stanton, Ryan; Tri-Cities Business Review; November 28, 2007

Taylor, Anne; Manager, Plante & Moran; Oakland Economic Conference; presentation conducted on April 23, 2008

Torrence, Philip; Miller, Canfield, Paddock, & Stone; Medical Devices 101; presentation conducted on April 23, 2008

National

<http://www.mdrweb.com/> (directory of medical suppliers)

<http://www.devicelink.com/expo/awards06/home/> (event, resource, etc)

<http://www.devicelink.com/links/venture.html> (list of national VC firms in MDI)

<http://www.bioworld.com/servlet/com.accumedia.web.Dispatcher?next=mddVC3605> (2007 medical device VC directory)

[http://www.canonmediakit.com/upcoming\\_issues/mp/](http://www.canonmediakit.com/upcoming_issues/mp/) (medical device manufacturing news)

[http://www.fda.gov/Fdac/features/2001/301\\_home.html](http://www.fda.gov/Fdac/features/2001/301_home.html) (article)

<http://www.frost.com/prod/servlet/frost-home.pag> (marketing consultants for technology)

<http://www.mc3corp.com/about.html> (r & d resources, marketing, investors, researchers) Page | 27

[http://www.ispor.org/publications/MDD\\_book.asp](http://www.ispor.org/publications/MDD_book.asp) (book)

<http://www.onemedplace.com/blog/team/> (tv/web resource)

<http://www.fr.com/technology/index.cfm?child=tech> (law firm)

<http://www.oakgov.com/peds/assets/docs/emergingsectors/MedicalDevices.pdf>

<http://www.managingautomation.com/maonline/summit/2007/agenda.jsp> (seminar)

<http://www.biospace.com/Default.aspx> (medical device and diagnostics careers)

<http://www.medicaldevices.org/public/> (medical device manufacturing association)

<http://www.mmda.org/> (Michigan medical device association)

<http://www.mtaonline.com/> (Michigan Tooling Association)

<http://www.michigansmalltech.com/> (association for growing small and nano industry)

<http://www.northcoastvc.com/index.html> (MI venture capital firm)

<http://www.muci.org/Home/default.asp> (Commercialization support (Challenge Fund), university activities, networking, etc.)

<http://projects.oit.cmich.edu/cartweb2/a-alliance.html> (resource for tech companies – leads on VC, patents, marketing, etc. – based out of CMU – SF a member of group)

European resources

<http://www.devicelink.com/company/emdm/index.html> Phillip D. Torrence, Esq