

***The Biotechnology and Medical Device  
Industry in Washington State:  
An Economic Analysis***

**Prepared by:**

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Kirkland, Washington  
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# Foundation for a Healthy Future . . .

## THE BIOTECHNOLOGY AND MEDICAL DEVICE INDUSTRY IN WASHINGTON STATE

The biotechnology and medical device industry is the primary engine that drives the conversion of advanced biomedical knowledge into products that make a difference in the lives of millions of people worldwide. Most often when we think about a new therapy for arthritis or novel devices used in cardiovascular disease, we think about the importance of such advances to human health. Yet, during the past two decades, the creation of biotechnology products and medical devices has been important to the fiscal health of our state as well.

In 2002, the Washington Biotechnology & Biomedical Association (WBBA) commissioned Huckell/Weinman Associates, Inc. to conduct an economic analysis of the biotechnology and medical device industry in Washington state. The results of this analysis indicate that the biosciences sector is an area of growth for our state's economy, leading to increases in direct and indirect employment, capital expenditures and tax revenue.

We are proud of the sector's accomplishments during the past two decades and excited about the potential it has, both as a pillar of our economy and a source for new and important health-related products. While the results of the study demonstrates positive trends in the strength of the bioscience sector and the contributions it makes to Washington's economy, it also reveals a number of policies and practices that may pose significant challenges for the contin-

ued growth of the bioscience sector.

We believe the state's ability to weather the current economic challenges and emerge in strong fiscal condition depends on attracting, retaining and expanding those industries with significant growth potential. WBBA remains committed to working with all interested parties to develop an environment in which those research institutions and companies working to improve our physical health can continue their contributions to Washington's fiscal health as well.

This summary provides an overview of the study's results. The complete report, which I encourage you to read, is available on the WBBA website ([www.wabio.com](http://www.wabio.com)) or by contacting WBBA at [washbio@washbio.org](mailto:washbio@washbio.org). Let's work together to support the health of the bioscience industry – it is working to support ours.

Sincerely,

*Ruth Martens Scott*

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## INDUSTRY AT A GLANCE

- The bioscience sector in Washington state continues its historic growth, having employed 19,300 people in 2002. The average salary is \$68,000 per year, with total estimated wages at \$1.32 billion. Indirect employment is approximately 43,000 statewide.
- The combined industry's contribution to the Washington Gross State Product in 2000 was \$3.5 billion, about 1.5% of total Gross State Product that year.
- More than 190 biotechnology and medical device companies are headquartered in Washington state or have a significant presence here.
- The root of the growth in the state's biosciences sector is world-class basic research performed at various institutions including the University of Washington, Washington State University, the Fred Hutchinson Cancer Research Center, Pacific Northwest National Laboratory, and others. In FY 2002, the state's bioscience institutions and firms received \$649 million from the National Institutes of Health for research. Combined with other government funds, the sector garners more than \$1.5 billion annually for R&D.

**INDUSTRY OVERVIEW**

The biotechnology and medical device industry in Washington state generates an estimated \$1 billion in revenue and nearly \$500 million in exports. Biotechnology products include therapeutics, diagnostics, bioinformatics tools and products for use in agriculture and food production (Figure 1). Medical devices include medical instruments, surgical appliances and supplies, laboratory equipment, ophthalmic goods as well as X-ray and nuclear medicine equipment.

There are 133 biotechnology companies and 57 medical device companies in Washington state, the majority of which are focused on the healthcare and medical markets. These companies face increased demand for new products as the population ages. A number of factors converge to create important growth opportunities for the industry:

- Globally, the over-60-year-old population is expected to more than triple between 2000 and 2050, representing more than one-fifth of the world’s population.
- In the U.S., the over-65-year-old population is expected to more than double between 2001 and 2030.
- Americans 65 years and older account for 13% of the nation’s population, yet consume an estimated 33% of all U.S. pharmaceutical output.
- The over-65-year-old segment of the U.S. population will expand significantly after 2010 when the leading edge of the baby boom generation begins to turn 65.
- According to the World Health Organization, the incidence of cancer, heart disease, and other chronic diseases – which cause some 28 million deaths worldwide annually – is expected to increase in the future.

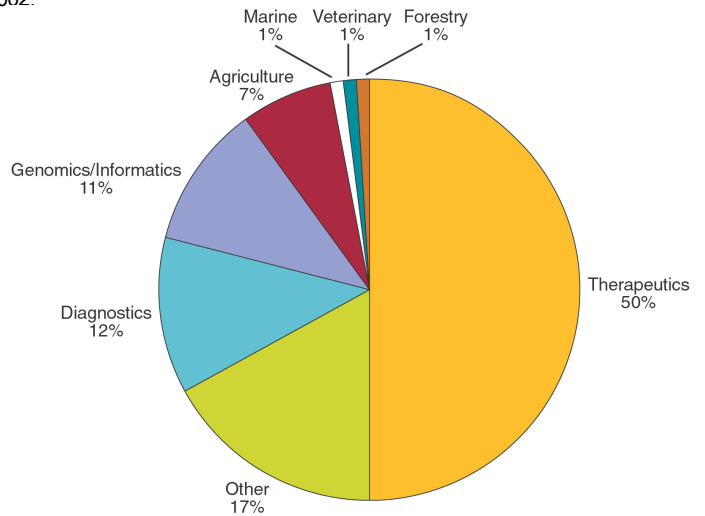
**INCREASING HEALTH CARE EXPENDITURES CREATE A GROWING MARKET**

According to the Centers for Medicare & Medicaid Services, health care expenditures rose 9.6% in 2001 (Figure 2) and are expected to continue rising at an annual rate of 6.9% for the next 10 years. This creates a sizeable and growing market for the biotechnology and medical

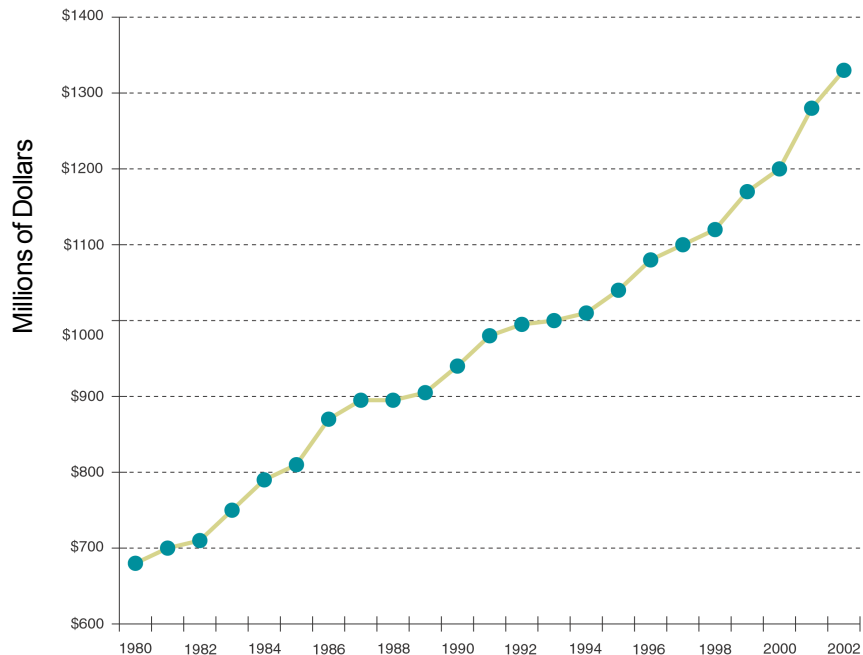
device industry. While the industry now accounts for a relatively small percentage of U.S. healthcare expenditures, spending on biopharmaceutical and medical devices is expected to escalate annually during the next decade.

- U.S. healthcare expenditures (hospital care, physician care, drugs, devices, supplies) were \$1.42 trillion in 2001.

**Figure 1: Washington Biotechnology Companies by Market Segment, 2002.**  
Source: Info.Resource, Inc., 2002.



**Figure 2: Personal Health Care Expenditures in the U.S., 1980-2002.**  
Source: Centers for Medicare & Medicaid Services.



- In the next decade, healthcare expenditures are expected to exceed \$2.8 trillion.
- Current expenditures are \$141.8 billion for pharmaceuticals and \$19.9 billion for devices.
- Spending on pharmaceuticals is expected to grow at an annual rate of 11%, and a 5.4 percent annual growth rate is anticipated for devices.

**THE BIOTECHNOLOGY AND MEDICAL DEVICE INDUSTRY BRINGS IN FEDERAL GRANT FUNDING**

The biotechnology and medical device industry converts scientific and medical knowledge into products that help to improve human health. The sector requires two types of fuel for growth – financial capital and intellectual capital. Washington state has developed as a robust biosciences cluster, due in large part to the presence of world-class research institutions, including the Fred Hutchinson Cancer Research Center; the University of Washington; Washington State University; Battelle Pacific Northwest National Laboratories; Institute for Systems Biology, and Seattle Biomedical Research Institute. These institutions, and others throughout the state, are a source of the technologies on which the industry is based. These institutions also provide talented and highly trained workers who possess the technical know-how to advance these technologies into the marketplace.

Washington’s research institutions and biotechnology and medical device companies bring federal grant dollars to our state. In FY 2002, Washington state universities, institutes, and companies received \$649 million from the National Institutes of Health (NIH) for biosciences research. This is more than double the funding

received by Washington in 1992 (Figure 3), reflecting both an increase in the NIH budget and the growth of academic and corporate bioscience research activity in the state.

As federal funding for bioscience research has increased there has also been a rise in the amount of funding provided by grants that support the early stages of product commercialization (Figure 4). Small Business

Innovation Research (SBIR) and Small Business Technology Transfer Research (STTR) grants are annual set-aside programs for small companies and research institutes.

Other sources of federal funding for bioscience activities within Washington state come from the National Science Foundation (\$21.6 million in 2002) and the Department of Energy (\$72.6 million).

Figure 3: NIH Funding to Washington State, FY 1992-2002.

Source: National Institutes of Health.

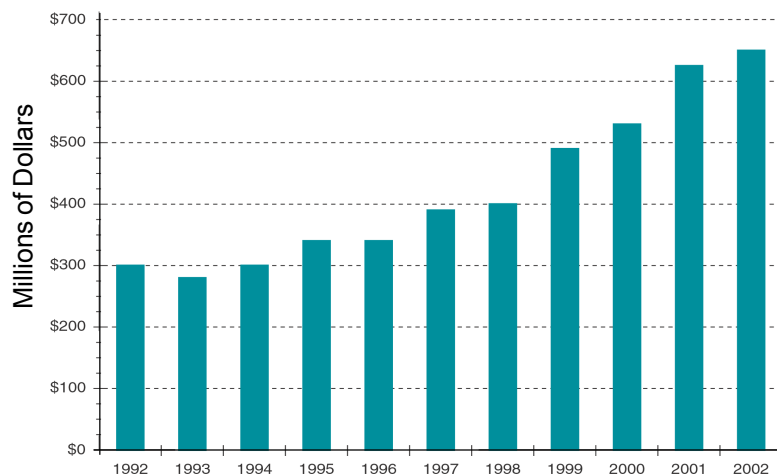
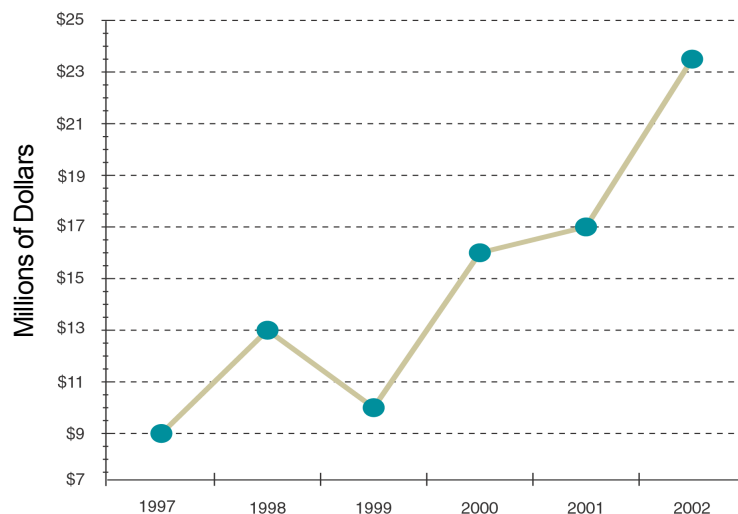


Figure 4: SBIR and STTR Funding for Biosciences Research in Washington State, 1997-2002.

Notes: Small Business Innovation Research (SBIR) and Small Business Technology Transfer Research (STTR) are annual set-aside programs for small companies and research institutes administered by respective federal agencies with extramural research and development budgets of \$100 million or more. The presented award data is from the NIH program.



**EMPLOYMENT IN THE BIOTECHNOLOGY AND MEDICAL DEVICE INDUSTRY IS GROWING**

The biotechnology and medical device sector has significantly outperformed the Washington economy. Since 1990, employment in biotechnology and medical devices has grown at an average annual rate of 10%, compared to only modest statewide growth in total employment and actual decline in manufacturing (Figure 5).

With unemployment on the rise in Washington, employment growth in the biotechnology and medical device industry is a bright spot in an otherwise bleak job market.

- On average, each worker in the biotechnology and medical device industry earned \$68,000 in 2001, nearly double that of the statewide average of \$37,500.
- Pharmaceutical preparation manufacturing workers, with average annual wages of \$116,600, represent the highest paid manufacturing workers in Washington state.
- Between 1990 and 2002, employment in the industry nearly tripled, with an average annual growth rate of 10% (Figure 6). Employment in the industry is expected to grow during the next several years (Figure 7).

**WHAT IS GOOD FOR THE INDUSTRY IS EVEN BETTER FOR WASHINGTON'S ECONOMY**

These are particularly well-paying jobs, thus stimulating employment in a number of other industries in the State. Biotechnology and medical device workers are some of the highest paid workers in Washington.

In addition to the *direct* impacts of the bioscience sector, the industry generates jobs, wages and salaries, as well as revenues, through a number of

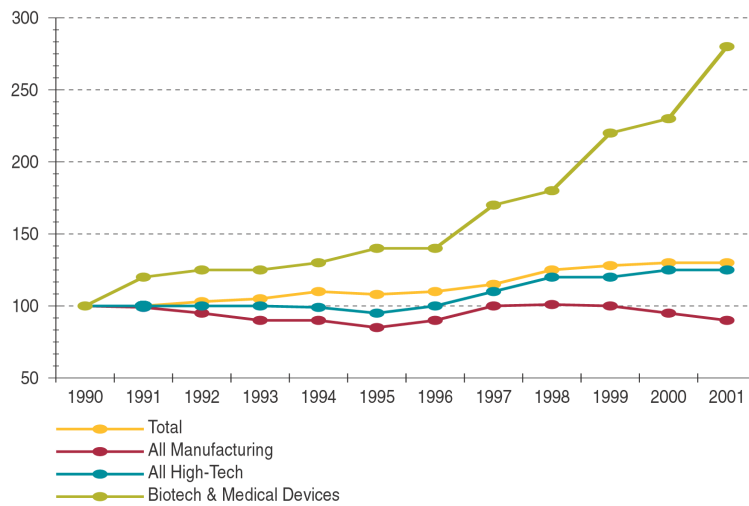
indirect and induced impacts. *Indirect* impacts are the result of purchases made by the biotechnology and medical device sector from other industries. The *induced* impact of the biotechnology and medical device industry is generated by the purchases made by workers and owners in the biotechnology and medical device industry as well as supporting industries. The sum of the direct, indirect and induced impacts is the total

economic impact of the biotechnology and medical device industry.

For every new job created in the biotechnology and medical device industry, another 2.23 jobs are created within Washington, and the \$1.3 billion earned by employees in the industry generated another \$1.6 billion in income in other areas of Washington's economy (Table 1). The combined biotechnology and medical device industries' contribution to the

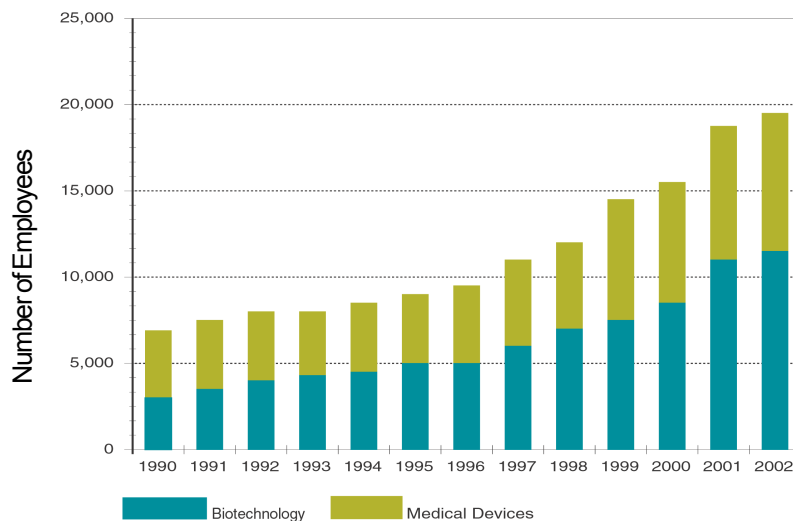
**Figure 5: Employment Indices in Washington State, 1990-2001.**

Source: Washington State Employment Security Department, Labor Market & Economic Analysis Branch. Statistics below combine the biotechnology, medical device and commercial physical research disciplines.



**Figure 6: Biotechnology and Medical Device Employment in Washington State, 1990-2002.**

Source: Info.Resource, Inc., 2002.



Washington Gross State Product was \$3.5 billion, about 1.5% of estimated total gross state product in 2002. The industry also contributes to the state economy by paying taxes – nearly \$25 million in 2001.

**PROSPECTS FOR THE FUTURE**

Washington’s biotechnology and medical device industry has been a dynamic and growing part of the state’s economy for more than a decade. The ability to continue this growth during the next decade and beyond is contingent on many factors, including: Federal healthcare legislation; the condition of the capital markets; the availability of new technologies and the skilled work force needed to advance them; and economic policy within the State.

Business and community leaders throughout the United States (and the world) are increasingly aware of the unfolding opportunities within the BioEconomy. The stakes are high for regions seeking to become competitive bioscience clusters. There are more than 40 regions in the U.S. that have engaged in some form of a life science strategy. These states have taken actions, unmatched by Washington, to attract and retain biotechnology and medical device companies.

State initiatives include developing a comprehensive bioscience strategy; providing state support for research parks and incubators; implementing workforce development programs; funding of academic research centers; and investment in seed and venture funds. The results of a national study on state policy initiatives in biotechnology indicates that Washington’s support of the industry lags behind that of other states (Table 2).

Considering the enormous amount of capital required to bring a biopharmaceutical or medical device to market, companies within the industry

are constantly looking for ways to conserve their operating cash. States that make it easier for companies to reduce their personnel training costs, provide tax incentives for research and development activities and make direct investments in the industry are more likely to attract and retain biotechnology and medical device companies.

We believe that Washington state needs to, at a minimum, match the initiatives that other states are taking to make themselves attractive to the bioscience sector. Failure to do so may significantly hinder the continued growth of the sector within Washing-

ton and potentially could lead to its decline.

Washington state public policy needs to address those issues that support and nurture the biotechnology and medical device industry. Specific elements, based on successful programs in other states, include:

- Promoting Washington as a place for biotechnology and medical device research and manufacturing.
- Developing a formal liaison between the industry and the state’s legislative and executive

Figure 7: Washington biotechnology and medical device industry employment forecast, 2002-2005.

Source: Info.Resource, Inc., 2002.

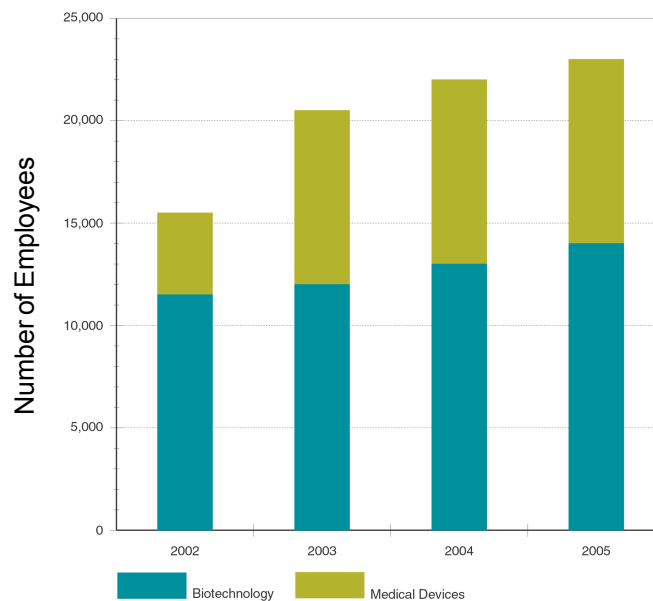


Table 1. Economic Impact of Biotechnology & Medical Device Industry, 2002.

Sources: Washington State Input-Output Study; IMPLAN.

Note: \* Labor income includes both wages and salaries and proprietor income.

Measure	Direct Impact	Total Impact	Implied Multiplier
Employment	19,360	62,530	3.23
Labor income* (\$ millions)	\$1,316	\$2.961	2.25
Value added (\$ millions)	\$1,652	\$3.503	2.12

branches.

- Soliciting a three-way partnership between the state, industry, and universities in creating institutes for science and innovation.
- Improving the structure for commercializing innovation, including skilled staff in licensing and a physical facility to serve new ventures formed from the initiative.
- Addressing the issue of the high cost of doing business in Washington as an obstacle to growth.
- Revisiting the state’s existing program of research and development credits and tax deferrals for the biotechnology and medical device industry.
- Encouraging the development of an early-stage venture capital fund for Washington-based biotechnology and medical device companies.

The Washington Biotechnology & Biomedical Association (WBBA) believes the state should actively strive to retain and attract research institutions and companies within the biotechnology and medical device sector. The biosciences have already contributed to the fiscal health of Washington State and the physical health of individuals around the globe. We invite you to work with us to ensure the sector’s continued growth and development.

**Table 2. State Policy Initiatives in Biosciences, Washington and Other States.**  
Source: Battelle Memorial Institute, State Government Initiatives in Biotechnology, 2001.

State Initiative	CA	GA	MD	MA	NJ	NY	NC	OR	PA	TX	WA
State bioscience strategy		X	X	X		X		X			
Increased state funding of academic biosciences research centers	X	X	X	X	X	X	X		X	X	
Publicly supported bioscience and venture funds	X		X	X		X	X	X	X	X	
Facilities financing for companies	X			X	X		X		X	X	
State tax policies	X	X	X	X	X	X	X	X	X	X	X
State-financed biosciences research parks and incubators	X	X	X	X	X	X	X	X	X	X	
Commercialization and business development initiatives for bioscience	X	X	X	X	X	X	X		X	X	X
Workforce development programs	X		X		X	X	X	X	X	X	X
Networking	X	X	X	X	X	X	X	X	X	X	X

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*The Washington Biotechnology & Biomedical Association (WBBA) is the leader in advancing the state’s bioscience research and industry through business development, political advocacy, information and member services.*