

# A TEXAS CEO SURVEY

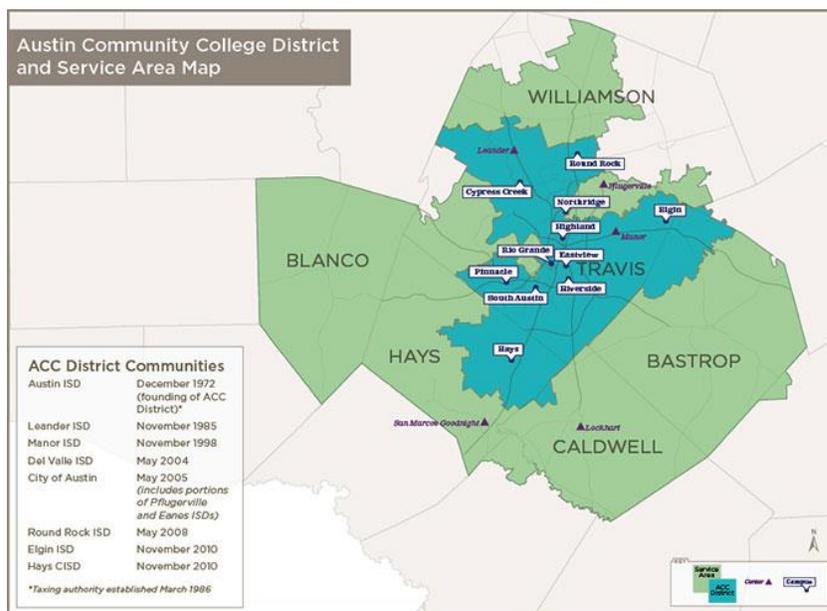
Life Science Growth Trends



TWC Wagner Peyser Grant 1415WPB000

## Austin Community College Workforce Training

[Austin Community College](#) (ACC) serves approximately 7,000 sq. miles, about the size of New Jersey. They have 11 campuses, plus 1 more under construction, and over 40,000 students a year. ACC's [Biotechnology Program](#) currently offers courses at two campuses: Round Rock Campus in Round Rock, Texas, and Eastview Campus in Austin. The new [ACC Bioscience Incubator](#) at the Highland Learning Center in central Austin, is set to open for business spring, 2017 and will host their new state-of-the-art biomanufacturing training, and workforce partnership core facility.



ACC's Biotechnology Program began training bioscience technicians in 1999 with a mission of "providing exceptional quality biotechnology education while delivering a technologically-relevant workforce" and has a reputation of successfully placing graduates into jobs in local bioscience industry every year. As the industry has grown in the Central Texas Region, so too has the program. Keeping pace, but not over-saturating the employee market, has always been the goal of the program.

Another important goal of the program is to determine new workforce trends to ensure the program attains its' educational training goal of a relevant workforce. For example, local industry needs changed from a workforce utilizing end-point Polymerase Chain Reaction (PCR) to one that can confidently execute Real Time PCR experiments and analysis. Now the industry is seeking individuals who can prepare materials and operate Droplet Digital PCR and prepare libraries for and operate Next Generation Sequencing (NGS) equipment. Staying ahead of workforce trends provides ACC's graduates a competitive edge in the job market.

ACC's Biotechnology Program offers several biotechnology award options to program students so they may attain the credentials that meet their employment goals; Level One Certificate in Biotechnology, a Level-2 Certificate in Biomanufacturing, a 2-year Associates of Applied Science (AAS) degree and an Advanced Technical Certificate (ATC) for students with a 4-year degree. The Level One and Two Certificates provide students the basic skills for an entry-level job. The AAS degree and ATC provides students with more advanced skills necessary to be a biotechnician as well as courses for transfer to local universities. In addition, the Biotechnology program offers short continuing education courses to satisfy workforce professional development needs.



At ACC, students are instructed by industry, in class sizes that ensure individual attention, on equipment that is used by industry, and have the time to practice outside of class until they master what they need to know. Even if they wanted to undertake this type of specialized instruction, universities do not have the resources to provide this type of education.

[The Biotechnology Program is accredited](#) by The [Texas Skill Standards System](#) administered by the Texas Workforce Investment Council for integrated Skill Standards into the curricula. The Texas Skill Standards System is composed of skill standards and credentials for sub-baccalaureate occupations with strong employment and earnings opportunity. To employers this means confidence they are getting employees who can perform specific technical tasks needed for a successful biotech business. To students, this means that their education prepares them for an easy and competitive transition into the local biotech industry.

### **THBI Promotes Life Science Innovation in Texas**

The [Texas Healthcare & Bioscience Institute](#) (THBI) is the leading voice of the Texas Healthcare and Bioscience Industries. With a focus on using advocacy as a tool to create a more favorable environment for the life sciences, we work with government and industry leaders to attract new participants in the life sciences. We promote effective legislation on the behalf of the industries. We advocate for a more favorable business environment for the life sciences. Our members are biotechnology, medical device, and pharmaceutical companies; universities and private research institutions; companies that provide goods and services to core organizations; and economic development organizations. The mission of THBI is to *“research, develop, and advocate policies and actions that promote biomedical science, biotechnology, agriculture, and medical device innovation in Texas”*.

We advocate on essential life science company issues such as: taxation, economic development, research oversight and appropriations, ethics and regulatory issues, and manufacturing. These policies affect every segment of the life sciences, from academic research to agricultural biotechnology, medical device development, pharmaceutical research, and traditional biotechnology.

### **What is biotechnology?**

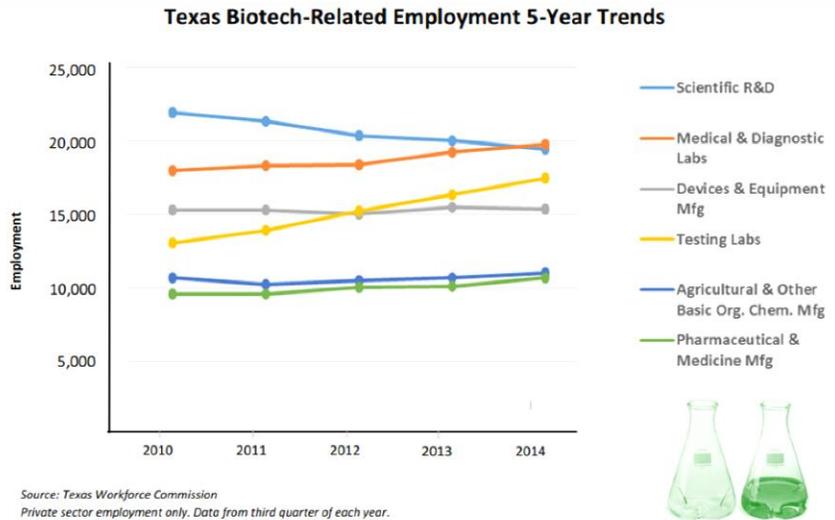
Biotechnology is technology based on biological processes that utilize cellular and molecular mechanisms to benefit the health of humans and the planet.



## Why Texas?

Texas is ranked #2 for life and physical scientists employed nationwide, with over 93,800 individuals employed in biotech-related sectors (Texas Workforce Commission, 2014). This is due in part to the vibrant business environment that allows companies to grow and succeed. Texas consistently ranks within the top 3 in scientists employed, doctorate holders employed, and job market growth and is the top state for doctorates awarded in agricultural sciences and natural resources, biological and biomedical sciences, health sciences, and life sciences. Everything's

bigger in Texas: it is home to the 2<sup>nd</sup> largest state airport system in the US and is home to two of the world's largest airlines. There is also no corporate income tax, no individual income tax, and no state-level property tax. Texas is ranked as the #1 exporter state in the US.



In 2003 the Texas Enterprise Fund was created and allotted \$295 million to attract businesses and new jobs to Texas. As of January 2015, \$98.1 million has been awarded to biotech-related projects (Texas Biotechnology Industry, 2015). In 2005, the Texas Emerging Technology Fund (TETF) was created at the urging of Governor Rick Perry to provide Texas with an unparalleled advantage in the research, development, and commercialization of emerging technologies. From this, over \$145 million has been invested into biomedicine and pharmaceutical-related projects. One such project is supported by a \$4.9M award through the Texas Emerging Technology Fund, the Advanced Commercialization ACcelerator (ACA), which aims to develop public-private partnerships by setting up a biotechnology incubator and wet lab facility, which will accelerate growth of the emerging technology economy and provide a trained workforce in Central Texas. Additionally, from 2008 to 2013, venture capitalists invested \$1.3 billion in 161 biotech and medical device deals (Office of the Governor, Texas Wide Open for Business 2015).

Texas is home to some of the largest manufacturers in the medical device industry with more than a dozen Fortune 1000 medical device giants having manufacturing or management operations in the state. Texas is also a leading pharmaceutical research state and ranks #2 in amount of clinical trials (~18,500 studies underway) and is home to six of the top 100 research medical schools according to *U.S. News & World Report* (Texas Biotechnology Industry, 2015). More



than 61% of Texas biotech employment is in research & development (R&D) and testing related fields. Many of the largest private biotech R&D firms in the world operate in Texas. In fiscal year 2013 alone, Texas public institutions of higher education expended almost \$2.9 billion on medical and life sciences research. In January 2015, the 84th Texas Legislature proposed to eliminate the Emerging Technology Fund and use the ETF's unexpended expenses to create the Governor's University Research Initiative. The Governor's University Research Initiative would provide matching funds to help Texas institutions of higher education recruit prestigious, nationally-recognized researchers to their faculty. Also found in Texas is the Texas Medical Center, considered the largest concentration of medical experts and professionals in the world, and the 8<sup>th</sup> largest business district in the world. It conducts \$3.4 billion in research annually.

Texas is also a leader in the field on cancer research. It is home to the MD Anderson Cancer Center, Texas Oncology, Scott & White Cancer Institute, and the Mary Crowley Cancer Research Centers to name a few. U.S. News & World Report has named MD Anderson one of the nation's top ranked cancer centers for 25 years (MD Anderson Cancer Center Homepage). Cancer Prevention and Research Institute of Texas (CPRIT) is a 3 billion dollar state-funded initiative based in Austin. CPRIT's goal is to expedite innovation in cancer research and product development, and to enhance access to evidence-based prevention programs throughout the state. Under the guidance of its governing body, the Oversight Committee, CPRIT accepts applications and awards grants for a wide variety of cancer-related research and for the delivery of cancer prevention programs and services by public and private entities located in Texas. All CPRIT-funded research will be conducted in state by Texas-based scientists and reflect CPRIT's mission to attract and expand the state's research capabilities and create high quality new jobs in Texas.



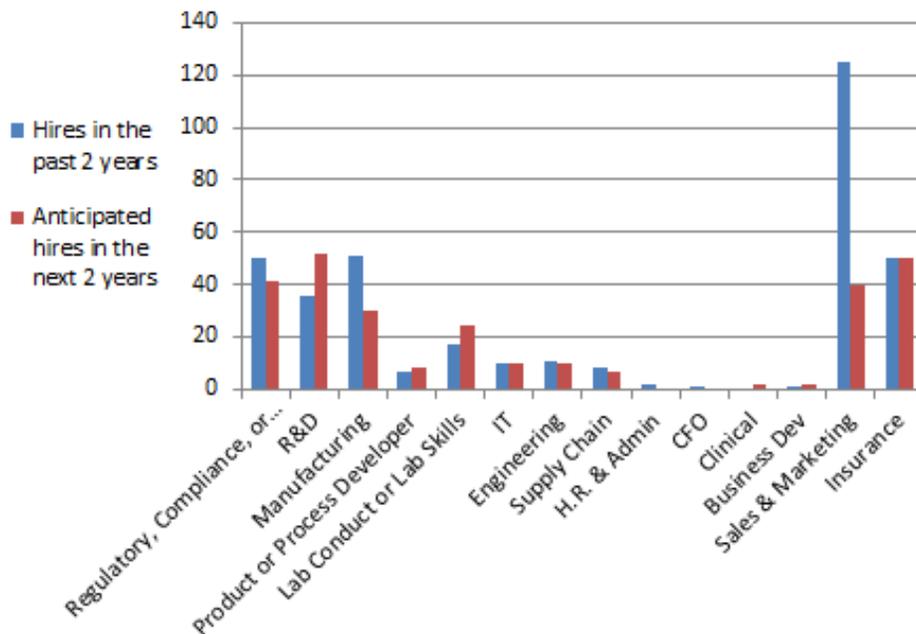
## Texas Life Science CEO Survey

CEOs from 22 Texas life science companies were issued a survey. Involved were 18 bioscience companies, 2 insurance companies, a medical device company, and a CRO/CMO.

### Educating the Changing Biotechnology Workforce

This study was funded by the Wagner Peyser Grant, Texas Workforce Commission (TWC) Grant 1415BPB000, “*Educating the Changing Texas Biotechnology Workforce*”. The Wagner Peyser is a federally funded grant administered by the Texas Workforce Commission. The goal of this grant is to support training for the position of Laboratory Technician by incorporating Current Good Manufacturing Practices (CGMP) education into program coursework and providing state-of-the-art skills needed for employment in the Biotechnology industry. In addition to lab technician training, this grant provides support services to current program students, future students, and alumni in helping meet the workforce needs of the biotechnology community locally in Austin and the State of Texas.

### Past Growth & Expected Growth



## Past Hires Education and Hiring Difficulty

Function	Minimum educational requirement					Position hard to fill?
	HS Diploma	Community College Certificate	Associate Degree 2-year Degree	4-Year Degree	Graduate Degree	
Regulatory, Compliance, or Quality				6	7	50%
R&D		1	1	7	11	14%
Manufacturing	3	1	1	6	3	25%
Product or Process Developer				5		20%
Lab Conduct and Lab Skills	1	1			4	0%
IT		1		2	1	0%
Engineering				5	3	20%
Supply Chain				2		0%
H.R. & Admin				1		0%
CFO					1	0%
Clinical				1	2	100%
Business Dev				1	1	100%
Sales & Marketing				2		0%
Insurance	1	1	1	1	1	100%

**Table 1: Number of companies hiring for said position and their required level(s) of education and perceived difficulty to fill the position**

### Benefit of Developed Industry-vetted Job-specific Skills

The CEOs were asked what impact teaching job-specific skills would have on them.

72.7% of the CEOs believe this would assist in their hiring decisions.

50% of the CEOs believe this would reduce the amount of administrative burden.

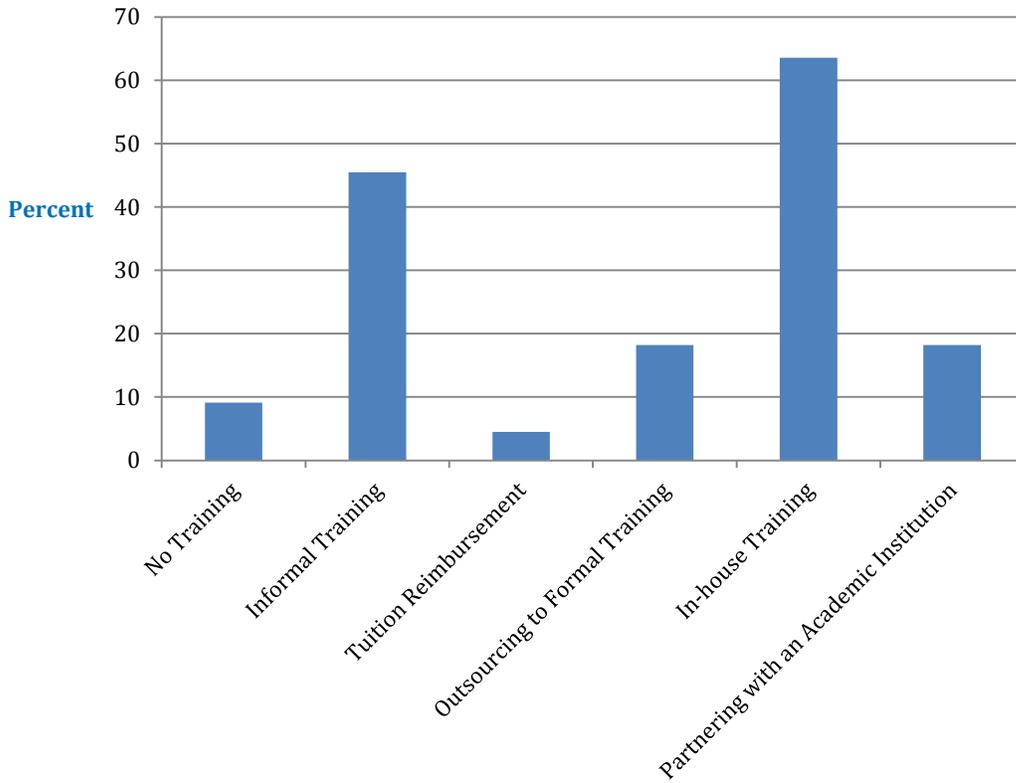
40.9% of the CEOs believe this would reduce the training costs.

27.3% of the CEOs believe this would reduce questions about consistency in preparation from different academic institutions.

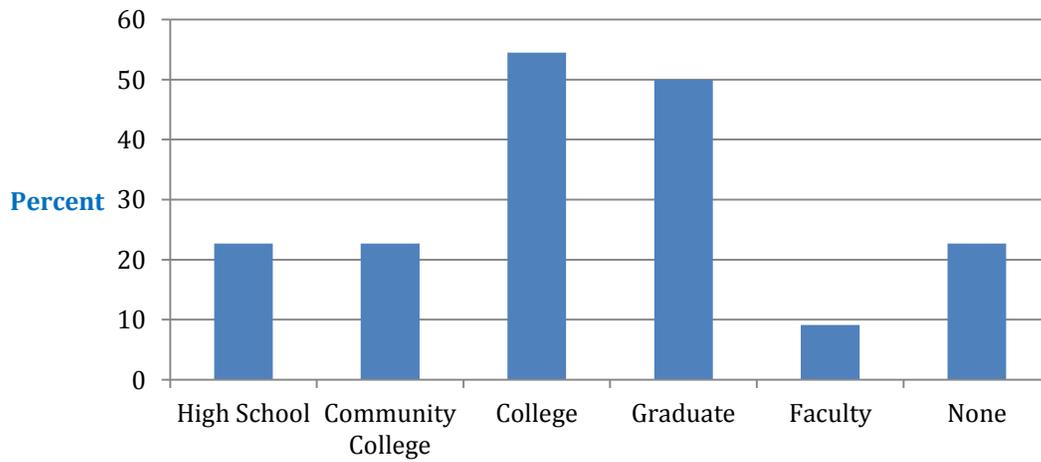
None of the CEOs thought that this would make either no difference in hiring decisions, increase administrative burden, increase training costs, or raise questions about consistency in preparation from different academic institutions.



### Training Offered to New/Incumbent Workers



### Internship Opportunities Provided



### **Anticipated Workforce Needs**

The CEOs were asked which areas they anticipated an increase in workforce needs. The most frequent response was for broad biomedical skills (including mass spec, cloning, protein biochemistry, enzymology) and general bench scientist/instrumentation skills. The next most frequent responses were for skills in animal studies, clinical operations, and regulatory roles. Finally there were multiple responses for quality assurance and medical device engineering. Also among the responses were operations & manufacturing, R&D, senior scientific leadership, biomedical engineering, biotechnology, bioinformatics, biomarker development, technical sectors, insurance underwriters, lab skills in microbiology, and lab personnel capable of writing protocols & reports.

### **Educational System Improvements**

The CEOs were asked what improvements to the educational system could be made in order to better the talent pool needed for their organizations.

Responses to this question were varied.

Solutions included: creation of a biotechnology program to cover all aspects of product development, an emphasis on practical skills and independent thinking (as opposed to strictly being able to follow orders), partnering for internships/fellowships in training, organized internships and outplacements, inviting speakers from the industry to come in and give lectures, lab courses that are coupled with broad based exposure to product development programs, increasing the number of biomedical engineers and biomedical graduates, increasing applied training, training to industry standards (as opposed to academia standards), more life science training, an increase in *relevant* hands on experience, brining awareness to the insurance industry and potential career opportunities in this area, and entrepreneurial training for Ph.D. & post-docs.

Drug development was heavily emphasized as was hands on experience and knowledge about the industry.

### **Most Desirable Skill Sets/Backgrounds for Key Roles**

Industry experience was seen as the most valuable skill. The next most valued was experience in drug development. Also answered was biomedical engineer, medical device production, senior executive experience in medical devices, talented engineers, experienced bench scientists, passion & commitment, in vivo/in vitro biology, interpersonal skills, biological sciences, animal experimentation, and senior level experience with strong regulatory and FDA background.

The CEOs were then asked if they had these people in place right now. 70.6% said yes but they will need more employees as their companies grow, 17.6% answered they had about half of what they needed, and 11.8% said that they did not.



## Improving Current Workforce

Finally, the CEOs were asked what would be most helpful in improving the capability and performance of their workforce:

- Ready to work biomedical production technicians
- Creation of a professional development program in Texas to help revise overall company core competencies/skill set while at the same time helping people's individual professional career/development
- Goal oriented thinking
- Hiring individuals with expanded skill sets to help expand the company
- Improving team cohesion
- Improved ability to create material transfer agreements with Texas academic centers
- Learning relevant experiences in school and not merely learning by the book
- Improving information retention to avoid repeats
- Universities teaching to industry standards, not academic standards
- Clearly explaining the differences between industry and academia
- Increasing capacity to match growth rates
- Increased awareness of insurance as a potential career opportunity



## Looking Forward

This preliminary report on the workforce needs of the biotechnology industry in Texas provides valuable information for educational and other entities that are involved in preparing the workforce. Based on the answers that industry provided, it also shows that all educational levels, from high school to graduate level, need to be involved and informed about these results. The report also shows that the industry, itself, is very interested in providing input concerning exactly what needs to be taught and how, for students and employees to be best prepared to work in the industry. Several recommendations can be made based on what is documented in this report as follows:

- (1) A more comprehensive survey needs to be undertaken. The questions in this survey were very broad, for example R&D, or Lab Conduct and Lab Skills and only answered by CEOs and not other “levels” (e.g. technicians and supervisors) in a company. A more comprehensive survey would target specific jobs within an area (e.g. Within R&D Scientist III, R&D (Membrane Protein Chemistry) at specific levels within a company.
- (2) More individuals from a company need to be involved in the survey. For this survey, only CEOs were polled, a comprehensive survey would include technicians and supervisors, employees who do the jobs that need to be filled.
- (3) The survey needs to involve a consortium partners who need or are involved in educating the workforce. The best way to ensure that educational partners understand what they need to do to educate the workshop is to involve them in the survey. And in many cases, it makes sense in that they are already getting input from industry. For example, Biotechnology Programs at Texas community colleges are required to have an annual advisory board meeting to gather input from industry concerning the program. Since advisory boards are composed of industry representatives from different areas of a company, their insights would be valuable since a comprehensive survey would include profiling workforce needs in all areas and levels in a company. For educational partners that do not already involve industry in their decisions, involving them will help inform their programs. To coordinate this activity, a third party whose job is to represent these companies (such as THBI) should coordinate these efforts since it has the ties to the state industry.
- (4) The comprehensive, Texas specific, workforce survey needs to occur annually or every two years depending how fast workforce needs change in the state. None of the national surveys, such as the Battle Report, are comprehensive enough nor include recommendations that are state specific to target specific Texas biotechnology workforce needs.



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## Appendix

**Regulatory, Compliance, or Quality:** These jobs have to do with a company's adherence to guidelines, laws, and regulations that are relevant to its area of business, and violations often result in legal punishment. It also is a way of preventing mistakes or defects in manufactured products and avoiding problems when delivering solutions or services to customers.

**R&D:** These jobs are not necessarily intended to generate immediate profit, but are a crucial component of the innovation lifecycle. These jobs help a company survive in this modern, fast-changing world. This can be the development and testing of new products, or the application of research to promote future product development.

**Manufacturing:** These jobs relate to the physical creation of products, ranging from operating systems, to electronic goods, to medicine and prosthetics.

**Product or Process Developer:** Help to create means of operation for the company in order to better achieve its production goals. These people understand and control processes that generate a final product and try to optimize the manufacturing process.

**Lab Conduct and Lab Skills:** These people possess the technical knowhow in order to properly, and safely, run the lab and the lab machinery.

**IT:** This stands for information technology and is the application of computers and other such storage technologies to store, receive, transmit, and manipulate data.

**Engineering:** These are the jobs where the actual components of the manufacturing process are generated. There is a wide range of engineers, so specification would be needed.

**Supply Chain:** This is the process of transferring products or services from supplier to consumer, and is often a vast network of people, companies, information, organizations, and resources.

**H.R. & Admin:** Human resources are all the individuals who make up the workforce for a company and human resource management is intended to maximize employee performance. These jobs typically include job analysis and design, staffing, training and development, and dealing with legal issues.

**CFO:** The chief financial officer is the one primarily responsible for overseeing the financial risks of a company. They are also in charge of financial planning and record-keeping as well as conveying this information up to higher management.

**Clinical:** Clinical jobs are those that relate to dealing with and treating patients.

**Business Development:** This job is aimed at creating and implementing strategies intended to further growth within and between organizations. It is particularly interested in creating long-term value for the company.

**Sales & Marketing:** These jobs have to deal with trying to advertise and sell the actual product that has been created and trying to generate interest within its consumer base.

**Insurance:** These jobs are all about protection against financial loss and are a form of risk management, and there is a large variety in the types of insurance offered.

