Carnegie Mellon University

Heinz College

INFORMATION SYSTEMS • PUBLIC POLICY • MANAGEMENT

HEALTH CARE ANALYTICS CAREER GUIDE

INDUSTRY INSIGHTS, APPLICATIONS, CAREER PATHS AND **TOP SKILLS FOR SUCCESS.**

MAKE YOUR MOVE.
CHANGE THE WORLD.

CARNEGIE MELLON UNIVERSITY
PITTSBURGH

Curious About Health Care Analytics?
Here's What You Need to Know:

TRANSFORMATIVE
Data analytics and technology are transforming every segment of the health care ecosystem, improving diagnosis, affordability, access, and outcomes.

MEANINGFUL & LUCRATIVE
The Health Care Analytics field offers excellent pay, mission-oriented work, and the opportunity to positively impact the entire health care industry.

CHALLENGING
Effective Health Care Analytics professionals need a balance of "hard" technical skills and "soft" business and communications skills, as well as deep knowledge of the health care domain.

FLEXIBLE
The Health Care Analytics field provides career flexibility in a rapidly evolving industry across multiple industry segments.

Health Care Providers

Career Impact

Public Health Agencies

Health Care Consultancies

Insurance Companies

Product & Software Developers

0.00214565875

-0.21457

Read on to learn more...

An Insider's Look at the
Health Care Analytics Field

The health care industry urgently needs solutions that will simultaneously improve care and lower costs. To find and implement these solutions, experts in the health care domain need to leverage advanced technology and data analytics. As a result, the Health Care Analytics job market is growing at an explosive rate and people with the right skills are in high demand.

Jobs in Health Care Analytics have grown at four times the rate of all health care jobs, and six times the rate of all jobs total. This growth is being driven by the rapid digitization of the health care industry, the evolution of data analytics and technology, and the introduction of new data collection inputs — from electronic health records to connected "smart" medical devices.

The opportunity for master's program graduates with analytics expertise and a passion for health care is vast and continuing to expand.

This guide provides an **Insider's View** of what it means to work in the Health Care Analytics field today.

Read more to discover:

+ Exciting careers in Health Care Analytics for professionals with the right skills and training

+ Analytics applications that are changing key segments of the health care ecosystem

+ Skills needed to capitalize on the field's emerging opportunities

+ Career paths an individual might follow in Health Care Analytics — from new graduate to C-Level executive

+ How a master's program graduate might plan a career in Health Care Analytics, and succeed in a rapidly changing field

Why **Health Care Analytics?**

The problems are urgent, complex, and multi-faceted. And yet we can solve them like never before thanks to advances in data analytics and technology.

Careers in the Health Care Analytics field tend to be very lucrative. In fact, careers in Health Care Analytics pay better than careers in just about any other health care track. But well-trained graduates can make good money in many fields, so why choose Health Care Analytics?

It's about more than the money.

> ❝
>
> *"ANALYTICS PROFESSIONALS ARE AS VALUABLE AS DOCTORS IN IMPROVING CARE."*
>
> Dan Pellegrini, MD, Kaiser Permanente

The Work is Exciting and Challenging

In Health Care Analytics, you get to focus on the fun stuff. The field is being flooded with capital, innovative ideas, and game-changing projects. You will dig into a new set of diverse, complex, high-level challenges every day, working hand-in-hand with clinicians, organizational leaders, and other smart, driven, curious people who are dedicated to improving the industry.

The Chance to Transform Health Care for the Better

By entering the Health Care Analytics field, you will help bring health care into the 21st century. You will create data-driven, evidence-based, and analytics-informed solutions that deploy modern technologies and capabilities to improve age-old health care issues.

A Mission-Oriented Career

When you work in Health Care Analytics, you have a real impact on the world. Whether it's detecting diseases earlier, strengthening public health and population health efforts, or giving clinicians better tools for assessing the whole patient, effective Health Care Analytics can save lives. Join inspiring colleagues who are making peoples' lives better in tangible ways.

How Analytics are Transforming **Health Care**

The health care industry is huge, and composed of multiple unique segments that each play a distinct role in delivering patient & population care. And each of these segments is radically changing what they do, how they do it, and the results they deliver — thanks to Health Care Analytics.

Health Care Providers

Predicting Heart Attacks
Every minute counts when a patient suffers a heart attack. By applying new analytical models, providers can predict heart attacks 8-20 hours sooner than they could with traditional detection methods.

Processing 180+ Million Patient Data Points Daily
Providers can collect and process data at a rate and volume that was previously impossible, spotting subtle changes in patient condition to predict health issues long before they occur.

Staffing Hospitals Effectively
Hospital staffing is a huge challenge — both overstaffing and understaffing results in problems. Providers can now use analytics to predict when ER surges in admittance are most likely to occur to reduce patient wait times.

Creating Patient-Centric Care Models
Analytics are revealing what patients really want, what services providers need to offer, and what factors actually deliver the highest levels of patient satisfaction, including elements that are often overlooked.

Engaging Health Care Business Stakeholders
Provider organizations are developing cutting-edge data visualization powered by AI and ML to democratize their data, closing the gap between front-line health workers and back office business operations.

> ❝
> **"HEALTH CARE IS A HUGE INDUSTRY WITH SO MANY COMPLEXITIES. IF YOU ARE A PROBLEM-SOLVER WHO LOVES ANALYTICS, THE OPPORTUNITIES ARE ENDLESS."**
>
> Lisa Khorey, EVP & Chief Client Delivery Officer, AllScripts

Health Care Consultancies

Lowering Prescription Drug Prices
Consultancies are working with their clients to solve problems that impact prescription affordability and medication access.

Reducing the Cost to Manage Chronic Conditions
Recognizing that every patient group, procedure, and chronic condition requires substantially different care, consultancies and their clients are deploying advanced analytics to better understand connections between conditions, care, and costs.

Getting New Drugs to Market Faster
Consultancies are developing new analytics models that rapidly process drug development data, accelerating discovery and testing and reducing time-to-market — with upsides for pharmaceutical companies and patients alike.

Insurance Companies

Reducing Readmissions
Insurers are developing analytical models that predict which patients are most likely to be readmitted so providers can be proactive with care coordination, benefiting hospitals, insurers, and patients.

Improving Population-Level Health Outcomes
Different populations suffer different health issues, face different barriers to care, and require specialized programs tailored to their unique needs. Analytics allow insurers to proactively manage populations with individualized care.

Creating High-Touch Care Management Programs
To allocate resources more efficiently, insurers are developing models to predict which patients will continue to require more intensive services, and which patients will thrive under standard ongoing care.

Public Health Agencies

Feeding the World
Malnourishment is a leading cause of negative health outcomes. As the world's population expands, public health agencies are getting ahead of the problem, using analytics to improve agricultural output.

Identifying Social Detriments of Health
Non-profits are examining the social causes of poor health. By analyzing data on housing and food access, they can identify, make visible, and correct social detriments of health.

Reducing Waste in Health Care Spending
Public health agencies are using analytics to find suspicious spikes in activities including drug misuse, sites of inefficient care, and false positives that highlight opportunities for better care.

Innovating Payment Plans
Public health agencies are testing new payment plans that support outcomes-based medicine rather than "fee for service," and incentivize providers to offer the most effective service at all times.

Product & Software Developers

Developing Genome-Based "Precision Medicine"
In most cases, more finely-targeted treatments have better chances of positive patient outcomes. Product & software developers are using analytics to identify, map, and target diseases at the genetic level.

Helping Clinicians Make Evidence-Based Decisions
Product & software developers are creating apps that extract patient health information from the EHR, and combine it with peer-reviewing clinical information to facilitate better diagnoses.

Streamlining New Drug Development
Product & software developers are using analytics to create virtual models of new drugs and test their efficacy in a data-rich simulated environment to reduce costs and time-to-market.

Linking Behavior and Outcomes
Behavior patterns can affect health outcomes. Product & software developers are performing clinical trials to identify which behavior patterns might predict individual patient outcomes and care needs.

The Key Skills that **Unlock Career Success in Health Care Analytics**

One thing is crystal clear — organizations in every segment of the health care industry are ramping up their commitment to analytics. They are investing a lot of capital to break away from their old way of doing things and evolve.

To get to that brighter future, organizations are hiring Health Care Analytics professionals with the right blend of hard skills, soft skills, and domain expertise.

The Hard Skills

Hard Skills are the foundation of a career in Health Care Analytics. To what extent you develop your Hard Skills depends on your career track. When considering a master's degree program, analytical and technical training is non-negotiable.

Coding and Computer Programming
Get comfortable with tools like R and Python, and the specific coding languages underlying analytics platforms. Coding knowledge allows you to build and tweak models so you can ask the right questions.

> *"CODING – IT DOESN'T MATTER WHICH LANGUAGE – R, PYTHON, SAS – IS A KEY SKILL FOR PULLING DATA, CLEANING IT AND BUILDING EFFECTIVE MACHINE LEARNING MODELS."*
>
> Holly Biernacki, Director of Data Science for Experience Design, UnitedHealthcare

Statistics
Health Care Analytics professionals need both raw statistical skills and the ability to work with existing and emerging statistical tools.

Database Skills
Health care organizations use large, complex database systems. You need to be able to manage these databases, perform standard data mining activities, and convert raw data into a useful structure.

Software Proficiency
Health care organizations are updating their IT stacks with a diverse range of emerging tools and technologies. You need to be able to quickly learn and remain agile as organizations implement new systems and analytics tools.

"The Basics"

Many graduates of Health Care Analytics programs are overspecialized. You need a broad range of competencies, in particular project-based problem-solving skills and the ability to translate those skills to any methodology.

Mathematics

If you want to work in Health Care Analytics, you need to love numbers, data, and mathematical concepts. Health Care managers and leaders are increasingly asked to show solid quantitative skills in order to advance.

Data Visualization

Your job doesn't begin and end with brilliant data analysis. You must communicate your insights and recommendations via clear, highly-visual presentations that tell a story and can be easily understood by anyone in the organization.

The Soft Skills

Think technical skills will be the most important factor in your success? Think again. You'll find it's actually your Soft Skills that make or break your career. Analytics professionals at all levels need to ask the right questions, translate their insights, and communicate value. And while technologies will change over time, these Soft Skills will be just as vital 40 years from now as they are today — if not more so.

> **"SOFT SKILL DEFICIENCY IS WHAT KILLS THE CAREER OF AN ANALYST, HANDS DOWN."**
>
> Pamela Peele, Chief Analytics Officer, UPMC Health Plan & UPMC Enterprises

Storytelling with Data

Even the most groundbreaking insight will fall flat if you can't communicate its value. You must articulate your thinking persuasively in writing, tailor your message to your audience, and simplify complex concepts in an engaging way—you must act as a translator between data and business.

Business Stakeholder Intimacy

You will use analytics to improve the real-world, day-to-day life of both patients as well as business stakeholders. You need to learn the health care ecosystem, and get to know front-line clinicians and partners so you can translate their needs into real business solutions, while setting realistic expectations.

Strategic Thinking and Problem Solving

You need to develop the ability to step back, take the time to accurately identify the problem you're trying to solve, ask questions, think critically, and get to the root of the problem. Then, you can develop deep strategic solutions that address the cause of the problem rather than symptoms.

Teamwork and Collaboration

Health care is cross-functional — no one goes it alone. To affect positive change, departments must pool their data and align towards common goals. You must develop and leverage expert networks and work with interdisciplinary teams.

Leadership

Health care organizations are asking their analysts to step up and take on business leadership roles and responsibilities. You need to be able to see the big picture, set aspirational goals, lead teams to achieve those goals, and build a position of true influence in their business.

Intellectual Curiosity

Health care is changing so fast. What is taken for granted today might be obsolete by tomorrow. You must be able to quickly adapt to new technologies, tools, and techniques, and intentionally cultivate an attitude of lifelong learning. Rethink what's possible.

Change Management

Organizational change is hard, and to be successful people have to buy in. You will need to persuade, motivate, and influence internal stakeholders to adopt new ways of doing business.

Project Management

Solutions only matter if they are implemented. You'll need the ability to create a project plan, manage it, and maintain complete accountability for its delivery — all while continuously adjusting to stay aligned with changing demands.

Negotiation

This is a truly critical skill. You will negotiate with many parties including clients, internal departments, and business stakeholders. You must learn to navigate the give-and-take so your projects can be successful.

Don't Overlook **Health Care Domain Expertise**

> **"WHEN YOU'RE WORKING WITH CLINICIANS, YOU NEED TO UNDERSTAND WHAT THEIR DAYS LOOK LIKE AND HOW ANALYTICS CAN SAVE THEM MINUTES AND HOURS EVERY SINGLE DAY."**
>
> Trevor Filipiak, Sr. Analytics & Business Intelligence Consultant, Tiber Solutions

Any new graduate with this blend of hard and soft skills will be in high demand in the Health Care Analytics field. But if you develop deep domain expertise in the health care industry, you will truly stand out.

The health care industry is complex, highly regulated, and the difference between a successful or an unsuccessful outcome is often, quite literally, life and death. The stakes are high!

Sometimes the person who gets the best opportunities is the person who clearly understands the Health Care industry. A master's degree program should provide that domain expertise.

Bringing It All **Together**

Health care organizations need talented, passionate individuals with this blend of hard skills, soft skills, and domain expertise to help them:

+ Transform into a data-driven decision-making culture.

+ Improve the quality, completeness, and accuracy of their data.

+ Make their data accessible, interoperable, and unconstrained.

+ Restructure their data to provide intuitive self-service analytics capabilities.

+ Translate their data into insights, and their insights into game-changing actions.

+ Digitize manual analysis to increase speed, scope, and accuracy.

+ Shift their attention from profit-based metrics to outcome-based metrics.

+ Consolidate technology and data structures following mergers & acquisitions.

Delivering on these objectives will pull Health Care into the 21st century.

Health Care Analytics Careers: **Many Paths, Endless Opportunities**

> ## "
> **"THERE ARE SO MANY FULFILLING ASPECTS OF CONSULTING – FAST-CHANGING PROJECTS, CHALLENGING WORK AND ALWAYS LEARNING NEW THINGS."**
>
> Vijaya Priya Joshi, Cognitive Engineering Consultant, IBM

Health care organizations have many needs, and there are many problems to solve. New graduates with the essential skills will find many opportunities for high-quality employment that is rewarding, lucrative, and meaningful.

This is a talent-driven job market where qualified graduates of Health Care Analytics master's programs are able to select a career path based on their own individual interests and strengths.

While Health Care Analytics is a nascent field, a few common career paths have already emerged. Whether it's a provider, consulting firm, pharmaceutical company, or insurer, you could be within one of these career tracks in virtually any Health Care organization.

Emerging Common Career Tracks

Technical / Analyst
Build your data engineering, reporting, business analytics, and data science portfolio. Work with advanced algorithms, perform more sophisticated statistical analysis on larger data sets. Become a Subject Matter Expert (SME), a lead-level analyst, or an analytics consultant. Take on a technical leadership position, managing analytics for their entire enterprise.

Project / Program Management
Start in front-line analytics work or consulting and move up to manage analytics resources and mission-critical strategy teams. Facilitate, coordinate, and organize individual analytics projects and entire analytics programs. Make more strategic decisions than a traditional IT-focused project manager. Translate business needs into technical solutions. Advance to partner-level leadership roles.

Business Development
Work with clients to identify problems, uncover root causes, and determine the appropriate analytics solution. Package together tools and teams into effective products or projects to sell. This career track applies the most to the consulting field.

Software Development and Management
Work with a software development company to improve existing products, or devise and build new analytics-driven tools. Help companies monetize their analytics either by selling their data, or developing their own internal tools to license externally.

Business Operations
Take data-driven insights, and make sure they are brought to life in programs that drive meaningful day-to-day business value. Focus on the consumption and actioning of data — not just its production. In time, shift from hands-on analytics work to operationalization, focusing on data governance and stewardship.

Leadership & Management
Entry-level analytics work can be a springboard to leadership in any organization. Leverage your understanding of health care IT and the health care business to act as a liaison between the two. Deliver solutions, manage people, and engage senior business stakeholders. In large organizations in particular, there is a fairly standard path from Junior Analyst, to Senior Analyst, Manager, Senior Manager, Director, Senior VP, and potentially all the way up to a C-level position such as Chief Analytics Officer or Chief Technical Officer.

Other Career Paths
You don't have to choose between following a pure IT path or business management path. Nearly every business function — finance, legal, HR, and service line operations — are beginning to work with their own data sets and problems that can be solved with analytics. And many graduates find the flexibility of consulting to be an appealing path.

What's Next for
Health Care Analytics?

The only constant in the future of health care is change. Core technologies will change. Segments will evolve. Major players will rise and fall.

But one thing won't change — the industry will continue to mature in its use of analytics and offer enormous opportunity to individuals with the right skills and passion for the work. You can help health care organizations become more efficient, more effective, and more capable of producing optimal outcomes for patients around the world. There is no greater calling than helping people lead healthier lives.

If you have the essential hard skills, soft skills, or domain expertise, you can probably get a good job. But if you combine all three, you will be a rare and valuable resource for the field, no matter what the future holds.

> *"WE'RE GOING TO SEE MORE ANALYSTS MOVE INTO LEADERSHIP ROLES BASED ON THEIR BUSINESS ACUMEN, PROBLEM SOLVING SKILLS AND THE ABILITY TO CREATE SOME LEVEL OF ORDER OUT OF CHAOS USING ANALYTICS. "*
>
> Bob Gladden, VP Enterprise Analytics, Highmark Health

Think of the impact you could have. It's time to make your move!

Master of Science in Health Care Analytics & Information Technology (MSHCA) – the Ideal Degree for the Future of Health Care

In Health Care Analytics, the opportunities are endless. The field is growing rapidly, and impactful careers await those with the right skills. Technology and big data are transforming the health care sector — in all aspects of the field and at all points of care, advanced technologies are causing us to rethink what's possible.

The Master of Science in Health Care Analytics & Information Technology (MSHCA) program at Carnegie Mellon University's Heinz College of Information Systems and Public Policy prepares graduates to drive positive change and innovation in the health care industry with technology and analytics.

As the #1 graduate school for analytics education and IT management, Heinz College provides a blend of rigorous quantitative and technical coursework along with experiential learning in health care contexts.

Students learn necessary hard skills in courses like R Programming for Analytics, Database Management, and Data Mining while mastering crucial collaboration and communication skills in courses like Organizational Design and Implementation, Telling Stories with Data, and Project Management.

Heinz College MSHCA students develop deep industry knowledge in the classroom and beyond. With a solid foundation in health care systems, financing, policy, and economics, students complete a semester-length capstone project solving a real problem for an actual industry client. Capstone projects involve a range of outcomes, from using machine learning to tackle the opioid epidemic, to developing data sharing platforms that support the delivery of personalized medicine.

Graduates of the Heinz College MSHCA program have next generation skills that set them apart in a competitive job market. In technical, operational, and leadership roles, MSHCA prepares graduates to adapt to an evolving industry. But perhaps most importantly: Heinz College empowers future leaders in technology and analytics to change the health care system for the better.

How this Insider Information Was Obtained

This guide's content was developed with insights and experiences of real-world Health Care Analytics professionals. The information was collected from 20 Health Care Analytics professionals currently working in the field in multiple segments/functions.

Carnegie Mellon University

HeinzCollege

INFORMATION SYSTEMS • PUBLIC POLICY • MANAGEMENT

CONTACT US

Heinz College Office of Admissions
5000 Forbes Avenue
Hamburg Hall
Pittsburgh, PA 15213-3890
412-268-2164
hnzadmit@andrew.cmu.edu

HEINZ.CMU.EDU