

Genetic Counselor

Snapshot

Career Cluster(s): Health Science; Science, Technology, Engineering & Mathematics

Interests: Science; Genetics; Human Biology

Earnings (Yearly Average): \$85,700

Employment & Outlook: Much Faster Than Average Growth Expected

OVERVIEW

Sphere of Work

Genetic counselors assess individual or family risk for a variety of inherited conditions, such as genetic disorders and birth defects. They provide information and support to other healthcare providers, or to individuals and families concerned with the risk of inherited conditions. This is just one area of medical genetics and genomics.

Work Environment

Genetic counselors typically work in offices and routinely meet with families and other healthcare providers.

Occupation Interest

Genetic counselors have an aptitude for science and human biology, and an interest in studying human genetics. Further, they are compassionate people who want to provide answers to families concerned about the risks of inherited genetic disorders.



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A Day in the Life—Duties and Responsibilities

Genetic counselors identify specific genetic disorders or risks through the study of genetics. A genetic disorder or syndrome is inherited. For a couple who are expecting a child, counselors use genetics to predict whether a baby is likely to have hereditary disorders, such as Down syndrome and cystic fibrosis, among others. Genetic counselors also assess the risk for an adult to develop diseases with a genetic component, such as certain forms of cancer.

Genetic counselors identify these conditions by studying patients’ genes through

Duties and Responsibilities

- Interviewing patients to get comprehensive individual family and medical histories
- Evaluating genetic information to identify patients or families at risk for specific genetic disorders
- Writing detailed consultation reports to provide information on complex genetic concepts for patients or referring physicians
- Discussing testing options and the associated risks, benefits, and limitations with patients, families, and other healthcare providers
- Counselling patients and family members by providing information, education, or reassurance regarding genetic risks and inherited conditions
- Participating in professional organizations or conferences to keep abreast of developments in genetics and genomics

DNA testing. Medical laboratory technologists perform lab tests, which genetic counselors then evaluate and use to counsel patients and their families. They share this information with other health professionals, such as physicians and medical and clinical laboratory technologists and technicians.

According to a 2016 survey from the National Society of Genetic Counselors (NSGC), most genetic counselors specialize in traditional areas of genetic counseling: prenatal, cancer, and pediatric. The survey noted that genetic counselors also may work in one or more specialty fields such as cardiovascular health, genomic medicine, neurogenetics, and psychiatry.

Profile

Working Conditions: Inside
Physical Strength: Light Work
Education Needs: Master’s Degree
Licensure/Certification: Usually Required
Opportunities for Experience: Internship
Interest Score: SIA

OCCUPATION SPECIALTIES

Clinical Geneticist

Clinical geneticists are physicians who care for patients in clinical settings, and are certified to evaluate, diagnose, manage, and treat inherited conditions in patients of all ages.

Clinical Laboratory Geneticist

Clinical laboratory geneticists oversee specialized clinical laboratories that test for genetic disorders. Certifications include clinical biochemical genetics, laboratory genetics, and genomics. These geneticists typically work in academic medical centers, reference laboratories, and the biotechnology industry.

WORK ENVIRONMENT**Immediate Physical Environment**

Genetic counselors work in university medical centers, private and public hospitals, and physicians' offices. Most genetic counselors work full time and have a standard work schedule.

Human Environment

As genetic counselors provide information and advice to other healthcare providers, and to individuals and families concerned with the risk of inherited conditions, they spend a great deal of their working hours interacting with others. They must be able to interact professionally with other healthcare providers and academics in their field, as well as show patience, compassion, and understanding when dealing with families. Depending on the outcome of genetic testing, interactions with patients can be difficult.

Technological Environment

Genetic counselors often use analytical and scientific software to perform genetic testing and analyze results, as well as medical software to record patient information. They must attend conventions and other professional events in order to stay abreast of the latest developments in their field, which includes innovative technology.

EDUCATION, TRAINING, AND ADVANCEMENT**High School/Secondary**

High school students interested in pursuing a career in genetics should focus on science and math courses, especially biology and chemistry. History, sociology, and English are also important for understanding human development and to refine communication skills.

Suggested High School Subjects

- Algebra
- Anatomy
- Biology
- Calculus
- Chemistry
- Economics
- English
- Geometry
- History
- Physics
- Physiology
- Psychology
- Sociology
- Trigonometry

Transferable Skills and Abilities

Communication Skills

- Simplifying complex findings so that patients understand them

Compassion

- Being sensitive and compassionate when communicating findings to patients seeking advice on family care or serious illnesses

Critical-thinking Skills

- Analyzing laboratory findings to determine how best to advise a patient or family.
- Using applied knowledge of genetics to assess inherited risks properly

Decision-making Skills

- Using expertise and experience to determine how to share their findings properly with patients

Related Career Pathways/Majors

Health Science Career Cluster

- Biotechnology Research & Development Pathway
- Diagnostics Services Pathway

Science, Technology, Engineering & Mathematics Career Cluster

- Science and Math Pathway

Postsecondary

Genetic counselors typically need a master's degree in genetic counseling or genetics.

Coursework in genetic counseling includes public health, epidemiology, psychology, and developmental biology. Classes emphasize genetics, public health, and patient empathy. Students also must complete clinical rotations, during which they work directly with patients and clients. Clinical rotations provide supervised experience for students, allowing them to work in different work environments, such as prenatal diagnostic centers, pediatric hospitals, or cancer centers.

The Accreditation Council for Genetic Counseling (ACGC) certifies master's degree programs.

Related College Majors

- Agricultural Engineering
- Biochemistry

Fast Fact

Many genetic counselors are branching out to utilize their skills around the world. There has been an 88% increase in the number of genetic counselors since 2006.

Source: jscreen.org



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- Biomedical Engineering
- Biotechnology
- Botany
- Forensic Chemistry
- Molecular Biology
- Pharmaceutical Science

Adult Job Seekers

Adults seeking to become genetic counselors should have training in a related field and be prepared to undergo additional schooling and accreditation in order to practice as a certified geneticist. It is advisable to join professional associations and organizations to access job portals, and to attend networking events.

Professional Certification and Licensure

The American Board of Genetic Counseling (ABGC) provides certification for genetic counselors. To become certified, a student must complete an accredited master's degree program and pass an exam. Counselors must complete continuing education courses to maintain their board certification.

About half of the states require genetic counselors to be licensed and other states have pending legislation for licensure. Certification is typically needed to get a license. For specific licensing requirements, contact the state's medical board.

Employers typically require or prefer prospective genetic counselors to be certified, even if the state does not require it.

EARNINGS AND ADVANCEMENT

Earnings depend on a geneticist's specialty and whether they work in a laboratory, hospital, or medical office. Median annual earnings of genetic counselors

were \$85,700 in 2020. The lowest 10 percent earned less than \$66,930, and the highest 10 percent earned more than \$126,350.

Genetic counselors may receive paid vacations, holidays, and sick days; life and health insurance; and retirement benefits. These are usually paid by the employer.

EMPLOYMENT AND OUTLOOK

Genetic counselors held 2,400 jobs in 2020. Employment is projected to grow 26 percent from 2020 to 2030, much faster than the average for all occupations.

Because genetic counselling is a small occupation, the fast growth is expected to result in only about 600 new jobs over the decade.

Ongoing technological innovations, including lab tests and developments in genomics, are giving counselors opportunities to conduct more types of analyses. Cancer genomics, for example, can determine a patient's risk for specific types of cancer. The number and types of tests that genetic counselors can administer and evaluate have increased over the past few years. Many types of genetic tests are covered by health insurance providers.

Related Occupations

- Epidemiologist
- Health Education Specialist/Community Health Worker
- Marriage/Family Therapist
- Medical Scientist
- Physician/Surgeon

MORE INFORMATION

Accreditation Council for Genetic Counseling (ACGC)

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McLean, VA 22102

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www.gceducation.org

American Board of Genetic Counseling (ABGC)

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American Board of Medical Genetics and Genomics (ABMGG)

6120 Executive Boulevard, Suite 525
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301.634.7315
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American College of Medical Genetics and Genomics (ACMG)

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American Genetic Association (AGA)

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American Society of Human Genetics (ASHG)

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Genetics Society of America (GSA)

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National Society of Genetic Counselors (NSGC)

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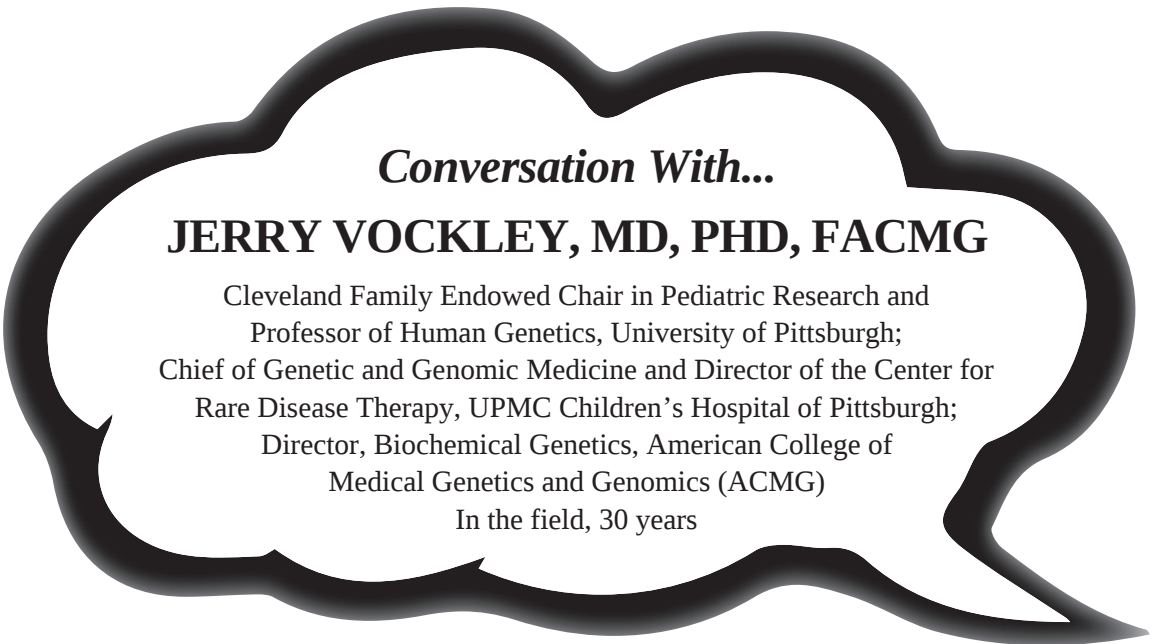
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Stuart Paterson



Conversation With...

JERRY VOCKLEY, MD, PHD, FACMG

Cleveland Family Endowed Chair in Pediatric Research and
Professor of Human Genetics, University of Pittsburgh;
Chief of Genetic and Genomic Medicine and Director of the Center for
Rare Disease Therapy, UPMC Children's Hospital of Pittsburgh;
Director, Biochemical Genetics, American College of
Medical Genetics and Genomics (ACMG)
In the field, 30 years

What was your individual career path in terms of education/training, entry-level job, or other significant opportunity?

Undergrad in biology at Carnegie Mellon University; MD, PhD at University of Pennsylvania; internship and residency in pediatrics at Children's Hospital of Denver; fellowship in pediatrics and human genetics at Yale School of Medicine; first faculty position at the Mayo Clinic.

What are the most important skills and/or qualities for someone in your profession?

I am both a clinician and a basic scientist. The most important quality for me has been the ability to see the need in patients with rare diseases and translate them into questions that could be addressed in the lab. This requires integration rather than compartmentalization of the two relatively disparate parts of my job. Empathy is a must. Next in importance is probably flexibility, the ability to adapt to changing needs in patient care and science. Perseverance is also key, as there is a lot of rejection in academics, with unfunded grant applications and manuscripts that aren't accepted for publication. In the end, I often say that the only good reason to do this job is that you can't possibly imagine doing anything else.

What do you wish you had known going into this profession?

I was probably blissfully ignorant of the long haul ahead when I first was deciding between an MD and a PhD, and ultimately choosing a joint program. In retrospect, it actually made it easier for me to concentrate on what I was doing rather than worrying about what the next steps were. I do think I had a fairly realistic view of academics because of my undergraduate mentors, and that was probably the most important piece for me making career decisions.

Are there many job opportunities in your profession? In what specific areas?

There is a shortage of medical geneticists and biochemical geneticists (a fellowship) nationwide. That means that there are multiple positions open for everyone finishing training, including careers involving research as well as purely clinical ones

How do you see your profession changing in the next five years, how will technology shift, and what skills will be required?

Medical genetics has reinvented itself every five years since I started in the field, largely because of technical breakthroughs. In the next five years, we will transition to using whole genome sequencing early in the clinical evaluation of patients. This will be backed up by other “omics” that will begin to address the ~50% of patients in whom we still cannot make a specific diagnosis. We will also be transitioning from being primarily diagnosticians to being treating physicians. New medications for genetic disorders, including gene therapy, are being developed at record pace and are transforming the field.

What do you enjoy most about your job?

I love my job from interacting with patients to seeing a new result in the laboratory. The most gratifying part of it currently is that we now have increasingly sophisticated techniques to actually do the things I thought I wanted to do when I started. My lab work and clinical research now have a focus of development of improved/new therapies due to a more sophisticated understanding of pathophysiology

Can you suggest a valuable “try this” for students considering a career in your profession?

It's hard to get the feel of a medical career without actually experiencing it. So shadowing a clinical geneticist is a good first when thinking about a clinical career. Pursuing an independent research project, clinical or laboratory, can help solidify an interest in a research career. That's what happened to me. I started undergrad research as a sophomore, fell in love with it, and never looked back.

Conversation With...

HEIDI REHM

Chief Genomics Officer, Massachusetts General Hospital;
Professor of Pathology, Harvard Medical School; Medical Director,
Clinical Research Sequencing Platform, Broad Institute of MIT and Harvard;
Vice President, Laboratory Genetics, American College of
Medical Genetics and Genomics (ACMG)
In the field, 28 years

What was your individual career path in terms of education/training, entry-level job, or other significant opportunity?

I received my bachelor's degree from Middlebury College in Molecular Biology and Biochemistry; then a PhD in Genetics at Harvard University, followed by a postdoctoral fellowship at Massachusetts General Hospital and Howard Hughes Medical Institute, studying the genetic basis of hearing loss. I then completed a fellowship in Clinical Molecular Genetics at Harvard Medical School, followed by board certification by the American Board of Medical Genetics and Genomics (ABMG). I then took a faculty position at Brigham & Women's Hospital with a major focus on directing a genetic testing lab, while also doing research in genomic medicine. Overall, my career focus is in clinical genomics.

What are the most important skills and/or qualities for someone in your profession?

The most important skills include a good scientific background in genetics and knowledge of human disease as well as good communication skills, both written and verbal, and a desire to work as a team, both locally and globally.

What do you wish you had known going into this profession?

I wished I had developed a better background in computational biology and software engineering.

Are there many job opportunities in your profession? In what specific areas?

Yes, there are lots of jobs, and the field is evolving quickly. While my work is as a genomic researcher and clinical laboratory geneticist, which requires a PhD and board-certification for the latter, other jobs include genetic counseling (a two-year Master's degree after college), and a variant scientist with backgrounds that can range across BA/BS, Master's, PhD.

How do you see your profession changing in the next five years, how will technology shift, and what skills will be required?

Genetics and genomics will continue to be relevant to many scientific areas of work, and will increasingly be adopted in the routine care of patients. Physicians and other health practitioners will increasingly need to support the integration of genomics into clinical care. Our field may change from a current focus on diagnosing the cause of existing disease in individuals, to predicting the onset of disease in the future.

What do you enjoy most about your job? What do you enjoy least about your job?

I most enjoy working as a team and tackling challenges across the entire field of genetics and genomics. I'm excited by the new solutions we can bring to the field, and helping patients receive a diagnosis and improve their health. However, there is still so much work to be done and the hours are long in my particular roles. But that's mostly my own doing. I still have a lot of flexibility in my job.

Can you suggest a valuable “try this” for students considering a career in your profession?

For some quick information about genomics and careers in the field, you can explore the links here: www.genome.gov/About-Genomics/Introduction-to-Genomics and www.genome.gov/careers-in-genomics. You can also get more in-depth exposure to this field by signing up to become a volunteer curator in the Clinical Genome Resource. More information can be found here: www.clinicalgenome.org/working-groups/clingen-community-curation-c3.

Conversation With...

STACY A. KRUEGER-HADFIELD

Assistant Professor, Department of Biology,
University of Alabama at Birmingham, Birmingham, AL, USA
In the field since 2006

What was your individual career path in terms of education/training, entry-level job, or other significant opportunity?

I wanted to be a marine biologist, but to be honest, I did not know exactly how to become a marine biologist. One avenue I stumbled upon was working at a zoo or an aquarium. I volunteered at the Los Angeles Zoo and had planned on applying to the Exotic Animal Training and Management (EATM) program at Moorpark College after high school. But before EATM, my parents encouraged me to earn my bachelor's degree.

I started out as a Marine Biology major at California State University Northridge. During my second semester, my intro bio teaching assistant recommended me for a research opportunity in the lab in which he was conducting his MS research. I had no idea research was not only a career, but also a way to be a marine biologist. I was offered the research assistant position and have never looked back.

I switched majors to Environmental Biology—a bit of a misnomer, as it should have been called Evolutionary Ecology—to broaden the types of courses I could take. While I completed the keeper course at the LA Zoo and interviewed for a position as a keeper, I realized I wanted to pursue research and focus on macroalgal—or seaweed—evolutionary ecology.

I stayed at CSUN to complete my MS thesis research. At the time, there were few people doing population genetics incorporating the complications of macroalgal life cycles. I was awarded a Sally Casanova Pre-doctoral Fellowship that afforded me the opportunity to complete an internship with Dr. Myriam Valero at the Station Biologique de Roscoff, in France. I learned molecular techniques and wrote a PhD proposal with Dr. Valero.

In 2008, I moved from the metropolis of Los Angeles to the tiny town of Roscoff after our project was funded by the French government (ANR and CNRS)! I spent most of my time in Roscoff, but also did a co-tutelle (co-matriculation) PhD, so I spent time in Santiago, Chile working with my co-advisor Juan Correa. I earned my PhD from the Université de Pierre et Marie Curie (though I never actually set foot on the campus until four years after I defended my PhD), and from the Pontificia Universidad Católica de Chile in 2011. I completed

post-doctoral research at the Marine Biological Association of the United Kingdom, and at the College of Charleston before starting my own lab at the University of Alabama at Birmingham in 2016.

Looking back, the LA Zoo keeper course and my first internship in Roscoff changed my life! The keeper course was great fun, but I realized I didn't want to be a zoo keeper. Realizing what you don't want to do is as valuable as realizing what you want to do! In Roscoff, I discovered molecular ecology and realized I wanted to pursue a career in evolutionary ecology.

What are the most important skills and/or qualities for someone in your profession?

Self-motivation and self-discipline have been the most important skills during my career.

As a professor, my time is divided into research, teaching, and service. My research now involves more than my own projects—I mentor post-docs, graduate students, and undergraduate student research projects in my own lab and beyond. I typically teach one course per term—new courses require a lot more time to prepare than a course I've taught before, in which I just update content. My service includes reading and commenting on other scientists' articles, work for several scientific societies to which I belong, editing the American Genetics Association blog, etc.

Apart from our lab meetings and my lecture time slots, my time is largely my own to organize. This can be both exhilarating and overwhelming. There are parts of my job that I like a lot better than others. It takes motivation and discipline to get everything done. This is particularly true for writing. Writing is something I try to do every day, but I am not always successful at finding time. Now that my time is much more carved up than it was when I was a student, it's taken a lot of discipline and motivation to make time to write. It was hard at first, but now much easier to write for the spare 20 minutes here or 30 minutes there.

Learning motivation and discipline are key—especially when your job is largely self-directed and one in which you get out what you put in.

What do you wish you had known going into this profession?

I wish I had known it was an option! I wanted to write and travel—my job is largely those two things! I was very fortunate to study at Cal State Northridge with excellent faculty that provided all the unwritten rules to their students.

Are there many job opportunities in your profession? In what specific areas?

There are many opportunities once you have earned a PhD. The traditional route of becoming a professor at a university or a college with your own research lab is much more challenging than it was just a few decades ago. However, there are many other options for conducting research or doing outreach beyond an academic research career. Earning a PhD gives one many skills that are applicable to many professions.

How do you see your profession changing in the next five years, how will technology shift, and what skills will be required?

Research-wise, genomic sequencing technologies have dramatically changed since I did my first polymerase chain reaction (RCN). It is so much easier to obtain the types of molecular data we routinely generate in the lab. I anticipate this getting easier and easier. However, I

hope that natural history observations keep pace with all the fancy genomic tools we now have in our toolkit. Nevertheless, we generate tons of data, and we will need to expand our bioinformatic and computational expertise.

Teaching-wise, the COVID-19 pandemic shifted all our instruction online. I suspect courses including online content will continue. This requires a whole different approach to instruction and creating course content. I've adapted an online statistics course and think expanding our pedagogical skills for different types of instruction will be necessary in the coming years.

What do you enjoy most about your job? What do you enjoy least about your job?

Setting my own hours is what I enjoy most about my job. I can spend a day writing, or a day at the lab bench. Figuring out what I want to do on any given day is the best part.

I don't enjoy some of the administrative tasks I now have to complete, but that's a part of any job. Items need to be ordered. Budgets created and maintained. However, it's worth it for the trips we take for field work, seeing student projects come to fruition, and seeing our papers published!

Can you suggest a valuable “try this” for students considering a career in your profession?

Internships were incredibly important for me figuring out what I did and did not want to do. There are many paid internships through Research Experience for Undergraduates (REU) programs at universities throughout the United States. Sometimes labs advertise for student interns. Not only do you get experience doing research you may be interested in, but you also build important professional contacts. If you are interested in research, email a professor at your university or the author of a paper you read and liked. I love receiving emails from students interested in research and helping them find a way to pursue a research project!