Actuaries use advanced statistics and modeling software to forecast the cost and probability of an event.

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<th>Quick Facts: Actuaries</th>
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<td><strong>2012 Median Pay</strong></td>
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<td><strong>Entry-Level Education</strong></td>
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<td><strong>Work Experience in a Related Occupation</strong></td>
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**What Actuaries Do**

Actuaries analyze the financial costs of risk and uncertainty. They use mathematics, statistics, and financial theory to assess the risk that an event will occur and they help businesses and clients develop policies that minimize the cost of that risk. Actuaries’ work is essential to the insurance industry.

**Work Environment**

Most actuaries work full time in an office setting. Actuaries who work as consultants may frequently travel to meet with clients.

**How to Become an Actuary**

Actuaries need a bachelor’s degree and must pass a series of exams to become certified professionals. They must have a strong background in mathematics, statistics, and business.

**Pay**

The median annual wage for actuaries was $93,680 in May 2012.

**Job Outlook**

Employment of actuaries is projected to grow 26 percent from 2012 to 2022, much faster than the average for all occupations. Actuaries will be needed to develop, price, and evaluate a variety of insurance products and calculate the costs of new risks.

**Similar Occupations**
Actuaries produce charts, tables, and reports to explain their calculations.

Actuaries analyze the financial costs of risk and uncertainty. They use mathematics, statistics, and financial theory to assess the risk that an event will occur and help businesses and clients develop policies that minimize the cost of that risk. Actuaries’ work is essential to the insurance industry.

What Actuaries Do

Duties

Actuaries typically do the following:

- Compile statistical data and other information for further analysis
- Estimate the probability and likely economic cost of an event such as death, sickness, an accident, or a natural disaster
- Design, test, and administer insurance policies, investments, pension plans, and other business strategies to minimize risk and maximize profitability
- Produce charts, tables, and reports that explain calculations and proposals
- Explain their findings and proposals to company executives, government officials, shareholders, and clients

Most actuarial work is done with computers. Actuaries use database software to compile information. They use advanced statistics and modeling software to forecast the cost and probability of an event.

Actuaries typically work on teams that often include managers and professionals in other fields, such as accounting, underwriting, and finance. For example, some actuaries work with accountants and financial analysts to set the price for security offerings or with market research analysts to forecast demand for new products.

With experience, actuaries are often given supervisory roles. They are responsible for delegating tasks and providing advice to senior management. They also may be called on to testify before public agencies on proposed laws that affect their business, such as state laws placing caps on auto insurance prices.

Most actuaries work at insurance companies, where they help design policies and determine the premiums that should be charged for each policy. They must ensure that the premiums are profitable, yet competitive with other insurance companies.

Actuaries in the insurance industry typically specialize in a specific field of insurance, such as one of the following:

**Health insurance actuaries** help develop long-term care and health insurance policies by predicting expected costs of providing care under the terms of an insurance contract. Their predictions are based on numerous factors, including family history, geographic location, and occupation.

**Life insurance actuaries** help develop annuity and life insurance policies for individuals and groups by estimating, on the basis of
Actuaries help evaluate risk factors such as age, gender, and tobacco use, how long someone is expected to live.

**Property and casualty insurance actuaries** help develop insurance policies that insure policyholders against property loss and liability resulting from accidents, natural disasters, fires, and other events. They calculate the expected number of claims resulting from automobile accidents, which varies depending on the insured person’s age, sex, driving history, type of car, and other factors.

Some actuaries apply their expertise to financial matters outside of the insurance industry. For example, they develop investment strategies that manage risks and maximize returns for companies or individuals. Some actuaries help companies develop broad policies and strategies that assess risks across all areas of business, a practice known as enterprise risk management.

**Pension and retirement benefits actuaries** design, test, and evaluate company pension plans to determine if the expected funds available in the future will be enough to ensure payment of future benefits. They must report the results of their evaluations to the federal government. Pension actuaries also help businesses develop other types of retirement plans, such as 401(k)s, and healthcare plans for retirees. In addition, they provide retirement planning advice to individuals.

Some people with an actuarial science background may become postsecondary teachers.  

### Work Environment

Actuaries typically work on teams that often include managers and professionals in other fields, such as accounting, underwriting, and finance.

Actuaries held about 24,300 jobs in 2012. Actuaries typically work in an office setting. However, actuaries who work for consulting firms may need to travel frequently to meet with clients. Actuaries typically work on teams that often include managers and professionals in other fields, such as accounting, underwriting, and finance.

The industries that employed the most actuaries in 2012 were as follows:

<table>
<thead>
<tr>
<th>Industry</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insurance carriers and related activities</td>
<td>69</td>
</tr>
<tr>
<td>Professional, scientific, and technical services</td>
<td>17</td>
</tr>
<tr>
<td>Management of companies and enterprises</td>
<td>6</td>
</tr>
<tr>
<td>Funds, trusts, and other financial vehicles</td>
<td>3</td>
</tr>
<tr>
<td>Government</td>
<td>3</td>
</tr>
</tbody>
</table>

Some actuaries are considered consultants and provide advice to clients on a contract basis. Many consulting actuaries audit the work of internal actuaries at insurance companies or handle actuarial duties for insurance companies that are not large enough to keep their own actuaries on staff. Other consulting actuaries work for employee benefits firms. These firms design, analyze, and manage employee benefit programs such as employer-sponsored healthcare and retirement plans for companies.

### Work Schedules

Most actuaries worked full time, and about 3 out of 10 worked more than 40 hours per week in 2012.

### How to Become an Actuary
Actuaries need a bachelor’s degree and must pass a series of exams to become certified professionals.

**Education**

Actuaries must have a strong background in mathematics, statistics, and business. Typically, an actuary has an undergraduate degree in mathematics, actuarial science, statistics, or other analytical field. Coursework in calculus and business, such as accounting and management, is essential for students as well.

To become certified professionals, students must complete coursework in economics, applied statistics, and corporate finance. Students should also take classes outside of mathematics and business to prepare them for a career as an actuary. Coursework in computer science, especially programming languages, and the ability to use and develop spreadsheets, databases, and statistical analysis tools, are valuable. Classes in writing and public speaking will improve students’ ability to communicate in the business world.

Many students gain experience through internships. In some cases, employers offer their interns permanent jobs after they graduate.

Many employers expect students to have passed at least one of the initial actuary exams needed for professional certification (as described in the certification section) before graduation.

**Certifications**

Two professional societies—the Casualty Actuarial Society (CAS) and the Society of Actuaries (SOA)—sponsor programs leading to full professional status. The CAS and SOA offer two levels of certification: associate and fellowship.

The CAS certifies actuaries who work in the property and casualty field, which includes automobile, homeowners’, medical malpractice, and workers’ compensation insurance.

The SOA certifies actuaries who work in life insurance, health insurance, retirement benefits, investments, and finance. Most actuaries in the United States are certified by the SOA.

The main requirement for associate certification in each society is the successful completion of exams. The SOA requires that candidates pass five exams for associate (ASA) certification. The CAS requires that candidates pass seven exams for associate (ACAS) certification. In addition, both CAS and SOA require that candidates take seminars on professionalism. Both societies have mandatory e-learning courses for candidates.

It typically takes 4 to 6 years for an actuary to get an ACAS or an ASA certification because each exam requires hundreds of hours of study and months of preparation.
After becoming associates, actuaries typically take another 2 to 3 years to earn fellowship status.

The SOA offers fellowship certification in five separate tracks: life and annuities, group and health benefits, retirement benefits, investments, and finance/enterprise risk management. Unlike the SOA, the CAS does not offer specialized study tracks for fellowship certification.

Both the CAS and the SOA have continuing education requirements. Most actuaries meet this requirement by attending training seminars that are sponsored by their employers or the societies.

Training

Most entry-level actuaries start out as trainees. They are typically on teams with more experienced actuaries who serve as mentors. At first, they perform basic tasks such as compiling data, but as they gain more experience, they may conduct research and write reports. Beginning actuaries may spend time working in other departments, such as marketing, underwriting, and product development, to learn all aspects of the company’s work and how actuarial work applies to them.

Most employers support their actuaries throughout the certification process. For example, employers typically pay the cost of exams and study materials. Many firms provide paid time to study and encourage their employees to set up study groups. Employees usually receive raises or bonuses for each exam that they pass.

Licenses

Pension actuaries must be enrolled by the U.S. Department of Labor and U.S. Department of the Treasury’s Joint Board for the Enrollment of Actuaries. Applicants must meet certain experience requirements and pass two exams administered through the SOA to qualify for enrollment.

Advancement

Advancement depends largely on job performance and the number of actuarial exams passed. For example, actuaries who achieve fellowship status often supervise the work of other actuaries and provide advice to senior management. Actuaries with a broad knowledge of risk management and how it applies to business can rise to executive positions in their companies, such as chief risk officer or chief financial officer.

Important Qualities

Analytical skills. Actuaries use analytical skills to identify patterns and trends in complex sets of data to determine the factors that have an effect on certain types of events.

Communication skills. Actuaries must be able to explain complex technical matters to those without an actuarial background. They must also communicate clearly through the reports and memos that describe their work and recommendations.

Computer skills. Actuaries must know programming languages and be able to use and develop spreadsheets, databases, and statistical analysis tools.

Interpersonal skills. Actuaries serve as leaders and members of teams, so they must be able to listen to other people’s opinions and suggestions before reaching a conclusion.

Math skills. Actuaries quantify risk by using the principles of calculus, statistics, and probability.

Problem-solving skills. Actuaries identify risks and develop ways for businesses to manage those risks.

Pay

<table>
<thead>
<tr>
<th>Actuaries</th>
<th>Median annual wages, May 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuaries</td>
<td>$93,680</td>
</tr>
<tr>
<td>Computer and mathematical occupations</td>
<td>$76,270</td>
</tr>
</tbody>
</table>
The median annual wage for actuaries was $93,680 in May 2012. The median wage is the wage at which half the workers in an occupation earned more than that amount and half earned less. The lowest 10 percent earned less than $55,780, and the top 10 percent earned more than $175,330.

Most actuaries worked full time, and about 3 out of 10 worked more than 40 hours per week in 2012.

**Job Outlook**

Employment of actuaries is projected to grow 26 percent from 2012 to 2022, much faster than the average for all occupations. However, because it is a small occupation, the fast growth will result in only about 6,300 new jobs over the 10-year period. Actuaries will be needed to develop, price, and evaluate a variety of insurance products and calculate the costs of new risks.

In the health insurance industry, more actuaries will be needed to evaluate the effects that new healthcare laws, such as changes in coverage and expansion of customer pools, pose to insurance companies and to develop new products in response. Changes in healthcare laws will also boost demand for consulting actuaries who evaluate healthcare plans for companies.

More actuaries will be needed in property and casualty insurance to evaluate the risks to properties and communities vulnerable to more frequent and powerful storms. These actuaries will be needed not only to predict the likelihood of such storms, but also to calculate the costs of insuring these properties and help insurance companies create specialized policies and products.

More actuaries will also be needed to help companies manage their own risk, a practice known as enterprise risk management. Actuaries will help companies avoid, manage, and respond to any potential financial risks across all areas of their business operations. This analysis helps companies adjust their business or investment strategies to achieve economic returns and respond to new financial regulations and requirements.

**Job Prospects**

Actuaries should expect strong competition for jobs. Actuaries make up a small occupation, and the relatively high pay and comfortable working conditions make being an actuary a desirable career. Students who have passed at least two actuarial exams and have had an internship while in college should have the best job prospects for entry-level positions.
Employment projections data for Actuaries, 2012-22

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Actuaries</td>
<td>15-2011</td>
<td>24,300</td>
<td>30,600</td>
<td>6,300</td>
</tr>
</tbody>
</table>


Similar Occupations

This table shows a list of occupations with job duties that are similar to those of actuaries.

<table>
<thead>
<tr>
<th>OCCUPATION</th>
<th>JOB DUTIES</th>
<th>ENTRY-LEVEL EDUCATION</th>
<th>2012 MEDIAN PAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accountants and Auditors</td>
<td>Accountants and auditors prepare and examine financial records. They ensure that financial records are accurate and that taxes are paid properly and on time. Accountants and auditors assess financial operations and work to help ensure that organizations run efficiently.</td>
<td>Bachelor's degree</td>
<td>$63,550</td>
</tr>
<tr>
<td>Budget Analysts</td>
<td>Budget analysts help public and private institutions organize their finances. They prepare budget reports and monitor institutional spending.</td>
<td>Bachelor's degree</td>
<td>$69,280</td>
</tr>
<tr>
<td>Cost Estimators</td>
<td>Cost estimators collect and analyze data in order to estimate the time, money, materials, and labor required to manufacture a product, construct a building, or provide a service. They generally specialize in a particular industry or type of product.</td>
<td>Bachelor's degree</td>
<td>$58,860</td>
</tr>
<tr>
<td>Economists</td>
<td>Economists study the production and distribution of resources, goods, and services by collecting and analyzing data, researching trends, and evaluating economic issues.</td>
<td>Master's degree</td>
<td>$91,860</td>
</tr>
<tr>
<td>Financial Analysts</td>
<td>Financial analysts provide guidance to businesses and individuals making investment decisions. They assess the performance of stocks, bonds, and other types of investments.</td>
<td>Bachelor's degree</td>
<td>$76,950</td>
</tr>
<tr>
<td>Insurance Underwriters</td>
<td>Insurance underwriters decide whether to provide insurance and under what terms. They evaluate insurance applications and determine coverage amounts and premiums.</td>
<td>Bachelor's degree</td>
<td>$62,870</td>
</tr>
<tr>
<td>Mathematicians</td>
<td>Mathematicians use advanced mathematics to develop and understand mathematical principles, analyze data, and solve real-world problems.</td>
<td>Master's degree</td>
<td>$101,360</td>
</tr>
<tr>
<td>Personal Financial</td>
<td>Personal financial advisors give financial advice to people. They help with</td>
<td>Bachelor's degree</td>
<td>$67,520</td>
</tr>
</tbody>
</table>
Advisors

Postsecondary Teachers

Statisticians

Contacts for More Information

For more information about actuaries, visit
American Academy of Actuaries

For more information about actuaries in property and casualty insurance, visit
Casualty Actuarial Society

For more information about actuaries in life and health insurance, retirement benefits, investments, and finance/enterprise risk management, visit
Society of Actuaries

For more information about how to become an actuary, visit
Be an Actuary

For more information about pension actuaries, visit
American Society of Pension Professionals & Actuaries

O*NET

Actuaries

Suggested citation:

Publish Date: Wednesday, January 8, 2014