Statistics as a Profession

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A US survey of best and worst jobs puts statisticians in the top five alongside mathematicians, actuaries and software engineers.

The worst job was as a roustabout - oil rig or gas pipeline workers - who routinely work 12 hour shifts in tough conditions, according to the survey.

The survey by online jobs site www.CareerCast.com evaluated 200 professions based on pay, environment, hiring outlook, stress and physical demands using data from the US Bureau of Labor Statistics, the Census Bureau and trade association studies.

The top five typically pay more than twice as much as the lowest jobs. The survey evaluated software engineers as having the best jobs, because they enjoy a strong outlook for employment, low stress, few physical demands and good wages.
Biostatisticians in high demand

Analyze and interpret data, report results

Summary Report for:
15-2041.00 - Statisticians

Engage in the development of mathematical theory or apply statistical theory and methods to collect, organize, interpret, and summarize numerical data to provide usable information. May specialize in fields, such as bio-statistics, agricultural statistics, business statistics, economic statistics, or other fields.

Sample of reported job titles: Statistician, Statistical Analyst, Education Research Analyst, Research Associate, Clinical Biostatistics Director, Clinical Statistics Manager, Institutional Research Director, Program Research Specialist, Research Analyst, Statistical Reporting Analyst

Also see: Biostatisticians, Clinical Data Managers

Tasks

- Report results of statistical analyses, including information in the form of graphs, charts, and tables.
- Process large amounts of data for statistical modeling and graphic analysis, using computers.
- Identify relationships and trends in data, as well as any factors that could affect the results of research.
- Analyze and interpret statistical data to identify significant differences in relationships among sources of information.
- Prepare data for processing by organizing information, checking for any inaccuracies, and adjusting and weighting the raw data.
- Evaluate the statistical methods and procedures used to obtain data to ensure validity, applicability, efficiency, and accuracy.
- Evaluate sources of information to determine any limitations in terms of reliability or usability.
- Plan data collection methods for specific projects and determine the types and sizes of sample groups to be used.
- Design research projects that apply valid scientific techniques and use information obtained from baselines or historical data to structure uncompromised and efficient analyses.
- Develop an understanding of fields to which statistical methods are to be applied to determine whether methods and results are appropriate.
### Skills

<table>
<thead>
<tr>
<th>Importance</th>
<th>Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td>91</td>
<td>Mathematics — Using mathematics to solve problems.</td>
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<tr>
<td>81</td>
<td>Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.</td>
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<tr>
<td>78</td>
<td>Science — Using scientific rules and methods to solve problems.</td>
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<tr>
<td>59</td>
<td>Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.</td>
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<tr>
<td>56</td>
<td>Reading Comprehension — Understanding written sentences and paragraphs in work related documents.</td>
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<td>56</td>
<td>Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most appropriate one.</td>
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<tr>
<td>53</td>
<td>Active Learning — Understanding the implications of new information for both current and future problem-solving and decision-making.</td>
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<tr>
<td>53</td>
<td>Programming — Writing computer programs for various purposes.</td>
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<tr>
<td>53</td>
<td>Speaking — Talking to others to convey information effectively.</td>
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<tr>
<td>53</td>
<td>Writing — Communicating effectively in writing as appropriate for the needs of the audience.</td>
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<tr>
<td>53</td>
<td>Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.</td>
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<tr>
<td>53</td>
<td>Monitoring — Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.</td>
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<tr>
<td>53</td>
<td>Learning Strategies — Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things.</td>
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<tr>
<td>53</td>
<td>Time Management — Managing one’s own time and the time of others.</td>
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### Abilities

<table>
<thead>
<tr>
<th>Importance</th>
<th>Ability</th>
</tr>
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<tbody>
<tr>
<td>91</td>
<td>Mathematical Reasoning — The ability to choose the right mathematical methods or formulas to solve a problem.</td>
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<tr>
<td>81</td>
<td>Number Facility — The ability to add, subtract, multiply, or divide quickly and correctly.</td>
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<tr>
<td>78</td>
<td>Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).</td>
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<tr>
<td>75</td>
<td>Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.</td>
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<tr>
<td>75</td>
<td>Near Vision — The ability to see details at close range (within a few feet of the observer).</td>
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<tr>
<td>69</td>
<td>Category Flexibility — The ability to generate or use different sets of rules for combining or grouping things in different ways.</td>
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<tr>
<td>69</td>
<td>Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).</td>
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<tr>
<td>69</td>
<td>Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.</td>
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<tr>
<td>69</td>
<td>Oral Expression — The ability to communicate information and ideas in speaking so others will understand.</td>
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<tr>
<td>69</td>
<td>Written Comprehension — The ability to read and understand information and ideas presented in writing.</td>
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<td>65</td>
<td>Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.</td>
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<td>65</td>
<td>Selective Attention — The ability to concentrate on a task over a period of time without being distracted.</td>
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<td>63</td>
<td>Speech Clarity — The ability to speak clearly so others can understand you.</td>
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<tr>
<td>63</td>
<td>Speech Recognition — The ability to identify and understand the speech of another person.</td>
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<tr>
<td>63</td>
<td>Written Expression — The ability to communicate information and ideas in writing so others will understand.</td>
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<tr>
<td>60</td>
<td>Flexibility of Closure — The ability to identify or detect a known pattern (a figure, object, word, or sound) that is hidden in other distracting material.</td>
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Getting and analyzing data or information, problem solving

**Activity**

**Work Activities**

- **Analyzing Data or Information** — Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.
- **Interacting With Computers** — Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.
- **Getting Information** — Observing, receiving, and otherwise obtaining information from all relevant sources.
- **Processing Information** — Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.
- **Communicating with Supervisors, Peers, or Subordinates** — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.
- **Organizing, Planning, and Prioritizing Work** — Developing specific goals and plans to prioritize, organize, and accomplish your work.
- **Updating and Using Relevant Knowledge** — Keeping up-to-date technically and applying new knowledge to your job.
- **Interpreting the Meaning of Information for Others** — Translating or explaining what information means and how it can be used.
- **Making Decisions and Solving Problems** — Analyzing information and evaluating results to choose the best solution and solve problems.
- **Documenting/Recording Information** — Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form.

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**PhD (37%), MSc (33%), BSc (30%)**

**Education**

<table>
<thead>
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<th>Percentage of Respondents</th>
<th>Education Level Required</th>
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</thead>
<tbody>
<tr>
<td>37</td>
<td>Doctoral or professional degree</td>
</tr>
<tr>
<td>33</td>
<td>Master's degree</td>
</tr>
<tr>
<td>30</td>
<td>Bachelor's degree</td>
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</tbody>
</table>

This occupation may require a background in the following science, technology, engineering, and mathematics (STEM) educational disciplines:

- **Life Sciences** — Biostatistics
- **Mathematics** — Applied Mathematics; Business Statistics; Mathematical Statistics and Probability; Mathematics; Mathematics, General; Statistics

**Interests**

Interest code: CI

- **Conventional** — Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.
- **Investigative** — Investigative occupations frequently involve working with ideas, and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.
Statistical Consulting

The Industrial Statistician

- Process Improvements
- Lean/Six Sigma
- Sampling Plans
- Quality Control
- DOE
- SPC
- Scorecards
- Quality Reports
- Customer Surveys
- Employee Surveys
- Key Process Indicators


The Statistician in Financial Institutions

- Performance Management
- Market Research
- Risk Management
- Management Reports
- HR Management
- Scorecards
- Customer Surveys
- Employee Surveys
- Credit Scoring
- Operational Risk Management
- Asset Management
The Statistician in Healthcare and the Pharmaceutical Industry

Risk Management
Clinical Trials
Annual Reports
Research
IT Systems
Surveys
Quality Control
Regulatory Compliance
Patient Safety

The Management Consultant

Business Analytics
Strategy
Market Research
Customer Surveys
HR Management
Employee Surveys
IT Systems
Data Mining
The Statistician in Academia

How to make a living from Statistics?

- Choose an appropriate field to focus on
- Learn the field and its language
- Gain expertise in relevant statistical tools
- Build organizational experience
- Questions to consider:
  - Self employed or employee?
  - Alone or in a group?
- Keep the drive to make a difference
- Be ready to explain what you do, at different levels
Messages to Educators

Statistics needs interactions with other disciplines

Good problems drive good Statistics

Teaching Statistics requires continuous investments in the learning environment

Fun should be part of doing and learning Statistics

Ask customers to assess the quality of Statistical work

www.enbis.org