## Competencies

### Biostatistics – ScM

#### Department of Biostatistics

<table>
<thead>
<tr>
<th>Specific Competencies</th>
<th>Learning Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Design research studies of human health and disease</strong></td>
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</tr>
</tbody>
</table>
| Acquire knowledge and skills in research methodologies to collaborate with substantive investigators | 140.646-9  
140.651-4  
260.600  
306.665  
340.751-3  
550.860  
Biostatistics Grand Rounds and Seminar Series  
Thesis | Essentials of Probability and Statistical Inference I-IV  
Methods in Biostatistics I-IV  
Introduction to the Biomedical Sciences  
Research Ethics and Integrity  
Epidemiologic Methods 1-3  
Research Ethics  
Biostatistics Grand Rounds and Seminar Series  
Thesis | X  
X  
X |
| Choose appropriate health outcomes, risk factors, and covariates | 140.651-4  
260.600  
340.751-3  
Biostatistics Grand Rounds and Seminar Series  
Thesis | Methods in Biostatistics I-IV  
Introduction to the Biomedical Sciences  
Epidemiologic Methods 1-3  
Biostatistics Grand Rounds and Seminar Series  
Thesis | X  
X  
X |
| Make sample size estimates so that studies have sufficient power to achieve their aims | 140.646-9  
140.651-4  
Thesis | Essentials of Probability and Statistical Inference I-IV  
Methods in Biostatistics I-IV | X  
X  
X |

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<tbody>
<tr>
<td><strong>2. Gain facility with one or more statistical packages</strong></td>
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</tbody>
</table>
| Have facility with one or more major statistical packages (SAS, R, or Stata) | 140.646-9  
140.651-4  
140.776  
Thesis | Essentials of Probability and Statistical Inference I-IV  
Methods in Biostatistics I-IV  
Statistical Computing | X  
X  
X |
### Competencies

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#### 3. Design and implement tabular and graphical displays if quantitative information

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<th>Evaluation Opportunities</th>
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</thead>
</table>
| Use statistical software to generate efficient and appropriate visual and tabular displays of data | 140.646-9  
140.651-4  
140.776  
Thesis | Essentials of Probability and Statistical Inference I-IV  
Methods in Biostatistics I-IV  
Statistical Computing | X  
X  
X |
| Recognize good graphical displays and poor graphical displays of data | 140.651-4  
340.751-3  
Biostatistics Grand Rounds and Seminar Series  
Thesis | Methods in Biostatistics I-IV  
Epidemiologic Methods 1-3 | X  
X  
X |

#### 4. Draw inferences from quantitative data

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<tr>
<th>Specific Competencies</th>
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</tr>
</thead>
</table>
| Correctly use biostatistical reasoning and methods | 140.646-9  
140.651-4  
Biostatistics Grand Rounds and Seminar Series  
Thesis | Essentials of Probability and Statistical Inference I-IV  
Methods in Biostatistics I-IV | X  
X  
X |
| Use linear and generalized linear models for regression analysis | 140.646-9  
140.651-4  
Biostatistics Grand Rounds and Seminar Series  
Thesis | Essentials of Probability and Statistical Inference I-IV  
Methods in Biostatistics I-IV | X  
X  
X |
| Present oral and written reports of results of statistical analyses | 140.646-9  
140.651-4  
Biostatistics Grand Rounds and Seminar Series  
Thesis | Essentials of Probability and Statistical Inference I-IV  
Methods in Biostatistics I-IV | X  
X  
X |
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### 5. Perform a major statistical analysis to address a public health or statistical research question

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<tr>
<th>Specific Competencies</th>
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</thead>
<tbody>
<tr>
<td>Frame the scientific question in terms of a statistical model</td>
<td>140.646-9, 140.651-4, 340.751-3, Biostatistics Grand Rounds and Seminar Series Thesis</td>
<td>Course Work Exam Written Comps Thesis</td>
</tr>
<tr>
<td>Estimate unknown parameters and confidence intervals and make appropriate tests of null hypotheses</td>
<td>140.646-9, 140.651-4, 340.751-3, Biostatistics Grand Rounds and Seminar Series Thesis</td>
<td>Course Work Exam Written Comps Thesis</td>
</tr>
<tr>
<td>Correctly interpret statistical findings in scientific terms</td>
<td>140.646-9, 140.651-4, 340.751-3, Biostatistics Grand Rounds and Seminar Series Thesis</td>
<td>Course Work Exam Written Comps Thesis</td>
</tr>
<tr>
<td>Summarize findings in written or oral presentations</td>
<td>140.646-9, 140.651-4, 340.751-3, Biostatistics Grand Rounds and Seminar Series Thesis</td>
<td>Course Work Exam Written Comps Thesis</td>
</tr>
</tbody>
</table>
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#### 6. Use statistical reasoning and theory to deal effectively with non-standard statistical problems

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<tbody>
<tr>
<td>Solve new problems by analogy to other problems with known solutions</td>
<td>140.646-9, 140.651-4 Essentials of Probability and Statistical Inference I-IV Methods in Biostatistics I-IV</td>
<td>X X X</td>
</tr>
<tr>
<td></td>
<td>Biostatistics Grand Rounds and Seminar Series Thesis</td>
<td></td>
</tr>
<tr>
<td>Determine statistical properties of a novel estimator using delta method or nonparametric methods such as bootstrapping</td>
<td>140.646-9, 140.651-4 Essentials of Probability and Statistical Inference I-IV Methods in Biostatistics I-IV</td>
<td>X X X</td>
</tr>
<tr>
<td></td>
<td>Biostatistics Grand Rounds and Seminar Series Thesis</td>
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#### 7. Assist statistical researchers in the conduct of original, methodologic research

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</thead>
<tbody>
<tr>
<td>Illustrate statistical methods and theory with analysis of public health data</td>
<td>Thesis</td>
<td>X</td>
</tr>
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</table>
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**8. Develop a public health perspective on research**

<table>
<thead>
<tr>
<th>Specific Competencies</th>
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<th>Evaluation Opportunities</th>
</tr>
</thead>
</table>
| Identify the development of human health across the lifespan; the major root and proximate cause of morbidity and mortality; and the most effective strategies for promoting health and preventing disease and disability in a population | 260.600 550.865 | Introduction to the Biomedical Sciences  
Public Health Perspectives on Research | X |
| Identify the scientific methods used in public health research and practice | 260.600 340.751-3 550.865 Thesis | Introduction to the Biomedical Sciences  
Epidemiologic Methods 1-3  
Public Health Perspectives on Research | X | X | X |
| Effectively translate statistical ideas and concepts to public health collaborators | 140.651-4 260.600 306.665 340.751-3 550.860 550.865 Thesis | Methods in Biostatistics I-IV  
Introduction to the Biomedical Sciences  
Research Ethics and Integrity  
Epidemiologic Methods 1-3  
Research Ethics  
Public Health Perspectives on Research | X | X |