

Department/Academic Unit: Public Health Sciences Degree Program: PhD Epidemiology

Degree Level Expectations, Learning Outcomes, Indicators of Achievement and the Program Requirements that Support the Learning Outcomes

<p>A. DLE – PhD Program</p>	<p>Learning Outcomes (program specific)</p> <p>This degree is awarded to students who demonstrate:</p>	<p>Relevant Courses, Academic Requirement (requirements that contribute to the achievement of learning outcomes and degree expectations</p>	<p>Indicators of Achievement As evidenced by:</p>
<p><i>Depth and breadth of knowledge</i></p>	<p>1. Understanding and mastery of basic through advanced biostatistics methods and concepts, as applied to the field of epidemiology</p> <p>Descriptive statistics, measures of occurrence, measures of effect, attributable risk, standard error and confidence interval estimation, significance tests, diagnostic tests, power and sample size determination, samplings methods, categorical analysis, stratified analyses, matched analyses, clustering, analysis of variance, survival analysis, regression models for different types of outcome data (Multiple, logistic, negative binomial, Poisson, Cox), selected advanced analytical topics (eg. Bayesian statistics, theory of statistical model development, assessment of confounding and interaction, mediation analyses, bias analysis, missing data analysis and imputations, structural equation modelling, factor analysis, multi-level modelling)</p>	<p>EPID 901 Advanced Epidemiology</p> <p>EPID 823 Advanced Biostatistics,</p> <p>Plus course electives advised by supervisory committee</p> <p>EPID 999 Thesis, including outline, protocol, and final dissertation</p> <p>Regular participation in departmental seminar series and thesis proposals and defences</p>	<p>Successful completion of assignments, quizzes, projects and examinations in advanced biostatistics (eg. EPID 823) and the statistical components of advanced epidemiology courses (eg. EPID 901)</p> <p>Demonstration of mastery of core concepts during the comprehensive examination, the writing and presentation of the PhD thesis outline and proposal and conduct of the thesis. This can include acceptance of quantitative manuscripts in peer reviewed journals associated with the thesis</p>

	<p>2. Understanding and mastery of basic through advanced methods of descriptive and analytical epidemiological study designs</p> <p>Appropriate study designs to describe health problems and phenomena; to investigate causal and prognostic factors (personal, social or environmental); and to evaluate the interventions and outcomes of treatment/interventions</p> <p>Includes: descriptive and surveillance designs; analytic designs (ecologic, case-control and nested case-control; retrospective and prospective cohort); experimental designs (randomized trials, randomized community trials), meta-analyses, and new and emerging designs (eg. Case-cohort)</p> <p>3. Understanding and mastery of concepts surrounding the design of epidemiological studies</p> <p>Core epidemiological concepts, including but not limited to: three major types of bias affecting study validity (selection, information and confounding); precision and the role of chance; statistical significance vs public health/clinical significance; matched vs unmatched designs; mediation, interactions and effect modification; external validity, study power and efficiency; models of disease causation;</p>		<p>Successful completion of assignments, quizzes, projects and examinations in intermediate and advanced epidemiology courses (eg. EPID 901)</p> <p>Demonstration of mastery of core concepts during the comprehensive examination, the writing and presentation of the PhD thesis outline and proposal, and conduct of the thesis</p> <p>Further demonstration of this mastery in teaching opportunities (lectures, seminars, teaching assistantship) , written and oral scientific communications and associated knowledge translation activities</p> <p>Successful completion of assignments, quizzes, projects and examinations in intermediate and advanced epidemiology courses (eg. EPID 901)</p> <p>Demonstration of mastery of core concepts during the comprehensive examination, the writing and presentation of the PhD thesis outline and proposal ,and conduct of the thesis</p> <p>Further demonstration of this mastery in teaching opportunities</p>
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	<p>conceptual and theoretical frameworks applied to the design of epidemiological studies</p> <p>4. Detailed and comprehensive knowledge of content as well as the specialized methods used within the thesis speciality area</p> <p>Includes core mastery of the substantive epidemiology of topic area for thesis; theoretical frameworks that underlie analyses in this field; as well as specialized statistical and non-statistical methods that support the thesis in this field</p> <p>5. Appreciation of the importance of non-epidemiological methods (eg. Psychometrics, qualitative enquiry, mixed methods) that have potential application to epidemiology</p> <p>Understanding of the role and appropriate application of non-epidemiological designs, to complement traditional epidemiological methods</p>		<p>(lectures, seminars, teaching assistantships), written and oral scientific communications and associated knowledge translation activities</p> <p>Demonstrated mastery of substantive areas of interest in the comprehensive exam, as well as the written thesis protocol, the final thesis document and the oral defence of these documents</p> <p>Ability to communicate this role and application, as applicable, in a cogent scientific manner</p>
<p><i>Research and Scholarship</i></p>	<p>6. Ability to critically read and appraise the epidemiological research literature, based upon core descriptive, analytic and experimental designs</p>	<p>EPID 901 Advanced Epidemiology</p> <p>EPID 823 Advanced Biostatistics</p> <p>Plus 899, including outline, protocol and final dissertation</p>	<p>Demonstration of abilities to conduct peer review of scientific manuscripts based upon various epidemiological study designs</p>

	<p>7. Capability to define and refine epidemiological research questions and hypotheses</p> <p>8. Use of appropriate techniques in data collection and associated field methods</p> <p>9. Use of appropriate techniques and software for data management</p> <p>10. Use of appropriate technique and software for epidemiological/ biostatistical analyses</p>	<p>Regular participation in departmental seminar series, and thesis proposals and defences</p> <p>SGS 804 Certification in ethics for research involving human subjects (School of Graduate Studies online course)</p>	<p>Demonstration of abilities to appraise the merits and weaknesses of bodies of literature related to the core thesis topic</p> <p>Development of scientific protocols for courses, granting agencies and the PhD thesis</p> <p>Completion of course components devoted to sampling, data abstraction, and data collection</p> <p>Successful completion of comprehensive exam, especially components related to such methods</p> <p>Demonstration of mastery of these techniques in the thesis outline, proposal and final dissertation</p> <p>Successful completion of course assignments involving computerized data management</p> <p>Successful completion of all data management tasks in PhD thesis</p> <p>Successful completion of course assignments involving such analyses</p> <p>Successful completion of design and</p>
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<p><i>Application of Knowledge</i></p>	<p>1. Specific abilities to apply basic through advanced biostatistical methods</p> <p>Describing categorical and continuous data</p> <p>Comparison of two or more groups (independent or matched) where the measurements are categorical, ordinal, continuous, or censored survival data</p> <p>Examine the effects of one or more explanatory variables on a categorical, discrete, continuous or censored dependent variable</p> <p>Examine the appropriateness of underlying assumptions taking corrective actions where indicated and interpreting the fitted model in relation to the objectives of the analysis</p> <p>Calculate sample size or power for a given study design involving one or two more groups</p> <p>Advanced skills using statistical packages, including importing/exporting data, selecting appropriate forms of analysis, performing analysis and interpreting the output in order to demonstrate the other learning outcomes</p>	<p>EPID 901 Advanced Epidemiology EPID 823 Advanced Biostatistics, plus course electives advised by supervisory committee</p> <p>EPID 999 Thesis, including outline, protocol and final dissertation</p> <p>Regular participation in departmental seminars, and thesis proposal/defences</p>	<p>EPID 823 assignments and exam, as applicable</p> <p>Biostatistical components of the comprehensive exam</p> <p>Demonstrated mastery of concepts in the thesis protocol and final dissertation</p>
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	<p>2. The ability to calculate epidemiological measures</p> <p>Measures of disease occurrence (eg. Incidence) and other population health indicators (infant versus perinatal mortality rate, life expectancy), measures of association between exposures and disease (eg. relative risk) and measures of public health impact (eg. Population attributable risk), patterns of disease occurrence (eg. trends, variations)</p> <p>Age-adjusted mortality and morbidity rates using the direct and indirect methods</p> <p>Validity of a screening and/or diagnostic test (sensitivity, specificity, positive predictive value, likelihood ratio etc.)</p> <p>3 The ability to apply appropriate study designs for descriptive and analytical epidemiology</p> <p>See above under learning outcomes</p>		<p>EPID 901 assignments and seminars, as applicable</p> <p>Epidemiological components of the comprehensive exam</p> <p>Demonstrated mastery of concepts in the thesis protocol and final dissertation</p> <p>As above</p>
<p><i>Professional Capacity/autonomy</i></p>	<p>1. Teaching skills through seminar, class and other presentations</p> <p>2. Mentoring skills through collaboration with other students and research project personnel</p>	<p>EPID 901 Advanced Epidemiology</p> <p>EPID 823 Advanced Biostatistics, plus course electives advised by supervisor committee</p> <p>EPID 999 Thesis, including outline, protocol, and final dissertation</p>	<p>Course requirements for core and elective courses</p> <p>Participation in department seminars</p> <p>TA evaluation reports (where applicable)</p> <p>Evaluation from thesis supervisors</p>

	<p>3. Awareness of ethics in research</p> <p>4. Ability to disseminate research findings through publications in credible scholarly journals</p> <p>5. Ability to facilitate group/team work and operate effectively as a member of a group or team</p> <p>Elicit problems and issues, frame problems in scientific terms, advise on appropriate research methods, advise on methods of data collection and analysis (including statistical analyses), interpret findings</p> <p>6 Decision-making skills (through analytical, critical thinking and problem-solving)</p>	<p>Regular participation in departmental seminar series, and thesis proposals and defences</p>	<p>Ethics approval obtained for thesis</p> <p>Certification of ethics training from School of Graduate Studies</p> <p>Manuscripts submitted for publication as part of a manuscript-based thesis (as applicable)</p> <p>Successful completion of core and elective courses requiring group work</p> <p>Ongoing participation in research laboratory (or equivalent) for thesis-based research (as applicable)</p> <p>Evaluation from thesis supervisor(s) and course instructors</p>
<p><i>Communication Skills</i></p>	<p>The ability to describe theories and methods of knowledge translation and dissemination</p>		<p>Successful completion of core and elective courses with modules/classes in knowledge translation</p> <p>Development of a plan for knowledge transfer and dissemination as part of the PhD thesis (as applicable)</p>