ASPH/CDC/CSTE

Applied Epidemiology Competencies Curriculum and Practicum Project

Task Force Report

Washington, DC

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“On the local public health level, the advantages of the applied epidemiology competencies are their comprehensiveness and ability to be evaluated. They may be useful in the typing of public health resources for emergency preparedness response. I would like to see training and education programs indicate the applicable competencies to enable the public health professionals to improve their skills in a particular tier or advance to a higher tier.”

From Dr. Margo Erme, Akron Health Department

Table of Contents

Executive Summary **4**
Background and Rationale: **5**
Methods **6**
Results **7**
Limitations **10**
Comments and Recommendations **11**
Appendix 1 ..... **13**
Appendix 2 ..... **17**
Appendix 3 ..... **20**
Appendix 4 ..... **24**
Appendix 5 ..... **28**
Appendix 6 ..... **32**
Appendix 7 ..... **34**

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Executive Summary

In this report, the ASPH/CDC/CSTE Applied and Epidemiology Competencies Curriculum and Practicum Task Force examined the CDC/CSTE Competencies for Applied Epidemiologists in Governmental Public Health Agencies (AECs) for the two-fold purpose of: reviewing sample curricula explicitly mapped to appropriate CDC/CSTE AECs for Tier 1 professionals and producing guidelines and examples for how to develop practicums that map to some of the AECs. The report aims to inform the faculty and administration at schools of public health about the AECs and to provide corresponding analyses and recommendations to stimulate the development and enhancement of curricula focused on applied epidemiology. The report and its appendices describe the background, methods, results, and limitations of the analysis of a sampling of graduate, accredited public health institutions. It concludes with the following comments and recommendations:

- Students who graduate with an MPH that carries a concentration or certificate in applied epidemiology for governmental public health can be expected to demonstrate acquisition of most or all Tier 1 AECs prior to the award of their degree; and,
- Governmental public health agencies and schools and programs in public health that offer a concentration or certificate in applied epidemiology should collaborate to develop minimum content and national standards for the practicum component of applied epidemiology curricula.

Background and Rationale:

The Centers for Disease Control and Prevention (CDC) and the Council of State and Territorial Epidemiologists (CSTE) developed competencies for Applied Epidemiologists in Governmental Public Health Agencies (Applied Epidemiology Competencies – AECs) to improve the practice of epidemiology within the public health system. These competencies were designed to: 1) define the discipline of applied epidemiology, and 2) describe the knowledge and skills useful for a range of applied epidemiology positions in governmental public health agencies, from entry level (Tier 1) to mid-level (Tier 2) to senior epidemiology management (Tier 3a) to scientist positions (Tier 3b), with the goal of expanding and enhancing the epidemiology workforce capacity.

As articulated in the Executive Summary of the document describing these competencies, (www.cdc.gov/od/owcd/cdd/aec/ and www.cste.org/competencies.asp) the "AECs were developed within the framework of the Core Competencies for Public Health Professionals – a product of the Council on Linkages Between Academia and Public Health Practice – and thus are consistent with the larger field of public health practice." These competencies are targeted toward practitioners, employers, and educators and focused on those choosing to work in governmental public health agencies.

Following completion of the competencies, officials at CDC/CSTE and leadership at the Association of Schools of Public Health (ASPH) held discussions regarding the use of these new competencies in academic programs in the ASPH-member schools of public health. These discussions led to a project, with funding provided to ASPH from CDC via CSTE, to examine the competencies and: 1) review sample curricula that are explicitly mapped to appropriate CDC/CSTE AECs, for Tier 1 professionals (recent MPH graduates majoring in epidemiology), and 2) produce guidelines and examples for how to develop practicums that map to some of the AECs.

ASPH formed a Task Force drawn from members of the ASPH Epidemiology and Biostatistics Council and volunteers who had been engaged in the development of the AECs as well as those who had led workgroups in the recent ASPH core MPH competency project.

The following is a list of Task Force members:

- **Sylvia Furner** - University of Illinois-Chicago (UIC) School of Public Health, chair;
- **James Gale** - University of Washington School of Public Health and Community Medicine;
- **Louise-Anne McNutt** - State University of New York (SUNY) at Albany School of Public Health;
- **Kathleen Miner** - Emory University Rollins School of Public Health;
- **Michael Moser** - Akron Health Department and Northeastern Ohio University College of Medicine;
- **Arthur Reingold** - University of California at Berkeley School of Public Health;
- **Erica Smith** - who recently completed her MPH at UIC, contributed as a research assistant; and,
- **Elizabeth Weist** - ASPH, who served to staff the project.

Input was also provided at various times from:

- **Matt Boulton** - University of Michigan School of Public Health, who served as a convener of the CDC/CSTE Panel that developed the AECs;
- **Susan Tonascia** - Johns Hopkins Bloomberg School of Public Health, who provided information on the school's applied epidemiology curriculum; and,
- **Lorraine Alexander** - University of North Carolina at Chapel Hill School of Public Health, who provided information on the school's field epidemiology certificate.

This project is timely as ASPH had recently completed the development of a comprehensive list of MPH core competencies designed to serve as a resource or guide for the basic knowledge, skills, and characteristics expected for students graduating with a MPH degree (ASPH Education Committee, Master's Degree in Public Health Core Competency Development Project, Version 2.3, August 2006, Washington, DC, 2006). The Task Force viewed development of a curriculum for a sub-specialty such as applied epidemiology as an opportunity to move applied epidemiology forward and provide an example of how the general MPH competencies and sub-specialty competencies can be integrated into a masters-level public health graduate curriculum.

Task Force review of the CDC/CSTE Tier 1 ACEs highlighted the multi-disciplinary nature of applied epidemiology in the governmental public health setting and made it clear that curriculum mapping for an applied epidemiology track could not be limited to epidemiology coursework *per se*. The skills and knowledge needed for applied epidemiology practice in a governmental public health agency cross over to many core competencies domains besides epidemiology and most certainly cross over to the practicum experience. Further, as was demonstrated in the Task Force's *Public Health Reports* paper (L McNutt, SE Furner, M Moser, EM Weist. Applied Epidemiology Competencies for Governmental Public Health Agencies: Mapping Content Curriculum and the Development of New Curriculum. Public Health Reports. 2008; 123:1:13-18, pp. 13-18) in Table 1, there are many examples of Tier 1 and ASPH MPH competencies that clearly overlap.

Methods

The Task Force held a series of in-person and/or teleconference discussions over an 18-month period. Outreach to others beyond the Task Force was accomplished with the assistance of ASPH staff and through opportunities to present the work of the Task Force to a broad audience at the annual ASPH meetings in 2006 and 2007 as well as at the meeting of the ASPH Education Committee in May, 2007.

Task Force members created and distributed a matrix of the Tier I Analysis and Assessment AECs to the participant schools to determine coverage of the particular competencies. The participating schools evaluated the content of the core SPH courses as well as courses in the curriculum for students "majoring" in epidemiology. Further the participants evaluated whether the competency was within the context of the practicum experience. Because there was variability in the level of coverage of a competency in a particular course, coverage levels were incorporated as follows:

X = Course covered topic, students should have good understanding of the competency
I = Course introduced topic, lecture devoted to the topic and possibly a homework assignment
T = Course touched on topic, but no lengthy discussion
S = Some students will get coverage in practicum/field experience and/or capstone

Results

Mapping of Curricula to Competencies:

The mapping of courses to AECs revealed, as expected, considerable variation in current coverage of the competencies and sub-competencies among the participating ASPH-member schools of public health. The analysis allowed the Task Force to determine which competencies and sub-competencies were covered through coursework and which competencies were covered through the practicum experience. These results were presented in a matrix (*See Appendix 1: Coverage of Applied Epidemiology Competencies in Select Schools of Public Health*). Further the Task Force was able to determine, based on the sample of selected schools, which competencies were either not covered in coursework or only touched on in the coursework. These competencies were primarily in the realm of surveillance or evaluation activities and various "hands-on" experiences, many of which may be acquired through the practicum *(See Appendix 2: Applied Epidemiology Competencies "Minimally Covered" in Coursework and Appropriate for Coverage in Practicum).*

A. Coursework

As the matrix (Appendix 1) shows, the three competencies that most extensively covered by coursework are:

C (Identify acute and chronic conditions or other adverse outcomes in the population),
F (Analyze data from an epidemiologic investigation or study), and
G (Summarize results of the analysis and draw conclusions).

Further, within **A** (Recognize the existence of a public health problem) two sub-competencies are rather extensively covered in coursework (1a. list relevant data and information sources within and outside the public health system and 1b. Seek assistance synthesizing existing data and information into a determination of expected and observed numbers of cases or outcomes in a population). Also within **B** (Conduct surveillance activities) four sub-competencies are also rather extensively covered in coursework (2a. Create case definition(s) based on person, place and time; 2g. Recognize potential uses of data to inform surveillance systems; 3a. Define objectives and uses of surveillance system, and 3e. Classify potential cases according to whether they meet the case definition).

B. Practicum

A practicum is commonly defined as a hands-on experience that involves supervised practical application of previously studied theory. The goal of most MPH practicums is to provide MPH students a supervised opportunity to use knowledge and skills acquired in their academic program as well as to

develop and apply competencies that are not fully developed in classroom activities. As schools of public health, and other MPH-granting institutions, have moved to incorporate competencies into their curriculum planning and course syllabi, practicums offer opportunities for evaluating these competencies. It is the assessment of this Task Force that the practicum is an essential component of any curriculum intended to qualify students for an MPH and, thus, the Task Force has identified guidelines for practicums drawn from the sample schools' experiences in this area *(See Appendix 3: Practicum Guidelines).*

With publication of the AECs, schools of public health and MPH programs that want to offer a concentration or certificate in applied epidemiology for governmental public health have a valuable benchmark for curriculum and practicum planning. The AECs are an important tool for further refinement of goals and deliverables of a practicum undertaken in fulfillment of the requirements of an applied epidemiology curriculum.

The Task Force believes that national standards for practicums to satisfy requirements for an MPH concentration or certificate in applied epidemiology for governmental public health are desirable to build credibility for these academic credentials. The ASPH Council of Public Health Practice Coordinators similarly calls for establishing "protocols to ensure consistency of the range of practice-based teaching modalities offered in the classroom and field" (Association of Schools of Public Health, Council of Public Health Practice Coordinators/W.K. Kellogg Foundation/Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services. Demonstrating Excellence in Practice-Based Teaching for Public Health. October 2004. Washington, DC, 2004). Particularly for MPH graduates who may seek employment at a distance from their school of public health or MPH program, it will be important to be able to cite an external standard of achievement. Practicum arrangements in many schools of public health and MPH programs currently emphasize flexibility in practicum design and assign considerable responsibility to students to identify, arrange, and complete their practicums. However, it is the judgment of the Task Force that establishing a national standard for AEC practicums should be completed/developed in stages. A staged approach will also allow development of better data about AEC practicums upon which to base standards development.

Special Educational Opportunities for Achieving AECs

A. Applied Epidemiology Track/Concentration *– an Example from Johns Hopkins University Bloomberg School of Public Health (JHBSPH)*

The JHBSPH Department of Epidemiology has a track/concentration in Applied Epidemiology. As stated in their website (www.jhsph.edu), "The focus of this sequence is on the application of epidemiology to public health problems, as utilized in health departments, health interventions, and health policy. In this course sequence, we expect students to develop competencies in epidemiology, communications, leadership, and analytic assessment skills." Beyond a basic principles of epidemiology course and a statistical methods in public health course, these students may take a two-term sequence of courses: Observational Epidemiology or "Applied Epidemiology 1" and Applied Epidemiology or "Applied Epidemiology 2" (*See Appendix 4 JHU "Applied Epidemiology 1" and Appendix 5 JHU "Applied Epidemiology 2").*

B. Applied Epidemiology Certificate

The Task Force discussed the possibility of a certificate in Applied Epidemiology as a way to gain the AECs. The UNC School of Public Health offers a twelve-credit hour (Four courses- Introduction to Epidemiology for Public Health, Field Epidemiology Methods, Introduction to Methods in Infectious Disease Epidemiology, and Fundamentals of Public Health Surveillance) Certificate in Field Epidemiology in an online format (*See Appendix 6: Certificate in Field Epidemiology*). The primary intent of this certificate is to provide competency in addressing urgent public health problems, including outbreak investigations.

The curriculum for this certificate has been mapped to the Tier 1 AECs and while there is substantial coverage of the AECs, a few competencies/sub-competencies were not covered, as was true for the MPH programs described above. Some of the sub-competencies in the area of surveillance and evaluation were not covered. In addition, the certificate courses did not map well in the sub-domain D. "Apply principles of good ethical/legal practice as they relate to study design and data collection, dissemination and use." Given that approximately 50% of the students pursuing this certificate come from the public health practice community, it is entirely possible that they have gained these competencies through their work experience. For those students who do not have such an experience base, planned future enhancements to this certificate program includes adding content to each of the four courses that will address the deficiencies noted above.

Guidelines for Practicum Development

" … the Task Force recommends that all practicums intended to partially satisfy requirements for an MPH concentration or a certificate in applied epidemiology for governmental public health be formally mapped to the CDC/CSTE Tier I AECs…"

Recommendations for the minimum content of an AEC practicum could take a number of forms. One approach proposed during the deliberations of this Task Force is to specify a minimum number of AEC competencies to be addressed during the practicum and to require that this number be drawn from all eight of the major Tier I competency domains. Advantages of this approach would be the external credibility associated with satisfactory demonstration of a significant fraction of Tier 1 AECs in a government public health agency setting, integrated with flexibility to tailor the competency mix to the setting of an individual practicum. An alternative approach that was discussed is to specify key Tier I competencies that should be addressed in every AEC practicum. This has the advantage of standardizing certain key elements of the AEC practicum across many institutions. However, the content of otherwise suitable practicums in governmental public health agencies varies sufficiently so that it is difficult to visualize a single standard for content that would fit all situations. The net effect of standardization to this level would likely be to limit the number of practicum experiences that could be used to satisfy the requirements for an AEC concentration or certificate. The Task Force therefore recommends caution with respect to this approach. A feature of any approach should be use of the AEC practicum to address AEC competencies that were not well covered in the student's MPH coursework.

As a first step, the Task Force recommends that all practicums intended to partially satisfy requirements for an MPH concentration or a certificate in applied epidemiology for governmental public health be formally mapped to the CDC/CSTE Tier I AECs by the student with the assistance of their faculty supervisor and the principal practicum site preceptor. The student, faculty supervisor, and preceptor should select a subset of the AEC competencies to be demonstrated and evaluated during the practicum. A formal record of the mapping, the AEC competencies selected for attention, and the evaluation of the student's mastery of these competencies should be generated and maintained by the institution. During this initial phase, the Task Force encourages schools and programs offering practicums to satisfy requirements for an AEC concentration or certificate to include assessment of at least one competency from each of the eight major competency domains of the Tier I AECs in the practicum plan. Work undertaken by this Task Force has identified a list of AEC competencies that are typically not covered well or at all in MPH coursework and that lend themselves to coverage during the practicum experience (*See Appendix 2*).

As a general rule, the Task Force believes it desirable that a practicum intended to satisfy the requirements for a concentration or certificate in applied epidemiology for governmental public health should take place in a governmental public health agency. While state and local public health departments are the usual governmental public health agencies hosting such practicums, the Task Force believes that there are other governmental health agencies at the local, regional, state, or federal level that may be suitable locations for such experiences. At the current time, some MPH-granting institutions consider it the student's responsibility to find and arrange MPH field experiences (i.e., practicum). As national recommendations are developed for practicums that will fulfill the requirements for an MPH concentration or certificate in applied epidemiology in governmental public health agency settings, it will be important to translate these recommendations to guidance for students and faculty who are responsible for finding and arranging these practicums.

Limitations

It is important to comment on the limitations of this analysis. First, there are only data from five out of the 40 accredited, graduate schools of public health. Four of the participants are from public institutions and one is from a private institution. Thus, there may well be major differences between the information depicted herein and what might be demonstrated with a larger representation of SPHs.

Second, the methodology for assessment of coverage of the AECs is an approximation. The use of coverage levels, as described earlier in this document, may not prove to be a fully accurate representation of the depth of coverage of the competency. Questions remain certainly about what amount of time is sufficient to ensure the students master a particular competency.

Third, it is important to note that in this analysis of courses, two of the five SPHs, when creating their entries on the matrix, included an evaluation of the core MPH courses in addition to the courses specific to epidemiology and the practicum. The remaining three focused solely on course offerings in epidemiology and the practicum.

"The establishment of the AECs is a welcomed development for public health agencies. Now for the first time, governmental public health epidemiologists have a defined discipline provided by the competencies framework, outlining the skills governmental epidemiologists should have to be effective in their profession, from entry-level to advanced epidemiologists."

James M Crutcher, "Applied Epidemiology Competencies: Perspectives of a State Health Officer," *Public Health Reports*, 2008 Supplement 1, Volume 123, 11-12

Comments and Recommendations

The Task Force first wants to congratulate the CDC/CSTE panel for developing and distributing these competencies and for providing opportunities to develop and/or support programs that train applied epidemiologists. The process they undertook was a rigorous, valid, and credible process that, while generated from outside of the academic institutions that provide the education, incorporated input from public health faculty and practitioners alike.

Second, the Task Force believes it has an important responsibility to inform the faculty and administration at all schools of public health about these competencies and that these analysis and recommendations will provide impetus for the development of curricula focused on applied epidemiology. The Task Force believes that many schools and programs that may wish to offer enhanced credentials in applied epidemiology are interested in guidance about how to translate the AECs into academic curricula. The Task Force also believes that potential employers of graduates who obtain this credential desire assurance that such graduates have credibly mastered the Tier 1 AEC's.

Recommended minimum standards for the practicums that will be used to fulfill curriculum requirements for a concentration or certificate in applied epidemiology for governmental public health address both of these needs. The practicum experience need not, and indeed should not, be the entire vehicle for achievement of the Tier I AECs by MPH degree candidates. Because of such factors as: (a) variation in practicum settings, (b) variation in practicum content, (c) the unpredictability of some important public health epidemiology activities, such as disease outbreaks, and (d) the long development and implementation time span of many important public health epidemiology activities (e.g., the development and implementation of a major project or study), it is not reasonable to expect that every MPH practicum student will demonstrate every Tier I AEC during an MPH practicum.

On the other hand, it is reasonable to expect that a student who graduates with an MPH that carries a concentration or certificate in applied epidemiology for governmental public health will have demonstrated acquisition of most or all Tier I AECs prior to the award of their degree. The MPH practicum should always be considered part of a larger MPH curriculum, and goals for individual practicums, as well as the minimum standards, should be established within that context. While the Task Force supports flexibility in the design of MPH practicums, the members believe that there are both pedagogic and practical reasons for developing national recommendations regarding the minimum amount of AEC content that should be addressed in the practicum component of a curriculum offering a concentration or certificate in applied epidemiology for governmental public health.

There seems little question that a move to offer MPH concentrations or certificates in applied epidemiology for governmental public health will require additional work at a number of levels to

ensure that students and their subsequent employers receive optimal benefit from this development. The Tier I competency statements in the CDC/CSTE AECs provide valuable guidance, but they are not sufficient unto themselves for this purpose. At the level of the individual practicum, there is the need for greater collaboration among the student, the faculty supervisor, and the site preceptor to use the AECs to build a practicum that meshes with the academic curriculum and provides credible validation of student skills for potential governmental agency employers of the graduate. At the level of the school or program, a faculty member who wishes to offer a certificate or concentration in applied epidemiology for governmental public health will need to carefully examine its epidemiology curriculum and decide the portion of the AECs they believe should be addressed within the academic setting, the portion within the practicum, and the portions in both. At the national level, this Task Force calls for a prospective effort to develop national standards for the practicum component of these curricula.

The Task Force determined that it was important to develop a checklist or some other mechanism that would serve three purposes. First, it would provide those persons seeking to pursue careers in applied epidemiology in a governmental public health setting an opportunity to learn what they would be expected to know. Armed with this list they could evaluate where to pursue their education. Second, the list could be valuable to academic institutions who wish to develop an academic concentration or major in applied epidemiology. Finally, the list would serve as an excellent tool for evaluating students' level of understanding of the competencies. The CDC/CSTE panel developed just such a tool for the Tier 1 epidemiologist (*See Appendix 7: Epidemiology Competency Assessment Form – Tier 1 Epidemiologist*).

Within the next three to five years, the Task Force recommends that a follow-up activity be undertaken with representation from key governmental public health agencies and the schools of public health and MPH programs offering a concentration or certificate in applied epidemiology for governmental public health to recommend minimum content standards for MPH practicums in applied epidemiology for governmental public health practice. This group should review the experience of schools and programs with applied epidemiology practicums completed since promulgation of the AECs and this Task Force report and evaluate available records of the mapping of practicum activities to Tier 1 AECs. Taken in conjunction with information collected by this Task Force, the Task Force believes that this information will provide a sufficient foundation to define workable parameters for MPH practicums in applied epidemiology, and to develop consensus recommendations for the content of MPH practicums intended to fulfill the requirements for a certificate or concentration in applied epidemiology for governmental public health.

"The AECs provide public health entities (e.g. state, local, and tribal health departments) with a foundation for assessing the competencies of their epidemiology workforce and for identifying where gaps exist."

Patel, AS, Powell, TA, Woolard, CD. "Assessment of Applied Epidemiology Competencies Among the Virginia Department of Health Workforce,"
Public Health Reports, 2008 Supplement 1, Volume 123, 119-127

Additional copies of this report may be accessed at the Association of Schools of Public Health (ASPH) website at: http://www.asph.org/document.cfm?page=600

Appendix 1

Coverage of Applied Epidemiology Competencies in Select Schools of Public Health

Coverage levels

X - Course covered topic, students should have good understanding of the competency

I - Course introduced topic, lecture devoted to topic and possibly a homework assignment

T - Course touched on topic, but no lengthy discussion

S - Some students will get coverage in practicum/field experience and/or capstone

Applied Epidemiology Competencies	Participating Schools				
	1	2	3	4	5
I Skill Domain - Assessment and Analysis					
A) Recognize public health problems pertinent to the population					
1) Recognize the existence of a public health problem					
a) List relevant data and information sources within and outside the public health system	I	X, S	S	X, S	I
b) Seek assistance synthesizing existing data and information into a determination of expected and observed numbers of cases or outcomes in a population	X	X, S	S	X, S	X
c) See assistance in determining threshold values (e.g. baseline disease burden, prevalence of risk behaviors) for public health action.	I	I, S	S	I, S	T
3) Collaborate with others inside and outside the agency to identify the problem	S	I, S	S	I, S	S
B) Conduct surveillance activities					
2) Identify surveillance data needs					
a) Create case definitions(s) based on person, place and time	X	X, S	X, S	X, S	X, S
g) Recognize potential uses of data to inform surveillance systems	I	X, S	S	I, S	I, S
3) Implement new or existing surveillance systems					
a) Define objectives and uses of surveillance systems	X	X, S	S	X, S	X, S
b) Test data collection, data storage and analytical methods as directed	I	I, S	S	I, S	I, S
c) Assist in creating working surveillance system	S	S	S	S	S
d) Collect data for verification of the define surveillance system parameters	S	S	S	S	S
e) Classify potential cases according to whether they meet the case definition	I	I, S	I, S	I, S	I, S
f) Interview persons with illness to solicit necessary information		T, S	S	S	S
g) Assist in monitoring data quality	T, S	T, S	S	T, S	S

Applied Epidemiology Competencies	Participating Schools				
	1	2	3	4	5
h) Maintain good working relationships with reporting entities	S	S	S	S	T, S
i) Provide feedback to reporting entities and other organizations or individuals who need to know about data or the system	S	T, S	T, S	S	T, S
4) Report key findings from surveillance systems					
a) Provide system results to senior epidemiologists			S	S	
b) Recognize implications to public health programs	I	X, S	S	I, S	T, S
c) Assist in developing conclusions from the surveillance data	I	T, S	S	I, S	T, S
d) Communicate results to senior staff			T		
5) Support evaluation of surveillance systems					
a) Collect data necessary for evaluation of surveillance systems using national guidelines and methods		T, S	S	T, S	S
b) Assist in preparing recommendations for modifications to surveillance systems on the basis of evaluation		S	S	S	S
d) Assist in implementing changes to surveillance systems on the basis of evaluation		T, S	S	S	
C) Identify acute and chronic conditions or other adverse outcomes in the population					
1) Assist in conducting a community health status assessment		T,S	S	I, S	S
3) Characterize investigative processes					
a) Recognize different principles of investigation for endemic/sporadic illness or disease clusters versus acute outbreaks	X	X	X	X	X
b) List the major epidemiologic study designs, including the strengths and weaknesses of each	X	X, S	S	X, S	X
4) Create hypotheses	I	X, S	S	I, S	X
5) Assist in design of investigation					
a) Identify target population for investigation	X	X, S	X, S	X, S	X, S
d) Create case definitions	X	X, S	X, S	X, S	X, S
6) Conduct investigation as directed					
a) Respond in a timeframe consistent with the public health problem being investigated		S	X	S	S
d) Use methods for finding cases or other subjects suitable to the investigation	T	T, S	X, S	S	S
e) Use data collection instruments that have been constructed for the investigation	T	I, S	X,S	T, S	T, S
f) Use identified sampling methods	T	T, S	S	T, S	T, S
g) Support necessary coordination between all groups involved in investigation		T, S	X, S	S	S

Applied Epidemiology Competencies	Participating Schools				
	1	2	3	4	5
D) Apply principles of good ethical/legal practice as they relate to study design and data collection, dissemination and use.					
1) Follow ethics guidelines and principles when planning studies, conducting research and collecting, disseminating and using data.					
a) Collect and use public health data, including individual identifiers, only with clearly identified justification	I	X, S	S	I, S	T, S
b) Balance respect for persons and individual privacy with the risk of the threat to the community	I	X	S	I, S	S
c) Apply public health code of ethics to collection, management dissemination and use of data and information, including principles of justice, timeliness and transparency of purpose	T	X	T, S	S	S
2) Apply relevant laws to data collection, management, dissemination and use of data and information.		S	T, S	T, S	S
4) Describe human subjects research	I	X, S	T, S	S	T, S
5) Apply IRB processes as directed	I	X, S	S	S	S
6) Bring potential conflicts of interest to attention of senior epidemiologists	I	I, S	X, S	S	S
7) Apply knowledge of privacy laws to protect the confidentiality, including HIPAA and applicable state and local privacy laws.	I	X, S	S	S	S
8) Know agency procedures for handling FOIA requests		T, S	I, S	S	S
9) Bring potential violations of ethical principles in preparing and submitting publications to the attention of senior epidemiologists.	I	S	S	S	S
E) Organize data from surveillance, investigations or other sources					
1) Assist in definition of database requirement if indicated.					
b) Adhere to national standards for coding and variables as directed to ensure accuracy and ease of analysis	T	X, S	S	I, S	S
c) Use data entry techniques that ensure accuracy and reliability	X	I, S	X, S	S	X,S
d) Conduct data entry validation	X	S	S	S	T, S
e) Perform data cleaning and error correction	X	S	X, S	X, S	S
2.) Maintain databases					
a) Maintain original data		X, S	S	S	T, S
c) Follow established procedures for creating new variables as necessary to support analysis of data		I, S	X, S	S	X, S
e) Follow established procedures for linking relational data and subsetting them into analysis-specific data sets		X, S	S	I, S	S
g) Document all changes to database		X, S	S	S	T, S
h) Apply practices for secure (restricted access) and stable (routine back-ups, database redundancy) data storage		T, S	S	S	X, S

Applied Epidemiology Competencies	Participating Schools				
	1	2	3	4	5
F) Analyze data from an epidemiologic investigation or study					
1) Use analysis plan for data					
d) Recognize/describe the assumptions used in interpreting results	X	X, S	S	X, S	X, S
2) Conduct analysis of data					
a) Compute frequencies and descriptive statistics	X, S	X, S	X, S	X, S	X, S
b) Perform analyses for rates and age adjustment as directed	X, S	X, S	X, S	X, S	X, S
c) Compute sensitivity, specificity, positive predictive value, incidence, prevalence, and attributable fraction as directed	X, S	X, S	X, S	X, S	X, S
e) Perform analyses for measures of association (e.g. RRs and Ors), confidence intervals and p values	X, S	X, S	X, S	X, S	X, S
i) Create standard epidemiology report and necessary components including tables, graphs and charts	I, X	I, S	X, S	I, S	I, S
G) Summarize results of the analysis and draw conclusions					
3) Identify key findings from the study	X	I, S	X, S	I, S	X, S
H) Assist in developing recommended evidence-based interventions and control measures in response to epidemiologic findings					
1) Define cultural/social/political framework for recommended interventions					
a) Describe study data in a way that makes clear the rationale for recommendations	I	I, S	X, S	I, S	X, S
I) Assist in evaluation of programs					
3) Collect surveillance and other data for use in tracking program objectives and outcomes	T	T, S	X, S	T, S	S
4) Assist in tracking progress toward program objectives and outcomes	I	I, S	S	I, S	S
5) Communicate information about progress toward program objectives and outcomes to program managers		S	S	S	S

Institution 1: Johns Hopkins University Bloomberg School of Public Health

Institution 2: University at Albany SUNY School of Public Health

Institution 3: University of California at Berkeley School of Public Health

Institution 4: University of Illinois at Chicago School of Public Health

Institution 5: University of Washington School of Public Health and Community Medicine

Appendix 2

Applied Epidemiology Competencies "Minimally Covered" in Coursework and Appropriate for Coverage in Practicum

B) Conduct surveillance activities

2. Identify surveillance data needs.
   g) Recognize potential uses of data to inform surveillance systems

3. Implement new or existing surveillance systems.
   b) Test data collection, data storage and analytic methods as directed.
   c) Assist in creating a working surveillance system.
   d) Collect data for verification of the defined surveillance system parameters
   e) Classify potential cases according to whether they meet the cases definition
   f) Interview persons with illness to solicit necessary information
   g) Assist in monitoring data quality
   h) Maintain good relationships with reporting entities.
   i) Provide feedback to reporting entities and other organizations or individuals who need to know about data or the system

4. Report key findings from surveillance systems.
   a) Provide system results to senior epidemiologists
   b) Recognize implications to public health programs
   c) Assist in developing conclusions from the surveillance data
   d) Communicate results to senior staff

5. Support evaluation of surveillance systems.
   a) Collect data necessary for evaluation of surveillance systems using national guidelines and methods
   b) Assist in preparing recommendations for modification to surveillance systems on the basis of evaluation
   d) Assist in implementing changes to surveillance systems on the basis of evaluation

C) Identify acute and chronic conditions or other adverse outcomes in the population

1. Assist in conducting a community health status assessment

6. Conduct investigation as directed.
   a) Respond in a timeframe consistent with the public health problem being investigated
   d) Use methods for finding cases or other subjects suitable to the investigation
   e) Use data collection instruments that have been constructed for the investigation
   f) Use identified sampling methods
   g) Support necessary coordination between all groups involved in investigation

D) Apply principles of good ethical/legal practice as they relate to study design and data collection, dissemination and use

1. Follow ethics guidelines and principles when planning studies, conducting research and collecting disseminating and using data.
   a) Collect and use public health data, including individual identifiers, only with clearly identified justification
   b) Balance respect for persons and individual privacy with the risk of the threat to the community.
   c) Apply public health code of ethics to collection, management dissemination and use of data and information, including principles of justice, timeliness and transparency of purpose

2. Apply relevant laws to data collection, management, dissemination and use of data and information

4. Describe human subjects' research

5. Apply IRB processes as directed

6. Bring potential conflicts of interest to attention of senior epidemiologists

7. Apply knowledge of privacy laws to protect the confidentiality, including HIPAA and applicable state and local privacy laws

8. Know agency procedures for handling FOIA requests

9. Bring potential violations of ethical principles in preparing and submitting publications to the attention of senior epidemiologists.

E) Organize data from surveillance, investigations or other sources

1. Assist in definition of database requirement if indicated.
   b) Adhere to national standards for coding and variables as directed to ensure accuracy and ease of analysis.
   c) Use data entry techniques that ensure accuracy and reliability
   d) Conduct data entry validation
   e) Perform data cleaning and error correction

2. Maintain databases
   a) Maintain original data
   c) Follow established procedures for linking relational data and subsetting them into analysis-specific flat data sets.
   e) Follow established procedures for linking relational data and subsetting them into analysis-specific data sets
   g) Document all changes to databases
   h) Apply practices for secure (restricted access) and stable (routine back-ups, database redundancy) data storage

H) Assist in developing recommended evidence-based interventions and control measures in response to epidemiologic findings.

1. Define cultural/social/political framework for recommended interventions.
   a) Describe study data in a way that makes clear the rationale for recommendations

I) Assist in evaluation of programs

3. Collect surveillance and other data for use in tracking program objectives and outcomes.

5. Communicate information about progress toward program objectives and outcomes to program managers.

Appendix 3

Practicum Guidelines

Institution 1: Johns Hopkins University Bloomberg School of Public Health

The MPH program expects students to obtain a significant practicum experience in population-based health prior to graduation. A practicum experience involves hands-on experience working and interacting with public health professionals.

The goal of the MPH mentored practicum is to have a practical public health experience that provides mentoring, contact with public health professionals, and the opportunity to participate in a meaningful way.

JHBSPH offers multiple opportunities for students. These include:

- Mentored Practicum with the State Department of Health & Mental Hygiene and Local Health Departments
- Mentored Practicum with Community-based Organizations in Baltimore
- Mentored Practicum in Health Care Epidemiology and Outbreak Investigation
- International or Domestic Public Health Practice Trips
- Population, Family, and Reproductive Health Internship Resource List
- Customized Opportunities

Each of these experiences has their own learning objectives, based on the experience.

Institution 2: University at Albany SUNY School of Public Health

Students analyze data using SPSS or SAS and make charts in Excel, learn about organization and use skills from class in a real world setting. Learning objectives are based on projects but are also based on many of those found in the CDC/CSTE Applied Epi Competencies. The ideal internship is 40 hours per week for three months, but may be part-time for six months.

I. Analytic Skills

a. Define the health problem being addressed in the internship.
b. Describe the use of data, statistical methods, and/or laboratory procedures used in addressing the problem.
c. Employ quantitative techniques to analyze data pertaining to the problem.
d. Describe the basic research design used in addressing the problem.
e. Explain how the data illuminate ethical, political, scientific, economic, and overall public health issues.
f. Make relevant inferences from the data.

II. Communication Skills

a. Communicate effectively both in writing and orally.
b. Present accurately and effectively demographic, statistical, programmatic, and scientific information for professional and lay audiences.
c. Solicit input from individuals and organizations.
d. Advocate for public health programs and resources.

III. Basic Public Health Sciences Skills

a. Describe public health science research methods used in this internship.
b. Identify the basic public health sciences used in this internship, including behavioral and social sciences, biomedical sciences, biostatistics, epidemiology, environmental health, and prevention of chronic and infectious diseases and injuries. (Many internships use more than one of the public health sciences.)

IV. Social and Cultural Skills

a. Describe the dynamic forces contributing to cultural diversity
b. Interact sensitively, effectively, and professionally with persons from diverse cultural, socioeconomic, educational, and professional backgrounds, and with persons of all ages and lifestyle preferences.
c. Develop and adapt approaches to problems that take into account cultural differences.

V. Policy Development/Program Planning/Management Skills

a. Collect and summarize data relevant to the public health issue addressed in the internship.
b. State policy options and summarize the fiscal, legal, social, political, administrative and overall public health implications of each option.
c. Apply basic human relations skills to the management of organizations and the resolution of conflicts.

Institution 3: University of California at Berkeley School of Public Health

This is a three-month supervised experience of approximately 480 hours. The experience is culminated by a final evaluation and final assignment based on the experience. The final assignment may consist of a case study, paper, poster, creative presentation or journal. This assignment also contains an organization profile, organization assessment, and self assessment. Each of these portions adds to the experience of the student and his/her thoughtful explanation and reflection of time in the position. Students write learning objectives to describe what they will learn based on the individual experience in addition to overall goals of internship experience. The major learning objectives are expected to fit into these categories.

I. Public Health Skills and Competencies

- Research
- Program Planning and Evaluation
- Policy
- Fiscal Functions

II. Core and Specialty Knowledge

- In-depth knowledge of specific public health issues

III. Leadership Skills and Abilities

- Problem-Solving & Teamwork
- Cultural Competence
- Communication

IV. Context and Environment

- Systems and Contexts with in public health
- Current Trends and Public Policy

V. Personal and Career Development

- Exploring Specific Career Interests
- Developing Professional Network

Institution 4: University of Illinois at Chicago School of Public Health

The experience consists of 192-320 hours of work which may be a paid or unpaid experience. Projects from field practicum should lead to a capstone presentation; so when looking at experience students are encouraged to look for an opportunity that will lead to a capstone presentation. Students should work together with advisor and preceptor to come up with learning objectives based on their particular experience. However, the following objectives apply across all practicum experiences:

Overall Objective
Students will acquire experience and develop skills in the application of basic public health concepts and of specialty knowledge to the solution of public health problems.

Field Practicum Learning Objectives
Through the field experience, MPH students will be able to:

- Apply public health theory, knowledge and skills in a practice setting.
- Complete a defined project(s) in an area of public health practice including core public health functions such as needs assessment, program planning, program evaluation, policy development, educational campaign or applied research.
- Relate the "realities" of public health practice -- organizational structure, local and organizational politics, program administration, community relationships, program coordination -- to their defined project(s).
- Demonstrate skills and knowledge in an area of interest not covered in depth elsewhere in their educational plan.
- Demonstrate competence in a public health practice area(s).
- Demonstrate leadership, teamwork, communication skills and creativity in the development of a public health practice activity.

Institution 5: University of Washington School of Public Health and Community Medicine

At least 120 hours of work is required in this program. It may consist of a practicum or a thesis and a practicum experience, but both experiences must contain separate objectives.
A project based on the experience is to be presented to the school.

Learning objectives for this experience are:

A. To provide students with practical field experience in an organization, agency, or community that provides planning or services relevant to public health;
B. To help students further develop skills or competencies learned in the academic program by applying them in a public health practice setting;
C. To provide a means for acquiring practical skills that are useful to public health professions and are not available through academic instruction;

D. To link academic training to the core functions of public health practice as described in the Washington State Public Health Improvement Plan;
E. To understand the political, economic, social and organizational context within which public health activities are conducted; and,
F. To gain exposure to an organizational and/or community context for public health activities.

Summary

All five institutions have specific learning objectives for the experience. Most have sample learning objectives that are similar to those found in the CDC/CSTE Applied Epidemiology Competencies. Institution 4 asks that the student works with both their preceptor and advisor to develop more specific learning objectives to match their exact goals. Institution 1 also has learning objectives based on the students' specific experience.

The length of time at each position varies between 120-480 hours depending on the school and number of credit hours which will be awarded for the experience.
All schools require an assessment of the experience, but Institution 4 does not require an additional project as part of this evaluation. At this Institution the information and data from the field experience may and ideally is used for the culminating experience instead of a separate project.

Regardless of school all practicum experiences are guided by the hands on experience of public health. Each of the schools requires students to find an experience that matches his/her own goals and to present information and skills they have learned from their position. As is shown in the matrix of Applied Epidemiology Competencies (AEC) and details of competencies with sub-optimal coverage, many skills that are not taught in the classroom are gained through the work completed for these positions. Regardless of the exact requirements at each school the practical knowledge learned through this portion of a student's education has the potential of completing/nearly completing the CDC/CSTE Tier 1 competencies.

Appendix 4

Johns Hopkins University Bloomberg School of Public Health
OBSERVATIONAL EPIDEMIOLOGY [340.608.01]
"Applied Epidemiology 1"
2007

General Information

Instructors: Brad Astor, PhD, Assistant Professor
Manning Feinleib, MD, MPH, DrPH, Professor
Frangiscos Sifakis, PhD, MPH, Assistant Scientist

Teaching Assistants: Jennifer Deal (*jdeal@jhsph.edu*)
Laura Baldassari (*lbalda@jhsph.edu*)

Course Coordinator: Allyn Arnold (*aarnold@jhsph.edu*; 410-614-6990; room W6507A)

Assistant Course Coordinator: Julie Thorne (*jethorne@jhsph.edu*); 410-955-9289; room W6508)

Prerequisites: 340.601 or 550.691-692 or 550.694-695 (introductory course in epidemiologic methods) and prior or concurrent enrollment in 140.612 or its equivalent.

Credits: 4

Approach: The focus of this course is on evaluating and interpreting results from a single study, report, or source of data. This course addresses some school-wide core competencies to employ epidemiologic study methods to evaluate the determinants and risk factors related to a specific public health problem.

This course is a second term alternative to Epidemiologic Research Methods series and is intended for students outside the Department of Epidemiology who do not intend to enroll in more advanced epidemiology methods courses (340.753 & 340.754).

Objectives:
- Identify and assess public health problems and priorities.
- Identify sources of data and epidemiological methods to assess burden of health problems.
- Identify strengths and limitations of both conventional and non-conventional epidemiological study designs.
- Understand the concept of causation and guidelines to establish causality.
- Identify threats to validity
- Understand quality control and assurance and approaches to minimize measurement errors.

Course Structure: The course is scheduled Mondays, Wednesdays, and Fridays from 9:00-10:20AM. Lectures will be given on Mondays and Wednesdays. Laboratory sessions will occur on Fridays, except the first Friday. There will be a lecture on Friday, October 26h.

Lectures are audio taped and posted on the course website.

An optional review session will be given on December 19, 2007

Rooms: Lectures: Becton-Dickinson Lecture Hall (Room W1020)
Laboratories: W2015, W2017, W3031

Textbook: There is no required textbook for this class. Readings will be posted on the course website as the course progresses.

Web Supplement: The course Web Supplement can be found at: www.courseplus.jhsph.edu

The web supplement contains the information on this syllabus, and an ONLINE LIBRARY of course material that you can print out.

All material related to course laboratory exercises and the class assignments will be posted in the ONLINE LIBRARY. Hardcopies of the lecture handouts will be distributed before each lecture and will be posted in the archive 48 hours after the day they are given. To locate the ONLINE LIBRARY click "class materials & resources" tab then click the Online Library link.

Please see Allyn Arnold if you cannot access the Web Supplement. If technical problems arise with Web Supplement access, please notify her as soon as possible.

Laboratory: Meets on Fridays except for the first Friday which is a lecture.

You will be assigned at random to one of three rooms for the laboratory discussions. You will be notified of this assignment on Wednesday, October 31st.

Grading:
20% Lab
40% Midterm examination
40% Final examination

Office Hours: Course TAs will hold office hours on Tuesdays and Thursdays from 12:15 – 1:15PM, beginning October 30th. All sessions will be in W4019.

Lecture & Lab Schedule
Mondays, Wednesdays and Fridays 9:00 – 10:20 AM

Date	Topic	Lecturer
10/26	Lecture 1: Introduction to Course	Dr. Feinleib
	Epidemiology in Action: The Case of the Baltimore City Health Department	Dr. Joshua Sharfstein, Commissioner of Health in Baltimore City
10/29	Lecture 2: Review of Measures of Disease and Association, Rates and Person-Time	Dr. Astor
10/31	Lecture 3: Indices of Disease Burden	Dr. Feinleib
11/2	Lab Problem 1: Indices of Disease Burden	
11/5	No Class – APHA *	
11/7	Lecture 4: Surveillance: Principles and Methods I	Dr. Sifakis
11/9	Lab Problem 2: Surveillance Methods	
11/12	Lecture 5: Surveillance: Principles and Methods II	Dr. Sifakis
11/14	Lecture 6: Sampling	Dr. Sifakis
11/16	Lab Problem 3: Survey Design and Implementation	

**** Because the School is closed so that students and faculty can go to APHA, this planned lecture, "Sources and Uses of Available Data" will be covered within the context of other lectures. Notes of this lecture will be posted on the course web site.***

Date	Topic	Lecturer
11/19	Lecture 8: Study Design in Applied Settings I: Cross-sectional and Case-Control studies	Dr. Astor
11/21	Lecture 9: Study Design in Applied Settings II: Longitudinal Studies	Dr. Astor
11/23	**THANKSGIVING RECESS**	
11/26	Lecture 10: Study Design in Applied Settings III: Interventional Studies	Dr. Astor
11/28	Lecture 11: Study Design in Applied Settings IV: Alternative Designs	Dr. Astor
11/30	MIDTERM EXAM	
12/3	Lecture 12: Threats to Validity I	Dr. Seaberg
12/5	Lecture 13: Threats to Validity II	Dr. Seaberg
12/7	Lab Problem 4: Assessing Threats to Validity	
12/10	Lecture 14: Quality Assurance and Quality Control	Dr. Astor
12/12	Lecture 15: Evaluation of Evidence	Dr. Samet
12/14	Lab Problem 5: Understanding and Evaluating an Epidemiological Research Article	
12/17	Panel Discussion	
12/19	REVIEW SESSION	
12/21	FINAL EXAM	

Appendix 5

Johns Hopkins University Bloomberg School of Public Health
"Applied Epidemiology 2" [340.647]
2007
Objectives and Organization of the Course

Introduction

Applied epidemiology has been defined in different ways. It encompasses the use and application of epidemiological tools to evaluate public health measures. As defined by others it mostly focuses on effectiveness rather than efficacy of interventions. The focus of this course is on implementation and evaluation of programs, policies and public health procedures, rather than etiologic research.

Applied Epidemiology is primarily intended for students interested in the practical aspects of public health as it relates to the use of epidemiology to answer public health problems. Students who have completed Principles of Epidemiology and Observational Epidemiology or the first year of the Epidemiology Methods sequence represent the majority of enrollees. The class is open for all students who meet the pre-requisites as stated below.

The focus of this course is on the synthesis and communication of findings from a collective body of epidemiologic evidence. This course addresses some school-wide core competencies to evaluate, critique and integrate results from multiple studies, determine the state of knowledge and research needs, and apply the most appropriate analytic approaches to identify policy and program options to address a specific problem.

Course Objectives

Upon successfully completing this course, students will be able to:

- Evaluate and synthesize evidence to establish causal inference in public health.
- Conceptualize inferential processes and identify the nature and impact of these processes as they relate to applied epidemiology.
- Understand the concepts of effectiveness and translation of epidemiological information into policy.
- Identify the role of epidemiology in the decision-making process that leads to implementation or changes in public health practice and policy.
- Communicate epidemiological information influencing implementation and outcome of public health interventions.

Pre-requisites

Principles of Epidemiology (either 340.601, 340.621/622) or the online course Fundamentals of Epidemiology (550.694/695) or Epidemiologic Methods I (340.751)
Observational Epidemiology (340.608) or Epidemiologic Methods II (340. 752)
Previous or concurrent enrollment in Biostatistics course series (140.621-624) or (140.651-654)

Course Organization

The course is scheduled for Mondays and Wednesdays from 9:00 am to 9:50 am, and Fridays from 8:30 am to 10:20 am. Generally, lectures will be given on Mondays and Wednesdays followed by laboratory on Fridays. A schedule of lecture topics, lecturers and laboratory exercises is attached. Digital recordings will be made of each lecture, and the audio files posted on the Course Plus web site.

The course also consists of a group project providing students with the opportunity to apply concepts and methods presented in lecture for the identification and assessment of a public health problem.

Laboratory

The lab sessions will provide specific application of lecture material, with exercises that illustrate epidemiological principles, practice, and methodology as applied to public health questions. Students will be randomly assigned to laboratory groups in order to provide a varied representation of disciplines and backgrounds in each group. Laboratory attendance is required.

Laboratory groups are expected to work as a cohesive unit. Each group is also expected to discuss the problem among themselves and with instructors. Indeed, this is the major reason we have laboratory sessions. It is strongly suggested that background reading, reading of the exercise and basic calculations are done prior to the lab session.

Each exercise is scheduled for discussion on the day indicated on the course outline. The group to present the discussion will be selected by a random process at the beginning of the lab session on the indicated discussion day. A group that has made one presentation will be at a low but finite risk of making a subsequent presentation. During the presentation, time must not be wasted by repeating descriptive material in the exercise but should be devoted to questions in the problem and to conceptual issues raised by the exercise.

Group Project

The aim of the group project is for students to gain experience in applying epidemiologic concepts and methods for the assessment, analysis and public health planning of community health problems. Each lab group will work collectively to identify and define a public health problem, set priorities, gather appropriate data, develop policy recommendations, and communicate findings to relevant health professionals/agencies. The lectures and laboratory exercises will serve as guides to the project formulation and analysis. Group members will submit an individual written report, and as a group, present their findings to the class.

Grading

Course grades will be based on the results of a midterm examination, evaluation of the group project report and presentation, and of a written press statement summarizing an outbreak investigation. Although students will work in groups on the project, each student will be expected to write his or her project report individually.

40%	Midterm examination
40%	Individual written report for group project
10%	Group presentation
10%	Outbreak investigation press statement

Textbooks and readings

Recommended:

Nelson K, Williams C. Infectious Disease Epidemiology: Theory and Practice. Jones and Bartlett Publishers, Boston, 2006. Second Edition **Chapter 4, Chapter 5**

Szklo, Moyses and Nieto Javier: Epidemiology Beyond the Basics. Jones and Bartlett Publishers, Boston, 2007. Second Edition **Chapter 10**

Brownson Ross and Petitti Diana: Applied Epidemiology: Theory and Practice. Oxford University Press, New York, 2006. Second Edition.

Armenian, Harutune and Shapiro, Sam: Epidemiology and Health Services. Oxford University Press, New York, 1998.

Galea S, Vlahov D (ed) Handbook of Urban Health, New York, Springer Press, 2005.

Applied Epidemiology - Lecture and Laboratory Schedule

Day	Date	Lecture Number	Topic	Lecturer
Wed	1/23	1	Introduction to Applied Epidemiology	Dr. Taha
Fri	1/25	**Lab 1**	Introduction to Course Project – Identification and Assessment of Public Health	Dr. Taha
Mon	1/28	2	Outbreak Investigation I	Dr. Taha
Wed	1/30	3	Outbreak Investigation II	Dr. Taha
Fri	2/1	**Lab 2**	An Outbreak Investigation	Dr. Taha
Mon	2/4	4	Uses of Geographic Information System for Tracking Public Health Problems	Dr. Jennings
Wed	2/6	5	Complex Study Designs Involving a Public Health Intervention: Examples	Dr. Taha
Fri	2/8	**Lab 3**	Application of Causal Criteria	Dr. Szklo
Mon	2/11	6	Ethics of Epidemiologic Research and Public Health Practice	Dr. Kass
Wed	2/13	7	Program Evaluation I	Dr. Celentano
Fri	2/15		**Midterm Exam**	
Mon	2/18	8	Program Evaluation II	Dr. Celentano
Wed	2/20	9	Rules of Evidence; Effectiveness; Fundamentals of Meta-Analysis	Dr. Szklo
Fri	2/22	**Lab 4**	Evaluation of Screening Programs I – Prostate Cancer Screening	Dr. Szklo
Mon	2/25	10	Decision Analysis; High-Risk vs Population-based Approaches to Prevention	Dr. Szklo
Wed	2/27	11	Screening for Breast Cancer	Dr. Szklo
Fri	2/29	**Lab 5**	Evaluation of Screening Programs II– Breast Cancer Screening	Dr. Szklo
Mon	3/3	12	Confounded vs Biased Associations; Critical Review of Hill's Guidelines - I	Dr. Szklo
Wed	3/5	13	Critical Review of Hill's Guidelines - II	Dr. Szklo
Fri	3/7	**Lab 6**	Project Presentations	Faculty
Mon	3/10	14	Communicating Results of Epidemiologic Studies to Peers	Dr. Szklo
Wed	3/12	15	Communicating Results to the Public	Dr. Samet
Fri	3/14	**Lab 7**	Project Presentations	Faculty

Appendix 6

Certificate in Field Epidemiology

University of North Carolina at Chapel Hill School of Public Health

Overview

A survey conducted by the Council of State and Territorial Epidemiologists showed that as of November 2001, 42% of epidemiologists working in state and territorial health departments had no formal training in epidemiology. The terrorist events of September 11, 2001, the bioterrorism-related anthrax exposures of November 2001, the emergence of SARS and West Nile virus, and the continued threat of influenza viruses necessitate a public health workforce prepared to respond to emerging and re-emerging health threats and bioterrorism. To address this need and fill the gap in educational programs available to practitioners, the School of Public Health at the University of North Carolina at Chapel Hill has developed the online Certificate in Field Epidemiology Program. This 12-credit certificate program consists of four online courses: introductory epidemiology, field epidemiology methods, infectious disease epidemiology, and surveillance.

Who should apply

This program should be considered essential for public health preparedness staff, nurses, communicable disease investigators, epidemiologists, environmental health specialists, health educators, health officers, physicians, and veterinarians working in the public health field, as well as for any other individuals currently performing epidemiological tasks with limited or no formal training.

Benefits

Graduates of this program will have a solid background in introductory epidemiology and the ability to competently conduct outbreak investigations. They will know how to apply field epidemiology methods, use epidemiology software to identify patterns in infectious disease outbreaks, and they will be able to set up surveillance systems to collect and monitor data used to identify outbreak patterns.

Curriculum

This 12-credit program can be completed in 16 months. Participants take courses one at a time, in the fall, spring, summer, and fall semesters. Courses are offered in sequence and admission is available in Fall, Spring, and Summer I. The schedule and core topic areas are:

- Introduction to Epidemiology for Public Health (fall and summer, 3 credits): This is an introductory course that considers the meaning, scope and applications of epidemiology to public health practice and the uses of vital statistics data in the scientific appraisal of community health.

- Field Epidemiology Methods (spring, 3 credits): This course focuses on the epidemiological methods required to investigate urgent public health problems. The skills and tools needed to conduct outbreak investigations and communicate findings to the public are covered in this course.
- Introduction to Methods in Infectious Disease Epidemiology (summer, 3 credits): This course encompasses the interaction between an infectious agent, host and environment, modes and dynamics of transmission, the role of immunity in infectious disease epidemiology, and disease elimination strategies.
- Public Health Surveillance (fall, 3 credits): The course provides the conceptual foundations and practical skills for designing and implementing surveillance systems and for using surveillance data for the conduct and evaluation of public health programs and research.

Admissions criteria

- Priority given to those with at least three years in a health or social science related field
- Demonstrated math competency
- Excellent English language skills
- Basic computer skills and access to the Internet

Appendix 7: Epidemiology Competency Assessment Form - Tier 1 Epidemiologist

Individuals – use this form to evaluate your level of understanding and ability to perform each of the following competencies
Organizations – use this form to evaluate epidemiologic competence of current staff members

Training and Competency:
1 = Awareness: No training or experience
2 = Basic: Received basic training
3 = Intermediate: Repeated successful experiences have been completed.
4 = Advanced: You can perform the actions associated with this skill without assistance.
5 = Expert: You are known inside and/or outside the organization as an expert.

Importance:
1 = An important competency for my position
2 = Neutral
3 = Not an important competency for my position

Frequency:
D = Daily
W = Weekly
M = Monthly
R = Rarely
A = As Needed

Skill Domain	**Epidemiology Competency:** The competency statements listed below represent abbreviated versions from the more comprehensive competency statements listed in the AEC document	No Training ← →Competent/Expert					Importance	Frequency
		1	2	3	4	5		
1, A-1	Recognize the existence of a public health problem							
1, A-3	Collaborate with others inside and outside the agency to identify problems							
1, B-2	Identify surveillance data needs							
1, B-3,4	Implement/revise a surveillance system & report key surveillance findings							
1, B-5	Support evaluation of surveillance systems							
1, C-1,3	Assist in a conducting a community health status assessment and characterize investigative processes							
1, C,4,5	Assist in design of an investigation including hypothesis generation							
1, D-1	Follow ethics guidelines/principles in studies, research, and data use							
1, D-4,5	Describe human subjects research & apply Institutional Review Board (IRB) processes							
1, D-7	Apply knowledge of privacy laws to protect confidentiality, including Health Insurance Portability and Accountability Act (HIPAA) and applicable state/local privacy laws							
1, E-2	Maintain databases							
1, F-1,2	Use analysis plan and conduct analysis of data							
1, G-3	Identify key findings from a study							
1, H-1	Define cultural/social/political framework for recommended interventions							
1, I	Assist in evaluations of programs							
2, A	Know how causes of disease affect epidemiology practice							
2, A-2	Use knowledge of human and environmental biology and behavioral sciences and principles to determine potential biological mechanisms of disease							
2, B	Identify the role of laboratory resources in epidemiologic activities							
2, C	Use identified informatics tools in support of epidemiologic practice							
3, A	Communicate epidemiologic findings orally and in writing to agency staff							
3, B	Recognize the basic principles of risk communication							
3, C-1	Demonstrate effective listening when epidemiology findings are presented or discussed							
3,D	Use effective communication technologies							
4	Assist in providing epidemiologic input for community planning processes							
5	Practice culturally sensitive epidemiological activities							
6	Apply appropriate fiscal and administrative guidelines to epidemiology practice							
7, B	Support the organization's vision in all programs and activities							
7, D	Promote ethical conduct in epidemiologic practice							
7, E	Practice professional development							
8, A-1	Describe how policy decisions are made within the agency							

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

CSTE
Council of State and Territorial Epidemiologists

APPLIED EPIDEMIOLOGY COMPETENCIES