Phase II Committee Chair Report

Course area: PubH 6414: Biostatistical Literacy

Committee Chair: Ann Brearley & Laura Le

Committee Members: (none)

CEPH competencies, skills, knowledge to be addressed in the course (complete template):

Unit (Week)	Learning Objectives	CEPH Competencies & Knowledge
Unit 1 Introduction to Biostatistics	• Recognize the difference between a sample and a population and be able to identify each in a reported research study. • State some of the potential errors that may result when using a *sample* to understand something about a *population*. • Identify the sampling method(s) used in a reported research study. • Identify the study design(s) used in a reported research study. • Identify the primary outcome measured in a reported research study. • Describe the cycle of research and its components. • State the main advantages and limitations of each study design.	**C:** **K:**
Unit 2 Introduction to Survival Data	• Recognize survival data in an article. • Explain what constitutes an "event" in a given study. • Identify characteristics of a survival data analysis, such as starting date and entry criterion, from an article. • Identify summary measures of survival data analysis, such as median survival time and five-year survival rate, from an article or a survival curve. • Explain what censored data is. • Interpret a Kaplan-Meier survival curve: know what is on the x- and y-axes, why the curve has steps, what the curve tells you, the role of censoring is taken into account in constructing the curve, and how censoring is depicted on the curve.	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate. 4. Interpret results of data analysis for public health research, policy or practice. **K:**

Unit 3 Confidence Interval for a Proportion	• Recognize the type of a variable. • State which summary statistics, tables, and graphs are appropriate for each type of variable. • Recognize variables that would be summarized using proportions. • Translate between proportions expressed as natural frequencies or counts, as fractions, as decimals (0 to 1) and as percents. • Explain when a confidence interval for a proportion is used, and what it is used for. • State what information you need to calculate a confidence interval of a proportion. • Be able to calculate a confidence interval from a margin of error and vice versa. • Explain what sampling variability means and give an example of it. • Distinguish and describe the relationships between the sample proportion, the confidence interval and the population proportion. • Explain the meaning of the confidence level. • Distinguish between bias and precision. • Recognize and interpret the margin of error in a journal article. • State what factors make a confidence interval for a proportion wider or narrower. • Be able to use a confidence interval for a proportion to make inferences about the population proportion.	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate 4. Interpret results of data analysis for public health research, policy or practice **K:**
Unit 4 Summarizing Continuous Variables	• Recognize variables that would be appropriately summarized using measures of center and measures of spread. • State the definitions of the commonly-used measures of center (mean, median, mode, etc.) and how to interpret them. • State the definitions of the commonly-used measures of spread or scatter (SD, IQR, range, MAD, CV, etc.) and how to interpret them. • State the limitations of the commonly-used measures of center and spread. • Describe what quantiles and percentiles are used for and how to interpret them. • Interpret the information found in a dot plot, a histogram, or a box plot. • Interpret the summary statistics found in the typical “Table 1” of a clinical trial journal article.	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate 4. Interpret results of data analysis for public health research, policy or practice **K:**

Unit 5 Confidence Interval for a Mean	**Normal Distributions** • Know the basic properties of a normal distribution. • Know how to normalize a continuous measurement (calculate a Z score) and what it means. **Sampling Distributions** • Be able to explain what sampling variability means. Be able to give an example of it. • Understand the differences between the population distribution, the sample distribution, and the sampling distribution for the sample mean. • Be able to distinguish between the standard deviation (SD or s) and the standard error of the mean (SE or SEM). • Understand the implications of the Central Limit Theorem. • Know what the sampling distribution of the sample mean looks like and how it varies with the population distribution's shape, mean (mu), standard deviation (sigma), and sample size (N). **Confidence Interval for a Mean** • Recognize variables that would be summarized using means. • Explain when a confidence interval for a mean is used, and what it is used for. • Know what information you need to calculate a confidence interval for a mean. • Be able to calculate a confidence interval from a margin of error and vice versa. • Be able to distinguish and describe the relationships between the sample mean, the confidence interval, and the population mean. • Know what factors make a confidence interval for a mean wider or narrower. • Recognize and interpret the margin of error in a journal article. • Be able to use a confidence interval for a mean to make inferences about the population mean.	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate 4. Interpret results of data analysis for public health research, policy or practice **K:**

Unit 6 Hypothesis Testing	• Be able to describe the purpose of hypothesis testing. • Know the terminology of hypothesis testing: null hypothesis, alternative hypothesis, test statistic, sampling distribution of the test statistic, *p*-value, false positive result, false negative result, Type I error, Type II error, power. • Given a journal article involving a hypothesis test, be able to state the appropriate null and alternative hypotheses. • Know what information is needed to calculate a *p*-value. (You do not need to be able to carry out the calculation though.) • Understand what the significance level of a test means. • Given a *p*-value and a significance level, be able to decide what the conclusion of the test would be. • Be able to describe what probability the *p*-value for a test refers to.	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate 4. Interpret results of data analysis for public health research, policy or practice **K:**
Unit 7 Challenges in Statistics	**Multiple Comparisons** • Be able to recognize situations in which multiple comparisons may be an issue. • Be able to explain the consequences of failing to properly account for multiple comparisons. • Be aware of the common approaches for accounting for multiple comparisons. **Normality** • Be aware that few measurements in the real world can be perfectly normally distributed. • Recognize that even samples taken from truly normal populations often look far from normal, especially when the sample size is small. • Be able to state the question that a test of normality addresses and be able to make a conclusion from the results of the test of normality. • Be able to explain when it matters if a sample is from a severely non-normal population and when it doesn't. • Be aware of some of the statistical analysis	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate 4. Interpret results of data analysis for public health research, policy or practice

	options that exist if your sample is from a severely non-normal population. • Recognize the consequences of using a statistical method that assumes normality when the assumption is not valid. **Outliers** • Recognize that even samples taken from truly normal populations may often look like they contain outliers, especially when the sample size is small. • Be able to state the question that the test for outliers addresses and be able to make a conclusion from the results of the test for outliers. • Recognize which statistics are robust to outliers, i.e. less sensitive to the presence of outliers. • Know good practices for dealing with suspected outliers.	**K:**
Unit 8 Statistical Tests, Part 1	**Comparing Observed and Expected Distributions** • Know the question that the chi-square goodness-of-fit test addresses, and be able to make a conclusion based off of the *p*-value. **Comparing Proportions: Relative Risk** • Know what a contingency table is and how to read and interpret it. • Know how to calculate a **risk difference** (or 'attributable risk') from a 2x2 contingency table and be able to interpret it. Given the confidence interval, be able to make a conclusion using it. • Know where the number needed to treat (NNT) or number needed to harm (NNH) comes from and what it means. • Know how to calculate a **relative risk** from a 2x2 contingency table and be able to interpret it. Given the confidence interval, be able to make a conclusion using it. • Be able to describe when it would be more appropriate to summarize data using the relative risk and when it would be more appropriate to use the absolute risk difference. • Know what it means to say that two variables are "associated". • Know when Fisher's exact and Pearson's chi-square tests of independence are used. Know	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate 4. Interpret results of data analysis for public health research, policy or practice

	when you would use one instead of the other. • Know the question that these tests of independence address, and be able to make conclusion using the resulting *p*-values. **Comparing Proportions: Odds Ratio** • Be able to calculate the odds of an event and the probability of an event, given appropriate data, and understand the difference between the two. • Know how to calculate an **odds ratio** from a 2x2 contingency table and be able to interpret it. Given the confidence interval, be able to make conclusions using it. • Be able to describe some of the biases that could potentially occur in a retrospective case-control study. • Know when it is appropriate to summarize data using a relative risk and when it is appropriate to use an odds ratio. • Know when the odds ratio is a good approximation of the relative risk, and what you can then conclude from it.	**K:**

Unit 9
Statistical Tests, Part 2
	Comparing Survival Curves
	• Be able to compare two survival curves visually and decide whether they are significantly different using their confidence bands.
	• Know what the hazard is and be able to distinguish a survival curve (or region of a survival curve) where the hazard is low from one where it is high.
	• Be able to make a conclusion about the comparison of two survival curves using:
	  ○ a confidence interval for the hazard ratio.
	  ○ a log-rank test.
	
	Comparing Two Means
	• Be able to make a conclusion about the comparison of means in two groups using:
	  ○ a confidence interval for the true difference in means.
		C:
		3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate
		
		4. Interpret results of data analysis for public health research, policy or practice

	○ a two-sample *t*-test. **Comparing Two Paired Groups** • Be able to distinguish between situations when an unpaired *t*-test would be used and when a paired *t*-test would be used. • Be able to distinguish between situations when a regular chi-square test would be used and when a paired test (McNemar's test) would be used. • Be able to make a conclusion about the mean from paired (continuous) data using: ○ a confidence interval for the true mean of the paired differences. ○ a paired *t*-test. • Be able to make a conclusion about proportions from paired (categorical) data using McNemar's test.	**K:**
Unit 10 Communicating Risk	**Screening Tests** • Be able to state in your own words the definitions for prevalence, sensitivity, specificity, false positives, false negatives, positive predictive value (PPV) and negative predictive value (NPV). • Be able to calculate any of these from a table of cell counts, or the equivalent information in words (e.g. in an article). • When found in a journal article or other material, be able to correctly interpret them. • Be able to explain how the positive predictive value of a screening test depends on the prevalence of the disease. • Appreciate the trade-offs (medical, financial, emotional, etc.) involved in the use of screening tests.	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate 4. Interpret results of data analysis for public health research, policy or practice

	Communicating Risk • Understand what factors make 5-year (or 10-year, or similar) survival rates misleading, and what alternative statistics are less misleading. • Understand the importance of clearly communicating the denominator in any proportion or percentage, particularly for screening test measures. • Understand how results can be slanted to suit the bias of the reporting organization by using relative risks vs. absolute risk differences. • Understand what makes screening test results (particularly sensitivity vs. PPV) confusing and know how to avoid the confusion, for yourself and for your patients (if any).	**K:**
Unit 11 Correlation and Regression	• Understand why the first step in correlation or regression analysis is to graph the data. • Know when a correlation coefficient is used and what it is used for, when simple linear regression is used and what it is used for, and when to use one vs. the other. • Be able to interpret a correlation coefficient, and make a conclusion from its confidence interval or *p*-value. • Be able to interpret an R^2 value. • Be able to write down the equation for a simple linear regression model. • Be able to identify the slope and the intercept in a graph of a regression line or in the equation for the regression line. • Be able to interpret the regression-fitted slope and intercept, and make a conclusion from their associated confidence intervals and *p*-values. • Be able to list four of the reasons why two variables might appear correlated but may or may not be causally related. • Understand the difference between statistical significance and clinical/practical significance.	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate 4. Interpret results of data analysis for public health research, policy or practice
		K:

Unit 12 Multiple Linear Regression	**Models** • Be able to write down the equation for a simple linear regression model and describe what each parameter means. • Be able to explain the difference between the parameters of a model and their estimated values. **Comparing Models** • Know when a goodness-of-fit *F*-test can be used to compare two models, what the appropriate null hypothesis is, and how to make a conclusion from the results. **Multiple Linear Regression (MLR)** • Be able to describe when multiple linear regression can be used, and what it is used for. • Be able to write down the equation for a multiple linear regression model (including interaction terms) and describe what each parameter means. • Know what kind of a plot is used to assess how well a multiple linear regression model fits the data, and be able to interpret both the plot and the model R^2 value. • Be able to interpret the fitted model regression coefficients, and make a conclusion from its confidence intervals and *p*-values. • Be able to explain what 'variable selection' is, how to recognize it in an article, and why it is a potential issue. • Be able to recognize or give examples of study designs that result in correlated data and cannot be analyzed using MLR.	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate 4. Interpret results of data analysis for public health research, policy or practice **K:**

Unit 13 Logistic and Proportional Hazards Regression	**Overall** Given a short research study scenario or abstract, be able to tell: • what the scientific research question is; • what the primary outcome of interest is and what type of variable it is; • what the primary predictor(s) of interest are and what the other covariates of interest are, if any; • what method(s) would be appropriate to use to address the scientific research question. **Logistic Regression** • Be able to describe when logistic regression can be used, and what it is used for. ○ Know what simpler test is equivalent to a logistic regression model with only one predictor. • Be able to write down the equation for a (multiple) logistic regression model and describe what each parameter means. • Be able to use the fitted logistic model regression coefficients to obtain odds ratios for each variable in the model. • Be able to interpret the odds ratios for each variable. Know what value an odds ratio would have if a variable has no effect, and what values are associated with a variable having a positive or a negative effect on the outcome. • Be able to interpret the confidence intervals and	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate 4. Interpret results of data analysis for public health research, policy or practice

	make a conclusion from the *p*-values for the odds ratios. **Proportional Hazards Regression** • Be able to describe when proportional hazards regression (Cox regression) can be used, and what it is used for. ○ Know what simpler test is equivalent to a proportional hazards model with only one predictor. • Be able to write down the equation for a (multiple) proportional hazards regression model and describe what each parameter means. • Be able to use the fitted proportional hazards model regression coefficients to obtain hazard ratios for each variable in the model. • Be able to interpret the hazard ratios for each variable. Know what value a hazard ratio would have if a variable has no effect, and what values are associated with a variable having a positive or a negative effect on the outcome. • Be able to interpret the confidence intervals and make a conclusion from the *p*-values for the hazard ratios.	**K:**
Unit 14 ANOVA	• Be able to describe when ANOVA can be used, and what it is used for. • Be able to make a conclusion from the results of an ANOVA *F*-test. • Be able to explain the purpose of post-hoc tests following ANOVA. • Be able to interpret the results of post-hoc tests following ANOVA. • Know what regression method is an alternative to ANOVA, and what benefits it offers.	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate 4. Interpret results of data analysis for public health research, policy or practice **K:**

Island Project
(semester-long)
	• Work as a team to carry out a research study on the Island:
	  ○ Research question
	  ○ Study design
	  ○ Sampling methods
	  ○ Statistical methods
	  ○ Interpret statistical results
		C:
		2. Select quantitative and qualitative data collection methods appropriate for a given public health context
		
		3. Analyze quantitative and qualitative data using

	○ Write a report ○ Create a poster presentation	biostatistics, informatics, computer-based programming and software, as appropriate 4. Interpret results of data analysis for public health research, policy or practice 19. Communicate audience-appropriate public health content, both in writing and through oral presentation 21. Perform effectively on interprofessional teams
		K:

Ideas for teaching strategies or assignments (can be included on grid):

- Ideas for further integration with other disciplines
  - Ethics in statistics (e.g., Holocaust)
  - Pair with Epidemiology to align our courses better, for example, using each other as guest lecturers

Requirements for implementation (can be included on grid):

- Need for resources
  - Case studies
  - Literature articles (esp. related to health disparity and diversity)
  - Data
  - Team-teaching
  - Guest lecturers
  - Assessment

Phase II Committee Chair Report

Course area: PubH 6450: Biostatistics Methods I

Committee Chair: Ann Brearley & Laura Le

Committee Members: (none)

CEPH competencies, skills, knowledge to be addressed in the course (complete template):

<table>
<tr><th>Unit (Week)</th><th>Learning Objectives</th><th>CEPH Competencies & Knowledge</th></tr>
<tr><td rowspan="2">Unit 1a
Variability and Randomness

Unit 1b
Introduction to programming (R and SAS)</td><td rowspan="2">• What is random?
  ○ With multiple concrete examples (list of examples and identify what is random)
• What is (random) variable?
• Sources of variability (e.g., measurement error, biological variability, time-dependent variability)
• Idea of distributions (of random variables)

• Installing software
• Uploading data
• Basic commands</td><td>C:</td></tr>
<tr><td>K:</td></tr>
<tr><td>Unit 2a
Sampling and Sampling variability</td><td>• Sample vs. population
  ○ Recognize the difference between a sample and a population.
  ○ State some of the potential errors that may result when using a sample to understand something about a population.
• Logistics of a study (e.g., cost, time)
• Sampling methods
  ○ Identify the sampling method(s) used in a reported research study.
• Sampling error (in lecture or textbook)
• Understanding the concept of sampling</td><td>C:
3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate.
4. Interpret results of data analysis for public health research, policy or practice.</td></tr>
</table>

Unit 2b
Types of Variables and Measurement Scales
	variability
	
	• Be able to tell the type of variable
	  ○ What are the subtypes of variables (discrete, continuous)
	  ○ translate between proportions expressed as natural frequencies or counts, as fractions, as decimals (0 to 1) and as percents.
	• Be able to choose how to best summarize the data (based on the type of variable)
	  ○ Plots
	  ○ Tables
	  ○ Numerical summaries
	  ○ (something with Table 1)
		K:

Unit 3 Estimation: CI for a single proportion, Margin of error, CI for inference	• Purpose of CI • Calculate CI proportion • Inference from CI proportions ○ Distinguish and describe the relationships between the sample proportion, the confidence interval and the population proportion. • Confidence level and CI • Sample size and CI • What is MOE (polling) • (terminology) Expected value • Distinguish between bias and precision.	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate. 4. Interpret results of data analysis for public health research, policy or practice. **K:**
Unit 4a Sampling distribution for a mean, CLT, SE **Unit 4b** Use of CIs for comparing groups: means	• Explore how sample distributions affect sampling variability/sampling distribution • Explore how sample size affect sampling variability/sampling distribution • CLT (sampling distribution of a mean) • SE!!! • How sampling distribution width is related to width of CI • Intro to t-distribution	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate. 4. Interpret results of data analysis for public health research, policy or practice.

	• SE for comparing two means	**K:**
Unit 5 Concept of hypothesis testing	• Understand the purpose of hypothesis test • Introduction to hypothesis testing terminology (null, alternative, type I and II errors) • (informal reasoning about hypothesis testing)	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate. 4. Interpret results of data analysis for public health research, policy or practice.
		K:

Unit 6a
Hypothesis testing: two group means
	• Be able to conduct a hypothesis test for means (two-sample situations) – four steps
	  ○ Define the null and alternative hypotheses
	  ○ Compute test statistics
	  ○ P-values
	  ○ Conclusions
	• One- vs. two-sided tests
	• Population variance known (z) vs. unknown (t)
	• Equal variance (pooled) vs. unequal variance
	• Connection between CIs and
		C:
		3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate.
		4. Interpret results of data analysis for public health research, policy or practice.

Unit 6b
Hypothesis testing: proportions (“Binary data”)
	hypothesis tests
	
	• CI for a single proportion
	  ○ Large sample vs. small sample (continuity correction)
	• Hypothesis test for a single proportion
	  ○ Large sample (normal approximation) vs. small sample (exact p-values)
	• CI for a difference in proportions
	  ○ Large sample vs. small sample (continuity correction)
	• Hypothesis test for a difference in proportions
		K:

Unit 7 Errors, power, and sample size	• Describe the errors that can occur in hypothesis testing • Understand what is meant by Type I error, Type II error, and power • Harp on why sample size matters • Power analysis (find a web applet, or have a Shiny app) • Understand some of the concepts involved in sample size estimation • Perform a simple calculation of sample size for a two-sample t-test	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate. 4. Interpret results of data analysis for public health research, policy or practice.
		K:
Unit 9/10 Comparing categorical data	• 2x2 (and larger?) tables • Chisq test • OR, RR • CIs for both (mention CI for comparing proportions of two groups)	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate. 4. Interpret results of data analysis for public health research, policy or practice.
		K:

Unit 11 Correlation and Simple linear regression	• Describe when correlation is used and what it is used for. • Understand the steps for correlation analysis. • Interpret scatterplots (e.g., form, precision, direction, strength) • Understand caveats with correlation (e.g., correlation does not imply causation, no linear relationship vs. no relationship, effect of outliers) • Understand the steps for test of significance for correlation and be able to make a conclusion from the results • Describe when linear regression is used and what it is used for. • Understand the steps for linear regression. • Understand what least squares means. • Interpret the results of simple linear regression • Be able to predict a value of Y given the LR equation. • Understand what a residual is. • Understand caveats with linear regression (e.g., extrapolation, outliers and influential points, plot the data to check for linear relationship) • Interpret R^2 • Understand the assumptions behind SLR • Understand the steps for test of significance for slope and be able to make a conclusion from the results	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate. 4. Interpret results of data analysis for public health research, policy or practice. **K:**
Unit 13 SLR Prediction and Diagnostics	• Understand the similarities and differences between prediction intervals and confidence intervals • Understand what effect inherent variability has on a prediction interval • Understand the four major assumptions for simple linear regression • Describe the importance of each assumption for estimation, inference and prediction • Perform basic model diagnostics on a	**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate. 4. Interpret results of data analysis for public health research, policy or practice.

	linear model • Interpret the output from diagnostics to assess the fit of a linear model • Understand what Cook's distance measures	**K:**
Weeks 14 & 15 Data Case-Competition		**C:** 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate. 4. Interpret results of data analysis for public health research, policy or practice. 19. Communicate audience-appropriate public health content, both in writing and through oral presentation 21. Perform effectively on interprofessional teams
		K:

Ideas for teaching strategies or assignments (can be included on grid):

- Ideas for further integration with other disciplines
    - Ethics in statistics (e.g., Holocaust)
    - Pair with Epidemiology to align our courses better, for example, using each other as guest lecturers

Requirements for implementation (can be included on grid):

- Need for resources
    - Case studies
    - Data
    - Team-teaching
    - Guest lecturers
    - Assessment

PubH 6102 Issues in Environmental Health			
Topic	**Objectives**	**CEPH Knowledge**	**CEPH Competency**
Introductory Case Study	Introduce the concepts of Global Health, Social Determinants of Health and Environmental Justice, so they can be recognized throughout each topic during the semester	3. Explain the role of quantitative and qualitative methods and sciences in describing and assessing a population's health 7. Explain effects of environmental factors on a population's health 11. Explain how globalization affects global burdens of disease 12. Explain an ecological perspective on the connections among human health, animal health and ecosystem health (eg, One Health)	
Air	Link air pollutants to specific human health outcomes	6. Explain the critical importance of evidence in advancing public health knowledge 4. Interpret results of data analysis for public health research, policy or practice 2. Select quantitative and qualitative data collection methods appropriate for a given public health context 7. Explain effects of environmental factors on a population's health	*4. Interpret results of data analysis for public health research, policy or practice* *6. Discuss the means by which structural bias, social inequities and racism undermine health and create challenges to achieving health equity at organizational, community and societal levels*
	Identify the most relevant air pollutants and their respective sources		
	Discuss the current scope of air pollution in the US and globally		
	Discuss community strategies for the prevention of air pollution		
Water	Where do we get our water?	11. Explain how globalization affects global burdens of disease	22. Apply systems thinking tools to a public health issue

	What do we use water for?		
	What threats to health can water pose?		
	How do we ensure an adequate supply of potable water?		
Food	Discuss global food security issues and identify global patterns of hunger and obesity	7. Explain effects of environmental factors on a population's health 10. Explain the social, political and economic determinants of health and how they contribute to population health and health inequities 11. Explain how globalization affects global burdens of disease 12. Explain an ecological perspective on the connections among human health, animal health and ecosystem health (eg, One Health)	19. Communicate audience-appropriate public health content, both in writing and through oral presentation
	Identify the major food producing regions of the world and discuss global patterns of food trade		
	Identify the most important causes of foodborne illness and how they can be prevented		
	Discuss environmental health considerations of food production		
Land	Analyze the evidence linking solid and hazardous waste with adverse human health effects.	7. Explain effects of environmental factors on a population's health	6. Discuss the means by which structural bias, social inequities and racism undermine health and create challenges to achieving health

	Define types of waste (i.e. hazardous waste).		equity at organizational, community and societal levels
	Identify community strategies for the control of solid and hazardous waste. (RCRA, TSCA,CERCLA)		
Housing	Analyze the evidence linking housing conditions with adverse health effects.	10. Explain the social, political and economic determinants of health and how they contribute to population health and health inequities	22. Apply systems thinking tools to a public health issue
	Identify essential elements of healthy housing conditions.		
	Identify community strategies for the provision of healthy housing. (Star Trib series on poverty and housing)		
	Identify public health challenges linked to poor access/quality housing and some possible strategies for addressing these challenges.		
Climate Change	Greenhouse effect, nomenclature	7. Explain effects of environmental factors on a population's health 12. Explain an ecological perspective on the connections among human health, animal health and ecosystem health (eg, One Health)	22. Apply systems thinking tools to a public health issue
	Science behind it		
	Adaptation		
Disaster Preparedness	To be determined		

Workplace and Injury	Occupational health: historical and public health context	7. Explain effects of environmental factors on a population's health	6. Discuss the means by which structural bias, social inequities and racism undermine health and create challenges to achieving health equity at organizational, community and societal levels 12. Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence 13. Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes
	Understand basic policy framework for providing a healthy working environment	5. Discuss the science of primary, secondary and tertiary prevention in population health, including health promotion, screening, etc.	
	Appreciate the global burden of occupational disease and injury		
	Understand how occupational health issues are tracked		
	Explore some specific issues in occupational health		
Infectious Disease	Discuss the primary routes of infectious disease transmission,	7. Explain effects of environmental factors on a population's health 8. Explain biological and genetic factors that affect a population's health 12. Explain an ecological perspective on the connections among human health, animal health and ecosystem health (eg, One Health)	
	Identify environmental factors that affect the major routes of transmission,		
	Discuss various prevention strategies, pros and cons, that are used to stop the spread of pests and their diseases		
	Identify factors associated with the emergence of new infectious diseases, and		

	Discuss global disparities in resources to control infectious diseases.	11. Explain how globalization affects global burdens of disease	
Chronic Disease	Describe four chronic diseases that are the major causes of death in the U.S.	4. List major causes and trends of morbidity and mortality in the US or other community relevant to the school or program 8. Explain biological and genetic factors that affect a population's health	
	Describe the conditions that contribute to the risk of developing specific chronic diseases.		
	Explain how the environment, broadly defined, contributes to the risk of developing specific chronic diseases.	7. Explain effects of environmental factors on a population's health	
	Explain the term "gene-environment interaction."	8. Explain biological and genetic factors that affect a population's health	
	Explain how changes in the environment, broadly defined, can affect rates of incidence of and deaths due to chronic diseases.		

Core Curriculum Revision Worksheet

Course area: Introductory Epidemiology

Committee Chair: Rachel Widome

Committee Members: Pamela Lutsey, DeAnn Lazovich, Theresa Osypuk

COURSE NAMES AND NUMBER:
1) PubH 6320 in-person Fundamentals of Epidemiology (FUND)
2) PubH 6320 online Fundamentals of Epidemiology (eFUND)
3) PubH 6341 Epidemiology Methods 1 (METH)

Overview

At the University of Minnesota School of Public Health the MPH epidemiology requirement can be fulfilled by taking either online PubH 6320 (taught Fall, Spring and Summer terms), in-person PubH 6320 (taught Fall and Spring terms), or PubH 6341 (taught in two sections in the Fall term). Currently there are eight instructors that teach these courses.

Audience

While many of the students in these courses are MPH students, there are also a fair number of students that take our introductory epidemiology programs from MS and PhD programs both from within and outside our SPH. There are also students in these classes in the SPH's certificate program. So there is a sizable minority of introductory epidemiology students who many not be taking all or even any other SPH core courses.

Knowledge domains and competencies

In the grids below we indicate whether each of the three courses touches upon each knowledge domain and competency and to what depth. shaded rows are knowledge domains and competencies that the committee thought there might be potential for expansion in our courses, if indeed this was an area of weakness across the core.

CEPH KNOWLEDGE DOMAINS – amended October 2016

Profession & Science of Public Health	
1. Explain public health history, philosophy and values	FUND, eFUND, and METH = some
2. Identify the core functions of public health and the 10 Essential Services	FUND, eFUND, and METH = not at all
3. Explain the role of quantitative and qualitative methods and sciences in describing and assessing a population's health	FUND, eFUND, and METH = in depth
4. List major causes and trends of morbidity and mortality in the US or other community relevant to the school or program	FUND, eFUND, and METH = in depth
5. Discuss the science of primary, secondary and tertiary prevention in population health, including health promotion, screening, etc.	FUND, eFUND, and METH = in depth
6. Explain the critical importance of evidence in advancing public health knowledge	FUND, eFUND, and METH = in depth
Factors Related to Human Health	
7. Explain effects of environmental factors on a population's health	FUND, eFUND, and METH = some
8. Explain biological and genetic factors that affect a population's health	FUND, eFUND, and METH = some
9. Explain behavioral and psychological factors that affect a population's health	FUND, eFUND, and METH = some
10. Explain the social, political and economic determinants of health and how they contribute to population health and health inequities	eFund = not at all; FUND, METH = some
11. Explain how globalization affects global burdens of disease	FUND, eFUND, and METH = not at all
12. Explain an ecological perspective on the connections among human health, animal health and ecosystem health (eg, One Health)	FUND, eFUND, and METH = not at all

CEPH 22 COMPETENCIES – amended October 2016

Evidence-based Approaches to Public Health	
1. Apply epidemiological methods to the breadth of settings and situations in public health practice	FUND, eFUND, and METH = in depth
2. Select quantitative and qualitative data collection methods appropriate for a given public health context	FUND, eFUND, and METH = in depth
3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate	FUND, eFUND, and METH = not at all

4. Interpret results of data analysis for public health research, policy or practice	FUND, eFUND, and METH = in depth
Public Health & Health Care Systems	
5. Compare the organization, structure and function of health care, public health and regulatory systems across national and international settings	FUND, eFUND, and METH = not at all
6. Discuss the means by which structural bias, social inequities and racism undermine health and create challenges to achieving health equity at organizational, community and societal levels	eFund = not at all; FUND, METH = some
Planning & Management to Promote Health	
7. Assess population needs, assets and capacities that affect communities' health	FUND, eFUND, and METH = not at all
8. Apply awareness of cultural values and practices to the design or implementation of public health policies or programs	FUND, eFUND, and METH = not at all
9. Design a population-based policy, program, project or intervention	FUND, eFUND, and METH = not at all
10. Explain basic principles and tools of budget and resource management	FUND, eFUND, and METH = not at all
11. Select methods to evaluate public health programs	eFund = not at all; FUND, METH = some
Policy in Public Health	
12. Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence	FUND, eFUND, and METH = some
13. Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes	FUND, eFUND, and METH = not at all
14. Advocate for political, social or economic policies and programs that will improve health in diverse populations	FUND, eFUND, and METH = not at all
15. Evaluate policies for their impact on public health and health equity	FUND, eFUND, and METH = some
Leadership	
16. Apply principles of leadership, governance and management, which include creating a vision, empowering others, fostering collaboration and guiding decision making	FUND, eFUND, and METH = not at all
17. Apply negotiation and mediation skills to address organizational or community challenges	FUND, eFUND, and METH = not at all
Communication	
18. Select communication strategies for different audiences and sectors	FUND, eFUND, and METH = not at all

19. Communicate audience-appropriate public health content, both in writing and through oral presentation	FUND, eFUND, and METH = not at all
20. Describe the importance of cultural competence in communicating public health content	FUND, eFUND, and METH = not at all
Interprofessional Practice	
21. Perform effectively on interprofessional teams	FUND, eFUND = in depth; METH = not at all
Systems Thinking	
22. Apply systems thinking tools to a public health issue	FUND, eFUND, and METH = not at all

For further exploration

As instructed, our committee discussed the idea of a cross-cutting theme that could be taught across all core courses. Committee members were open to this idea but had limited enthusiasm for it. Advantages of such a strategy would it would help connect topics across various core classes and potentially it could give the core a timely feel if the cross-cutting topic was current and updated every few years. A disadvantage of this concept was that not all of our students take the other core courses and even among those who do, these classes are taken in different orders or potentially over longer time periods in the case of part-time students. This might mean that the connections between courses might not seem obvious for all students or that some students' MPH careers might overlap several topics if they are changed every couple years. Our thought for how to best incorporate a cross-cutting topic in introductory epidemiology would be to create a "container lab/exercise" that any topic could be applied to. An example might be an exercise where students are directed to design a case-control study exploring Topic X, discuss the pros and cons or that study design with regard to Topic X, etc.

We also discussed way we could work together more as instructors, to develop exercises that could be used in any of our classes. Rachel Widome met with the chairs of the biostatistics committee several times to discuss ways we could harmonize terminology in our classes, perhaps guest lecture in each others' classes, and share resources in order to make the epidemiology and biostatistics introductory classes complement each other.

Teaching strategies and assignments

There is great diversity in how our three introductory epidemiology classes are taught. There is one class that is totally online, two classes have substantial lab components, one class is primarily a lecture format with frequent in-class exercises. A common thread across classes is there are many opportunities for students to work out problems collaboratively, either through labs or in-class exercises.

Resource needs & parking lot

If a decision was made to do a theme topic across the core, we would need good backgrounders on each topic as it may be outside of our areas of expertise. There is some potential to expand certain

areas of what we teach if needed (see shaded areas in grids above), however we do already have a pretty packed curriculum and that may come at the expense of other topics.

Public Health 6741: Ethics in Public Health – Professional Practice and Policy

Core Curriculum Report

Course Goals and Objectives

This course will better enable students to identify, analyze, and resolve ethical issues related to public health practice and public health policy. Reading assignments, course materials, and writing assignments will help students address ethical issues encountered in the practice of public health as well as in health policy formation. By the end of the course, students will have developed basic skills in ethical analysis and understanding of the major frameworks in public health ethics. Students will have increased familiarity with key topics in public health ethics and increased competence with which to make ethical decisions in their professional practice.

Class/Topic (F2F)	**Learning Objectives**	**CEPH Knowledge or Competency**	**Teaching strategies or assignments**
Introduction to Public Health Ethics (Week 1)	• Introduce students to the values and principles that distinguish public health from medical care, and public health ethics from bioethics. • Introduce students to the Code of Ethics for Public Health, developed by the Public Health Leadership Society. • Introduce students to the idea of macro- and micro-level ethical deliberation and the role of ethics in programmatic and policy decision-making.	K 1. Explain public health history, philosophy and values C 8. Apply awareness of cultural values and practices to the design or implementation of public health programs (slight) 11. Select methods to evaluate public health programs and policies (moderate) 12. Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence (moderate)	Visual mapping of class values

Ethical Principles in Public Health and the Distribution of Public Health Resources (Week 2)	• Familiarize students with different philosophical principles for distributing resources. • Examine the primary role of social justice in public health ethics. • Comprehend the relationship between the social determinants of health and justice, and how these principles shape scholars' and public health professionals' ideas about the scope of public health practice, policy, and law.	K 1. Explain public health history, philosophy and values 10. Explain the social, political and economic determinants of health and how they contribute to population health and health inequities	Case study – food deserts / social justice, social determinants of health
		C 6. Discuss the means by which structural bias, social inequities and racism undermine health and create challenges to achieving health equity at organizational, community and societal levels (moderate) 15. Evaluate policies for their impact on public health and health equity (moderate)	
Priority-Setting and Resource Allocation at the Macro Level (Week 3)	• Understand why the allocation of scarce public resources for improving the public's health is one of the most significant ethical issues at a policy level. • Analyze methods for allocating resources at the level of public policymaking, with particular attention to the *process* and *outcomes* of priority-setting. • Examine current issues in public health practice and policy related to priority setting.	K 10. Explain the social, political and economic determinants of health and how they contribute to population health and health inequities (slight)	Design essential health plan benefits; Deliberative democracy simulation – allocating health insurance benefits as a group
		C 12. Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence (moderate)	
Priority-Setting and Resource	• Identify how macro- and micro-level decisions are related.	K 10. Explain the social, political and	Design pandemic flu vaccine allocation plan; Group press release

Allocation at the Micro Level (Week 4)	• Understand how health departments and local public health agencies confront issues of allocating scarce resources (supplies, treatments, money, and employees' time) and what values, frameworks and skills are useful in daily micro-level decisions. • Practice applying ethical frameworks and principles in teams to address and communicate about public health ethical dilemmas at administrative levels	economic determinants of health and how they contribute to population health and health inequities C 12. Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence (moderate) 21. Perform effectively on interprofessional teams (slight)	writing
Balancing Individual and Community Interests (Week 5)	• Introduce the ethical tension in public health between preserving individual liberties and promoting the community good. • Understand the balancing of individual, stakeholder, and community interests in past and present health policy.	K 1. Explain public health history, philosophy and values (moderate) C 12. Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence (moderate) 13. Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes (slight)	Mock legislative hearing – raw milk regulation
Ethics of Disease Prevention (Week 6)	• Explore strategies for balancing the interests of the individual and community in disease prevention. • Comprehend how ethical analysis and frameworks can support implementation of a health prevention strategy. • Analyze the tension between	K 1. Explain public health history, philosophy and values (moderate) C 12. Discuss multiple dimensions of the policy-making process, including the roles of ethics and	Case study – state immunization requirements Social media exercise

	promoting the public good and the threat of imposing social stigma on individuals or groups.	evidence (moderate)	
Ethics of Health Promotion (Week 7)	• Understand how the shift in the public health mandate from *preventing disease* to *promoting health* raises complex ethical issues (i.e., raising the charge of "blaming the victim"; attributing responsibility for health; paternalism). • Examine health promotion approaches ranging from classic education campaigns to newer evidence-based behavioral economics interventions. • Evaluate the ethical issues arising from various approaches to health promotion (i.e., health education campaigns, wellness incentives, anti-obesity campaigns).	K 1. Explain public health history, philosophy and values	Discussion of obesity prevention PSAs
		C 18. Select communication strategies for different audiences and sectors (slight)	Critique of employer-based wellness plan incentives
Ethics Analysis (final paper)	• Apply skills in ethical analysis, including stakeholder identification, consideration of ethical concepts, applying an ethics framework, identifying a course of action • Communicate clearly and persuasively	K	Final 5 page paper
		C 11. Select methods to evaluate public health programs (slight) 12. Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence (moderate) 13. Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes (moderate)	

		19. Communicate audience-appropriate public health content, both in writing and through oral presentation (moderate)	

Other Issues as Noted in the Optional Columns on the Template

For further exploration [ideas on existing courses or on career development modules that could be created]

Not sure – would need to hear more about other core courses and what types of career development activities are needed.

Resource needs & parking lot issues [pedagogical or institutional needs]

One major issue that must be addressed ASAP if PubH6741 will be part of the core curriculum is what happens to PubH6742. Currently, students can choose one or the other to fulfill their requirements for ethics. The instructors of 6741 (practice and policy, the above course) do not know what the breakdown is in enrollment among our MPH students in 6741 versus 6742 but this must be determined so that we can better understand the implications if ONLY 6741 is made required. Currently, Sarah Gollust and Ruth Mickelsen are the only two instructors of 6741 and they are currently at capacity (or *over* capacity, given their other obligations), typically teaching 2 or 3 sections of the course each year (for between 4-6 sections offered in total). If 6741 is required of every student, we will need an additional instructor to reduce the burden. In addition, since the Center for Bioethics offers 6742, they are an important stakeholder that would need to be consulted if a change goes into effect whereby 6742 is not the required course for any SPH students. This would have financial implications for them. I believe that Leigh Turner is typically the instructor for 6742 but they may rotate other instructors as well.

Foundations of Public Health Couse Committee Work
11/23/2016 FINAL VERSION (PHASE 2)

#	Themes	Objectives for Each Theme	CEPH Competencies and Knowledge Domains
1	**Introduction and the History of Public Health** *(2-3 sessions)*	• What is Public Health and why it matters • Understanding social justice and how the historical racial ethnic frame and the dominant narrative impact public health history and current practice • Equity/Fairness • Core Functions and Essential Elements of PH • Intercultural Development Inventory assessment (or similar tool) • Careers in PH (?)	Competencies: #8. Apply awareness of cultural values and practices to the design or implementation to public health programs (Some depth) #6. Assess impacts of structural bias at organizational, community, and societal levels that pose challenges to health equity (Minimally addressed) Knowledge domains: #1 Explain public health history, philosophy and values #2 Identify the core functions of public health and the 10 Essential Services #6 Explain the critical importance of evidence in advancing public health knowledge #10 Explain the social, political and economic determinants of health and how they contribute to population health and health inequities
2	**Structures of Public Health** *(2-3 sessions)*	• Federal, Tribal, State, and Local structures and authorities • Global health structures and authorities (like WHO) • Population Health and the US Health Care and Services System • Systems Thinking • Overarching Case Study (e.g. Flint case) • Teamwork	Competencies: #5. Compare the organization, structure, and function of health care and public health systems across national and non-international settings. (Some depth) #20. Apply systems thinking tools to a public health issue. (Minimally addressed) Knowledge domains: #7 Explain effects of environmental factors on a population's health #10 Explain the social, political and economic determinants of health and how they contribute to population health and health inequities

			#11 Explain how globalization affects global burdens of disease
3	**Legal & Ethical Foundations of Public Health** *(2 sessions)*	• Public Health Laws as a basis for authority • Tribal law • Ethical considerations • Cultural traditions	Competencies #5. Compare the organization, structure, and function of health care and public health systems across national and non-international settings. (Minimally addressed) #12. Assess multiple dimensions of the policy-making process, including ethics and evidence in relation to their capacity to improve health and health equity. (Minimally addressed) Knowledge Domains: #1 Explain public health history, philosophy and values #10 Explain the social, political and economic determinants of health and how they contribute to population health and health inequities

4	**Social/Political Determinants of Public Health** *(4 sessions)*	• Power, Privilege, Structural Racism • Historical narrative and policy-making • Intersectionality • History of Inequities • Global perspectives	Competencies #6. Assess impacts of structural bias at organizational, community, and societal levels that pose challenges to health equity. (Some depth) #7. Assess population needs, assets, and capacities that affect communities' health. (Minimally addressed) #8. Apply awareness of cultural values and practices to the design or implementation to public health programs (Some depth) #12. Assess multiple dimensions of the policy-making process, including ethics and evidence in relation to their capacity to improve health and health equity. (Minimally addressed) Knowledge Domains: #1 Explain public health history, philosophy and values #4 List major causes and trends of morbidity and mortality in the US or other community relevant to the school or program #7 Explain effects of environmental factors on a population's health #9 Explain behavioral and psychological factors that affect a population's health #10 Explain the social, political and economic determinants of health and how they contribute to population health and health inequities
5	**Advocacy, Cultural Agility and Humility** *(4 sessions)*	• Understanding bias, discrimination, structural racism, and assimilation • Intercultural Development Inventory discussion • Historical Trauma • Human Rights • Social movements, social wellbeing and aspirations	Competencies #6. Assess impacts of structural bias at organizational, community, and societal levels that pose challenges to health equity. (Minimally addressed) #8. Apply awareness of cultural values and practices to the design or implementation to public health programs (Some depth) #14. Advocate for programs and political, social, and economic policies that will improve health in diverse populations. (Some depth)

			#19. Perform effectively on inter-professional teams. (Minimally addressed) Knowledge Domains: #1 Explain public health history, philosophy and values #7 Explain the effects of environmental factors on a population's health #9 Explain behavioral and psychological factors that affect a population's health #10 Explain the social political and economic determinants of health and how they contribute to population health and health equities
6	**Communication and Financing Public Health** *(1 session)*	• Critical appraisal of information (e.g. research, news, data, advertisements) • Distinguishing good science and junk science • Media, including access to, accuracy of reported news and unreported news, so-called "balance" in news, "fake" news • Public health is financing in US and in the world: opportunities and challenges (including in low-resource settings)	Competencies #10. Explain basic principles and tools of budget and resource management (Minimally addressed) #16. Choose appropriate strategies for communicating a public health issue to various audiences (Some depth) Knowledge Domains: #3 Explain the role of quantitative and qualitative methods and sciences in describing and assessing a population's health #6 Explain the critical importance of evidence in advancing public health knowledge #10 Explain the social, political and economic determinants of health and how they contribute to population health and health inequities

7	**Public Health in the 21st Century – Future Directions** *(1 session?)*	• Equity • Summary and Wrap-Up	Competencies #6. Assess impacts of structural bias at organizational, community, and societal levels that pose challenges to health equity. (Minimally addressed) #8. Apply awareness of cultural values and practices to the design or implementation to public health programs (Minimally addressed) #12. Assess multiple dimensions of the policy-making process, including ethics and evidence in relation to their capacity to improve health and health equity. (Minimally addressed) #14. Advocate for programs and political, social, and economic policies that will improve health in diverse populations. (Minimally addressed) Knowledge Domains: #1 Explain public health history, philosophy and values #7 Explain effects of environmental factors on a population's health

Committee on Revision of the Core Management Course, Fall 2016

Contents

Our Committee

- James Begun, PhD, Professor, Health Policy and Management
- Darren Kaltved, MEd, Associate Director, Career and Professional Development Center, School of Public Health
- Chukwudi Njoku, 2nd year student in PHAP
- Laura Rosenboom, 2nd year student in Public Health Nutrition
- Melissa Stone, PhD, Gross Family Professor of Nonprofit Management, Humphrey School of Public Affairs
- Rebecca Wurtz, MD, MPH, Associate Professor, Health Policy and Management

Introduction

Many students come to the management core course with management experience, perhaps more so than in the content areas of the other core courses (e.g., epi, bio, environmental health). Traditionally, MPH students have not liked the management course, perceiving it to be irrelevant to their professional goals. Nothing could be farther from the truth: effective management is the cornerstone of effective programs, social change, and community engagement.

The charge to the Management course development committee was to

- Identify CEPH competencies with management components.
- Identify employers' needs and marketplace considerations.
- Identify students' needs.

- Emphasize active learning, analytical thinking, practical application, and problem solving.
- Integrate with other courses as indicated by overlapping content.
- Address health equity and ethical issues.
- To consider in-person and online educational best practices.

At the Core Curriculum Phase II retreat in August 2016, participants assigned proposed CEPH competencies to different core classes. We have incorporated those assignments in our final recommendations.

Our Process

We reviewed material from many places and spoke with many people outside of the committee.

Framing the Future

All committee members read the ASPPH's Framing the Future report, as well as the "Public Health Employers' Advisory Board: Summary of Interviews" addendum.

Syllabus review

We reviewed syllabi for the two existing versions (face-to-face and online) of 6751, Professor Stone's syllabus for the core management course at the Humphrey School, and core management course syllabi from the following Schools of Public Health:

- Rollins (Emory)
- University of Illinois at Chicago
- UCLA
- UNC-Chapel Hill
- Northwestern

We were surprised to find that many schools do not have what we would consider a public/population management course, focusing instead in the core management course on policy and/or health *care* management.

Student course evaluations

RW reviewed the student course evaluations for both existing versions of 6751 (face-to-face and online), from 2014 onward, to gather past advice from students.

Competency review

We reviewed relevant management competencies from the ASPPH, CEPH competencies, and the Council on Linkages in Public Health. CoL/ASPPH competencies relevant to management are summarized in the appendix. We include these because we think they address management competencies in public and population health more effectively than the CEPH competencies.

Interviews and focus groups

We spoke with graduates who had taken the Certification in Public Health Exam (CPHE) to understand the management content covered in the exam. The CPH exam placed emphasis on theories of management, to the surprise of SPH graduates who took it. We reviewed notes from the focus groups held with students, alumni, and employers as part of Phase I of the core curriculum review.

Alumni and employers emphasized the importance of management skills: effective teamwork, project management, evaluation/quality improvement skills, goal/priority setting, planning (including strategic planning), budgeting, conflict management, stakeholder engagement, and negotiation skills.

Community Advisory Board

RW met with the PHAP programs' Community Advisory Board, comprised of leaders in public/population health managers, to get their advice regarding curriculum. As above, these potential employers emphasized management skill building.

Core curriculum redesign chairs and content experts

RW met with Jennifer Linde, chair of the Social and Behavior Health committee, the core course that currently has the most overlap with the Management core course.

JB and RW met with Sarah Gollust and Ruth Mickelsen, instructors of the current core ethics course, to discuss management and professional ethics.

Our Findings and Recommendations

We wholeheartedly endorse active learning in the classroom and online, including case-based learning. Case-based learning is used in many settings (including business schools focused on management education) to improve analytic thinking, practical applications, and problem solving. We recommend more case-based learning in the management course, and that the course participate in the proposed "core-wide" case, provisionally about the Flint MI water crisis.

Although we appreciate the value of practitioner guest lectures, we also note that these occupy valuable instructional time, and sometimes don't integrate well with course content.

We also note that PubH 6751 is a core course and can't delve deeply into any one subject. A large number of courses address management topics in more detail, including PubH 6724 The Health Care System and Public Health, PubH 6727 Leadership, PubH 6755 Planning and Budgeting, PubH 6765 CQI, PubH 6805 Project Management, PubH 6852 Program Evaluation in Health and Mental Health Settings, PubH7200 Public Health Program Management in an International Setting, PA 5101 Nonprofit Management and Governance, PA 5929 Effective Grantwriting for Non-Profit Organizations, PA 5190 Managing Conflicts, PA 5104 Strategic Human Resource Management, SW 8561 Human Resource Management in Human Services Agencies, and the Integrative Leadership university minor.

In the table below, we list the general topics we think belong in the core management course, Bloom Taxonomy-informed objectives for each topic, and the CEPH core competency(ies) that we think align with those topics.

Lastly, we suggest that the course's name be changed to Management in Population Health Settings.

Table. Topics, Objectives, and Competencies

Topics	**Objectives for Each Topic:** After completing the course, students should be better able to…	**CEPH Competencies**
1. Introduction	• Define management and organizations. • Identify personal management strengths and weaknesses.	15. Apply principles of effective leadership, governance and management, including fostering collaboration, guiding decision making, creating a vision and empowering.
2. Context for management in public/population health	• Identify the main management and organizational behavior theoretical frameworks. • Describe the diverse settings for public/population health work.	5. Compare the organization, structure and function of health care and public health systems across national and non-international settings.
3. Teams and groups	• Contribute to organizational teams and teamwork. • Create an agenda. • Run a meeting.	13. Propose strategies to build coalitions and partnerships for influencing public health outcomes. 19. Perform effectively on inter-professional teams.
4. Budgeting	• Define conventional, priority, zero-based, performance-based, and community-based budgeting. • Identify revenue streams for public and not-for-profit organizations. • Develop an operational budget for an organization.	10. Explain basic principles and tools of budget and resource management.
5. Planning	• Identify the differences between operational and strategic planning. • Develop vision, mission, and value statements for an organization. • Create a strategic plan for an organization.	10. Explain basic principles and tools of budget and resource management. 15. Apply principles of effective leadership, governance and management, including fostering collaboration, guiding decision making, creating a vision and empowering.

6. Negotiation and conflict	• Define conflict management. • Identify opportunities for engagement. • Assess personal conflict management style. • Use conflict constructively.	6. Assess impacts of structural bias at organizational, community and societal levels that pose challenges to health equity. 7. Apply awareness of cultural values and practices to the design or implementation of public health programs. 13. Propose strategies to build coalitions and partnerships for influencing public health outcomes. 19. Perform effectively on inter-professional teams.
7. Leadership	• Define leadership. • Evaluate the qualities needed for leadership. • Assess personal leadership strengths and weaknesses. • Analyze the leadership strengths and weaknesses in a complex population health problem.	5. Compare the organization, structure and function of health care and public health systems across national and non-international settings. 15. Apply principles of effective leadership, governance and management, including fostering collaboration, guiding decision making, creating a vision and empowering.
8. Project management	• Define project management. • Define project management concepts and terms. • Create a project management plan.	9. Design a population-based project, program, policy, or intervention.
9. Quality improvement	• Define QI concepts and terms. • Practice using QI concepts and terms to analyze real world systems. • Apply quality and performance improvement concepts and tools to address organizational performance issues.	9. Design a population-based project, program, policy, or intervention.
10. Change management	• Define organizational change and change management.	15. Apply principles of effective leadership, governance and management, including fostering collaboration, guiding decision making, creating a vision and

		empowering.
11. Performance evaluation	• Identify opportunities for performance evaluation at the individual, work unit, program, and organization level	9. Design a population-based project, program, policy, or intervention.
12. Making a career and professional development plan	• Create a plan for continued learning of management and leadership skills.	15. Apply principles of effective leadership, governance and management, including fostering collaboration, guiding decision making, creating a vision and empowering.
13. Miscellaneous		
a. Emergency management	• Define incident command system. • Organize resources in an emergency management scenario.	20. Apply systems thinking tools to a public health issue.
b. Diversity in the workplace	• Identify challenges and opportunities for diverse workplaces.	6. Assess impacts of structural bias at organizational, community and societal levels that pose challenges to health equity.
c. Managing communications	• Identify management/leadership opportunities to communicate messages. • Practice communications skills in speaking and writing.	16. Choose appropriate strategies for communicating a public health issue to various audiences, including stakeholders at all levels and sectors. 18. Deliver oral presentations on public health issues.

Appendix.

COL competencies

Financial Planning and Management Skills		
Tier 1	**Tier 2**	**Tier 3**
7A1. Describes the local, state, and federal public health and health care systems	7B1. Interprets the interrelationships of local, state, and federal public health and health care systems for public health program management	7C1. Leverages the interrelationships of local, state, and federal public health and health care systems for public health program management
7A2. Describes the organizational structures, functions, and authorities of local, state, and federal public health agencies	7B2. Interprets the organizational structures, functions, and authorities of local, state, and federal public health agencies for public health program management	7C2. Leverages the organizational structures, functions, and authorities of local, state, and federal public health agencies for public health program management
7A3. Adheres to the organization's policies and procedures	7B3. Develops partnerships with agencies within the federal, state, and local levels of government that have authority over public health situations or with specific issues, such as emergency events	7C3. Manages partnerships with agencies within the federal, state, and local levels of government that have authority over public health situations or with specific issues, such as emergency events
	7B4. Implements the judicial and operational procedures of the governing body and/or administrative unit that oversees the operations of the public health organization	7C4. Manages the implementation of the judicial and operational procedures of the governing body and/or administrative unit that oversees the operations of the public health organization
7A4. Participates in the development of a programmatic budget	7B5. Develops a programmatic budget	7C5. Defends a programmatic and organizational budget

7A5. Operates programs within current and forecasted budget constraints	7B6. Manages programs within current and forecasted budget constraints	7C6. Ensures that programs are managed within current and forecasted budget constraints

Financial Planning and Management Skills (cont'd)		
Tier 1	**Tier 2**	**Tier 3**
7A6. Identifies strategies for determining budget priorities based on federal, state, and local financial contributions	7B7. Develops strategies for determining budget priorities based on federal, state, and local financial contributions financial contributions	7C7. Critiques strategies for determining budget priorities.
		7C8. Determines budgetary priorities for the organization
7A7. Reports program performance	7B8. Evaluates program performance	7C9. Evaluates program performance
7A8. Translates evaluation report information into program performance improvement action	7B9. Uses evaluation results to improve performance	7C10. Uses evaluation results to improve performance
7A9. Contributes to the preparation of proposals for funding from external sources	7B10. Prepares proposals for funding from external sources	7C11. Approves proposals for funding from external sources
7A10. Applies basic human relations skills to internal collaborations, motivation of colleagues, and resolution of conflicts	7B11. Applies basic human relations skills to the management of organizations, motivation of personnel, and resolution of conflicts	7C12. Applies basic human relations skills to the management of organizations, motivation of personnel, and resolution of conflicts

7A11. Demonstrates public health informatics skills to improve program and business operations (e.g., performance management and improvement)	7B12. Applies public health informatics skills to improve program and business operations (e.g., business process analysis, enterprise-wide information planning)	7C13. Integrates public health informatics skills into program and business operations (e.g., business process analysis, enterprise-wide information planning)
7A12. Participates in the development of contracts and other agreements for the provision of services	7B13. Negotiates contracts and other agreements for the provision of services	7C14. Approves contracts and other agreements for the provision of services

Financial Planning and Management Skills (cont'd)		
7A13. Describes how cost-effectiveness, cost- benefit, and cost-utility analyses affect programmatic prioritization and decision making	7B14. Uses cost-effectiveness, cost-benefit, and cost-utility analyses in programmatic prioritization and decision making	7C15. Includes the use of cost-effectiveness, cost-benefit, and cost-utility analyses in programmatic prioritization and decision making
		7C16. Incorporates data and information to improve organizational processes and performance
		7C17. Establishes a performance management system

Leadership and Systems Thinking Skills					
Tier 1		**Tier 2**		**Tier 3**	
8A1.	Incorporates ethical standards of practice as the basis of all interactions with organizations, communities, and individuals	8B1.	Incorporates ethical standards of practice as the basis of all interactions with organizations, communities, and individuals	8C1.	Incorporates ethical standards of practice as the basis of all interactions with organizations, communities, and individuals
8A2.	Describes how public health operates within a larger system	8B2.	Incorporates systems thinking into public health practice	8C2.	Integrates systems thinking into public health practice
8A3.	Participates with stakeholders in identifying key public health values and a shared public health vision as guiding principles for community action	8B3.	Participates with stakeholders in identifying key values and a shared vision as guiding principles for community action	8C3.	Partners with stakeholders to determine key values and a shared vision as guiding principles for community action
8A4.	Identifies internal and external problems that may affect the delivery of Essential Public Health Services	8B4.	Analyzes internal and external problems that may affect the delivery of Essential Public Health Services	8C4.	Resolves internal and external problems that may affect the delivery of Essential Public Health Services (e.g., through the identification of root causes and other QI processes)
8A5.	Uses individual, team and organizational learning opportunities for personal and professional development	8B5.	Promotes individual, team and organizational learning opportunities	8C5.	Advocates for individual, team and organizational learning opportunities within the organization

Leadership and Systems Thinking Skills (cont'd)

Tier 1	Tier 2	Tier 3
8A6. Participates in mentoring and peer review or coaching opportunities	8B6. Establishes mentoring, peer advising, coaching or other personal development opportunities for the public health workforce	8C6. Promotes mentoring, peer advising, coaching or other personal development opportunities for the public health workforce, including him or herself
8A7. Participates in the measuring, reporting and continuous improvement of organizational performance	8B7. Contributes to the measuring, reporting and continuous improvement of organizational performance	8C7. Ensures the measuring, reporting and continuous improvement of organizational performance
8A8. Describes the impact of changes in the public health system, and larger social, political, economic environment on organizational practices	8B8. Modifies organizational practices in consideration of changes in the public health system, and the larger social, political, and economic environment	8C8. Ensures organizational practices are in concert with changes in the public health system, and the larger social, political, and economic environment
		8C9. Ensures the management of organizational change

Phase II Committee Report

Course area: Fundamentals of Social & Behavioral Sciences (PubH 6020)

Committee chair: Jennifer Linde, PhD (EpiCH faculty)

Committee members: Kelsey Ball (HPM student); Ellyn Buchanan (Office of E-Learning Services; J'Mag Karbeah (EpiCH student); Ira Moscovice, PhD (HPM faculty); Toben Nelson, ScD (EpiCH faculty); Sarah Sevcik, MPH, MEd (SPH Alumna and EpiCH instructor)

CEPH competencies, skills, knowledge to be addressed in the course:

CEPH Knowledge Domains Addressed Throughout the Course (in bold type)
1. Explain public health history, philosophy and values
2. Identify the core functions of public health and the 10 Essential Services (services addressed in class are in bold type): 1. **Monitor health status to identify and solve community health problems.** 2. **Diagnose and investigate health problems and health hazards in the community.** 3. **Inform, educate, and empower people about health issues.** 4. **Mobilize community partnerships and action to identify and solve health problems.** 5. **Develop policies and plans that support individual and community health efforts.** 6. Enforce laws and regulations that protect health and ensure safety. 7. **Link people to needed personal health services and assure the provision of health care when otherwise unavailable.** 8. Assure competent public and personal health care workforce. 9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services. 10. Research for new insights and innovative solutions to health problems.
3. Explain the role of quantitative methods and sciences in describing and assessing a population's health
4. List major causes and trends of morbidity and mortality in the US or other community relevant to the school or program
5. Discuss the science of primary, secondary and tertiary prevention in population health, including health promotion, screening, etc.
6. Explain the critical importance of evidence in advancing public health knowledge
7. Explain effects of environmental factors on a population's health
8. Explain biological and genetic factors that affect a population's health
9. Explain behavioral and psychological factors that affect human health
10. Explain the social, political and economic determinants of health and how they contribute to population health and health inequities
11. Explain how globalization affects global burdens of disease
12. Explain an ecological perspective on the connections among human health, animal health and ecosystem health (eg, One Health)

Course Units / Content Areas	Unit Objectives	CEPH Competencies Addressed by Unit	Additional Courses of Interest to this Topic
UNIT ONE: PSYCHOSOCIAL			
1. Introduction to SBS and social ecological models 2. Equity and social justice 3. Theoretical models of health behavior change 4. PRECEDE-PROCEED model for planning and evaluating programs	• Understand the role of theoretical models and/or frameworks in shaping public health interventions • Explain concepts of equity and social justice as they apply to public health action • Apply models to explain health behavior decisions or cause/effect patterns • Develop intervention campaigns or programs based on theoretical models, as applied to specific populations of interest • Evaluate strengths and weaknesses of models or programs in public health	C5. Compare the organization, structure, and function of health care and public health systems across national and international settings. C6. Discuss the means by which structural bias, social inequities and racism undermine health and create challenges to achieving health equity at organizational, community and societal levels. C7. Assess population needs, assets, and capacities that affect communities' health. C8. Apply awareness of cultural values and practices to the design or implementation of public health policies or programs. C9. Design a population-based policy, program, project or intervention. C18. Select communication strategies for different audiences and sectors.	• PubH 6055, Social Inequalities in Health • PubH 6034, Evaluation • PubH 6852, Program Evaluation in Health and Mental Health Settings • PubH 6855, Medical Sociology

Course Units / Content Areas	Unit Objectives	CEPH Competencies Addressed by Unit	Additional Courses of Interest to this Topic
UNIT TWO: COMMUNITY			
5. Social networks and social support 6. Community approaches and community organizing 7. Community engagement (including Diffusion of Innovations and social marketing)	• Understand patterns of social connection and their influences on health • Review community change concepts and theories • Learn about and apply community organizing techniques to areas of concern in public health • Develop communication campaigns to spread public health messages in social networks • Understand the role of a community organizer in the change process	C6. Discuss the means by which structural bias, social inequities and racism undermine health and create challenges to achieving health equity at organizational, community and societal levels. C7. Assess population needs, assets, and capacities that affect communities' health. C8. Apply awareness of cultural values and practices to the design or implementation of public health policies or programs. C13. Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes. C14. Advocate for political, social and economic policies and programs that will improve health in diverse populations. C16. Apply principles of leadership, governance, and management, which include creating a vision, empowering others, fostering collaboration and guiding decision-making. C18. Select communication strategies for different audiences and sectors. C20. Describe the importance of cultural competence in communicating public health content.	• PubH 6066, Building Communities, Increasing Health: Preparing for Community Health Work • PubH 6074, Mass Communication and Public Health • PubH 6281, Immigrant Health Issues • PubH 6705, Community Health Assessment • PubH 6804, Community Mental Health • PubH 6815, Community-based Participatory Research

Course Units / Content Areas	Unit Objectives	CEPH Competencies Addressed by Unit	Additional Courses of Interest to this Topic
UNIT THREE: ECONOMICS			
8. Overview of economics and health 9. Other econ lecture: applications to public health areas	• Understand the role of economics in developing, implementing, and evaluating public health programs • Explain the role of costs and benefits related to public health decision making • Analyze externalities related to public health decision making • Relate concepts of supply and demand to public health	C7. Assess population needs, assets, and capacities that affect communities' health. C14. Advocate for political, social or economic policies and programs that will improve health in diverse populations.	• PubH 6557, Health Finance I • PubH 6558, Health Finance II • PubH 6755, Planning and Budgeting for Public Health • PubH 6832, Economics of the Health Care System • PubH 6861, Health Insurance • PubH 6862, Cost-effectiveness Analysis in Health Care

Course Units / Content Areas	Unit Objectives	CEPH Competencies Addressed by Unit	Additional Courses of Interest to this Topic
UNIT FOUR: POLICY			
10. What is public health policy? Distributive justice and health care resources 11. Interest groups and processes / social determinants of health 12. Policy analysis	• Define the concept of distributive justice as it relates to public health policy • Understand the policy process and apply it to a public health area of interest • Discuss the role of interest groups in public health decision making • Evaluate the role of social determinants in shaping policy decisions • Analyze externalities related to public health policy • Discuss the conditions under which public health policies are justified	C12. Discuss multiple dimensions of the policy-making process, including the role of ethics and evidence. C13. Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes. C14. Advocate for programs and political, social, and economic policies that will improve health in diverse populations. C15. Evaluate policies for their impact on public health and health equity. C18. Select communication strategies for different audiences and sectors.	• PubH 6045, Skills for Policy Development • PubH 6049, Legislative Advocacy Skills for Public Health • PubH 6078, Public Health Policy as a Prevention Strategy • PubH 6113, Public Policy and Risk: Strategies for Effective Decisions and Discourse • PubH 6569, Healthcare Policy • PubH 6634, Children and Families: Public Health Policy and Advocacy • PubH 6711, Public Health Law • PubH 6735 or 6835, Principles of Health Policy

COMPETENCIES ADDRESSED THROUGHOUT COURSE
C19. Communicate audience-appropriate public health content, both in writing and through oral presentation. (note: in writing for all sections, with option for oral presentation in in-person section)
C22. Apply systems thinking tools to a public health issue. (Tentative, to be confirmed in Phase III)

Ideas for teaching strategies or assignments

- Lecture-type lesson modules to deliver basic course content – consider "flipped" classroom model for in-person section, with post-lesson quizzes to confirm lesson completion prior to attending class; to be decided in Phase III.
- Readings (textbook and/or journal articles, editorials, briefs, etc.) assigned to each lesson to augment content.
- One major assignment per unit to test application of knowledge to public health question selected by student at beginning of term; applications question/short answer vs. short research paper format to be determined in Phase III.
- One case-type activity per unit to assess working knowledge of relevant concepts prior to major assignment completion; assignments currently in use will be reviewed by Phase III team.
- Incorporation of community partners into classroom and online experiences (especially during Community unit).
- Peer review as method for reinforcing content, applications, and collaborative work.
- Use of relevant section of overarching core case study in one unit of this course.
- Small group exercises (case-type activity completion or other) to be integrated across all Fall and Spring semesters; consider for Summer if time permits (Summer term is time-compressed).

Requirements for implementation

- One in-person section in Fall semester; frequency of class meetings to be determined in Phase III. The team strongly recommends restoration of this course to 3 credits (meeting twice weekly), though 2 credits (meeting once weekly) can be managed within the current plan if necessary.
- Three online sections (Fall, Spring, Summer).
- All sections led by faculty in the Division of Epidemiology & Community Health (EpiCH).
- First teaching assistant (1 per 30 students) for online sections currently selected according to negotiation with Division of Health Policy and Management (HPM), additional TAs appointed at EpiCH instructor's discretion; TA(s) for in-person section selected by EpiCH instructor.
- In-person section classroom should facilitate group work and/or discussion among students (not an auditorium-style, lecture-only setup).
- Phase III participating instructors (EpiCH instructors of record) should receive adequate release time (10% effort per instructor for one year, beyond usual teaching effort) to redevelop courses (in-person and online); contributing HPM instructors should be compensated as well for updating lectures and readings, at a rate to be decided with their consultation.
- E-learning services and administrative support for course development activities (online section redevelopment, eReserves setup, scheduling meetings and coordinating between EpiCH and HPM, article searches, or other necessary tasks).
- Training or other appropriate support for developing case-based materials for course or for flipped classroom delivery, other novel pedagogical approaches.

MPH core curriculum area: Applied Practice Experiences (previously Field Experience)

Please note: Integrative Learning Experience (previously culminating experience) will be addressed in next steps

Committee Chair: Betsy Wattenberg

Committee Members: Shelley Cooksey, Carol Francis, Megan Lafontaine Gallert, Linda Kahn,

CEPH competencies, skills, knowledge to be addressed in the course: Students must identify at least five competencies, including three foundational competencies, to be addressed by their Applied Practice Experience

Ideas for teaching strategies or assignments: Develop a 1-credit online course that prepare students for the Applied Practice Experience by addressing professional development, documents the five competencies to be addressed by the MPH Applied Practice Experience, and documents the two required portfolio products that result from the Applied Practice Experience.

The 1-credit course would be the minimum required credits for the Applied Practice Experience across Divisions and Programs. Divisions and Programs can require additional Applied Practice Experience if appropriate.

Requirements for implementation: Resources for development of the 1-credit online course, and monitoring the successful completion of the course. For example, monitoring the successful completion of the course might require designated staff or faculty.

Next Steps for Applied Practice Experience

- Conduct focus groups with current students, alumni, preceptors, and people who are considering becoming preceptors to determine what makes a meaningful Applied Practice Experience from their perspectives and experiences. The results will help do the following:

    - Draft guidelines for students to plan their Applied Practice Experience

    - Develop a mechanism, (e.g., an online course described below) to prepare students for the Applied Practice Experience, monitor their experience, and document the products students need to produce to fulfill the requirement, including addressing five competencies

    - Determine what components of the Applied Practice Experience should be consistent across the School of Public Health

- Develop a 1-credit online course, which serves as the minimum requirement for each student.

    - The course will prepare students for the Applied Practice Experience by addressing professional development.

    - The course will document the five competencies, three of which must be foundational, that will be addressed through the Applied Practice Experience

    - The course will document the two portfolio products that result from the Applied Practice Experience (e.g., narrative on their professional development to prepare them for future jobs in public health; summary of reflections that documents how the competencies were addressed through the Applied Practice Experience)

    - Each Division can require additional credits and assessments, if appropriate

    - Students may participate in a school-wide poster session every year that highlights Applied Practice Experiences, which would serve to introduce new students to examples Applied Practice Experiences and to help thank preceptors, who would be invited to attend the poster session

- Develop a list of Applied Activities that students can choose from to complete their Applied Practice Experiences (these may be completed as individual or group-based).

    - Traditional internship
    - List of community-based courses
    - Co-curricular activities

Next Steps for Integrative Learning Experience

- Review the current culminating options across the Divisions and Programs, including credit requirements and methods for assessment
- Review the new CEPH requirements for Integrative Learning Experiences
- Determine if the current options need to be updated to meet the new CEPH requirements
- Determine if there are minimal requirements for the Integrative Learning Experience that should be common across the Divisions and programs