CHRONIC DISEASE EPIDEMIOLOGY

CDE 502a / EHS 502a, Physiology for Public Health Staff
The objective of this course is to build a comprehensive working knowledge base for each of the primary physiologic systems that respond to acute and chronic environmental stressors, as well as chronic disease states. The course follows the general framework: (1) examine the structural and functional characteristics of given physiological system; (2) explore how both structure and function (within and between physiological systems) work to promote health; (3) explore how necessary features of each system (or integrated systems) are points of vulnerability that can lead to dysfunction and disease. In addition, this course offers the opportunity to examine each physiological system with respect to influences key to public health interest, e.g., age, race/ethnicity, environmental exposures, chronic disease, microbial disease, and lifestyle, including the protection afforded by healthy lifestyle factors. Not open to auditors.

[CDE 515, Accelerated Epidemiology]
This intensive seven-week summer course provides a comprehensive overview of epidemiologic concepts and methods. Topics include measurements of disease frequency and association, study design (including randomized and non-randomized controlled trials, cohort studies, case-control studies, cross-sectional studies, and ecologic studies), screening principles, reliability and validity, bias, confounding, and effect modification. After completing this course, students are able to calculate and interpret epidemiologic parameters, identify the strengths and weaknesses of various study designs, and apply the principles and methods of epidemiology to the design and analysis of new studies. Not open to students in the traditional two-year M.P.H. program. 1 Course cr

[CDE 516, Principles of Epidemiology II]
This purpose of this one-credit course is to provide students with expertise in the science and practice of intermediate epidemiologic methods. This course introduces the concept and is subsequently grounded in principles of causal inference. The course reviews fundamentals of study design and threats to validity (confounding, bias) through the lens of critical evaluation of the published literature. Specific topics covered include effect modification, standardization, matching, residual confounding, survival analysis, sample size and power, meta-analysis, screening, and the so-called hierarchy of designs. Through lectures, interactive discussion and activities, readings from the peer-reviewed literature, and homework assignments, students learn to (1) evaluate the scientific merit and feasibility of epidemiologic study designs; (2) review, critique, and evaluate epidemiologic reports and research articles; and (3) draw appropriate inferences for public health action from epidemiologic data at the intermediate level. Not open to auditors. Prerequisite: EPH 508 or equivalent. 1 Course cr

[CDE 520, Case-Based Learning for Genetic x Environmental Diseases in the Modern Genomic Era]
This course is a gateway to several updated as well as landmark public health stories with insights, analysis, and exclusives, including topics such as epigenetics, development of disease prevention, and personalized medicines. Ethical, political, and economic issues involved in the proper handling of genetic information are also

discussed. Lectures are delivered using multimedia methods, including illustrations, cartoons, videos, and smart reads. Students take away the latest developments in tackling the causes of both early- and late-onset diseases; a roundup of key challenges; and skills in the appropriate design of a study, analysis, and interpretation that will be crucial for tackling the disease of their own interest in the future. Active participation in quizzes, writing, sharing personal research and opinions, and presentations are the criteria for the final grade. No prerequisites. 1 Course cr

CDE 525a, Seminar in Chronic Disease Epidemiology Staff
This seminar is conducted once a month and focuses on speakers and topics of particular relevance to CDE students. Students are introduced to research activities of the department's faculty members, with regular presentations by invited researchers and community leaders. The seminar is required of first-year CDE students. Although no credit or grade is awarded, satisfactory performance will be noted on the student's transcript. 0 Course cr

[CDE 526, Seminar in Chronic Disease Epidemiology]
This seminar is conducted once a month and focuses on speakers and topics of particular relevance to CDE students. Students are introduced to research activities of the department's faculty members, with regular presentations by invited researchers and community leaders. The seminar is required of first-year CDE students. Although no credit or grade is awarded, satisfactory performance will be noted on the student's transcript. 0 Course cr

[CDE 532, Epidemiology of Cancer]
This course applies epidemiologic methods to the study of cancer etiology and prevention. Introductory sessions cover cancer biology, carcinogenesis, cancer incidence, and mortality rates in the United States, and international variation in cancer rates. The course then focuses on risk factors for cancer (including tobacco, alcohol, hormonal factors, diet, radiation, and obesity/physical activity) and on major cancer sites (including colon, breast, and prostate). Emphasis is placed on critical reading of the literature. Prerequisite: EPH 508. 1 Course cr

[CDE 534, Applied Analytic Methods in Epidemiology]
This computer lab-based course provides students with a comprehensive overview of data management and data analysis techniques. The SAS statistical software program is used. Students learn how to create and manipulate data sets and variables using SAS; identify appropriate statistical tests and modeling approaches to evaluate epidemiologic associations; and perform a broad array of univariate, bivariate, and multivariable analyses using SAS and interpret the results. Prerequisites: EPH 505 and EPH 508; or, for Advanced Professional M.P.H. students, successful completion of EPH 515 or permission of the instructor. Not open to auditors. 1 Course cr

[CDE 535, Epidemiology of Heart Disease and Stroke]
Heart disease and stroke are among the leading causes of death and disability among industrialized nations. This course introduces students to the major categories of cerebrovascular and cardiovascular disease. Students are challenged to think about how individual diseases contribute to the epidemic of vascular disease in the United States. In this course, students learn basic principles about the rates of disease, risk factors, clinical trial results, and outcomes of heart disease and stroke. Through the analysis of actual studies, students apply basic epidemiology to critically evaluate current literature

and topics in this field. Sessions include a clinical overview of a specific disease or risk factor, as well as highly interactive discussion of a specific epidemiologic topic or principle. Students are encouraged to develop their own solutions to current gaps in the epidemiologic literature. 1 Course cr

[CDE 536, Foundations of Maternal Child Health Promotion]
This course provides a comprehensive introduction to the theory and practice of promoting lifelong health and wellbeing for mothers, children, and families. The course examines how maternal and child health is shaped by social, structural, environmental, and policy contexts and distinguishes promotion from prevention, treatment, or education alone. Students critically assess existing maternal and child health initiatives and explore the conditions that allow families to thrive. Emphasis is placed on applying conceptual frameworks to the design and translation of feasible, equity-oriented maternal and child health promotion strategies. 1 Course cr

[CDE 538, Soda Politics: How the Soft Drink Industry Profoundly Influences Social Policy around the World]
The story of soda is a remarkable tale of how a product that has no nutritional value and costs pennies to make came to be a mammoth profit leader through ingenious advertising, lobbying, and marketing. We explore soda's profound impact on health, the economy, the environment, philanthropy, and advertising and read the most recent studies on its contribution to the obesity epidemic. We also delve into who the players are in the politics of soda—the public health officials, lobbyists, health activists, advertising agencies, lawmakers, taxpayers, and academic researchers—and discuss what role, if any, the government should play in controlling access to soda in schools, hospitals, and other governmental institutions, and whether taxing soda is at odds with freedom of choice in the marketplace. Prerequisite: some facility with reading scientific journal articles and analyzing statistics is necessary. ½ Course cr

[CDE 547, Global Infectious and Chronic Disease Patterns]
The global burden of disease has been transitioning from communicable to noncommunicable diseases, but both remain major health issues. Accordingly, it is critical to develop perspectives and approaches to address this evolving double burden of disease. While traditionally infectious and chronic diseases have been siloed in public and global health, the emerging health picture is one of a complex relationship not easily teased apart. There is both the potential for co-existence and influence imposed between infectious and chronic diseases. The goal of this course is to examine and critique both the classic separateness and the modern-day complex interconnectedness and co-existence between infectious disease and chronic disease entities, including the role of environmental factors on these global conditions. 1 Course cr

[CDE 551, Global Noncommunicable Disease]
This course focuses on the contemporary burden of noncommunicable diseases (NCDs), with a particular focus on the health impact of NCDs in low- and middle-income countries. The first part of the course briefly covers the etiology and global distribution of four key NCDs: cardiovascular disease, cancer, chronic respiratory disease, and diabetes. We then discuss the shared behavioral, metabolic, and physiologic risk factors for these diseases and explore how NCDs are associated with economic development, globalization, and the demographic and health transitions. The second half of the course focuses concretely on approaches to NCD intervention,

from individual-level approaches to coordinated global action. The last five lectures are by guest speakers offering insight into the successes and challenges of their own intervention attempts. 1 Course cr

[CDE 553, Implementation Science to Address Chronic Diseases: Global Health Case Studies]
Chronic diseases, including cardiovascular diseases, cancer, diabetes, and obstructive lung disease, cause most premature deaths globally, with most occurring in low- and middle-income countries. Implementation Science takes "what we know" and turns it into "what to do and how" and systematically studies the strategies that enable research uptake into real-world settings. More implementation research is needed to meet the challenges of applying evidence-based interventions with fidelity, sustainability, and scale in different settings. This course provides an overview of the application of implementation science with seven case studies demonstrating how to define evidence-based interventions and implementation strategies; how to select, adapt, and apply theories/frameworks/models to global settings, how to develop and test implementation strategies, and how to evaluate implementation processes and outcomes. ½ Course cr

[CDE 554, Navigating the Media Landscape for Maximum Public Health Impact]
Public health in America has never been so divided. We have a crisis of trust—from the media to our government institutions. As public health students and experts, it's vital to understand not only what's happening in the public health sphere, but also how it is covered by both the mainstream media and the legions of influencers covering health and health-adjacent issues. By exploring several major public health stories from the past few years across various mediums (print, podcast, broadcast, social media), we examine how the media ecosystem is changing and how to navigate the new system for maximum impact. This course is available for all second year M.P.H. students. This course is designed to prepare students to apply the foundations that they have mastered at YSPH in the public health workforce. 1 Course cr

[CDE 562, Nutrition and Chronic Disease]
This course provides students with a scientific basis for understanding the role of nutrition and specific nutrients in the etiology, prevention, and management of chronic diseases. Nutrition and cancer are particularly emphasized. Other topics addressed include cardiovascular diseases, osteoporosis, obesity, diabetes mellitus, and aging. Implications for federal nutrition policy, such as dietary guidelines, dietary supplement regulations, and food labeling, are discussed. Not open to auditors. 1 Course cr

[CDE 563, Biomarkers of Exposure, Effect, and Susceptibility in the Epidemiology of Noncommunicable Disease]
This course explores how new biomarker approaches can be applied to understanding the health consequences of environmental exposures and other risk factors. We learn how advances in the measurement of environmental exposures, genes, proteins, metabolites, and the microbiome have strengthened epidemiological associations and narrowed the gap from correlation to causality. Variability in biomarker performance and susceptibility to disease due to ageing, diet, location, and other factors is discussed, along with methods that are used to evaluate biomarker evidence in epidemiology. Lectures describe chronic noncommunicable diseases of immediate concern to public health such as neurodegenerative diseases (Alzheimer's disease, Parkinson's disease),

cancer, cardiovascular diseases, and asthma. We examine seminal publications and the application of techniques that have transformed the understanding of each disease, resulting in improvements to early detection and treatment approaches for these diseases. We also delve into examples of epidemiologic studies that have been carried out on large prospective cohorts, such as the Framingham Heart Study and Nurses' Health Study, and compare and critique methods used to identify biomarkers of disease between the cohorts. To evaluate and foster greater understanding of these areas, students critique journal articles for homework assignments. 1 Course cr

CDE 566a / EHS 566a, Causal Inference Methods in Public Health Research Staff
This course introduces the theory and applications of causal inference methods for public health research. The rapid development of both the theoretical frameworks and applications of causal inference methods in recent years provides opportunities to improve the rigor of epidemiological research. The course covers topics such as (1) the principles of causal logic including counterfactuals and probability logic, (2) epidemiological study designs and sources of biases including misinterpretations of statistics, (3) applications of causal diagrams in epidemiology, (4) applications of causal modeling techniques in epidemiological research using real-world and simulated data. Students leave the course with a basic knowledge of causal inference methods to apply in their own research projects and the ability to further explore the causal inference literature. This is an introductory-level course for causal inference methods with a focus on epidemiological research using observational data. Students interested in the theoretical and mathematical basis of causal inference methods should consider taking BIS 537. Prerequisites: EPH 508 and either BIS 505 or CDE 534. Other equivalent classes would require the permission of the instructor. Programming experience is also required.

[CDE 567, Injury and Violence as Public Health Issues]
This course focuses on the contemporary burden of injuries and violence, with an emphasis on models and methods for studying and preventing injuries and violence. The first part of the course focuses on the history of injury and violence epidemiology and prevention, as well as the risk factors for, and distribution of, morbidity and mortality related to injuries and violence in the United States and globally. The remainder of the course focuses on specific types of injury and violence events, research and interventions to prevent and mitigate injury and violence, linkages between research and practice in the field of injury and violence prevention, as well as policy and legal issues in injury and violence prevention. 1 Course cr

[CDE 570, Humanities, Arts, and Public Health]
This course challenges students to explore the possibilities, problems, and potential uses of arts and humanities in public health practice. Utilizing the expertise present across Yale University and featuring work of artists from across the country, this primarily U.S.-focused course explores different methodologies for incorporating and assessing the impact of arts in the public health field. Classes meet twice weekly, once for a lecture/discussion and once for an interactive, hands-on workshop or performance. Each of the weekly modules focuses on a central theme and incorporates aspects of methods and assessment alongside creative work. By the end of the course, students are familiar with a variety of projects integrating arts, humanities, and health in the United States; understand the importance of self-reflection and responsible artistic practice; have a basic understanding of the importance of impact assessment;

and have designed and evaluated a hands-on creative project. EPH 507 and EPH 508 are recommended but not required. 1 Course cr

CDE 572a, Obesity Prevention and Lifestyle Interventions Staff
This course reviews the methods and evaluation of obesity prevention and lifestyle interventions conducted in multiple settings (e.g., individual, family, and community settings, as well as policy-level interventions). Topics include physical activity, nutrition, and weight-loss interventions in various populations (children, adults, those who are healthy, and those with chronic diseases). The course combines didactic presentations, discussion, and a comprehensive review of a particular lifestyle intervention by students. This course is intended to increase the student's skills in evaluating and conducting obesity prevention and lifestyle interventions.

[CDE 582, Health Outcomes Research: Matching the Right Research Question to the Right Data]
The overarching goal is to provide a bridge between previously learned statistical methodologies and public health subject matter (see prerequisites) to knowledge of secondary data resources and the ability to critically formulate and evaluate a research question. The course has been designed with the goal of achieving the following learning objectives: (1) understand types of health outcomes study designs and associated strengths and limitations; (2) know how to critically interpret studies; (3) critically formulate a research question; (4) be familiar with commonly used types of data and associated strengths and limitations; (5) be able to write, communicate, and incorporate feedback on a research question and analysis plan; (6) be able to evaluate and provide feedback on research questions and analysis plans. Prerequisites: EPH 505, EPH 507, EPH 508, and EPH 510. Not open to auditors. 1 Course cr

CDE 588a, Perinatal Epidemiology Staff
In this course we explore the epidemiologic field of fertility, pregnancy, and pregnancy-related outcomes for the mother and the offspring. Through lectures and discussions, we focus on particular substantive topics and methodological challenges and opportunities relevant to the perinatal setting. Examples of topics are family planning, maternal pregnancy complications, birth outcomes, and long-term consequences of being born preterm. Important risk factors are covered, with a focus on modifiable risk factors (e.g., smoking and nutrition), key demographics (e.g., age and race/ethnicity), and climate change. For methods, we examine how the use of e.g. negative controls, sibling comparisons and instrumental variables can reduce the numerous biases in this field. Current and landmark studies are discussed and critically reviewed. While students are introduced to basic pregnancy biology along with some public health policy, this course is primarily oriented towards epidemiological research: Students develop the ability to critically appraise the literature in perinatal epidemiology, identify research gaps, and design studies to address these gaps. Prerequisite: EPH 508, Foundations of Epidemiology and Public Health (or equivalent).

CDE 597a, Genetic Concepts in Public Health Staff
The widespread availability of genetic data has resulted in the translation of genetics into a variety of public health settings. At the core of public health genetics is the rapidly growing science of genetic epidemiology, the study of the role of human genetic variation in determining disease risk in families and populations. This course focuses on the design, analysis, and interpretation of genetic epidemiologic studies.

Topics covered include Mendelian laws of inheritance; recombination and linkage disequilibrium; types of genetic variation; molecular technologies for detection of genetic variation; study designs and statistical analysis methods used in genetic epidemiologic studies; and the translation of genetic epidemiologic findings into genetic testing and screening programs. The course provides an understanding of the role of the public health sciences of epidemiology and statistics in the study of human genetics, and of the role of genetics in public health. Prerequisite: previous course work in biology or genetics (BIOL 101–104 series for Yale College students) or permission of the instructors.

CDE 600a, Independent Study or Directed Readings Staff
Independent study or directed readings on a specific research topic agreed upon by faculty and student. By arrangement with faculty. For M.S. and Ph.D. students only.

[CDE 610, Applied Area Readings for Qualifying Exams]
Required of CDE Ph.D. students, in preparation for qualifying exams. Readings arranged with specific faculty in related research area. By arrangement with faculty. 1 Course cr

[CDE 617, Developing a Research Proposal]
Each student develops a research grant proposal independently. This includes the development of a research question, specific aims, study hypotheses, reviewing and summarizing relevant scientific literature, choosing a study design, and developing a data collection and analysis strategy. Students submit drafts of sections of the grant proposal throughout the course and resubmit the revised proposal to the instructor for a final grade. Prerequisite: EPH 505, BIS 505 (can be taken concurrently), CDE 516 (can be taken concurrently), doctoral status, or permission of the instructor. Not open to auditors. 1 Course cr

[CDE 619, Advanced Epidemiology]
This is a third-level methods course in epidemiology. It expounds on topics that were introduced in intermediate epidemiology (Principles of Epidemiology II) and introduces new topics. In addition to dealing with methodological topics, it provides tools with which students should be able to tackle new problems in epidemiology. It requires a substantial amount of reading. Prerequisites: PUBH 508, Foundations of Epidemiology and Public Health—introduction to basic epidemiologic concepts; PUBH 505, Biostatistics in Public Health—introduction to basic biostatistics concepts; CDE 516, Principles of Epidemiology II—understanding of intermediate concepts to build from in advanced epidemiology; or doctoral status. 1 Course cr

CDE 634a, Advanced Applied Analytic Methods in Epidemiology and Public Health Staff
This course provides students with the theoretical and analytical tools necessary to address complex research questions in epidemiology and public health. The course focuses on advanced modeling techniques that are gaining in popularity in these fields. The analytic techniques covered include propensity score analysis, quantile regression, principal component analysis, factor analysis, cluster analysis, structural equation modeling, path analysis, case-cohort analysis, and nested-case control analysis. Students learn how to conduct these analyses using the SAS programming software. Students also learn how to interpret and present the results of these methods. *Recommended for students with previous course work in epidemiology and multivariable*

regression modeling. Prerequisites: CDE 516 and CDE 534; other equivalent classes require permission of the instructor.

CDE 650a, Introduction to Evidence-Based Medicine and Health Care Staff
Evidence-based medicine and health care use best current evidence in addressing clinical or public health questions. This course introduces principles of evidence-based practice in formulating clinical or public health questions, systematically searching for evidence, and applying it to the question. Types of questions include examining the comparative effectiveness of clinical and public health interventions, etiology, diagnostic testing, and prognosis. Particular consideration is given to the meta-analytic methodology of synthesizing evidence in a systematic review. Also addressed is the role of evidence in informing economic analysis of health care programs and clinical practice guidelines. Using a problem-based approach, students contribute actively to the classes and small-group sessions. Students complete a systematic review in their own field of interest using Cochrane Collaboration methodology. Prerequisite: CDE 516 or permission of the instructor.

CDE 670a, Advanced Field Methods in Public Health Staff
The course offers direct experience in field methods in chronic disease epidemiology for doctoral students and advanced M.P.H. students. Students are expected to actively participate as part of a research team (8–10 hours per week) doing field research in some aspect of chronic disease epidemiology. It is expected that their progress will be directly supervised by the principal investigator of the research project. This course can be taken for one or two terms and may be taken for credit. Prerequisite: arrangement with a faculty member must be made in advance of registration.

[CDE 1999, Transfer Course]
Transfer Course 0 Course cr